Grain Export Agreements — No Gains, No Losses

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THERE has been a tremendous amount of publicity about the U.S. grain export agreements with the U.S.S.R. in 1975 and China in 1980. The threat of not renewing the agreement with Russia, which would have terminated October 1 this year, was considered by some to be a heavy penalty — both to the United States and the Soviets. Virtually no economic analysis has been done, however, that looks behind the publicity to determine the actual economic consequences of the treaties. This article assesses the major economic consequences of these agreements.

The Agreements

The first bilateral grain sale agreement was made with the Soviets in 1975 for a five-year period beginning October 1, 1976; the second was made with China in 1980 for a four-year period beginning January 1, 1981. Both agreements call for sales to be made in cash at prevailing market prices. They set minimum and maximum quantities of grain to be purchased from the United States, and prohibit the re-export of the grain to other nations.

The Soviet agreement stipulated that beginning October 1, 1976, the U.S.S.R. would buy six million metric tons of wheat and corn in about equal proportions from U.S. private commercial sources in each 12-month period. This quantity could be increased up to 2 million metric tons in any 12 months without consultation. If the U.S.S.R. wished to purchase additional amounts in any year, it was required to immediately notify the U.S. government.

The agreement with China calls for U.S. grain exports to China of 6 to 8 million metric tons each calendar year beginning January 1, 1981, of which 15 to 20 percent will be corn and the remainder, wheat. China may purchase an additional 1 million tons without prior notification.[1]

Objectives of the Agreements

The purpose of the agreements, according to U.S. government officials in press releases and hearings, is to provide greater stability in Soviet and Chinese purchases of grain from the United States. The agreements allegedly will require the Soviets and Chinese to purchase grain on a regular basis; hence, there should be fewer "surprises" to the U.S. grain markets. The importing nations are assured that during the term of the agreements the United States shall not exercise any discretionary authority to control exports purchased according to the agreement. Charles W. Robinson, a participant in the Soviet agreement, stated, "instead of uncertainty each year as to whether Soviet purchases would be 15 or 20 million tons or zero, grain producers and the markets now have an additional element that can be taken into account . . ." He further contended that farmers, consumers and our maritime industry

[1]The Bureau of National Affairs, Inc., *Daily Report for Executives*, October 22, 1980, pp. L4-5; United States Department of Agriculture, *Report of the Secretary of Agriculture, 1975*, p. 11; *Agricultural Outlook* (December 1980), pp. 18-19; and *Monthly Economic Letter* (First National City Bank of New York, December 1975), pp. 12-13.

"would all benefit from the expanding opportunities for employment generated by this long-term agreement."[2] Former Agriculture Secretary Bob Bergland, in announcing the agreement with China, said it was necessary to "reduce the element of surprise."[3] The alleged gains to the maritime industry are mentioned because the agreement contains a clause requiring that U.S. vessels carry not less than one-third of all of the grain purchased pursuant to the agreement.

While no official press releases have claimed that the agreements will increase overall grain exports, a number of statements to this effect have been made. For example, in connection with a summary of the U.S. farm export outlook, the United States Department of Agriculture reported that "the four-year grain agreement between the United States and China will boost future U.S. exports of grain to China well above the 4 million tons exported to China in 1979 as well as the previous record of 4.3 million in 1973."[4] The Secretary of Agriculture reported that "grain sales under the Chinese agreement will probably be worth about $1 billion per year."[5]

Furthermore, news coverage of the treaties generally viewed the agreements as vehicles for enhancing export sales. The *St. Louis Globe-Democrat*, referring to the Chinese agreement, reported "the agreement is expected to help appease grain farmers angered by a U.S. grain embargo. . . . The agreement is designed to help trade expansion. . . ."[6]

The favorable early impact of the Soviet agreement on the farm sector was emphasized by *The Economist*: "The day the farmers have been waiting for more and more impatiently came on Monday, October 20th when the grain agreement with the Russians was finally signed."[7] Such announcements led both the farming sector and much of the public at large to view the agreements as vehicles for increasing overall U.S. grain exports and stabilizing year-to-year levels of exports.

Table 1
U.S. Real Farm Exports (millions of 1967 dollars)

Calendar year	Total farm exports	Percent of farm commodity sales
1970[1]	6,599	14.4%
1971[1]	6,808	14.6
1972	7,521	15.4
1973	9,877	20.3
1974	11,458	23.8
1975	11,829	24.8
1976	12,364	24.1
1977	12,916	24.2
1978	13,992	25.4
1979	14,417	26.4
1980	16,772	29.5

[1]Total exports to Soviets were insignificant. Prior to 1972, the Soviets were generally net exporters of grain.

SOURCE: *Agricultural Outlook, U.S. Foreign Agricultural Trade Statistical Report, Agricultural Statistics, Economic Report of the President.*

ASSESSING THE IMPACT OF THE RUSSIAN GRAIN AGREEMENT

Although it is too early to assess empirically the consequences of the grain agreement with China, the Russian agreement provides an opportunity for analysis. From 1917 to 1972, the U.S.S.R. was generally a net exporter of grain. Beginning with the marketing year 1971/72, however, it became a net importer of grain and has remained so each year since then, importing much of its additional requirements from the United States.[8] Hence, the United States exported grain to the Soviets for five years prior to the effective date of the treaty and for five years since the treaty was signed. Although the embargo placed on grain shipments to the Soviets in mid-1979/80 (early January 1980) limited exports to the amounts stipulated in the agreement, it is possible at least partially to assess the treaty's effectiveness in achieving the objectives that have variously been associated with it.

[2]Statement of Charles W. Robinson, Undersecretary for Economic Affairs, Department of State, *United States-Soviet Grain Agreement, S.2492 and Other Matters*, Hearings Before the Subcommittee on International Finance of the Committee on Banking, Housing and Urban Affairs, United States Senate, Ninety-Fourth Congress, S.2492, December 9 & 10, 1975, pp. 66, 67 and 72.

[3]Statement by Secretary of Agriculture Bob Bergland in *Daily Report for Executives*, October 22, 1980, pp. L4-5.

[4]*Agricultural Outlook* (December 1980), p. 18.

[5]*Daily Report for Executives*, October 22, 1980, p. L5.

[6]"Grain Deal," *St. Louis Globe-Democrat*, October 23, 1980.

[7]*The Economist* (October 25, 1975), p. 70.

[8]The marketing year begins June 1 for wheat, barley, and oats, and October 1 for corn and sorghum grain.

Table 2
U.S. Exports of Wheat and Feed Grain (millions of metric tons)

Marketing year[1]	Wheat Total	Wheat To USSR	Feed grain Total	Feed grain To USSR	Combined Total	Combined To USSR
1970/71	20.2	—	19.0	—	39.1	—
1971/72	16.6	—	24.6	2.9	41.1	2.9
1972/73	30.9	9.5	39.3	4.2	70.2	13.7
1973/74	33.1	2.7	41.1	5.2	74.2	7.9
1974/75	27.7	1.0	35.9	1.3	63.6	2.3
1975/76	31.9	4.0	50.0	9.9	82.0	13.9
1976/77	25.9	2.9	50.6	4.5	76.5	7.4
1977/78	30.6	3.3	56.3	9.2	86.9	12.5
1978/79	32.5	2.9	60.2	8.3	92.7	11.2
1979/80	37.4	3.9	71.4	11.3	108.8	15.2
1980/81	41.5	3.0	73.1	5.0	114.6	8.0

[1]Year beginning June 1 for wheat, barley, oats and rye; October 1 for corn and sorghum.
SOURCE: U.S. Department of Agriculture, *Foreign Agriculture Circular.*

Impact on Volume of Grain Exports

If the agreement has resulted in larger overall grain exports without offsetting declines in the exports of other farm products, total U.S. farm exports would be expected to show a one-time upward shift following the agreement, other things equal. However, this has not occurred. Real U.S. farm exports, which are shown in table 1, had been increasing at an 11 percent rate from 1970 to 1976 when the grain agreement became effective. This trend largely reflected the freer foreign trade policies that the United States and other nations established in the 1950s and 1960s.[9] Following the treaty (1976-80), farm exports grew at a slower 7.9 percent rate. Hence, if other factors that affect exports remained unchanged, there is no evidence that the growth of total real farm exports has increased in response to the Soviet treaty.

U.S. wheat and feed grain (largely corn) exports are shown in table 2. Again, there is no evidence that the growth of either wheat or feed grain exports has accelerated following the treaty. U.S. wheat exports rose at an average annual rate of 9.6 percent from 1970/71 to 1975/76 (the last pre-treaty marketing year) and at a 5.4 percent rate from 1975/76 to 1979/80. The annual rate of increase in total feed grain exports slowed from 21.4 percent over the 1971/72-1975/76 period to 7.9 percent for the 1975/76-1979/80 period following the treaty. Annual growth in total exports of wheat plus feed grain decelerated from 16.0 percent prior to the treaty to 6.9 percent following the treaty.

The record of U.S.S.R. grain imports and utilization before and after the treaty is shown in table 3. There was no major break in overall grain imports by the Soviets at the effective treaty date (October 1976). The Russians, however, apparently shifted some grain purchases from other nations to the United States following the treaty until the embargo in early 1980. For the five years prior to the treaty, U.S.S.R. purchases average 8.1 million metric tons of grain per year from the United States (72 percent of Soviet net grain imports) and 3.2 million metric tons per year from non-U.S. sources. During the three years following the treaty and prior to the early 1980 grain embargo, Soviet purchases from the United States rose to 10.6 million metric tons per year (84 percent of total Soviet imports), while imports from non-U.S. sources declined to 2.0 million metric tons per year. Hence, the gains in U.S. sales to the Soviets tended to be offset by reduced Soviet grain purchases elsewhere.

This, however, does not indicate that American farmers gained significantly from this response,

[9]See Clifton B. Luttrell, "Rising Farm Exports and International Trade Policies," this *Review* (July 1979), pp. 3-10.

Table 3
U.S.S.R.: Grain Supply and Utilization (millions of metric tons)

Marketing year June-July	Production	Net grain imports[1]			Utilization		Change in stocks	Total grain imports[2] of non-Soviet nations
		From U.S.	From rest of world	Total	Food	Total		
1970/71	187	—	-7.0	-7.0	45	187	-7	109.7
1971/72	181	2.9	-1.6	1.3	45	180	+2	108.4
1972/73	168	13.7	7.3	21.0	45	187	+2	113.3
1973/74	223	7.9	-2.7	5.2	45	214	+14	137.2
1974/75	196	2.3	-1.9	0.4	45	206	-10	135.4
1975/76	140	13.9	11.5	25.4	45	180	-14	126.8
1976/77	224	7.4	0.3	7.7	45	221	+11	148.3
1977/78	196	12.5	4.1	16.6	45	228	-16	149.9
1978/79	237	11.2	1.6	12.8	46	231	+19	161.1
1979/80[3]	179	15.2	15.0	30.2	46	225	-16	168.3
1980/81[4]	189	8.0[5]	25.0	34.0	47	225	-2	177.0

[1]Total imports less exports. Prior to 1972 the Soviets were generally net exporters of grain.
[2]World trade less Soviet imports
[3]Preliminary
[4]Forecast
[5]Estimated
SOURCE: U.S. Department of Agriculture: *Foreign Agricultural Circular: Grains; USSR Agricultural Situation: Review of 1976 and Outlook for 1977.*

since they sell grain in the world market. Shifting Soviet purchases from one nation to another does not alter world demand for grain or the average grain price. Shifts in Soviet grain purchases from other grain-exporting nations to U.S. farmers are offset by reduced U.S. exports to non-Soviet nations. No overall change necessarily occurs in total world grain trade.

Stability of USSR Grain Imports

Soviet grain purchases from the United States were somewhat more stable following the signing of the treaty than before. For example, as shown in table 4, the standard deviation (a measure of the variation around the arithmetic mean) of such exports declined (although the decline was not statistically significant) from 6.0 million metric tons during the six pre-treaty years (1970/71-1975/76) to 3.2 million in the five years following the treaty.[10] However, as shown in table 3, the Soviets realized an unusually small harvest in 1975/76 which tended to distort the results toward less stability in the pre-treaty years.

Stability of World Grain Markets

Just because Soviet grain purchases from the United States may have been more stable following the treaty, however, does not mean that world grain markets were stabilized by the treaty. In fact, the increased stability of purchases from the United States may have led to less stable purchases from other nations. Although the difference is not statistically significant, the standard deviation of net Soviet purchases from other nations rose from 7.0 million metric tons in the pre-treaty years to 10.6 million metric tons following the treaty. As a result, total imports by the Soviets show little evidence of increased stability since the treaty. The standard deviation of total Soviet imports declined only from 12.7 million metric tons prior to the treaty to 11.0 million metric tons following the treaty.

Any apparent increase in stability of Soviet grain imports following the treaty can in part be explained by smaller fluctuations in year-to-year Soviet grain production in the post-treaty years. Grain production in the Soviet Union has always varied widely from

[10]The coefficient of variation (the standard deviation divided by the arithmetic mean) declined from .887 to .297.

Table 4

Measures of Annual Variation in U.S.S.R. Grain Production, Imports and Utilization, Before and After Treaty (millions of metric tons)

	Before treaty (1970/71-1975/76)			After treaty (1976/77-1980/81)		
	Arithmetic mean	Standard deviation	Coefficient of variation	Arithmetic mean	Standard deviation	Coefficient of variation
Production	182.5	27.8	.152	205.0	24.5	.119
Imports from:						
U.S.	6.8	6.0	.887	10.9	3.2	.297
Other nations	0.9	7.0	7.458	9.2	10.6	1.148
Total imports	7.7	12.7	1.646	20.1	11.0	.550
Total utilization	192.3	14.3[1]	.074	226.0	3.7[1]	.016
Non-U.S.S.R. imports	121.8	13.0	.106	160.9	12.2	.075

[1]Standard deviations which were significantly different at the 5 percent level.
SOURCE: Table 3.

year to year, reflecting a larger variability in weather conditions compared with many other nations, but the variation was somewhat less following the treaty.[11]

Furthermore, total international grain imports by all non-Soviet nations were apparently more stable following the agreement. The standard deviation of such imports declined (although the decline was not statistically significant) from 13.0 million tons prior to the treaty to 12.2 million following the treaty, and the coefficients of variation declined from .106 to .075, respectively.

Stability of Grain Price

To the extent that Soviet grain purchases from the United States following the agreement were stabilized at the expense of greater instability in their purchases elsewhere, the agreements were not a factor in stabilizing either U.S. or world grain prices. The U.S. price is determined by world supply and demand conditions, and Soviet purchases from any other nation typically have about the same impact on U.S. grain prices as if the purchases were made directly from the United States.

Although prices of feed grain and wheat apparently stabilized somewhat from the pre-treaty years 1970-76 to the post-treaty years 1977-80, this apparent stability is not statistically confirmed.[12] Moreover, the average price of all U.S. crops shows greater reduction in variation than feed grain and wheat prices. Hence, apparent price variability declined more in crops *not* involved in the treaty than in feed grain and wheat. Once again, there is no evidence that the treaty provided a price-stabilizing impact on the traded grains.

Grain Storage

Increased storage of grain by the Soviets following the treaty could have resulted in less variable Soviet grain imports and, hence, had some effect on world grain prices.[13] Greater buildup of grain reserves

[11]During the six pre-treaty years the standard deviation of Soviet grain production declined from 27.8 million metric tons with a coefficient of variation of .152, to 24.5 million metric tons with a coefficient of variation of .119 following the treaty.

[12]During the pre-treaty years the coefficient of variation of the price of feed grain was .387 and for all crops .321, while in the post-treaty years the coefficient of variation of the price of feed grain was .139 and for all crops .101. In other words, the coefficient of variation for all crops was 83 percent as large as the coefficient for feed grain in the pre-treaty period but was only 73 percent as large in the post-treaty years. The coefficient of variation for all crops likewise declined relative to wheat, dropping from 68 percent of the wheat coefficient in the pre-treaty years to 44 percent in the post-treaty years.

[13]A factor that tended to increase the variability of Soviet imports following the treaty was the increased stability of Soviet grain usage. Total year-to-year grain utilization by the Soviets was definitely stabilized about 1976/77, the year in which the treaty was made. During the five pre-treaty years total grain utilization fluctuated quite sharply from year to year having a standard deviation of 15.7 million metric tons. Following the treaty the standard deviation of total grain utilization was only 4.3 million metric tons. The coefficients of variation of grain usage prior to and following the treaty were .08 and .02, respectively.

during good crop years would permit the Soviets to utilize such reserves and to import less than otherwise following poor crop years. Charles Robinson contended that a Soviet buildup of grain reserves is inherent in the agreement because they are committed to purchase a minimum quantity of grain each year.[14] Of course, it could always be argued that the Soviets have less incentive to store large quantities of grain with an assured supply available at market prices. Nevertheless, with greater grain stocks, the Soviets could have supplemented grain usage with less imports following relatively small grain harvests.

The data, however, indicate that no buildup in Soviet grain stocks occurred following the treaty. Total Soviet grain stocks declined 13.0 million metric tons during the six pre-treaty calendar years 1970/71-1975/76 and declined another 5.0 million during the five post-treaty years 1976/77-1980/81 (table 3). Furthermore, as indicated earlier, Soviet grain production was larger and somewhat *less variable* in the post-treaty years than during the pre-treaty years. Hence, if the Soviets had plans for increasing their stock of stored grain, the post-treaty years would have been a relatively favorable period in which to do so. Evidence, however, indicates that instead of increasing stocks, the Soviets increased reliance on world markets to smooth out the impact of variation in annual production on short-run supply so as to maintain relatively stable consumption.

Exports Following Treaty Consistent With A World Grain Market

Grain is sold by those nations in which the cost of producing it is low relative to the world price; it is purchased by those nations in which the cost of producing (more) grain is high relative to the world price. Unless the Soviet or Chinese grain agreements have an impact on overall grain demand or upon world grain production (supply), they will have no impact on overall grain shipments or on total U.S. grain exports.[15]

Table 5

Soviet Grain Utilization, Livestock Inventory and Meat Production, Before and After Treaty (annual rates of change)[1]

	1972-75	1977-80
Grain utilization[2]	4.9 %	0.6 %
Cattle	2.1	1.4
Hogs	0.4	5.3
Sheep	1.3	0.9
Poultry	3.2	7.9
Meat production	3.2	1.5

[1]1976, the year of the agreement, was excluded because of extremely low Soviet grain production.

[2]Marketing year as in table 3.

SOURCE: U.S. Department of Agriculture, *Foreign Agriculture*, and table 2. Livestock numbers as of January 1; meat production for calendar year.

For example, if the Soviets purchase more grain from the United States and less elsewhere (i.e., there is no change in total Soviet imports) at market prices, other grain exporting nations will, in turn, export less to the Soviets and more to the other importing nations such as Japan and Western Europe. The world price would still allocate world grain production (supply) to world consumers (demand) as though the treaty did not exist, and total U.S. exports would remain unchanged. If the agreement, for example, required the Soviets to purchase more grain from the United States in any one marketing year than they wanted to purchase, they could reduce their purchases from other nations or sell some of their domestically produced grain on the world market to offset the unwanted purchases. Hence, the minimum purchase requirements of the agreement likewise have little net impact on world grain trade or world grain price.

Despite the greater stability in grain utilization in the Soviet Union in recent years, there is no evidence that the volume of grain utilization, livestock numbers or meat production have accelerated since the agreement. Total Soviet grain use rose 4.9 percent per year during the four years prior to the agreement and 0.6 percent per year from 1977 to 1980 after the agreement (table 5).

[14]Statement by Charles W. Robinson, p. 69.

[15]Like the recent grain embargo to the Soviets, the grain export agreement is not consistent with a commercial world grain market. Such a market continues to function despite the numerous trading agreements between governments that often ignore market price, and while a world market exists, government actions such as bilateral trade agreements and grain embargos can do little to increase or impede world trade or to reduce price variability caused by crop failures or above average crops in individual nations. Grain continues to move from areas where grain prices are relatively low to areas where grain prices are relatively high. For a further discussion of this topic see Clifton B. Luttrell, "The Russian Grain Embargo," this *Review* (August/September 1980), pp. 2-8.

The rates of increase in Soviet cattle and sheep numbers have declined, the former from 2.1 to 1.4 percent per year and the latter from 1.3 to 0.9 percent per year. While the rate of increase in hogs accelerated, almost all the gain was the result of a catch-up process to replenish hog numbers that were reduced sharply following the very sharp decline in the 1975/76 grain crop. Hog numbers dropped 20 percent from January 1975 to January 1976, and in January 1977 were still about 12 percent less than in 1975. Hog numbers rose only about 0.3 percent per year during the entire period 1972-80. Of the food animals, only poultry has accelerated since the agreement from a 3.2 percent annual rate in the four years prior to the treaty to a 7.9 percent rate during the post-treaty years.

Overall, Soviet meat production, while maintaining greater year-to-year stability since the agreement, has shown less growth. During the four pre-treaty years meat output rose at a 3.2 percent rate; in the post-treaty years it has risen at a 1.5 percent rate. Consequently, the trend toward rising dependence on imports of grain by the Soviets occurred largely prior to the grain agreement. There is no evidence that the treaty has increased the trend or led to additional overall imports.

SUMMARY

The Soviet grain agreement may have had some desirable side effects. If information on crop conditions is obtained through the treaty, it serves as a tool to help price the grain stocks on hand, and hasten the expansion or contraction of production in the rest of the world in response to the latest Soviet crop conditions. There is little evidence, however, that the agreement has contributed to rising U.S. grain exports, greater stability of U.S. grain exports, or greater grain price stability.

Soviet grain purchases from U.S. sources have become somewhat more stable, but their purchases from other grain-exporting nations have apparently become more variable, offsetting the price-stabilizing effects of their less erratic U.S. purchases. U.S. grain prices have stabilized somewhat since 1976. However, relative to the price behavior of all crops, both feed grain and wheat prices have been less stable since the agreement.

These results are consistent with a world grain market where grains move *relatively freely* between areas. In such a world market, agreements can do little to affect the overall grain trade of a nation. Increased sales to one nation are offset by reduced sales to other nations. The world price allocates production to consumers and a decision by one nation to make all of its sales to or purchases from another nation will not have a significant impact on total world grain trade or on the world grain price.