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WORLD AGRICULTURE, COMMODITY POLICY AND PRICE VARIABILITY

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The primary emphasis in this paper will be upon governmental agricultural commodity policies and their effects upon price variability. It is the commodity policies of the governments of the world that provide the links between what occurs in one part of the world and in the rest of the world's food and agricultural systems.

When one discusses price variability or its opposite, price stability, in today's world one must be quite specific in indicating the context which one is discussing. The market for most farm products is so fragmented as a result of governmental regulations and interferences with trade across national boundaries that there often is little relationship between the behavior of a particular price series, such as prices received by farmers for grain, in different countries. Not only are there substantial differences in prices for approximately the same product at a moment of time, but there are major changes in the differences over time. The differential changes reflect primarily the effects of governmental policies, though to some small degree variations in the costs of transportation can affect the difference in prices between two points in space.

There is an obvious point, which I must admit eluded me in several abortive efforts to prepare this paper, that I feel is worth making: If governments are interested in price stability for

agricultural commodities, their primary interest is in stability of prices within their own countries. This is not to say that governments have no interest in the stability of prices at which farm products are traded among nations, but past behavior of most governments and even a cursory examination of policies and programs designed to stabilize prices indicate that there is far less concern with the stability of prices outside than inside national boundaries. This is hardly a surprising conclusion.

In fact, the concern of most governments with internal price stability, with little or no regard for external effects, is comparable to the primary concern of governments with internal resource adjustments in agriculture. The agricultural and trade policies that were followed in recent years by most industrial nations to minimize their own need to adjust forced other nations to undergo relatively larger adjustments than would have been needed if all nations had participated on a more equal basis in the required resource adjustments.

There has been little recognition of the extent to which one nation or region achieves price stability at the expense of instability to others. This has not been an important issue in international negotiations or in trade negotiations. Where price stability has been considered an issue, it is in terms of arrangements that would limit fluctuations in international prices through commodity agreements or buffer stocks. The effects of national policies on price instability elsewhere have received almost no attention in such discussions.

The causes of international price instability have generally

been attributed to supply fluctuations due largely to output variations resulting from natural phenomena, the breakdown of buffer stock arrangements or fluctuations in demand over the course of business cycles. Instability has also been attributed to cobweb-like phenomena for tree crops or sugar where the time lag between investment and production can be such as to lead to alternating periods of high and low levels of production. These causes are real; there can be no doubt about them. But what can be doubted is whether these causes are the primary ones, at least for the very wide variations in international prices of most farm products such as we have seen in the past three years or perhaps even during the Great Depression.

National Price Stabilization

Market price stabilization requires that either the demand or supply functions be very elastic. Practically, for a given geographic area relatively little can be done to make consumption demand functions highly elastic. Thus programs designed to achieve market price stability must work through modifications of the supply function. The supply function for a given geographic area can be made very elastic in one of two main ways - by managing exports and/or imports and by storage.[1] Obviously the two techniques can be combined, as they have been in the United States and Canada for most of the past three decades.

The different methods of achieving a very elastic supply curve for a given geographic area have very different effects upon prices in international markets. The control of imports and/or exports to stabilize internal prices increases the variability of prices elsewhere

in the world. If internal prices are fully stabilized by controlling the flow of trade, this means that the price elasticity of demand for imports or the price elasticity of supply for exports, whichever is relevant, is zero. None of the variations in world supply and demand is absorbed by a country or region following such a system. All of the price effects of variations in supply or demand thus must be absorbed by others.

The effects of such policies of national price stabilization through the control of trade can perhaps be visualized best through a hypothetical example. Assume that half of the world's consumption of grain occurs within economies that stabilize internal prices through the control of trade. There is an autonomous shock that reduces the world's output of grain by 4 percent, and the only stocks that exist are working stocks. Assume further that the short-run price elasticity of demand for grain for the world is -0.1. The effects of the national price stabilization schemes are to require prices in the part of the world that normally consumes half of the world's grain to reduce their use by 8 percent. If the price elasticity of demand were -0.1 in this part of the world, the increase in price from a world production shortfall of 4 percent, assuming stable demand, would be 80 percent (approximately). If there were no national price stabilization schemes through the control of trade, the increase in price for the world would be 40 percent (approximately). Thus half the world following such schemes doubles the price swings for the rest of the world unless there are stocks to absorb the shortfall in production.

Price Stabilization Through Storage

If prices were stabilized through accumulation and decumulation of stocks, demand and production variability would be absorbed through changes in stocks. At some cost, prices could be stabilized within a specified price range - not with certainty unless the cost approached infinity, but with a very high probability of success.

In fact, during the 1960s for wheat and the feed grains the world came close to having a storage system that stabilized the international prices of these grains to a remarkable degree. It was a policy operated primarily by the United States and Canada with a late assist from Australia. The primary objective of the storage policies was not price stability; the storage function was largely an inadvertent outgrowth of efforts to increase prices and returns for the grains. In fact, the storage role was not only inadvertent but was also largely unwanted.

One of the major factors in the substantial modification of the U. S. farm programs during the early 1960s was the political concern over the high costs of storing the grain (and cotton) that could not be disposed of at the price support levels then prevailing. Similarly the revisions in our farm programs that came in the late 1960s and early 1970s were motivated by the same considerations - the fear that stocks would increase to levels that could not be politically sustained. This was the view not only in the United States, but also in Australia and Canada. The three governments took steps to drastically reduce the production of wheat and, in fact, accomplished this

end. In the process, stocks of wheat in the major grain exporters were substantially reduced from mid-1970 to mid-1972 - by almost 20 million tons or by a third (Johnson, p. 55).[2] The reduction in the stocks of wheat and the unwillingness of the United States to accumulate large quantities of feed grains occurred even though the absolute level of grain stocks in the exporting countries was significantly lower than in the early 1960s. In mid-1960 and mid-1961 the grain stocks of the major exporters represented about 15 percent of world grain production. In mid-1970 such stocks equalled 10 percent of world production. Even so the three major grain exporters desired to reduce stocks further, and did so.

As noted earlier, the storage and pricing policies of the major exporters achieved substantial stability of the export prices of grain during the 1960s (Johnson, pp. 54-55). For the crop years from 1960 through 1971 wheat prices were held within a range of $59 to $65 per metric ton in eleven of the twelve years; in one year (1969-70) the annual average price was $53. Corn prices were nearly as stable being held within a range of $47 to $57 per ton except for 1970, the year of the corn blight. Even in that year the annual average export price was $61.

The price stability during the 1960s was achieved during a period of significant variability in world grain production. In fact, the absolute shortfall of world grain production below trend during 1961-62 through 1965-66 was greater than during 1971-72 through 1974-75 - 72 million tons compared to 36 million tons. Even if 1970-71 is added to the later period to include the effects of the corn blight on U. S. and world production, the shortfall for the period in the 1970s was 62 million tons. The shortfall of production below trend in the 1970s, relative to

trend production and consumption, was at most two-thirds as large as during the first part of the 1960s (Johnson, p. 51).

Why, then, was the behavior of the prices in the international markets so different between the two periods? One reason was that the major exporters had held their stock levels to a lower level in the 1970s than in the 1960s. There is absolutely no evidence that except for India any other country in the world made any effort to increase stocks as an offset to the declines in North America and Australia (FAO, 1974, p. 7). Thus the change in storage policy of the major exporters appeared to be acceptable to the major importers. If there were any anxiety, it did not find expression in increased stocks.

Price Policies and International Instability

But I believe that a second reason was far more important as an explanation of the different price behavior in the 1970s than during the 1960s than the lower level of grain stocks in the later period. This reason was that a much larger percentage of the world's grain production and consumption in the 1970s than in the 1960s occurred within the framework of policies to achieve internal price stability through the control of imports and/or exports. It was not so much that basic policies had changed as it was that either the ability or the will to pursue price stabilization policies more effectively had changed.

For example, the basic features of the announced agricultural and food price policies of the Soviet Union were the same in 1972 as

in 1963. Prices paid to producers were fixed, and prices at which farm products were sold as farm inputs or to consumers were also fixed and stable. The difference between 1963 and 1972 was that a much greater effort was made in the later year to make the prices effective prices - to more nearly equate supply to demand at those prices. In the earlier period substantial shortfalls of supply relative to demand were tolerated; in the later period serious efforts were made to eliminate or minimize the shortfalls. Thus, after the poor crop of 1963, the Soviet Union imported only about a third of the grain production shortfall; the same relationship held following the poor 1965 crop. But in 1972-73 net grain imports exceeded the production shortfall relative to the previous year by approximately enough to maintain use at the trend level for 1972-73 (Johnson, p. 28).

Similar changes in the effectiveness of implementing price stabilization policies occurred in the European Community and, probably, in China. It is generally ignored that China has imported more grain, on the average, during the past three years than during the very difficult years in the early 1960s, or that since 1969-70 China has had larger aggregate net imports of grain than the Soviet Union (ERS, p. 24).[3] It appears that the countries of Eastern Europe and Western Europe also have effectively implemented policies to stabilize prices and use (around a rising trend) in recent years.

In the early part of these remarks I used a hypothetical example in which it was assumed that half of the world's grain use occurred within the framework of national price stabilization achieved primarily by control of trade. The half was not chosen arbitrarily.

Approximately half of the world's grain use in recent years has occurred in the Soviet Union, the rest of Europe and China (ERS, p. 24). These regions of the world increased their share of world grain use from 49 percent in 1969-70 through 1971-72 to 52 percent in 1974-75. In fact, the absolute increase in grain use of 68 million tons in these areas in 1974-75, compared to the earlier period, almost equaled the increase in world grain use of 73 million tons; the rest of the world increased grain use by only 5 million tons.

It would be an interesting exercise to determine how much the increase in the average price of grain received by farmers increased in the world between, say, 1971 and 1973 and 1974. A farmer in the United States would refer to an increase of approximately 175 percent in nominal prices, though perhaps 75 percent in real prices.[4] I have made a rough guess for the world as a whole - and it is little more than a guess. But that guess is that the real price of grain received by the world's farmers increased by no more than 40 percent between 1971 and 1974. In the European Community it appears that the real grain price actually declined over this period (Johnson, p. 34).

If a nation or region is successful in achieving price stability, prices do not serve the function of influencing either consumption or production when the world's demand-supply balance has changed. Thus, as noted before, all of the adjustment to the variability of supply and demand must be made elsewhere in the world. In the recent period these adjustments fell primarily upon two groups of countries - the major grain exporters and the low income developing countries that imported grain.

There were, of course, other factors that increased world prices of grain. One was the devaluation of the Canadian and American dollars. The dollar prices of grain could have been increased by such devaluations by perhaps 15 percent; with that increase the real price of grain to the major importers would have remained unchanged. There was obviously some speculative overreaction to the situation that developed in 1973 and 1974. However, it is not at all obvious that the major speculators consisted of those evil individuals that frequent the grain pits of the Chicago Board of Trade. Governments or governmental purchasing agents may well have been far more important, though this is only an impression that I cannot document. Another factor was that the major exporters held too long to too low export prices for grains during the summer of 1972. Pricing policies that had worked reasonably well for more than a decade were simply inappropriate in the situation that arose.

The radical interference with the operation of the market due to the U. S. wheat export subsidy resulted in maintaining the export price of wheat at too low a level. Without the export subsidy, market prices would have much more promptly reflected the impact of the enormous grain exports contracted for in 1972. No one knows, outside of a few individuals in Moscow, how much impact substantially higher grain prices would have had on the amount of Soviet imports. Given the level of purchases already made in 1975 at significantly higher real prices than in 1972, it is not clear that higher prices in 1972 would have had a significant impact on their imports. This may sound as though their behavior was irrational. However, imported grain at $140 to $150 per ton is in the range of the Soviet average procurement price and

significantly below marginal procurement prices.[5] It could be true that in the range of grain prices of $75 to $150 per ton, their import demand was very inelastic. I do not know that this is the case, but I would not be surprised if it were.

Reserves and International Price Stability

The conventional argument for a reserve is to offset uncontrolled variations in supply. This argument may be valid for an individual country that does not engage in international trade. It is not the valid explanation for the holding of substantial stocks in excess of working stocks for the world as a whole. Yagil Danin, Daniel Sumner and I have estimated the optimal grain reserves for the world for 1948-1973 if there were free trade in grains (Danin, p. 27).

The criterion for optimal grain reserves was that the expected increase in price would equal the expected increase in marginal cost of storage. Storage costs were estimated to be $7.50 per ton and a real rate of interest of 5 percent was assumed. Given the probability distribution of world grain production, based on actual variability of grain production for a period of approximately twenty-five years, we found that in only one year out of five would carryover stocks be expected to be positive, and only one year out of twenty would such stocks exceed 10 million tons. This was for a level of world grain production of approximately 1.2 billion tons. If we had taken into account demand variability - the demand function was assumed constant except for a trend coefficient - carryover levels would have been increased by a few million tons. However, we assumed a rather low price

elasticity of demand (-0.1), and this probably resulted in an overestimate of carryover levels.

Thus, for the world as a whole, grain production variability is not large enough to make it profitable to hold large reserves. What may make it profitable to hold substantial reserves are the governmental policies designed to achieve a high degree of price stability for individual countries or regional groupings such as the European Community. These policies result in significant year-to-year variability in the excess demand and supply functions for grain by these countries or regions. In the absence of reserves, such variations in the demand for imports or the supply of exports result in variations in the international prices of grain.

Would it be profitable for someone - governments or private traders - to hold carryover stocks in response to largely policy-induced variations in import demand and the production variability in the major exporting countries? The answer to that question is clearly in the affirmative. Before the massive direct and modern governmental intervention in the markets for farm products, which can be dated from about 1930, the private market did hold substantial carryover stocks of grain, especially wheat. Stated approximately for wheat, in the United States about half of annual production deviations, either positive or negative, were offset by variations in carryover and most of the remainder by variations in exports from 1896 through 1927 (Working, p. 173).

During the first part of this century there existed substantial interferences with the trade in grain, but the interferences consisted of specific tariff duties. In many countries, especially in Western Europe,

the tariffs were highly protective, but imports were determined primarily by market phenomenon - not by a bureaucrat or a legislature. Thus it is possible that the current governmental policies have introduced such a greater degree of uncertainty into the international grain market that the private trade would be less effective in minimizing price fluctuations than it was a half century ago.

Quite frankly, we do not know whether it would be in the interest of the governments of the major exporters jointly or one of them to adopt a carryover policy for the grains - not as a price support measure but as an investment. I hope that research that I am just now beginning, supported by the National Science Foundation, will provide at least a partial answer. An attempt will be made to determine the probability distributions of import demand functions for wheat and the feed grains. If this can be done, it should be possible to determine what the carryover levels for the United States or for the major exporters should be for any given total supply at the beginning of a year. One assumption that will be made is that the expected marginal return from the investment in carryover stocks should equal the expected marginal costs.

Some may argue that this approach will result in relatively small levels of carryovers - certainly much smaller than held by the major exporters in the early 1960s and probably lower than was held in 1972. If true, and I do not know if this will be the case, who should pay for the losses incurred in holding larger stocks than implied by the optimal inventory rule? Should it be producers in the exporting countries in return for greater price stability? Should it be the

taxpayers in the major exporting countries? Or should it be the taxpayers in the importing countries and consumers generally who should pay?

Roger Gray has made a persuasive case that it is consumers who gain from a reserve policy (FAO 1975, p. 7). The case depends, to a considerable degree, on the assumption that the price elasticity of demand becomes smaller absolutely as the price increases. If this assumption is correct, then shortfalls in supplies such as were witnessed in 1973 and 1974 result in very large transfers of income from consumers to producers. Consumers thus might find it in their interest to subsidize the holding of stocks in a greater amount than would be called for by the optimal storage or profitability rule.

If Gray's case for consumer benefits is valid, then it is probably not in the interest of grain producers to subsidize or to encourage the holding of stocks larger than indicated by the optimal carryover rule. However, it is possible that the exporters may find it necessary to hold fairly substantial reserves as a means of inducing importers to hold their degree of self-sufficiency in check or to actually decrease it (Johnson, p. 58).

Concluding Comments

The world need not have a period of price instability for major storable farm products such as it has witnessed since 1972 and is likely to have over the next year or more. If there were substantial liberalization of trade in farm products, price instability would be significantly reduced for internationally traded products. Trade liberalization would permit private traders and marketing firms, whether publicly or privately owned, to engage in price and supply stabilizing reserves. There would

remain considerable price instability, but the wide swings of recent and near future years almost certainly would be avoided.

Realistically one has to admit that there is little hope of enough trade liberalization over the next decade to make a significant contribution to international price stability. It is not only Western Europe and Japan that would have to modify domestic agricultural policies, but also the Soviet Union and China.

Given the numerous and uncoordinated national efforts to achieve internal price stability, the only feasible approach for achieving price stability in the international markets is through the creation of commodity reserves. Probably the only significant possibility of establishing a reserve policy that could be sustained and would not destroy the capacity of the price system to appropriately influence the allocation of resources and consumption decisions would be through the cooperative efforts of the three major grain exporters. But if such a cooperative effort attempted to hold price changes within very narrow limits, such as 25 percent, the effort would fail due to the unacceptably large costs that would be involved.

It is true that price stability has economic and social values. However, it must be recognized that with national agricultural policies as they are in countries that consume half of the world's grain, the costs of achieving a substantial degree of price stability in international markets will be large. It is a truism that the price stability objective must be related to a level of costs that is acceptable to those who will bear those costs.

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FOOTNOTES

1. It could be argued that storage is a means of making the demand function highly elastic. When stocks are being increased, it is clearly appropriate to speak in terms of the demand function. However, since stocks can be decreased as well as increased, and it is the supply available for consumption that adjusts rather than prices and consumption, I have considered a buffer stocks operation as a means of making the supply function for a given time period highly elastic. The underlying effects are the same, of course, whether one views a buffer stock operation as either a demand or supply phenomenon.

There are some other methods of making the supply somewhat more elastic than it would otherwise be such as marketing limitations or acreage controls or destruction of part of the output. Price discrimination, as in fluid milk markets, can be used to make the supply to one segment of the market highly elastic by reducing the elasticity of supply to other segments of the market. But the methods discussed in the text are the major ones with relatively broad applicability.

2. The tons used in this paper are metric tons.

3. However, Chinese imports have not exhibited the erratic behavior exemplified by the trade of the Soviet Union. Chinese grain imports do not appear to have been significantly influenced by the real price of grain.

4. The estimated changes in prices do not include the direct payments received by U. S. farmers. If these were included in the returns for 1971, the increase in returns for the later years would be significantly less than 175 percent. The data refer to crop years.

5. In this calculation, the value of the ruble used is approximately $1.40.

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