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Agricultural Protectionism in Industrialized Countries and Its Global Effects: A Survey of Issues

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I. Introduction

Agricultural policies in industrialized nations have evolved in response to changing conditions in the agricultural sector, in domestic economies as a whole and in the international environment. Major objectives are to: (a) insure equitable incomes for farmers, (b) maintain a certain degree of self-sufficiency in order to minimize the risk of embargos or other interruptions of imports, (c) maintain the «family-farm» structure, (d) protect the environment, (e) maintain a certain balance between rural and urban population, and (f) raise government revenues. Some of the policies, particularly those that are protectionist in nature, are developed in response to foreign competition, while others are implemented with primarily domestic goals in mind but which still have implications for foreign trade.

With sluggish growth and higher unemployment rates in the industrialized countries since the oil crisis of 1973, protectionist pressures in the manufacturing sectors have been increasing. A growing body of literature exists on this subject[1]. Less attention has been given to protectionist agricultural policies for several reasons. First, the agricultural sectors in industrialized countries are much smaller than the manufacturing sectors. Second, manufactured exports from developing to developed countries are, in terms of value, three times more important than non-fuel primary exports. Third, protectionist agricultural policies may be more inflexible than those in manufacturing. Fourth, although recently some protectionist actions have been implemented in manufacturing in response to macroeconomic imbalances, fewer measures have been taken with respect to agricultural trade.

[1] For a comprehensive survey, see, e.g., Martin Wolf, «Adjustment Policies and Problems in Developed Countries», World Bank Staff Working Paper No. 349, Washington, D.C., August 1979.

This paper analyzes the effects of agricultural policies in industrialized nations on their domestic economies, the world commodity markets, and developing countries. We present a selective review of major theoretical and empirical studies on the subject and point out areas where further research is needed. The paper is organized into six sections. First, selected domestic effects of agricultural policies in industrialized countries will be explained at both the theoretical level and for certain countries. Second, we examine the effects of these protectionist policies on the world market in terms of prices, welfare impacts, and instability. The third section traces the impacts of the policies on developing countries, emphasizing the disincentive effect on domestic agricultural production and the foreign exchange implications of these policies. The fourth section outlines the agricultural policies of certain developing countries, showing how these policies also frequently inhibit agricultural output. In the final two sections we point out the areas where further research is needed and draw conclusions based on the previous sections.

II. The Domestic Effects of Agricultural Policies in Industrialized Countries

A prime effect of agricultural policies in industrialized countries on the world economic system is their impact on the pattern and location of global agricultural output. While, in terms of global economic efficiency, it is in the world interest to design policies that will lead to the use of agricultural resources such that the costs of providing food and fiber are minimized, present patterns of agricultural production do not meet this standard. Agricultural policies in industrialized countries frequently provide for support of farm prices and restrict imports, thereby driving a wedge between domestic and world prices. These policies, which maintain output in inefficient industries (as judged by world prices), are instituted at considerable cost to national coffers and domestic consumers.

Because of our emphasis in this paper on the impacts of agricultural policies of industrialized countries on the rest of the world, we mainly consider the welfare and distributional aspects when reviewing policies in industrialized countries. First we provide a graphic analysis; then we focus our attention on individual countries or country groupings.

1. A Graphic Analysis

In Figure 1 we present the case of an importing country that may be called «typical» for many products in several industrialized countries. The supply

function is represented by SS'; the demand schedule is DD'. At the world market price P_w, substantial amounts have to be imported. Only at P_s is the country self-sufficient. Assume that the country has imposed a tariff of P_d-P_w or that it has imposed quotas or other measures that can be expressed as equivalent tariff P_d-P_w. Because of the tariff, production expands by Q_d-Q_w, while consumption is reduced by C_w-C_d. Imports as a result are reduced by $(Q_d$-$Q_w) + (C_w$-$C_d)$. The producers' welfare gain is $P_w AFP_d$. The welfare loss to consumers is $P_w DEP_d$, and government revenues are BCEF[2]. The net social loss in production is ABF, the net social loss in consumption is CED, while the total net social loss to the economy is the sum of the two. Finally, savings of foreign exchange amount to $P_w[(Q_d$-$Q_w) + (C_w$-$C_d)]$[3].

It is apparent that all the real and monetary effects depend heavily on the size of the tariff as well as on supply and demand elasticities. Hence, in an empirical evaluation of the effects of agricultural price policies, much attention has to be paid to these parameters.

In Figure 2, a situation is presented where a country is an exporter because of its pricing policy, whereas at the world market price P_w, it would be an importer. (Examples are sugar and milk in the EC.) Production expands by Q_d-Q_w and consumption decreases by C_w-C_d. Because of the tariff P_d-P_w, the self-sufficiency price P_s is exceeded. Hence, instead of importing C_w-Q_w, the country now exports Q_d-C_d. These exports are only possible with dumping, i.e., the government has to subsidize exports by BDEF. The producers' welfare gain is $P_w AEP_d$, and the consumers' welfare loss is $P_w CFP_d$. The net social loss in production is ADE, and the net social loss in consumption is BCF. The foreign exchange gain is $P_w[(C_w$-$Q_w) + (Q_d$-$C_d)]$.

2. The European Community

The cornerstone of the EC's common agricultural policy (CAP) is a system of administered prices where variable levies are used to cover the difference between the «threshold price» and the world price. By this mechanism, price competition by foreign suppliers is prevented. In some cases the threshold price is also maintained by government purchases in the domestic market. In these cases, as for wheat and certain milk products, export restitutions financed by EC

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[2] For a presentation of the concept of economic surplus and its applications see R. D. Willig, «Consumers Surplus Without Apology», American Economic Review 66 (1976): 589–97 and T. M. Currie, T. A. Martin and A. Schmitz, «The Concept of Economic Surplus and Its Use in Economic Analysis», Economic Journal 81 (1971): 741–99.

[3] For the mathematical equations of the adjustment effects, see Malcolm D. Bale and Ernst Lutz, «Price Distortions in Agriculture and Their Effects: An International Comparison», American Journal of Agricultural Economics, forthcoming (February 1981).

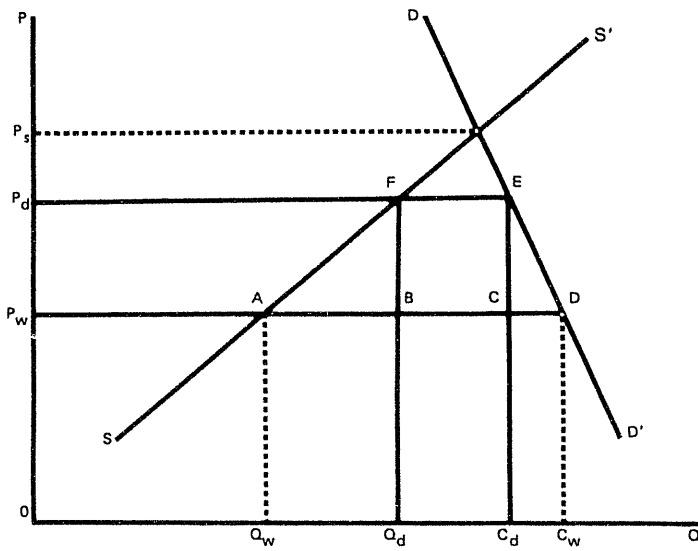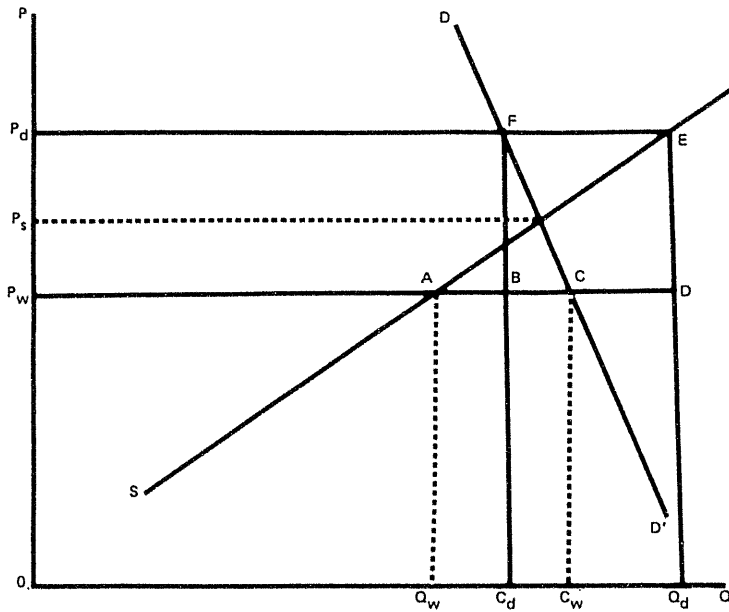*Figure 1:*   Price Protection in Importing Country

Figure 2:   Switch from Importing to Exporting Country Because of Price
Protection

funds are used to «dump» the products on world markets or divert them to inferior uses (such as animal-feed supplements). Some examples of the premium for domestic prices over world prices in West Germany in 1976 are: wheat, 49%; barley, 51%; sugar, 77%; and beef, 42% [4]. Equivalent figures for France are 26%, 39%, 35%, and 27% respectively[5]. These price premiums induce additional resources to flow into agriculture above those that would prevail at «market» rates. Consequently, agricultural production is enhanced, consumption is reduced, and imports decline. Further, there are income distribution and foreign exchange effects associated with such policies. These and other effects have been quantified by Bale and Lutz. The estimates of the annual total net social loss that results from market intervention in wheat, maize, barley, sugar and beef in France, Germany, and the United Kingdom amounted to $337.2, $516, and $52.2 million, respectively, in 1976.

While the issue of CAP has long been a political thorn in the side of exporters of products from temperate climates, it recently has become an explosive issue within the EC itself[6]. The monetary cost of supporting agriculture at its present level consumed three-quarters of the over-US$19 billion budget of the EC in 1979, and the European Parliament and the Council of Ministers have had severe difficulties agreeing on a budget for 1980[7]. Because of the open-ended nature of the agricultural guarantees that flow automatically from the annual price-setting exercise of the Council of Agricultural Ministers, the agricultural allocation is difficult to predict and impossible for the budget authorities to control. By 1981 or 1982 it is expected that a financial crisis will arise, since the Community's financial resources will be insufficient to cover the obligatory agricultural expenses. The Parliament is attempting to rectify this by setting a limitation on the agricultural budget within which Agricultural Ministers will have to work.

Further, there is the divisive problem of the unequal method by which the costs and benefits of the budget are distributed among member states. Some countries in effect view their contributions as transfer payments to the agricultural sector of other members whose production is often surplus to EC needs. The problem is concentrated in the dairy sector, which in 1979 received 45% of

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[4] Figures quoted in this section are from Malcolm D. Bale and Ernst Lutz (1981), op. cit.

[5] While the CAP sets uniform prices within the EC, a system of «green» exchange rates for agriculture means that when domestic prices are converted into US dollars using official exchange rates, the premium over world prices differs from country to country.

[6] For a recent treatment of this issue, see Stefan Tangermann, «EC Policies and Agricultural Trade with Developing Countries», Invited Paper, Conference of the International Association of Agricultural Economists, Banff, Canada, September 1979.

[7] All monetary values are expressed in US dollars converted at the prevailing official exchange rate.

the entire agricultural expenditure, ar⁻ to a lesser extent in the grains (wheat) sector. For these reasons, it appears that the EC will have to institute fundamental reforms in at least part of the CAP[8].

3. *Switzerland*

In a recent study, Rieder analyzed different variants of Swiss agricultural policies[9]. He estimated total net social costs of agricultural production in Switzerland at about 650 million Swiss francs (amounting to about 400 million US dollars at current exchange rates) annually. However, EC producers' prices were used as border prices. Hence, the use of world market prices would raise the cost estimate even further. In order to know the total net social costs one would have to estimate also the social losses on the consumption side because of the higher prices.

Since producers' and consumers' prices in Switzerland are significantly higher than border prices, it is clear that, due to the agricultural price policy, large transfers are taking place from consumers to producers. The welfare losses of consumers represent the lower limit of what consumers are willing to pay to achieve goals such as risk reduction of an interruption in imports, environmental preservation and regional population distribution. From the point of view of the Swiss economy as a whole, significant parts of the transfers cancel each other out. Thus, only the total net social costs represent the real costs in terms of GNP, which the Swiss People as a whole are willing to pay for the achievement of the objectives mentioned above.

It is clear that for agricultural policy formation, many factors have to be taken into consideration such as social, socio-economic, regional, environmental and political factors. However, sound, quantitative economic analyses should be an important input into the discussion and the decisionmaking. It may therefore be useful to undertake a more detailed commodity by commodity welfare analysis of Swiss agricultural policy.

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[8] For further details on the EC budgetary process, see C. Tugendhat, «Some Thoughts on the European Communities' Budget», Intereconomics, March/April 1980. For estimates of the impact of EC policies on Mediterranean trade, see R. Pasca, «Mediterranean Agricultural Trade Problems and the Effects of the EC Policies», European Review of Agricultural Economics 5 (1978): 221–49, and for a discussion of the impact of EC policies on temperate food exporters, see Stefan Tangermann, «Agricultural Trade Relations between the EC and Temperate Food Exporting Countries», European Review of Agricultural Economics 5 (1978): 201–19.

[9] Peter Rieder, «Volkswirtschaftliche Kosten unterschiedlicher Agrarmarktsysteme», Schweizerische Zeitschrift für Volkswirtschaft und Statistik, Heft 1/1979, pp. 45–64.

3. Japan

Although Japan has a modern and highly developed agricultural industry, it is the world's largest net importer of agricultural products. Because of its vulnerability to commodity price changes and its fear of trade interdictions, achieving certain levels of self-sufficiency has been a basic tenet of its agricultural policy. Japan's agricultural output is maintained at its high level by a series of product price supports, input subsidies, and controlled foreign trade such that the domestic prices of certain food items in Japan are double or in some cases treble those prevailing in world markets.

The Japanese government is pervasively involved in planning and regulating the agricultural sector. Beef production is protected by an annual import quota and a 25% ad valorem tariff; pork prices are stabilized by government purchases and sales of stocks and by a variable duty on imports; poultry, eggs, and dairy product imports have a 20–35% tariff imposed on them; and an agency of the Ministry of Agriculture, Forestry and Fisheries is the sole buyer and seller of domestic and imported food grains and sets farm purchase prices and resale prices that differ markedly from world levels.

Wheat and rice are interesting examples. Wheat consumption has increased dramatically in Japan since World War II, mainly as a result of the trend toward a bread-based Western diet; it has risen from 41 kg per capita in 1955/56 to 50 kg in 1975/76. The government purchases wheat from domestic producers at approximately twice the price that it pays for imported wheat. The resale price of domestic and imported wheat (to millers) has typically been 50% above the world price, resulting in revenue for the Japanese treasury. However, with high world grain prices in the mid-1970s, the government maintained the resale price of wheat at previous levels to curb inflation, and in so doing subsidized wheat consumption.

For rice, the traditional staple in Japan and the mainstay of Japanese agriculture, support prices paid by the government to farmers are equivalent to approximately twice the level of world prices. To maintain consumption, which has declined on a per capita basis over the last two decades, a subsidy is paid, but even so the domestic price is above the price at which imported rice could be sold. The effects of these market distortions produce a net social loss in rice production and consumption, as well as overproduction and underconsumption of rice. As a result of the administered prices, rice production in Japan exceeds consumption, forcing the government to dispose of surplus rice by stockpiling, diverting to livestock feed, or exporting it at subsidized rates to rice-importing countries. Approximately one-half of one million tons of rice have been dumped by Japan in each of the last two years. While this may seem to be a small quanti-

ty, it is significant for a product for which world demand is inelastic and total free-world trade amounts to less than 8 million tons. In addition, it has caused political friction between Japan and commercial rice-exporting countries.

Estimates of the net social loss to Japan in 1976 of its pricing policies on wheat, barley, sugar, beef and rice amount to $3.15 billion. Production, because it is overvalued, is well in excess of what it would be under world prices. Rice output, for example, would drop dramatically (by approximately 80%) if free trade were allowed. Likewise, world price levels would stimulate consumption (by approximately 6% for rice and 31% for beef)[10].

4. The United States and Canada

The United States and Canada are interesting contrasts to the foregoing countries because they are major agricultural exporters competing in world markets with their agricultural products, yet some parts of the farm sector receive a substantial degree of protection.

The agricultural legislation in both countries has provided price support for several commodities since the 1930s. More recent legislation has also provided income supports by providing «deficiency payments». In the United States, target prices are established, and farmers participating in a «set-aside» scheme designed to limit planted areas receive deficiency payments amounting to the difference, if any, between the target price and the average market price. Producers who do not want to limit their planted acreage may produce for sale on the open market. During times of high commodity prices, farmers often opt to leave the program, since at such times the market price exceeds the target price. Products under this scheme are wheat, rice, feedgrains, cotton and sugar. Other products have similar price support/production control features, where acreage provisions and price levels are often set on a historical «parity» basis.

Because of the importance of agricultural exports from the United States and Canada, mainly of foodgrains, feedgrains, and oilseeds, the commodity programs in these countries must be designed to place floor prices on agricultural goods, rather than support prices at levels in excess of world prices. In this respect the record is mixed. In some years the market price exceeds the target price for major export products, and no deficiency payments are made. In other years, deficiency payments have been quite high, and the government has accumulated grain stocks through its purchasing activities. In recent years,

[10] For further details on the cost of Japan's agricultural policies, see Malcolm D. Bale and Bruce L. Greenshields, «Japanese Agricultural Distortions and Their Welfare Value», American Journal of Agricultural Economics 60 (1978): 59–64, and Malcolm D. Bale, «Distributional Aspects of Price Distortions», American Journal of Agricultural Economics 61 (1979): 348–50.

deficiency payments have ranged from $800 million to $4 billion in the United States, while in Canada payments made under the Western Grain Stabilization Program have run between $100–200 million.

During the last decade, farm exports from the United States have expanded annually, mainly as a result of the growth in world demand for cereals and oilseeds. Because of excess capacity in the rural sector, farmers were quick to respond to increasing prices in the mid-1970s. Output of crops, especially cereals, increased dramatically. For example, the wheat area increased from 19.1 million hectares in crop year 1972 to over 28 million hectares in crop year 1975, while corresponding wheat production increased from 42 million metric tons to 57.8 million metric tons. In 1979 agricultural exports reached almost $35 billion, while agricultural imports, mainly of tropical products including rubber, amounted to less than half of that[11].

Despite the importance of agricultural exports to Canada and the United States, there are a number of agricultural commodities that are heavily protected from outside competition, some of which are also exported. The dairy industry of both countries is maintained by direct subsidies or price supports, along with quotas on imports of dairy products. Yet both countries still export some dairy products. The same is true of tobacco and beef, where tariffs and/or quotas and voluntary marketing agreements are used to control imports. In the United States, the Meat Import Law has a formula for counter-cyclical quotas, whereby imports and quotas vary inversely to domestic production. Tobacco is an important agricultural export in the United States and to a lesser extent in Canada, yet both countries support the industry through price supports and production controls, together with tariffs on raw tobacco and escalating tariffs on further processed tobacco products[12].

5. Exchange Rates and Agricultural Policy

The official devaluation of the US dollar against gold in 1972 signaled the beginning of the end of a system of fixed exchange rates that had been established by the Bretton Woods Agreement in 1944. Since then, some currencies, especially the «key currencies» – the US dollar and pound sterling, have been allowed to float with varying degrees of «dirtiness», while other countries either float independently or are fixed on a specific foreign currency or basket of currencies. The actual currency regime under which a country operates has implications for agricultural trade. Schuh has argued that the overvalued US

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[11] See Stephen R. Milmoe, «US Farm Exports», Foreign Agriculture, April 1980.

[12] For further details on US agricultural programs, see Willard W. Cochrane and Mary E. Ryan, American Farm Policy 1948–73, University of Minnesota Press, 1977.

dollar prior to 1972, for example, resulted in US agricultural products being undervalued and that the subsequent devaluations and floating resulted in important structural changes in US agriculture[13]. He stated that the government purchase and stockpiling policies of the 1950s and land-retirement schemes of the 1960s may be interpreted as attempts to offset the overvalued dollar (i.e., the undervalued agricultural sector). Such measures have not been required to the same degree since 1972.

Japan and Germany are two countries whose currencies were reportedly undervalued during the mid- and late 1970s. The results on agriculture of an undervalued currency are to stimulate domestic production over that which would prevail at market rates and to curtail imports. Thus maintaining an under-valued currency contributes to an artificially expanded agricultural sector.

Four prominent scholars in agricultural trade and development have written about the highly distorted world agricultural economy and the implications for globally efficient use of resources. Johnson suggested that agriculture was in disarray[14]. Hayami and Ruttan refered to a massive disequilibrium in world agriculture. Nobel Laureate Schultz claimed that global agricultural output depended more on government action than on technical considerations; and that governments' alteration of market incentives was leading to sub-optimum resource allocation and economic growth[15]. There are, of course, further impli-cations of these policies. They skew global distribution of income both within and across countries. In developing countries, where a major share of the popula-tion is dependent on agriculture, per capita rural income usually is substantially lower than that of the nonfarm sector. Income and output are held back in many developing countries that export primary products because of overvaluation and consequent overproduction in many industrial countries. These conditions give rise to food security issues. The level and the geographical distribution of food supplies, availability of stocks, and trade policies, all affect food security. Be-cause of their protected agriculture, their strong emphasis on the domestic market first, their import substitution policies for tropical products such as sugar, the alleged effect on developing country production of food surplus disposal programs («aid»), and the system of escalating tariffs as raw products are processed[16], industrialized countries have acquired a reputation for supporting

[13] G. E. Schuh, «The Exchange Rate and US Agriculture», American Journal of Agricultural Economics 56 (1974): 1–13.

[14] D. Gale Johnson, World Agriculture in Disarray, London, Fontana/Collins, 1973.

[15] Yujiro Hayami and Vernon Ruttan, Agricultural Development: An International Perspective, Baltimore: Johns Hopkins University Press, 1970, and T. W. Schultz, Distortions of Agricultural Incentives, Bloomington: Indiana University Press, 1978.

[16] For example, coffee beans enter the US duty free, while processed coffee enters at a 60 percent tariff.

an agricultural system that negatively affects developing countries[17]. However, developing countries also contribute to their export problems by their exchange rate and export tax policies. In most developing countries, official exchange rates and calculated market equilibrium exchange rates (i.e., shadow exchange rates) differ markedly. Generally, the administered official rates are greater than the shadow rates, implying an overvalued currency, which is equivalent to a tax on exports. If, in addition, an export tax (either direct or indirect) is imposed, exports are additionally restricted. The impact of just one of these instruments is sufficient to reduce the incentive to export, and the imposition of both may remove all profit from the export market.

6. Consumer Actions

Development-oriented groups in industrialized countries have often suggested that consumers should buy less meat and more grain products and that the nutrition of the poor in developing countries would thereby be improved. This view is based on the fact that when grains are transformed into meat, much energy is lost, i.e., about 10 grain calories are needed to produce one beef calorie. Less consumption of beef would reduce beef prices which in turn would reduce beef production. Therefore, less grain (as an input into beef production) would be used; grain prices would fall and the world's poor people could afford to buy more grain.

An economic analysis of this proposal points out that what may help the world's poor in the short run may work against them in the long run. Svedberg has pointed out that it is a misconception to think of fixed world food resources independent of supply and demand conditions[18]. In the short run the supply of grains is completely inelastic, but from a long-run point of view supply is elastic. It is clear that the price impact of a reduction in meat consumption in the rich countries on grain prices depends heavily on the elasticity of world supply. It is evident that the larger the elasticity of supply, the smaller would be the short-run gain for developing countries from a given reduction of demand for grains in rich countries. Svedberg stated that a reduction of food consumption in rich countries can only in the very short term, and under rather special circumstances, be warranted as a means of relieving food insufficiency in poor countries. He concluded:

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[17] This argument can be carried too far and is countered by the fact that industrialized countries provide the major markets for tropical products such as coffee, cocoa, rubber, citrus and tea.

[18] Peter Svedberg, «World Food Sufficiency and Meat Consumption», American Journal of Agricultural Economics 60 (1978): 661–666.

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«Altered food habits in the rich countries seem to be an inefficient, if not impossible, means of solving the long-run food problem in the Third World. This is because (a) the decrease in food prices on the world market tends to be small because production is also going to fall, (b) the effect is not aimed directly at those starving, i.e., the lower prices will not benefit only the starving but also the rich in all countries, and (c) there is no guarantee that the governments in the starvation-stricken countries would use the additional incomes to improve the lot of the people suffering from extreme hunger»[19].

III. The Effects of Protectionist Policies on the World Market

In this section, we discuss the combined effects of the agricultural policies of the major industrialized countries or country groups on world commodity markets. An important question is by how much imports of developed countries are decreased because of trade distortions. If that is known, and given an elasticity of supply for exports in the rest of the world, the resulting reduction of the «world market price» can be determined.

1. A Graphic Analysis

A graphic analysis is presented in Figure 3 where the world has been divided into two regions: an exporting and an importing region. S_1S_1', D_2D_2', S_2S_2' and D_2D_2' represent the supply and demand functions of the importing and exporting regions, respectively. These two groups match the classification of developed and developing countries only for some products, while for others both develo-ped and developing nations may be net exporters or net importers. At the world market price P_W, net imports of developed countries amount to AB. Because of protectionist policies, they are reduced to DC. As a result, the «world market price»[20], which is equal to the price of the exporting region in this graphic analysis, drops to PE, since the market clearing equation allows only for exports of EF (equal to DC).

2. Trade and Price Effects

At an empirical level, it is difficult to make intuitive statements about the magnitude of the combined effects of agricultural policies in industrialized countries. From the theory of second best, we know that price distortions may be

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[19] Peter Svedberg, op. cit., p. 665.
[20] I.e., the price at which a small (marginal) country can export or import any amount it wishes to buy or sell.

Figure 3: Price Distortions in a Two-Region World Model

Exporting Region

Importing Region

Agricultural Protectionism

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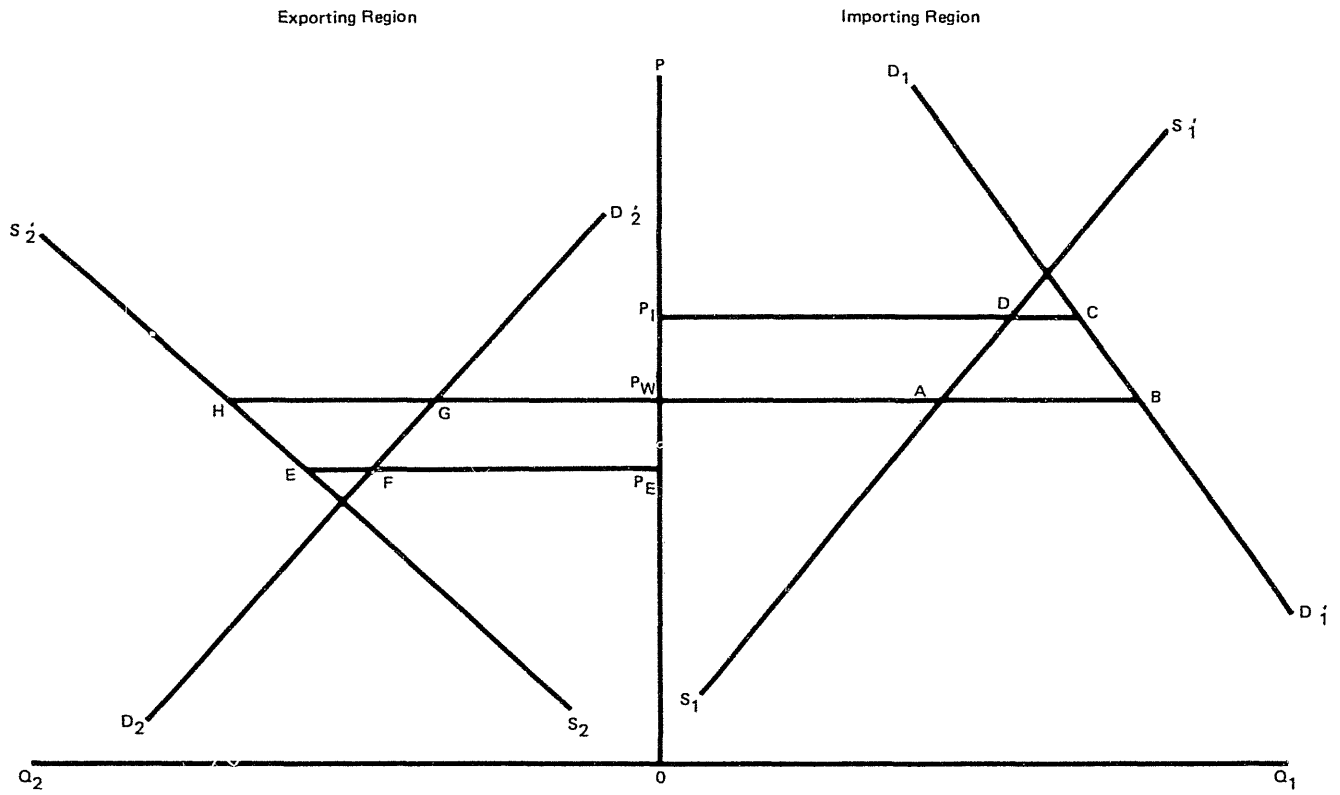
offsetting. The trade and welfare effects of a trade restriction in one country may be offset by an export subsidy in another country such that the first order conditions for welfare maximization, i.e., that the marginal rate of transformation between any pair of commodities in domestic production equals the foreign marginal rate of transformation and the marginal rate of substitution in consumption, still holds. Numerous examples of at least partially offsetting price distortions can be found in agricultural trade. For example, the restrictive entry policies in the EC on wine, fruits and vegetables from the Mahgreb countries may be offset by irrigation subsidies in these countries. Yet in many other cases there is little doubt that distortions are altering both trade patterns and the location of production. There are two types of foregone opportunities that may arise as a result of agricultural policies in industrialized countries. First, protection of domestic agriculture in industrialized countries reduces the export opportunities of developing country exporters of those products. Sugar, fruit and vegetables, rice and beef are outstanding examples. Second, dumping of the unwanted agricultural surpluses of industrialized countries in developing countries, unless carefully managed, inhibits their agricultural development and restricts commercial exports from third-party countries. Commodities that fall into this category are, in the EC – wheat and barley and certain milk products; in Japan – rice, intermittently in the United States in recent years – wheat, corn and tobacco; and in Canada – tobacco[21].

It is clear that the «self sufficiency» policies of many industrialized countries are not cancelled out by other distortions and that trade from developing countries is prohibited. Sugar and tobacco – tropical products that have been adapted for production in temperate climates – are good examples. Trade in fruits and vegetables (which often supply off-season demand in the Northern Hemisphere), vegetable oils, and beef is also reduced to the detriment of developing countries by various tariff, quota, or sanitary devices. Wheat and rice are more ambiguous. Certainly production of wheat in parts of Europe, wheat and rice in Japan, and rice (over much of the 1970s) in the United States would be reduced under free trade; Argentina, Brazil, Thailand, China and South Africa would be the likely beneficiaries. But some developing countries would no longer have ready access to subsidized cereal exports and to aid shipments.

Yet, even general statements such as those above must be made with care. When considering agricultural trade liberalization, it is almost impossible, without the aid of sophisticated models, to conceptualize the general equilib-

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[21] There is a great body of literature and continuing debate over the production and welfare effects of food aid. See, for example, Paul J. Isenman and H. W. Singer, «Food Aid: Disincentive Effects and Their Policy Implications», Economic Development and Cultural Change 25 (1977): 205–37, and references cited therein.

rium impacts across commodities and across countries that might result from free trade. Small changes in relative prices can cause dramatic changes in production patterns both within a country and between countries. A recent example of this is the dramatic expansion of cassava production at the expense of rice, sugar cane, and hard fibers in Thailand as a response to market opportunities in the EC.

Similar general equilibrium considerations also apply when considering the price effects. While trade liberalization will cause international prices of liberalized commodities to rise, reduced government payments for domestic agricultural support and the elimination of associated transactions costs in industrialized countries will still leave the domestic economy better off in net welfare terms[22]. Likewise, free trade will allow the global economy to move to a higher welfare level.

3. The Impact on World Market Price Instability

As shown in the previous section, agricultural protectionism in industrialized countries results in a lower level of imports and hence in a reduction of the «world market price» of some commodities. The effects are independent of whether the distortions are caused by tariffs, quotas or other measures. On the other hand, the impact of agricultural policies on the instability in world commodity markets depends heavily on the types of restrictions that are used. For purposes of conceptualization, we first present a graphic analysis.

Figure 4 shows an importing and an exporting region with demand functions D_1D_1' and D_2D_2' and with supply functions S_1S_1' and S_2S_2', respectively. Under free trade conditions, the equilibrium price would be P_W, and exports would amount to BE (equal to GH). Because of protectionist measures, the internal price in the importing region is P_I, while the price in the exporting region is P_E. Given these distortions, exports amount only to CD (equal to KI).

As a result of a stochastic influence in period 2, the supply function in the importing country is shifted to $\bar{S}_1 \bar{S}_1$'. Since the price in the importing country is fixed, imports increase by LK, so that total imports equal LI. As a result of the increase in exports to AF, the price in the exporting country jumps to P_E'. Hence, all the instability created by the supply sector in the importing region is exported, and the burden of adjustment is put on the exporting region.

Several studies have been done on trade distortions and price instability where a mathematical framework was used to derive results. Johnson[23] provided

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[22] Of course, income redistributions will occur and programs may need to be designed to distribute the benefits of liberalization more equitably than would occur under a free market.

[23] Harry Johnson, «The De-Stabilizing Effect of International Commodity Agreements on the Prices of Primary Products», The Economic Journal, September 1950: 627–629.

Figure 4: Transmission of Supply Instability due to Price Fixing
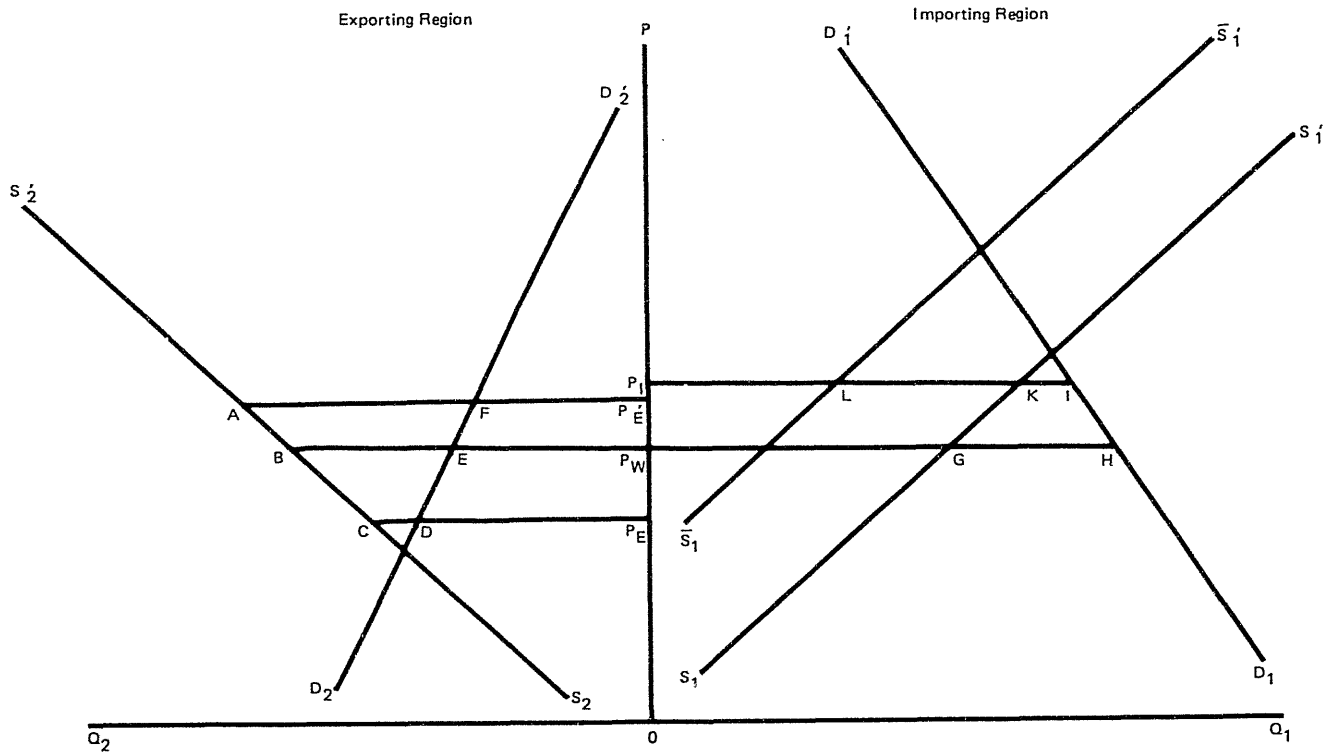
an early and respectable analysis of the destabilizing effects of international commodity agreements which stabilize the price of part of a traded commodity, while destabilizing the freely traded quantities. More recently, Bale and Lutz[24] used a two-region world model with one commodity, linear supply and demand functions and additive random disturbances. The variance in the world market price was taken as the standard against which variances resulting from different forms of price intervention either by the exporting or the importing country were compared. It was calculated that a specific tariff, i.e., a tariff that is fixed in absolute terms, imposed by the importing region lowers the foreign price and raises the domestic price but has no effect on price variability in either of the two regions. Hence, the risk pooling effect of international trade is preserved even under a fixed tariff. On the other hand, an ad valorem tariff, i.e., a tariff that is proportional to the export price, imposed by the importing region increases the domestic price variance, while the price fluctuations in the exporting region are reduced. A fixed quota effectively separates the two regions so that no instability is transmitted or none of the instability risks is pooled. The price variances in the two regions are the same as if no trade took place at all. Another type of market intervention is the proportional quota, by which import rights are assigned to producers or consumers in proportion to their production or consumption of a particular good. Bale and Lutz have analyzed the case where domestic producers in the importing region are guaranteed a constant market share, i.e., the import quota is a constant share of total domestic consumption. It was shown that such a quota results in general in the transmission of instability from the exporting to the importing region. Also, in general, the resulting price variance in the importing region would exceed that of both the free-trade and the no-trade cases. The quantitative results depend on the slopes of the supply and demand functions as well as on the size of the supply and demand disturbances. Another prevalent type of distortion is price fixing. It was shown that by this measure, all domestically created instability is exported. In order for this measure to be effective, additional price intervention measures such as variable levies, variable tariff or variable quotas are necessary.

The analysis by Bale and Lutz was recently extended by Lloyd[25]. He used a highly mathematical general equilibrium analysis to derive his conclusions, which modify or qualify some of the earlier results. He stressed that free international trade is a way of sharing the risks of instability. He noted that under the joint assumptions of linear functions and multiplicative disturbances (as com-

[24] Malcolm D. Bale and Ernst Lutz, «The Effects of Trade Intervention on International Price Instability», American Journal of Agricultural Economics 61 (1979): 512–16.

[25] Peter J. Lloyd, «The Effects of Trade Interventions on International Price Instability and National Welfare», unpublished manuscript, March 1980.

pared to Bale and Lutz, where additive disturbances were used), one can show that the variances of the distribution of prices in the importing and the exporting region are no longer equal after the imposition of a specific tax, but both are greater than the variances in the free trade situation. Lloyd extensively analyzed the case of price fixing in one country or a group of countries. He noted that it is difficult to draw *a priori* conclusions about how price instability is affected in different countries. He showed that the price distributions depended, in addition to the type of trade distortion, on the shape of the excess demand functions[26], as well as on the countries' attitudes toward risk. His last result, which is intuitively clear, showed that the effect of a country's price interventions on the distribution of prices increases with its total consumption and production of the commodity and its own elasticities of supply and demand.

The theoretical analyses provide some general, mostly qualitative answers and guidance for empiricial analyses. Some of the empirical questions are: (1) what is the functional form of the supply and demand functions and what are the relevant elasticities; (2) are the stochastic disturbances multiplicative or additive; (3) what are the estimated values of the relevant variables such as slopes of the functions and disturbances; (4) what types of trade intervention measures or combinations thereof are being used; (5) what is the existing degree of price instability in the world market; and (6) if the industrialized countries only used fixed tariffs or if they abolished price fixing or if they switched to other types of trade intervention, how would the world market price variance change?

Table 1 gives some insights into the magnitude and type of the price fluctuations of some major traded food and non-food agricultural commodities between 1955 and 1978. From Table 2 it is apparent that there has been a sharp increase in the volatility of commodity prices over time. The average year-to-year fluctuations in the prices of all 33 commodities covered by the index rose from 4.7% in the period 1951–60 and 4.8% in the period 1961–70 to 12.4% during the period 1971–80. How much of this increase is the result of agricultural policies in the industrialized countries is, however, unknown.

4. The Welfare Effects

The increased instability of world market prices caused by the policies of industrialized countries affects the welfare of all trading countries. The literature in general has focused on the question of who gains and who loses from price stabilization. In the context of this paper the question is who gains and who loses from a reduction in instability, assuming that developed countries start pursuing policies that would result in more instability being absorbed internally.

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[26] Whether they are convex, concave or linear.

Table 1: Indices of Fluctuations in Commodity Prices, 1955–1978 [27]

| | Moving Averages a) | | Annual Average |
	3-year (percent)	5-year (percent)	Change b) (percent)
Coffee	6.7	9.6	18.1
Cocoa	11.0	16.7	26.5
Tea	4.7	4.1	9.7
Sugar	17.0	29.6	37.4
Beef	5.3	9.9	12.3
Bananas	3.4	6.0	7.3
Oranges	6.0	8.7	15.1
Lemons	11.6	13.9	18.7
Rice	7.0	14.8	16.8
Wheat	4.4	7.2	10.0
Maize	4.8	6.7	9.9
Grain Sorghum	4.7	5.5	9.2
Palm Oil	7.6	11.0	14.0
Coconut Oil	10.6	16.6	19.4
Groundnut Oil	6.6	10.5	12.6
Soybean Oil	8.4	13.1	18.3
Soybeans	5.8	8.4	11.0
Copra	10.8	18.6	21.9
Groundnuts	5.4	9.1	10.3
Palm Kernels	10.2	16.0	18.9
Soybean Meal	7.9	10.7	14.2

[27] For the calculation of the indices of fluctuation in commodity prices, annual prices data in 1977 constant dollars for 1955-1978 were used. Formulas used are as follows:

a) The average percentage deviation from the moving average.

$$(\frac{P_t - P_t{'}}{P_t}) \times \frac{1}{n} \times 100$$

where P_t = the price in year t.

$P_t{'}$ = the moving average centered on year t.

n = the number of observations of the relevant moving average.

b) Average of annual percentage change, ignoring negative signs.

Source: World Bank, Economic Analysis and Projections Department, Commodities and Export Projections Division.

Table 2:   Indices of Fluctuation in Real Commodity Prices[28] by Main
             Commodity Groups

	34 Primary Commodities	Total Agriculture	Total Food	Non-Food Agriculture	Metals and Minerals
1951–60	4.7	6.3	8.8	11.0	5.9
1961–70	4.8	5.1	5.3	6.4	8.4
1971–80	12.4	13.6	15.8	10.9	11.3

Source: World Bank, Economic Analysis and Projections Department, Commodities and Export
Projections Divisions.

In recent years, questions about international price stabilization have
received considerable attention in the literature. Hueth and Schmitz[29] have
extended the Massell model from a closed economy to a two-region model.
Their main conclusion was that the welfare gains from international price
stabilization depend significantly on the origin of the stochastic disturbances.
They derived the gain functions for consumers and producers in the importing
and the exporting region and pointed out that the gainers from stabilization
could compensate the losers so that everyone could be made better off. In an
extension of this work, Bieri and Schmitz[30] analyzed the welfare effects from
price stabilization in the presence of tariffs and export monopolies. They showed
that welfare effects depend, in addition to the source of the disturbances, also on
the presence of trade distortions. One of the limitations of the two studies is
their assumption about the linearity of the supply and demand functions. It is
plausible that the demand function for basic food commodities like grain is
convex, i.e., that demand is very inelastic at high prices, while at low prices
consumption, particularly in feed usage, expands. It was hypothesized that under
such conditions, consumers and importing countries have a larger interest in
price stabilization than producers and exporting countries. Just, Lutz, Schmitz
and Turnovsky have analyzed this hypothesis for both the free trade case[31] as

   [28] Computed from annual price data in 1974–76 average constant dollars.
   [29] Darrell Hueth and Andrew Schmitz, «International Trade in Intermediate and Final Goods:
Some Welfare Implications of Destabilized Prices», Quarterly Journal of Economics 86 (1972):
351–365.
   [30] Jurg Bieri and Andrew Schmitz, «Export Instability, Monopoly Power, and Welfare», Journal
of International Economics 3 (1972): 389–396.
   [31] Richard Just, Ernst Lutz, Andrew Schmitz and Stephen Turnovsky, «The Distribution of
Welfare Gains from Price Stabilization: An International Perspective», Journal of International
Economics 8 (1978): 551–563.
   [32] Richard Just, Ernst Lutz, Andrew Schmitz and Stephen Turnovsky, «The Distribution of
Welfare Gains from International Price Stabilization under Distortions», American Journal of
Agricultural Economics 59 (1977): 652–661.

well as for price fixing in the importing countries[32]. They used general, non-linear functions (that include linearity as a special case) and multiplicative disturbances to derive the gain functions for consumers and producers in the exporting and the importing country. They concluded that the welfare effects depend on the shape and the position of the demand and supply funtions, the types of disturbances (whether they are additive or multiplicative), the sector and regional origin of the disturbances, and the presence of distortions. Further, the supply response to risk is one of the important factors that should be taken into consideration[33]. While it is possible to give clear indications as to who gains and who loses for special cases or when one of the factors is considered alone, it becomes increasingly difficult to do so when more factors are considered simultaneously. Hence, from a theoretical point of view, no clearcut answers can be given as to who would gain and by how much from the price stabilization of a particular commodity market.

The major welfare effects that agricultural protectionism in the industrialized nations have on developing countries are not so much caused by a change in the degree of price instability but by a change in the price level. All developing countries that are net exporters of commodities whose prices are negatively affected by protectionist policies incur welfare losses. This is apparent from Figure 3. Consumers' welfare gains in the exporting region are FP_EP_WG. Producers' welfare losses amount to EP_EP_WH. Hence, the exporting region incurs a net social loss of EFGH.

IV. Effects on Developing Countries

1. Foreign Exchange Effects

Agricultural policies in the industrialized countries influence world market prices, which in turn affect developing countries. The foreign exchange effects depend largely on whether a country is an importer or exporter of the commodity in question. On imported commodities the country saves foreign exchange, given lower world market prices and assuming no or only a limited expansion of import quantities. This applies particularly to countries that import grains at commercial rates. On the other hand, export earnings of developing countries are reduced because of the lower quantities imported by the industrialized nations and the lower prices resulting from it. This is particularly apparent for a commodity such as sugar.

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[33] Ernst Lutz, «The Welfare Gains from Price Stabilization under Risk Response», Schweizerische Zeitschrift für Volkswirtschaft and Statistik, Heft 2/1978.

It would be interesting and important to know how much foreign exchange the developing countries lose or save on the different traded commodities. On a net basis for all food and non-food agricultural commodities, we would expect them to lose. However, we are not aware of an empirical study that has tried to answer this question.

2. Internal Effects

Internal markets in developing countries are often insulated from the world market by different types of trade barriers such as tariffs, quotas, subsidies, forced procurement and overvalued exchange rates. The real question, then, is to what extent lower world prices on the world market are reflected in the developing countries. Little analytical work has been done on this question. So for now we assume that the change in world market prices caused by agricultural protectionism in developed countries is reflected fully in the internal markets.

A reduction in prices represents an additional disincentive for agricultural production. Already, the agricultural sectors of developing countries are being taxed mostly by tariffs on export crops, but also by price distortions for imported commodities.

In addition to the direct effects that agricultural policies in the industrialized nations have on developing countries through the world market prices, there is one other measure that is of some relevance. Because of protected prices, several industrial countries produce surpluses of agricultural products. One way to dispose of them is through food aid. Much of this aid may be desperately needed for drought relief and other emergencies, but in other cases it may depress internal prices and thereby discourage domestic production. This needs to be balanced by the beneficial effects on consumers in developing countries who gain from lower prices and particularly from food aid that is targeted to a specific group. Then, nutrition levels are improved, at least in the short run.

V. Agricultural Policies in Developing Countries

While this paper addresses agricultural policies in industrialized countries and analyzes their effects internally, on world commodity markets as well as on developing countries, it is important to note the agricultural policies in developing countries themselves.

Peterson analyzed agricultural policies in developing countries using real prices in terms of kilograms of fertilizer that could be purchased with 100 kilo-

grams of wheat equivalents[34]. He concluded that real prices received by farmers in developing countries have been substantially lower than prices received by farmers in developed nations. His evidence also shows that the aggregate supply elasticity for agriculture is greater than one and that unfavorable farm prices have significantly reduced agricultural output and economic growth in many developing countries.

More recently, Lutz and Scandizzo analyzed government policies in agricultural commodity markets for a sample of developing countries[35]. They quantified the effects of the pricing policy on prices, supply, demand, producers' and consumers' welfare and on foreign exchange. The empirical results showed that the agricultural sector in developing countries is often heavily taxed[36]. As a consequence, agricultural production is discouraged and consumption is subsidized. The countries gain government revenues by taxing exports, but the policies result in net social losses and in a reduction of foreign exchange earnings.

VI. Areas for Further Research

This paper has provided a broad and selective overview of the many different effects of agricultural policies in industrialized nations. Some questions and issues were answered but many more were raised. In this section we note areas in which research is needed for a more complete understanding. This is not an exhaustive inventory of research needs, but merely a statement of some points that we think are of importance.

A fundamental «structural» problem of agriculture in industrialized countries is their inability to deal with surpluses generated by support prices that exceed world prices. Dairy products in the US and EC, and wheat in the EC are outstanding examples. Clearly, when such a situation arises, it is indicative of an incorrect policy and the inability of policymakers to design a program that would allow orderly adjustment of a sector rather than one that freezes production patterns to those prevailing at one point in time. The research questions that arise are: what practical steps can be taken to allow at least a breeze of foreign competition to blow across certain sectors of agriculture, and what assistance measures can governments provide to facilitate structural adjustment in agriculture?

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[34] Willis L. Peterson, «International Farm Prices and the Social Cost of Cheap Food Policies», American Journal of Agricultural Economics 61 (1979): 12–21.

[35] Ernst Lutz and Pasquale L. Scandizzo, «Price Distortions in Developing Countries: A Bias Against Agriculture», European Review of Agricultural Economics 7/1, 1980.

[36] See also Ernst Lutz, «Entwicklungshemmende Agrarpreispolitik in der Dritten Welt», Neue Zürcher Zeitung, No. 259, Dienstag, 7. November 1978.

Further questions are: what are the quantitative impacts of agricultural protection in industrialized countries on the world market; by how much would prices rise or fall, and by how much would price instability be increased or decreased; what are the global welfare effects of this; which countries would benefit from agricultural trade liberalization and by how much; would the benefits be evenly distributed, or would merely a few developing countries (and a few developed ones) be the major beneficiaries?

In relation to the Common Agricultural Policy of the EC, one may want to look at the question of trade diversion, i.e., which countries (e.g., associated member countries, Lomé-countries) have gained from the protectionist measures of CAP. Specifically, it would be interesting to know which countries have been able to derive rents for exporting certain commodities to the EC. A working hypothesis would be that for an increasing degree of monopolization of a commodity market the rents would be increasing and the average size of the variable levies would be decreasing.

On the side of developing countries, the questions are: what are the supply responses of developing countries, how do their internal pricing mechanisms reflect world prices, and what supply constraints and institutional bottlenecks would arise if a major agricultural expansion were feasible from the demand side point of view?

VII. Concluding Comments

As one examines the global agricultural complex, one is impressed by the number and extent of resource misallocation occurring and persisting in agriculture. Agricultural protectionism in industrialized countries is one of the major causes of misallocated resource use. Some of the reasons given for agricultural protectionism are: to provide domestic security against trade embargos or other interruptions of food imports, to maintain a certain rural population, to decrease domestic price instability and to preserve an aesthetic rural environment. But often, these benefits are achieved at considerable economic cost – both national and global, and it would appear that policymakers frequently subordinate cost considerations.

It is obviously too simplistic to argue for completely free trade in agriculture based on comparative advantage, given existing constraints, but policies should be considered that offer flexibility and the possibility of adjustment in agriculture that would allow a more optimal global production pattern and resource allocation.

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