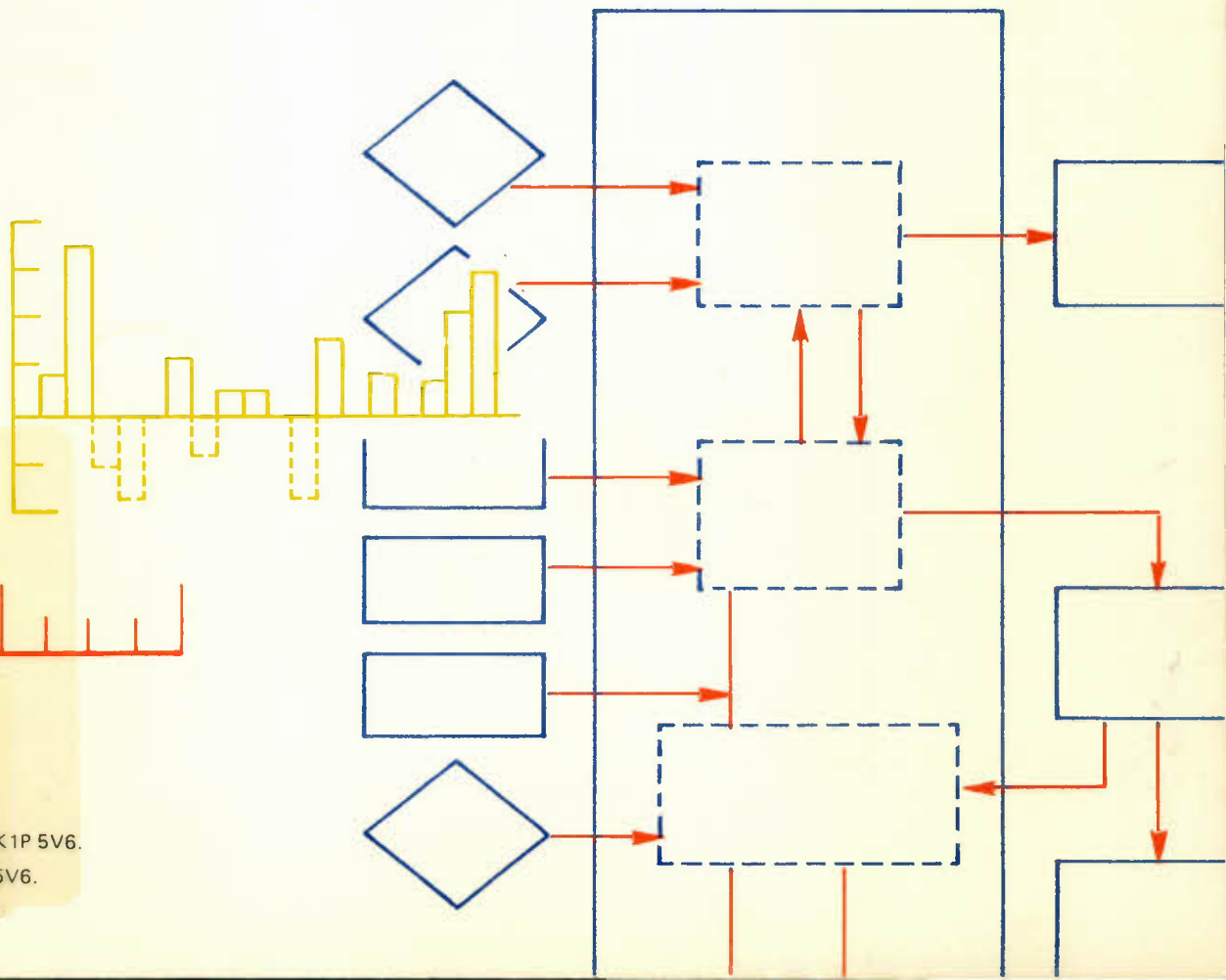


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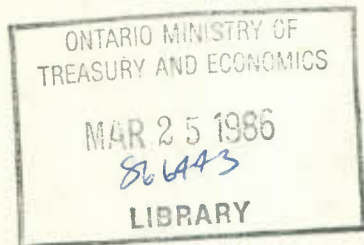
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DISCUSSION PAPER NO. 167

The Canadian Interest in an  
International Wheat Agreement

by

Anthony P. Ellison

prepared for

The Centre for the Study of  
Inflation and Productivity

This Paper was prepared as part of the research program undertaken by the Centre for the Study of Inflation and Productivity (CSIP). It has benefited from comments by independent outside experts who were asked to referee an earlier version of the manuscript, and is being made available in limited numbers and in the language of preparation.

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## RÉSUMÉ

En 1974, le prix du blé vendu sur les marchés mondiaux a atteint des niveaux sans précédent. Le contraste avec les prix relativement bas et stables des années 60 est frappant. Au cours de la présente décennie, grâce à des méthodes de culture améliorées et à des prix de soutien élevés dans les pays exportateurs, notamment aux États-Unis, au Canada, en Australie et en Argentine, d'abondants stocks de céréales ont été constitués. Les prix des céréales vendues sur les marchés mondiaux étaient peu élevés, souvent même inférieurs aux prix de soutien des pays exportateurs. Les pays industrialisés importateurs ont cependant imposé des tarifs élevés afin de protéger leurs propres producteurs, ce qui a contribué à garder à un bas niveau le prix des céréales offertes sur les marchés mondiaux. Les cours mondiaux peu élevés et les dépenses croissantes qu'ont occasionnées le soutien des prix et le maintien de stocks plus considérables ont amené les pays exportateurs à diminuer leur production et à réduire leurs stocks. Dès le début des années 70, les résultats de ces politiques se manifestaient par une diminution de la superficie ensemencée et par le faible niveau des stocks. Or, juste au moment où le rapport stocks-production atteignait son plus bas niveau, la récolte a été mauvaise à la fois dans les pays exportateurs et dans les pays importateurs. Les cours mondiaux ont alors dépassé le niveau des prix de soutien, les stocks étant insuffisants pour freiner leur ascension.

L'achat de céréales a donné lieu à une surenchère entre les pays en développement et les pays plus riches du monde industrialisé. Même au Canada et aux États-Unis, les prix intérieurs des céréales ont augmenté. Face à des prix céréaliers exorbitants, les cultivateurs ont abattu bovins, porcs et volailles. Après une chute momentanée du prix de la viande, le volume exceptionnel d'abattage a conduit à une réduction de

l'offre et à de fortes augmentations des prix. Les pays importateurs de la CEE et le Japon ont réagi à la situation en remplaçant leurs tarifs par des subventions, de façon à abaisser les prix à l'importation au-dessous des cours mondiaux.

Cette montée soudaine des prix des céréales a incité les pays importateurs et les pays exportateurs à constituer des stocks, gérés aux termes d'accords internationaux, en espérant que cette mesure servirait à neutraliser les mouvements de prix dans l'avenir. Des accords internationaux sur le commerce du blé avaient déjà été conclus dans le passé, principalement dans le but de prévenir la chute des prix mondiaux; mais le projet de recours à des stocks internationaux destinés à stabiliser les prix mondiaux constituait une innovation. Une telle initiative, cependant, n'a pas été acceptée car, lors de leur réunion du printemps 1979 à Genève, les pays négociateurs ont été incapables de s'entendre sur une échelle à l'intérieur de laquelle les cours mondiaux devaient être stabilisés.

A l'heure actuelle, le commerce des céréales ne fait l'objet d'aucun accord international. Les grands pays importateurs continuent d'imposer des tarifs douaniers sur les céréales importées, et les principaux stocks sont détenus dans les pays exportateurs. Ces stocks demeurent faibles par rapport à la production. Il reste à espérer que les récoltes seront assez stables pour répondre à la demande.



## SUMMARY

In 1974 the prices of internationally traded wheat reached record high levels. The contrast with the low and largely stable prices of the previous decade was striking. During the decade improved growing techniques and high support prices in the exporting countries of the U.S., Canada, Australia and Argentina had brought forth plentiful supplies of grain. The prices of traded grain were low, and often below the support prices in the export markets. The developed, grain importing countries, however, imposed high tariffs, which served to protect their domestic grain sectors and kept traded grain prices at low levels. The low traded prices, the increasing expense of maintaining support prices and the growing stocks caused the exporting countries to cut back production and to run down stocks. By the early seventies the results of these policies were seen in the reduced acreage devoted to grain and the low stock levels. Yet just as the ratio of stocks to production reached its lowest level, there was a coincidence of poor harvests in the exporting and importing countries. Traded prices rose above support levels and moved on upwards, for there were insufficient stocks to contain the surge.

Developing countries found themselves bidding for grain with the more affluent importing countries of the industrial world. In Canada and the U.S., the domestic prices of grain also rose. Farmers, faced with huge increases in grain prices, responded by slaughtering their cattle, pigs and poultry. Although meat prices dropped initially, the exceptional slaughter resulted in reduced supplies and high increases in meat prices. The importing countries of the EEC and Japan responded by changing their tariffs into subsidies, resulting in import prices which were lower than traded prices.

The sharpness of the increase in grain prices was sufficient for the importing and exporting countries to consider the use of internationally held stocks as an instrument to contain future price movements. International wheat agreements had operated in the past, and had primarily



been concerned with containing the drop in traded prices. The proposed use of internationally held stocks to stabilize traded prices was an innovation. It was an innovation, however, which was not accepted, for at the meetings in the spring of 1979 in Geneva the negotiating countries were unable to agree on the price band within which the price of traded grain was to be stabilized.

At the present time the trade in grains is not subject to an international agreement. The large importing countries continue to use tariffs on imported grain and the major stocks are held in the exporting countries. These stocks remain small in proportion to production. The hope is that the harvests will be reliable.

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## INTRODUCTION

Among the sources of the worldwide rapid inflation of the early and mid-1970s were the price increases of many primary products. While the oil price increases in 1973-1974 were the most widely remembered, the period was also characterized by exceptionally high rises in grain prices. In the period 1972 to 1973 the Gulf export prices of winter wheat rose by over 50 percent, and corn by 60 percent. In the next year the increases were 95 and 35 percent respectively. These were years of peak grain prices not only in the export market, but also in the domestic North American market, for they were the result of poor harvest occurring in years when the grain stocks had been run down to low levels. In Canada the domestic price of grain paid to farmers rose by 53 percent in 1972/73 and by over 28 percent in 1973/73. In the latter year the imported price of crude oil rose by 208 percent at Montreal and the price of domestic crude at the refineries in Sarnia by over 40 percent.<sup>1</sup>

The importance of changes in wheat prices is the influence that they have on the price of food. This influence is primarily via the effect they have on grain prices and in turn the effect they have on feed prices and the effect that these prices have on meat prices, the latter of which account for a large part of the expenditure on food in North America. The reason for this link is because when wheat is cheap, more is used for feed, and less is used when it is expensive. When it is expensive cattle-men and poultry farmers buy more corn and other grain - actions which cause the price of such grains to rise. This is an important determinant of meat prices, for feedgrain account for a high proportion of the costs of rearing cattle and poultry.

Simulations suggest that a doubling of the price of feed grains will raise the food item of the CPI by 9.3 percent and will raise the CPI all items by 2.7 percent. It appears, however, that domestic feed grain prices rose by 80 percent during the two years of 1973 through to 1975, an increase which could be expected to increase the food item of the CPI by 7.4 percent and the CPI all items by 2.1 percent.

The food prices increases registered by the movements in the CPI were startling in the seventies not only because they were high, but also because they exceeded the increases in the all items CPI for a number of years. In 1974 the all food item of the CPI rose by 16.2 percent in contrast to a rise of almost 11 percent in the all item CPI. In the years 1972 to 1975 inclusively, the increases in the food item of the CPI exceeded the increase in the all items of the CPI, yet between 1961 and 1971, only in two years, in 1965 and 1966, did the increase in the food item exceed the increase in all items.

The rise in grain prices was alarming, because most of the sixties had been characterized by low and stable prices. The support prices in the exporting countries brought forth abundant supplies. Stocks expanded, but even so, market prices dropped below the support levels in the exporting countries. Exports were subsidized and deficiency payments, which bridged the gap between support and market prices, were considerable. At the end of the sixties the exporting countries engaged in extensive cut-back programmes. Land was withdrawn from grain production, production was reduced and stocks were drawn down. Just as stocks fell to a low proportion of production there was a worldwide failure of the grain harvests. The stocks were insufficient to contain the rise in prices. The price rises were felt across the world. The overpopulated developing countries were faced with bidding for short supplies of expensive cereals to feed their populations. So substantial were the price increases that renewed efforts were made to engage in international cooperation to contain future price increases.

The major forum for these negotiations was the International Wheat Council. The proposed agreements concerned the formation of an international wheat agreement. They were distinguishable in two ways from those of the past. First, they contained proposals for importing and exporting countries to hold grain stocks. These were to be coordinated so as to contain prices within an upper and a lower limit. The interest in an upper price band was the second distinguishing mark of the negotiations, for previously the major interest had been for the exporting countries



to obtain an agreement to support the market prices from falling to unremunerative levels.

Alongside these negotiations were others which were concerned with the easing of trading barriers. Centred around GATT, these talks reflected the importance of trading barriers and domestic food policies in the determination of the form and extent of the adjustment in the traded grain market. The major importing countries of the EEC and Japan pursued domestic price stability by adjusting their imports and exports. They maintained support prices for domestic grains above import prices and used import taxes to make up the difference. The demand for traded grain became more inelastic, resulting in the possibility of large adjustments in price in the event of an unexpected failure in the harvests. Such an event arrived in the early seventies, and the market adjustment took the form of a rapid rise in price. It was a rise which was aided by the importing countries, for instead of increasing their domestic support prices in line with the rise in market prices, they kept them below world market prices. The result was an increase in the demand for imports.

The Tokyo round of GATT, as it has become known, has been an attempt to bring some agreement between the trading nations with respect to trade restrictions and tariffs. The announcements of the agreements in the spring and summer of 1979 suggests that some of the general trade restrictions have been removed. The tariff agreements, however, produced little in the way of an improvement in the trade of grain. As for the proposed international wheat agreement, the talks in Geneva ended in discord in March 1979. There remains no agreement to hold and to use internationally coordinated stocks of grains to contain price movements within a range acceptable to producing and importing nations.

The EEC and Japan have continued their domestic pricing policies. The USSR has also continued with its domestic meat pricing policy. This places a great strain on its domestic grain production such that fluctuations in the harvest in the USSR have considerable effects on the world demand for imports, and in turn on the price of grain. The recent actions of the USA in reducing its exports to the level it negotiated with the

USSR in 1975 present an unexpected twist in the development of this market. In retaliation for the invasion of Afghanistan, the USA had hoped to win the support of the other grain exporting countries in obtaining a reduction in grain exports to the USSR. So far it has been unsuccessful in persuading Argentina to reduce its exports of coarse grains.

The purpose of this paper is to outline the contribution which the use of grain stocks, as outlined in the proposed 1978/79 international wheat agreement, can make to stabilizing the prices of traded grain. In doing so the paper presents an interpretation of the causes and incidences of the fluctuations in traded grain prices over the last one and a half decades. When these have been presented, the role of grain stocks as a instrument of stabilization is examined, along with a consideration of some of the benefits that could ensue to Canada by shifting the burden involved in stabilizing the market in internationally traded grain.

References

1. See Ellison [1] Table 2.1

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- [1] Ellison Anthony, P. The Effects of Rising Energy Costs on Canadian Industries. C.E.R.I. Study No. 3, April 1979.

Chapter 1

FLUCTUATIONS IN THE WORLD GRAIN MARKETS

1.1 Introduction

In the season of 1971-72 the export price of winter wheat from the Gulf Ports of the U.S. averaged \$1.63 per bushel (f.o.b.). During the next season it rose to an average of \$2.47 and in the following year it rose to \$4.81 (see Chart 1.1). Feed grain export prices showed a similar movement. These dramatic increases set in motion a substantial rise in the price of food throughout the world at a time when the same economies were absorbing increases in oil prices. As a result of the impacts of these food price increases, renewed interest was focused on the causes and the methods of alleviating these price fluctuations. With the help of hindsight it appears that a number of unanticipated developments, in a market which is inherently prone to instability, played their part in these dramatic price increases. This chapter presents a description of these fluctuations and a brief analysis of the major reasons which appear to have been their cause.

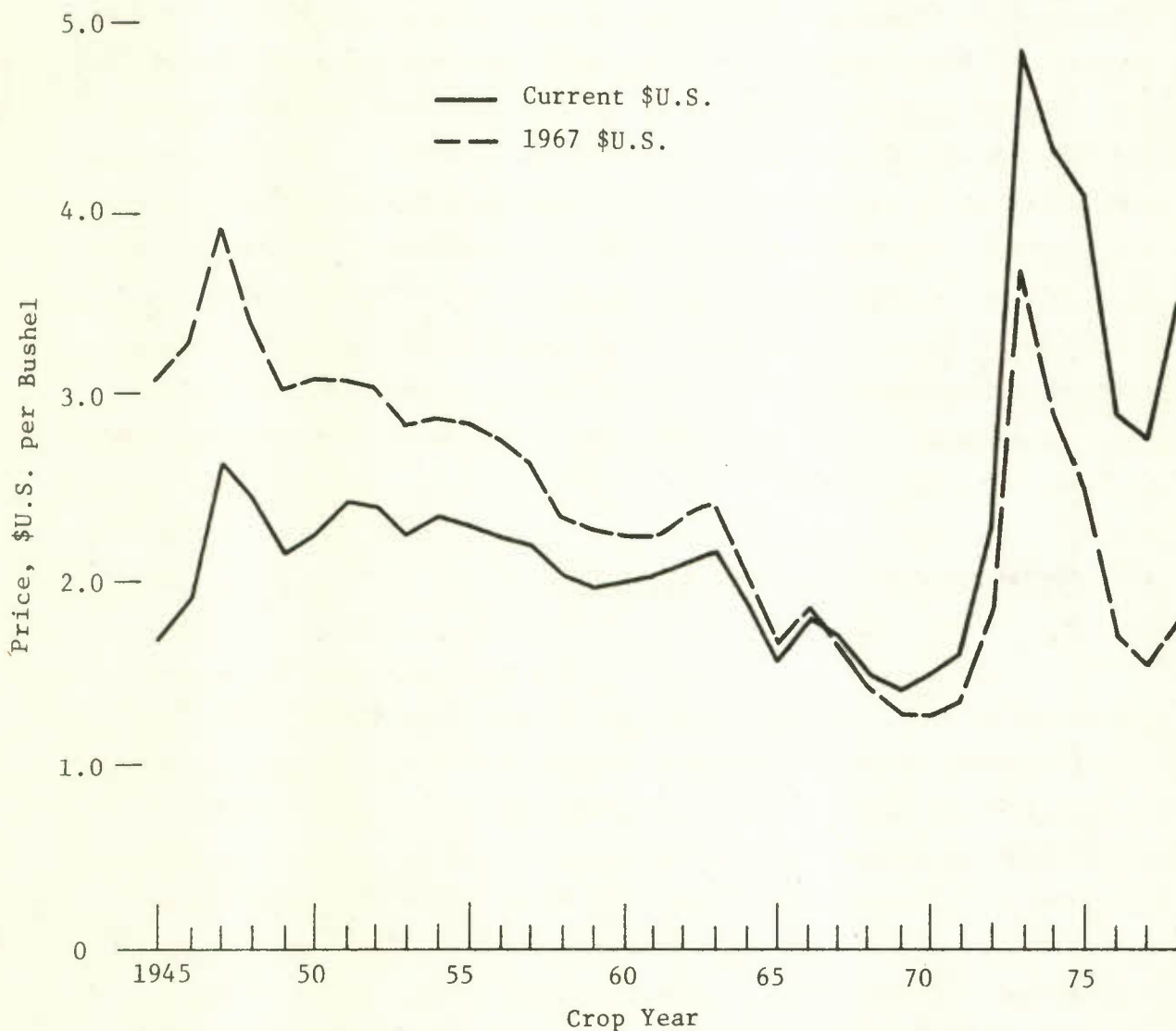
1.2 Movements in the World Grain Markets

The variability in the harvest of grain has provided historians with one of their most important themes in the unfolding change and development of societies. The unpredictability of the weather and the importance of cereals in human diets have been the two primary reasons why these variations in harvests have had such significant effects on the development of economies. The present era is no exception, for the fluctuations in supply in the major exporting countries have significant effects on the traded price of cereals and, in turn, on the incomes of producers and consumers. Similarly, variations in the harvests in many of the less developed countries of the world determine the margin between subsistence and starvation for their inhabitants.



Chart 1.1

MOVEMENTS IN WHEAT PRICES SINCE WORLD WAR II  
(No. 2 Hard Red Winter Wheat at Kansas City)



Sources: Historical Statistics of the United States, Agricultural Statistics.  
USDA: Wheat Situation.

The grain market consists of three groups of fairly close substitutes: wheat, coarse grains (including rye, corn, oats and barley) and rice. Wheat and rice are the primary food grains, while more than half of the production of corn, barley, oats, sorghums and millets is used for animal feed. Wheat is also used for animal feed along with non-grain feeds derived from such commodities as rapeseed, soybeans, sunflower seeds and tapioca.

Although rice provides the staple diet of the large population of many Asian countries, wheat and coarse grains are the most heavily traded of the grains. Collectively the three grain groups provide approximately 52 percent of the total calories consumed by the world's population and 62 percent of those consumed in the less developed countries.<sup>1</sup>

The demand for wheat is inelastic with respect to price and income. These characteristics, along with the unexpected shifts in supply caused by unpredictable changes in climate, have provided the underlying instability in the wheat market. It is the close substitution that is possible in supplying and consuming wheat and coarse grains that has placed them under the same influences. Changes in the supply of both groups of commodities tend to be similar, owing to their subjection to the same variable weather conditions.

The world's production of grain over the last one and a half decades has been characterized by an upward trend. As a result of improved growing techniques and their widespread adoption, the production of wheat, coarse grains and rice increased considerably. Such developments, along with changing land tenure systems and the use of stronger varieties of grain, led to increased yields. The increased availability of arable land and the actions of governments extended the acreage which was farmed. Such changes in yields and acreages, however, did not occur in all growing regions, nor did they occur evenly over time.

While the trend in grain production was upwards, there was considerable movement about the trend. Similar variations also characterized other aspects of the world's grain market. As a means of illustrating the

timing and the extent of these fluctuations in the grain market, Table 1.1<sup>2</sup> presents a set of figures which describe the movement of production, consumption and trade of grains from the mid-sixties up to the late seventies. The figures measure the percentage deviation from the trend,<sup>3</sup> the purpose of the device being to illustrate the fluctuations in the movements of the demand, supply and trade of grain.

Movements about the trend show a marked increase in yields in the first three years of the seventies while, at the same time, there was a fall below the trend in the area harvested. Then, between the years 1973 and 1975, yields dropped substantially, and so did production. Exports fell in 1974 and then rose again in 1975. Export prices rose dramatically in these two years, only to fall in 1977 and 1978 as production increased.

The movements in the wheat and coarse grain markets are shown in Tables 1.2 and 1.3. What is interesting is that although production of wheat and coarse grains dropped substantially in 1974, it had also done so in 1963 and 1965, yet the increases in export prices in the earlier years had been far less dramatic than they were in 1974. In 1963 world wheat production fell below the trend by over 7.5 percent, yet export prices were only 15 percent above the trend.<sup>4</sup> In 1974 the production of wheat was 3 percent below the trend, yet prices were 75 percent above the trend. The average annual wheat export price in this year was almost double that of the previous year.

One of the reasons for the different response in the export price between the two periods was because of the differing levels of beginning year stocks. In 1963, beginning year world stocks were some 73.8 million tons, or 31.0 percent of the production of that year. The total stocks and percentage of the total stocks held by the leading exporting countries were 47.3 million tons and 21 percent respectively. In the 1973/74 crop season the figures were much lower. The actual world wheat stocks were 63.1 million tons or 17 percent of world production. The exporting countries held stocks of 22.7 million tons. Indeed, it was the reduction in the holdings of stocks by the major exporting countries which provided one

Table 1.1

WORLD TOTAL GRAIN(1): 1966-78  
 PERCENTAGE DEVIATIONS FROM THE ESTIMATED TRENDS(2)

Crop Year	Acres Harvested	Yield	Beginning Stocks(3)	Production(5)	Total Utilization(4)	Total Exports	Export Corn	Export Wheat(6)	Prices
1966	0.21	-0.75	-19.23	-0.08	-2.31	10.25	1.33		-10.8
1967	1.23	-0.85	- 3.53	0.39	-1.17	0.67	- 1.61		- 4.3
1968	1.24	-0.40	9.08	1.01	-1.46	-11.86	-21.4		-21.4
1969	0.62	-0.56	28.08	-0.42	1.33	- 4.16	-20.59		-18.4
1970	-1.69	0.34	20.80	-1.97	2.03	- 3.73	-16.72		-34.4
1971	-1.30	4.47	- 1.67	3.17	2.10	- 6.80	-13.41		-29.7
1972	-2.96	0.36	9.53	-2.34	1.80	9.94	-28.49		-33.8
1973	-0.11	3.21	-14.75	3.59	3.83	12.67	9.21		- 4.9
1974	-0.27	-2.34	-11.37	-2.90	-1.35	- 4.30	34.00		75.3
1975	1.48	-4.18	-18.37	-3.47	-2.94	6.47	39.72		54.0
1976	1.89	0.48	-16.01	2.78	-0.48	0.57	18.74		35.1
1977	0.43	-2.38	17.54	-1.98	-0.86	0.98	- 2.87		- 4.4
1978	-0.66	2.96	15.98	2.59	-0.25	- 7.25	-14.55		- 8.0

Notes: (1) Total grain includes: wheat, coarse grains and rice.

(2) The trend used is:  $\log y = a_1 + a_2 \text{ time}$ .

(3) Based on the suggestion of differing local marketing years and should not be construed as representative of world stock levels at a fixed point in time. The P.R. China is excluded as well as parts of Eastern Europe.

(4) For those countries for which stocks are not available (Ex. USSR), utilization estimates should be viewed as representative.

(5) Based on an aggregation of differing local marketing years and will therefore differ from July to June data appearing elsewhere.

(6) The wheat data refers to Gulf f.o.b. export price of winter wheat No. 2, 13½%. The corn refers to the f.o.b. price of corn at Gulf Ports.

Sources: USDA Foreign Agricultural Circular, Wheat; various issues.

USDA Feed Situation, various issues.

For details of the original set of data, see Tables B.3 and B.4.



Table 1.2

WORLD WHEAT: SUPPLY AND DEMAND  
PERCENTAGE DEVIATIONS FROM ESTIMATED TRENDS(1)

Year	Area Harvested	Yield	Beginning Stocks	Production	Total Exports	Total Utilization	Export Price:		
							No. 2	13	1/3%
1960	-1.18	3.87	3.42	2.83	- 5.50	0.95			
1961	-2.12	-4.06	5.95	-6.21	- 1.14	-2.56			24.0
1962	-0.17	2.51	- 8.74	2.76	- 6.67	-0.11			18.9
1963	-0.822	-6.73	- 1.80	-7.57	15.58	-4.84			15.3
1964	2.99	0.22	-13.34	3.47	4.93	-0.78			12.4
1965	2.13	-6.31	- 0.21	-3.80	15.60	2.68			2.9
1966	0.82	7.59	-27.14	8.70	5.90	-0.93			-10.8
1967	2.50	-1.84	7.93	-2.20	- 5.48	-1.80			- 4.3
1968	4.26	3.29	18.67	8.19	-14.95	0.31			-21.4
1969	0.77	-2.24	49.77	-1.17	- 6.32	4.42			-18.4
1970	-4.71	1.82	27.17	-2.54	- 8.03	4.98			-34.4
1971	-2.49	6.90	- 3.63	4.29	-10.84	2.44			-29.7
1972	-3.94	3.38	5.32	-0.65	11.06	5.08			-33.8
1973	-1.71	6.15	-18.27	4.34	9.71	2.86			- 4.9
1974	-0.81	-2.70	- 9.19	-3.11	- 0.14	-0.68			75.3
1975	0.97	-8.83	-18.06	-8.07	5.14	-7.07			54.0
1976	3.80	1.78	-19.05	5.50	- 2.55	-2.51			35.1
1977	0.34	-6.48	26.08	-6.04	1.42	-0.91			- 4.4
1978	-0.11	3.91	5.17	3.78	- 1.05	-0.60			- 8.0

Note: (1) See Table 1.1 for details of the trend calculations. And note also that the other footnotes mentioned in Table 1.1 also apply to the columns in this table.

Sources: See Tables B.1 and B.4

Table 1.3  
 WORLD WHEAT AND COARSE GRAINS: (1)  
 PERCENTAGE DEVIATIONS FROM ESTIMATED TRENDS

Year	Area Harvested		Yield	Beginning Stocks		Production	Total Exports		Total Utilization		Export Price	
										Wheat	Corn	Wheat
1960	1.75		-2.06	1.12		3.83	-5.72		1.21			
1961	-0.12		-3.61	9.28		-4.04	4.12		-1.19		24.0	8.21
1962	0.27		0.69	-6.00		0.59	-3.80		-0.56		18.9	5.47
1963	0.95		-4.79	-3.32		-3.75	10.66		-3.60		15.3	11.23
1964	1.87		-2.94	-5.81		-1.02	3.17		-1.95		12.4	9.58
1965	0.55		-4.02	-2.91		-3.45	16.39		0.77		2.9	6.43
1966	-1.65		5.05	-18.16		3.34	3.05		-0.35		-10.8	1.33
1967	-0.19		2.38	0.08		2.41	-5.03		0.19		-4.3	-1.61
1968	0.12		2.99	11.90		3.11	-16.69		-0.18		-21.4	-21.43
1969	-1.65		1.62	30.78		0.74	-8.53		2.69		-18.4	-20.59
1970	-2.92		1.48	21.20		-1.64	-7.45		2.99		-34.4	-16.73
1971	-1.95		6.64	-4.02		4.70	-9.81		2.68		-29.7	-13.41
1972	-3.18		2.18	10.14		-1.04	8.56		3.13		-33.8	-28.49
1973	0.02		5.24	-12.78		4.96	12.88		5.21		-4.9	9.21
1974	-0.19		-3.50	-10.25		-3.58	-3.83		-1.87		75.3	40.00
1975	1.68		7.03	-18.12		-5.52	8.12		-4.53		54.0	39.72
1976	3.06		0.02	-19.06		3.02	1.54		-1.16		35.1	18.74
1977	1.39		-4.56	19.17		-3.48	3.50		-1.79		-4.4	-2.87
1978	0.42		1.45	14.70		1.85	-4.40		-1.13		-8.0	-14.55

Notes: (1) Corn, sorgham, barley and oats.  
 (2) The same footnotes of Table 1.1 apply to this table.

Sources: See Table B.2.

of the reasons why purchasers were willing to pay higher prices for wheat in 1974 than they were in 1963.

A closer look at the figures for the early seventies show that a number of forces were at work accounting for this drop in stock holdings by the exporting countries. By the 1969/70 crop season the exporting countries' total supply for exports and carry-over had reached the record of 95.6 million tons. With such an overhang on the market, the farmers in the exporting countries saw themselves faced with prolonged low grain prices for their grain. Furthermore, the exporting countries were acting as the holders of stocks and so were incurring the major costs of the operation, a role which many farmers (and the U.S. and Canadian governments) thought should be shared with the wealthier members of the consuming countries. The exporting countries started to cut back their areas of land devoted to grains.

In the U.S., during the period 1966 to 1970, an annual average of over 17 percent of the plantable acreage was withheld from production. Similar cutbacks in Canada, Australia and Argentina resulted in substantial drops below the trend in the area harvested (see Table 1.2). During this period of the early seventies consumption in both the exporting and importing countries continued to increase, yet in 1970 production dropped. Consumption was maintained by reductions in stocks. It was the continuation of this depletion of stocks that formed the background to the drop in production in 1974. In the major wheat and coarse grains growing areas of the world an untimely drought reduced yields and production just when stocks reached low levels. The result was an increase in export prices.

The coarse grain market experienced a similar leap in price, a development which caused substantial cutbacks in consumption in the feed sector. Animals were hurriedly brought to market, causing a reduction in herds as cattlemen slaughtered their cattle in the face of high feed costs. Initially meat prices fell, only to increase as the massive slaughter of cattle resulted in smaller herds and lower supplies. The beef cycle took an upward spin, resulting in high prices for beef.

Grain prices affect feed costs and in turn influence meat prices.<sup>5</sup> Similarly, the demand for meat affects the demand for feed grain and for particular coarse grains. One of the characteristics of the market for grain over this period has been the growth in the demand for meat as consumers grew more wealthy. This growth in income and in the demand for beef provided one of the strong trends in the growth of the demand for grain.

Although during the seventies the underlying trends in the demand and supply of grain were upwards, the fluctuations about the trends were substantial. An understanding of the timing and the incidence of the resulting fluctuations in price and quantities requires a consideration of the patterns of trade and of the forms of control by which the grain industry was, and is, regulated. An examination of the patterns of trade follows in the next section.

### 1.3 Movements in the Trade of Grain

The production of wheat is widely distributed between a number of countries. Exports, as a percentage of world production, have ranged from around 15 to 24 percent during the last two decades. While these are modest proportions, they mask the effects of fluctuations in trade on the major exporters and importers. The U.S. accounts for around 40 percent of the world's exports of wheat, followed by Canada with 20 percent and Australia with between 10 to 15 percent (see Table 1.4). Argentina is the other large wheat exporter, although its share has been highly variable.

In the mid-1970s the four major exporting countries accounted for over 27 percent of the world's wheat production. Their share of the world's wheat and coarse grain production was 32 percent. In the 1975/76 season the USSR produced 19 percent of the world's wheat output. China accounts for around 11 percent of production, a figure which is similar to that of the nine members of the European Economic Community. The large producer among this group is France. India produces around 7 percent of the world's output and Canada just under 5 percent.



Table 1.4  
 WORLD WHEAT TRADE:  
 EXPORTS EXPRESSED AS A PERCENTAGE OF TOTAL EXPORTS  
 (year beginning July 1st)

Crop Year/Country	Argentina	Australia	Canada	United States	Exports as a Percentage of Total World Production
1963/64	4.8	13.5	26.1	40.2	24.4
1964/65	8.1	12.1	22.6	36.7	19.7
1965/66	12.4	8.8	23.5	36.9	23.2
1966/67	5.4	12.0	25.7	34.8	18.7
1967/68	2.6	13.0	16.6	37.7	18.5
1968/69	5.4	10.9	17.6	29.8	14.9
1969/70	3.8	13.5	16.4	30.2	17.9
1970/71	2.7	16.2	21.5	33.8	17.8
1971/72	2.2	14.8	26.9	28.7	16.0
1972/73	4.6	7.7	21.4	43.7	20.8
1973/74	1.6	7.8	17.0	45.2	19.5
1974/75	3.4	12.9	17.5	43.8	19.0
1975/76	4.8	11.8	18.2	47.4	21.0
1976/77	8.8	13.4	20.4	40.7	16.9

Source: USDA Foreign Agricultural Circular, various issues.

Table 1.5

WORLD WHEAT AND FLOUR TRADE:  
NET IMPORTS EXPRESSED AS A PERCENTAGE OF TOTAL WHEAT IMPORTS

Crop Year/ Country	Japan	W. Europe	E. Europe	P.R. China	USSR	S.E. Asia	Africa	L. America
1963/64	6.7	11.1	9.9	9.0	12.2	10.8	5.0	5.4
1964/65	6.6	6.6	13.5	9.5	-	16.7	6.6	7.2
1965/66	5.5	7.7	9.9	9.9	9.3	14.3	6.1	6.1
1966/67	7.4	8.8	6.4	8.7	(2.2)	15.8	10.4	8.0
1967/68	7.4	4.8	4.8	7.8	(7.1)	17.3	10.4	9.5
1968/69	8.5	7.1	4.6	7.1	(11.3)	10.9	7.5	8.7
1969/70	8.0	2.9	6.2	9.3	(9.7)	9.8	6.9	7.1
1970/71	8.2	12.3	9.9	6.3	(11.4)	7.5	8.8	6.6
1971/72	8.5	5.7	7.3	5.1	(4.0)	8.1	9.1	7.4
1972/73	7.5	1.7	5.0	7.2	18.7	7.9	7.1	8.5
1973/74	7.8	0.7	5.6	8.1	(0.8)	10.9	10.0	9.0
1974/75	8.4	3.4	4.3	8.9	(2.3)	16.9	12.0	7.8
1975/76	8.8	4.6	6.4	3.3	14.4	16.2	12.1	9.4
1976/77	8.7	1.9	4.4	4.9	5.7	9.6	12.9	8.7

Notes: ( ) Denotes a negate import figure, i.e. exports.

1. This group includes: Bangladesh, India, Indonesia, Pakistan and Sri-Lanka.
2. This group includes: Algeria, Egypt, Libya, Morocco, Nigeria, South Africa, Sudan and Tunisia.
3. This group includes: Mexico, Brazil, Chile, Colombia, Peru and Venezuela.
4. This group includes: Intra EC-9 trade.

Source: USDA Foreign Agricultural Circular, various issues.

Table 1.6

WORLD COARSE GRAIN TRADE:  
EXPORTS EXPRESSED AS A PERCENTAGE OF TOTAL EXPORTS  
(year beginning July 1st)

<u>Crop Year/Country</u>	<u>Canada</u>	<u>Australia</u>	<u>Argentina</u>	<u>United States</u>
1963/64	3.4	2.0	10.6	45.3
1964/65	2.4	2.1	13.9	48.4
1965/66	2.2	1.1	8.2	56.5
1966/67	2.5	2.0	15.1	48.4
1967/68	2.6	0.7	9.5	46.5
1968/69	1.2	2.1	13.6	38.9
1969/70	2.9	2.0	13.8	44.2
1970/71	7.9	4.3	15.0	38.1
1971/72	8.0	5.8	11.2	38.0
1972/73	6.2	2.5	6.5	55.4
1973/74	3.4	2.4	10.5	56.1
1974/75	4.3	5.0	13.3	53.8
1975/76	6.3	4.1	6.9	60.4
1976/77	5.5	3.9	12.9	60.5

Source: USDA Foreign Agricultural Circular FG., various issues.

Table 1.7  
 WORLD COARSE GRAIN TRADE:  
 NET IMPORTS EXPRESSED AS A PERCENTAGE OF TOTAL IMPORTS  
 (years beginning July 1st)

Crop Year/Country	Japan	W. Europe	E. Europe	USSR	P.R. China	L. America	Asia	Africa
1963/64	13.2	52.0	4.0	(3.4)	2.3	1.1	3.1	1.4
1964/65	13.9	48.7	3.0	(3.8)	1.0	0.8	2.7	0.8
1965/66	11.4	54.1	6.0	(4.9)	0.2	0.4	4.7	0.6
1966/67	16.5	49.1	0.4	(0.6)	0.2	0.4	7.6	0.4
1967/68	18.2	47.5	0.7	(0.7)	0.2	0.4	6.6	0.9
1968/69	20.6	39.9	2.9	(0.9)	-	1.2	4.3	0.4
1969/70	23.0	35.7	28.9	(1.8)	-	1.8	5.5	0.4
1970/71	20.5	40.3	3.1	(1.1)	-	2.5	5.1	0.5
1971/72	18.5	28.4	7.3	6.8	0.7	1.2	7.3	0.5
1972/73	18.6	26.9	5.9	8.4	1.2	2.8	7.5	0.6
1973/74	18.0	27.1	1.9	6.7	2.7	3.6	6.8	0.9
1974/75	20.5	34.7	8.1	2.6	0.7	5.6	7.6	1.5
1975/76	17.6	25.8	4.8	20.2	-	3.1	7.7	1.3
1976/77	19.0	37.2	8.5	4.2	-	2.6	7.9	1.0

Notes: ( ) Denotes net exports.

1. Corn, Sorgham; barley and oats.
2. Chile, Mexico and Venezuela.
3. Hong Kong, India, Iran, Iraq, Israel, Korea, Lebanon, Malaysia, Philippines and Taiwan.
4. Libya, Zaire and Egypt.

Source: USDA Foreign Agricultural Circular, various issues.



Currently wheat exports represent just over 60 percent of the production in the four major exporting countries, compared with less than 50 percent in the 1969 season. Imports as a percentage of the importing countries' wheat production have been lower. During the seventies they reached a high of 29 percent in the 1975 season but, on average, were around the 23 percent mark. In contrast to this apparent stability in the total import proportions, particular national and regional shares have shown considerable variation. As Table 1.5 illustrates, the USSR has been both a large net importer of wheat, as in 1975 and 1972, and a net exporter, as in 1965. The USSR is also seen to play a similar role in the coarse grain market (Table 1.7), which also exhibits instability of importers' shares. The distinction, however, between the wheat and coarse grain importing countries, is the dominance of the developed economies of Western Europe and Japan in the latter. They account for around 60 percent of the coarse grain imports. In contrast, their share of net wheat imports (Table 1.5) is much lower and more variable, ranging from 20.5 percent in 1970 to under 9 percent in 1973.<sup>6</sup> Most notable has been the drop in imports to Western Europe, and to the EEC in particular. The high rates of protection for grains in the EEC has, in part, resulted in them becoming net exporters of wheat.

In the wheat market the less developed countries (LDCs) are more important importers than they are in the coarse grain market, as Tables 1.5 and 1.7 testify. It is in these countries, and particularly the larger populated countries of South East Asia, that wheat imports have played a decisive role in bridging the gap between starvation and subsistence. A considerable amount of the imports consist of food aid, such that in 1970 they accounted for 40 percent of the quantity of cereals imported into the non-OPEC developing countries, representing 33 percent of the cereals consumed in those countries.<sup>7</sup>

The trade in grain suggests that it is small in relation to world production, but large with respect to the production of the four main exporting countries. As for the importing countries, the developed industrial countries of Western Europe and Japan are the larger importers, while the block of LDCs figure significantly in wheat imports. The

large, variable importer is the USSR, a factor which introduces the important question as to the degree of stability in the production of grains in the exporting and importing countries. Given the small proportion of world production traded, a small change in production can have substantial effects on the fluctuations in consumption, stocks, prices and trade.

In 1969 wheat production in the importing countries was below their trend, in the exporting countries it was slightly above (see Table 1.8). Consumption was maintained in the importing countries by drawing down stocks. Export prices remained below the trend. During the first three years of the seventies the fluctuations in wheat production in the exporting and importing countries complemented one another. Production in the exporting countries was below the trend but above the trend in the importing countries. In 1974 matters changed, for both exporting and importing countries experienced lower productions which were below trends. Stocks at the start of 1974 in the exporting countries were very low. Export prices rose causing, in part, the cutbacks in consumption in 1975.

An examination of Table 1.9 helps to locate those exporters and importers experiencing the largest variation in wheat production since the start of the sixties.<sup>8</sup> The EEC had the lowest annual variation in wheat production, while India and Japan had the highest. Somewhat surprisingly, the LDCs had a relatively low degree of variation.<sup>9</sup> As residual suppliers, the major exporters could be expected to have some degree of variation in production. Of this group, Canada had the highest degree of variation. In fact, from these figures it would appear that, with the important exceptions of Japan, India and the Centrally Planned Economies (CPEs), the exporting countries displayed a slightly higher degree of variation in production than did the major importing countries.

The behaviour of the USSR was of considerable importance in the movement of trade in the seventies. In 1970/71 the USSR had been a significant net grain exporter. This changed in the 1971/72 season, when it became a net importer to the tune of 19 million tons of grain, and so became a sizable importer in the world market (see Tables 1.5 and 1.7). It would appear that these changes from an exporter to an importer did not

Table 1.8

WHEAT IMPORTING & EXPORTING COUNTRIES:  
 PRODUCTION AND CONSUMPTION:  
 PERCENTAGE DEVIATION FROM THE ESTIMATED TRENDS

Crop Year	Production		Exporting Countries Current Crop Surplus	Exporting Countries Total Supply & Carry Over	Exporting Countries Beginning Year Stock	Consumption	
	Exporting	Importing				Exporting	Importing
1960	5.51	1.35	10.75	13.91	15.25	- 0.96	0.48
1961	-11.99	- 4.67	-17.92	4.63	21.57	- 4.35	-2.06
1962	- 5.16	5.09	- 3.46	-	4.31	- 6.93	0.57
1963	- 7.36	-12.67	17.84	9.67	6.02	- 5.51	-4.86
1964	10.54	1.08	19.19	2.62	- 7.78	0.09	-0.95
1965	- 0.77	- 4.21	- 5.80	- 7.39	- 4.52	6.89	2.60
1966	11.60	7.24	20.07	-10.66	-35.24	1.45	-1.01
1967	1.80	0.65	5.17	-13.05	-26.14	- 1.46	-0.53
1968	11.34	7.68	17.82	1.08	- 9.98	3.97	-0.40
1969	1.21	- 1.53	- 1.21	13.75	38.42	6.28	2.90
1970	-22.94	3.62	-41.05	1.56	60.12	4.30	3.91
1971	- 6.86	7.39	-19.01	- 4.03	22.27	12.50	2.79
1972	-12.51	2.44	-23.96	- 9.34	16.85	6.07	5.32
1973	- 0.60	5.26	- 0.73	-17.27	-34.32	1.66	2.64
1974	- 5.88	- 1.47	- 4.28	-21.42	-41.28	- 6.26	0.09
1975	11.00	-12.77	22.85	- 1.19	-32.52	- 4.74	-6.74
1976	18.60	2.86	35.15	16.63	- 7.47	- 4.46	-2.13
1977	- 0.87	- 6.52	- 0.01	16.36	50.39	0.10	-0.62
1978	- 1.77	2.61	2.32	16.99	47.93	- 5.99	-1.21

Notes: (1) Argentina, Australia, Canada and the USA. Importing countries consist of all the rest of the world.  
 (2) All the other columns are subjected to the same qualifications as those noted at the footnote of Table 1.1.

Source: USDA Foreign Agriculture Circular. FG; various issues.

Table 1.9

ANNUAL PRODUCTION AND TRADE FOR WHEAT AND COARSE GRAINS:  
 VARIATIONS FROM SIXTEEN YEAR MEANS  
 1960/61 - 1976/77

(Percentages) Country/Region	Production		Trade	
	Wheat	Coarse Grain	Wheat	Coarse Grain
U.S.	20.3	14.8	25.5	48.1
Canada	24.9	24.9	21.6	73.0
Australia & Argentina	20.5	23.2	20.9	43.3
ECC-9	13.1	18.9	13.3	25.2
Japan	64.6	68.0	23.9	51.1
Centrally Planned Economies				85.0
India	19.9	21.1	33.8	124.3
Other LDCs	38.4	14.0	45.3	
	17.1	17.0	16.5	37.0

Note: (1) These are measured by taking the standard deviations.

Source: USDA Foreign Agricultural Circular, Wheat, various issues.



mirror exactly the behaviour of the USSR harvests,<sup>10</sup> but in part reflected the grain purchasing policies and meat planning objectives of the agricultural planners in the USSR. Nevertheless, the important point is that the size of the USSR and the behaviour of its weather and its planners has had significant impact on grain trading patterns.

The prices of exported grain showed considerable increases in the mid-seventies. They were not, however, completely reflected in the prices charged in all the importing countries. Indeed, two of the major grain importing blocks, the EEC and Japan, used various subsidizing schemes<sup>11</sup> to compensate their importers and to shelter their consumers from the high import prices. In contrast, many of the LDCs were unable to buffer their consumers from the price rises, either because they had not the size of stock or because they had not the finance for the operation. As a result, the incidence of the fluctuations in the market struck hardest at the weakest - the LDCs.

Placed within the prospective of the last thirty years, the rise in grain prices in the early seventies was exceptional. Given the inherent variability of grain harvests, the relatively inelastic demand for grain and the small proportion of grain production that is traded, the question perhaps should be why hasn't there been greater variability in the price of traded grain? An answer to this question requires an acquaintance with methods of stabilization employed in the domestic grain markets in the exporting and importing countries. These policies, and their effect on stability of the market in traded grain, are explored in the next chapter.

References

1. The USDA: Economic Research Service: The World's Food Situation and Prospects to 1985. Foreign Agricultural Economic Report No. 98. Dec. 1974, Page 49.
2. The figures used in the set of tables in this chapter have been drawn primarily from the United States Department of Agriculture. The uncertainty surrounding some of the estimates, particularly for the Eastern block countries and the developing countries, is recognized. Outlines of these problems are described in the footnotes to Table 1.1.
3. For details of the calculation of the trends see the footnote to Table 1.1.
4. The actual annual average increase in wheat export prices in 1963 was only 2.8% over the previous year.
5. According to USDA sources the quantity of grain used as feed in the 1976-77 season totaled 251.1 million tons, which represent 37 percent of the world utilization of coarse grains in that season.
6. Notice that imports are net of exports and expressed as percentages of total imports.
7. See: OECD (2)
8. See Table B.5 for details of the average productivity rate over the same period for these countries.
9. Although in aggregate the LDCs showed a low variation in output, it's quite possible that individual countries showed a high degree of variation. The aggregate variation will be dependent on the timing of each country's fluctuations in production. It should also be noted,

however, that to treat the LDCs as a group masks the important fact that few of these countries have the mechanisms by which they can export and import from one another.

10. See Luttrell (1)

11. See Chapter 2 for a description of these policies.

#### Bibliography

[1] Clayton B. Luttrell: The Russian Wheat Deal - Hindsight vs Foresight, Federal Reserve Bank of St. Louis, Oct. 1973.

[2] Food Aid; OECD , Paris 1974.

Chapter 2

THE REGULATION OF THE PRODUCTION, CONSUMPTION AND TRADE IN GRAIN

2.1 The Incidence of Instability in the Grain Market

For the exporting countries the sixties were years of bountiful harvests. They were reflected in the low, stable level of food prices in these countries. By the mid-seventies, however, the picture had changed. Poor harvests were followed by price increases. These showed in the food component of the consumers price index (CPI) which exceeded in a number of years the all item index. The less developed countries (LDCs) also experienced reversals in the seventies, although some countries, such as India, had experienced very poor harvests in the mid-sixties. In contrast, the major importing countries of the developed economies insulated their consumers from the price rises of the mid-seventies by deploying various subsidizing schemes. Although these policies resulted in the relatively stable consumption of grain, they also had the unintended effect of aiding in the rise in the prices of traded grains.

As Table 2.1 shows, only in three years in the sixties did food price increases in Canada exceed the all item index in the C.P.I.<sup>1</sup> In the major importing countries of Europe the food price increases were also modest during this period. In France, out of the ten years of the sixties, food price increases exceeded the increases in price of all items during four years. In the case of Germany this occurred in three years, while in England, only in two years. Of the major importers, Japan was the exception, for food price increases in this country were less than the all items increase only in 1966. Of the developing countries shown in Table 2.1, Indonesia suffered a civil war in the early sixties as well as an incredibly high rate of inflation. The harvest failures in India in the mid-sixties showed in the high food prices during that period, while in Thailand, traditionally a food grain exporter, food price increases were highest in seven out of the ten years. In Kenya, the number was as low as four, but one of these years, 1966, registered a sizable increase.



Table 2.1

PERCENTAGE CHANGE FROM THE PRECEDING YEAR IN CONSUMER PRICE  
INDEXES FOR FOOD AND FOR ALL ITEMS, SELECTED COUNTRIES: 1961-77

(Annual Data, 1970 as base year)(1)

YEAR	CANADA		UNITED STATES		AUSTRALIA		FRANCE		GERMANY		U.K.		JAPAN		INDIA		INDONESIA		KENYA (3)		THAILAND (2)	
	Food	All Items	Food	All Items	Food	All Items	Food	All Items	Food	All Items	Food	All Items	Food	All Items	Food	All Items	Food	All Items	Food	All Items	Food	All Items
1961	1.6	0.9	1.2	1.0	3.2	2.6	4.0	3.3	1.1	2.5	1.6	3.4	6.1	5.2	0.0	2.2	50.0	31.6	1.8	2.4	2.2	1.3
1962	1.7	1.3	0.9	1.2	-2.8	-0.3	6.3	4.9	4.5	3.5	-2.5	4.3	8.1	7.0	4.3	3.2	175.0	168.0	3.7	2.7	3.3	2.4
1963	3.2	1.7	1.5	1.3	0.3	0.5	5.1	4.8	2.9	3.0	2.5	1.9	9.4	7.4	3.1	3.1	113.6	116.4	-1.3	1.4	-0.1	0.9
1964	1.6	1.9	1.1	1.3	3.9	2.4	3.6	3.4	-3.1	2.3	2.9	3.4	4.1	3.9	15.0	13.0	118.4	105.5	-2.1	-1.1	4.3	2.0
1965	2.7	2.3	2.2	1.7	5.8	3.9	2.4	2.5	3.2	3.3	3.9	4.7	8.6	6.7	10.4	9.7	304.9	304.7	7.7	4.7	0.6	0.9
1966	6.4	3.7	5.0	2.8	2.1	3.0	2.7	2.7	10.2	3.5	3.1	3.9	3.7	5.1	11.0	10.5	958.5	1044.3	7.2	4.4	6.5	3.7
1967	1.2	3.6	0.9	2.9	3.9	3.2	1.6	2.6	-0.1	1.6	2.5	2.5	4.9	4.0	16.3	13.9	181.1	169.6	1.3	1.8	7.2	4.0
1968	3.3	4.0	3.7	4.2	2.6	2.7	3.0	4.6	-0.9	1.6	3.9	4.7	6.4	5.4	3.7	2.6	139.3	125.5	0.2	0.4	3.4	2.1
1969	4.3	4.5	5.1	5.4	1.3	2.8	6.3	6.4	2.3	1.9	6.4	5.4	6.0	5.2	3.9	0.6	3.0	6.1	-1.1	-0.2	4.0	2.1
1970	2.2	3.3	5.5	5.9	3.6	4.0	5.9	5.3	2.3	3.4	7.0	6.4	9.1	7.6	5.3	5.1	9.3	12.4	2.5	-2.2	0.2	0.8
1971	1.1	2.9	3.0	4.3	3.9	6.1	6.4	5.5	3.8	5.3	11.1	9.4	6.0	6.1	1.5	3.3	2.6	4.3	26.5	1.9	0.6	1.7
1972	7.6	4.8	4.4	3.3	3.8	5.8	7.9	6.2	5.7	5.5	8.8	7.1	3.4	4.5	6.4	6.3	10.3	6.5	3.3	3.1	6.5	4.0
1973	14.5	7.6	14.5	6.2	15.2	9.4	9.4	7.3	7.6	6.9	15.0	9.2	13.0	11.7	21.3	16.8	13.4	31.0	4.8	7.4	14.4	11.7
1974	16.2	10.9	14.2	11.0	15.2	15.1	12.5	13.7	4.7	6.9	17.9	15.9	27.7	24.2	30.5	28.7	41.2	40.5	17.9	14.8	28.4	23.2
1975	12.9	10.8	8.5	9.1	7.5	15.0	11.3	11.7	5.2	5.9	25.6	24.2	12.9	11.8	4.3	5.6	20.5	19.0	20.9	18.4	4.0	4.1
1976	2.6	7.5	3.0	5.7	12.2	13.5	9.3	9.2	5.1	4.5	19.9	16.5	9.1	9.2	-12.7	-7.8	22.0	19.8	6.7	8.4	5.4	4.9
1977	8.3	7.9	6.2	6.4	11.5	12.2	14.0	9.7	5.0	3.9	19.0	15.8	6.6	8.0	9.9	8.4	10.6	11.0	12.0	11.3	11.5	8.4

Source: United Nations: Monthly Bulletin of Statistics: various issues.

NOTES

- (1) The base is 1972, and the prices represent those paid by the middle classes.
- (2) Bangkok, Metropolis.
- (3) Refers to middle class incomes.

The 1970s saw the coincidence of below trend harvests in exporting and importing countries in 1974, and as we have seen, this led to larger increases in the export prices of grain in this period. As Table 2.1 shows, these were reflected in the high price increases in food registered in the exporting countries. In Canada, food price increases exceeded increases in all items in five out of the eight years. In the U.S. the number was three, while in Australia it was two. The latter country, however, along with the European countries and Japan, was adjusting to the massive hikes in the price of imported oil. These oil price increases were not as drastic in North America, owing to the domestic oil pricing policies which gave consumers some temporary shelter. Nevertheless it is rather surprising to see that the increases in food prices in the U.S. and Canada in 1973 and 1974 exceeded the food price increases in France, Germany and Japan in 1973, and France and Germany in 1974. Only in Japan in 1974 and the U.K. in both years did food prices exceed those in the U.S. and Canada.<sup>2</sup> Even though the appreciation of the deutschmark and the yen and the entry of the U.K. into EEC in 1973 present added factors in interpreting these movements, it seems clear that the exporting countries experienced the higher food price increases. As for the LDCs, it appears that the increase in oil prices affected them particularly badly, with the exception of oil producing Indonesia. Nevertheless, the figures for these selected countries suggest that they experienced very substantial increases in food prices.

A re-examination of Table 1.8 shows that the very high increases in prices for food in the exporting countries were reflected in the drop below the trend in consumption in 1974. The large drop below the trend in consumption in the importing countries occurred a year later, in 1975. Table 2.2 gives a more detailed breakdown, in which the domestic utilization of wheat and coarse grains is given for the U.S. and the EEC. Deviations from the trend show that although there was a slight drop below the trend in wheat consumption in the U.S. in 1973, the larger drop in coarse grain and wheat consumption occurred a year later. These drops below the trend were considerably greater than the drop in consumption in the EEC in 1975. This difference is particularly noticeable in the case

Table 2.2

CONSUMPTION OF WHEAT & COARSE GRAINS: SELECTED COUNTRIES  
 PERCENTAGE DEVIATION FROM THE TREND

YEAR	U.S.			EEC			EEC			JAPAN			ASIA		
	Domestic Utilization			Domestic Utilization			Imports(2)			Imports(3)			Imports		
	Feed Grains	Wheat		Coarse(1) Grains	Wheat		Coarse Grains	Wheat		Coarse Grains	Wheat		Wheat		
1971	0.77	14.68		-0.04	-0.60		-10.53	-4.58		-4.77	2.49		70.65		
1972	9.14	6.45		1.55	4.97		-9.46	5.56		3.00	9.01		-30.59		
1973	1.33	-2.43		5.42	-0.76		2.13	-20.58		12.36	3.49		-6.64		
1974	-18.08	-12.17		-0.66	2.15		0.10	-14.64		-3.09	0.06		45.93		
1975	-7.04	-7.64		-1.27	-3.52		-8.32	1.10		-7.29	5.71		-31.40		
1976	-5.74	-6.87		-1.35	-1.11		41.35	-11.46		2.01	-4.72		-8.19		
1977	1.97	5.69		-0.24	1.34		-18.11	31.92		-2.93	-6.19		11.28		

Notes: (1) Rye, barley, oats, corn and sorgham.

(2) The period was 1970-77.

(3) The period was 1966-77.

(4) The ECC includes all 9 members, even though the EEC consisted of only 6 members in 1972.

Source: USDA Foreign Agricultural Service: FG 18-78.

of coarse grain consumption. In the case of Japan, the imports of coarse grain dropped below the trend in 1975, but not so wheat, which showed a large drop in 1976. As for Asia, wheat imports showed enormous drops below the trend in 1972<sup>3</sup> and 1975.

The evidence of Table 2.2 suggests that the large adjustments in the prices and the consumption of grains in the mid-seventies occurred in the exporting and in the LDCs, while Japan and the EEC showed relatively less change in consumption. Changes in domestic production, price changes, regulatory policies and general economic changes have all played their part in these fluctuations. The next section prepares the way for an examination of the likely effects of the regulatory mechanisms employed in the major importing and exporting countries on the form and the incidence of adjustment to these fluctuations. The section examines the instruments employed to regulate the production, consumption and trade of grain in the major exporting and importing countries. In doing so it prepares the way for a consideration of the effects these instruments have had on the form of the adjustment to fluctuations in the market and, in turn, the effects these adjustments have had on the fluctuations in the grain trading markets.

## 2.2 The Regulation of Production and Consumption in the Major Exporting and Importing Countries

The U.S. is the largest exporter of wheat and coarse grains. Canada has traditionally been the second largest exporter of wheat, followed by Australia and Argentina. Of varying importance as exporters have been the USSR and the EEC. The latter have engaged in the export of soft wheat, usually subsidized and largely to the LDCs. The U.S. is also the major exporter of corn and soybean, followed by Argentina, while Canada is the major exporter of oats and rye.

The varying significance of these exports for the major exporters is illustrated in Table 2.3, which displays the value of exports in 1978. Canada and Australia stand out by the importance of wheat exports in their total grain exports. Although total agricultural exports in Canada ac-



Table 2.3

MAJOR GRAIN EXPORTING COUNTRIES: TRADE IN GRAIN  
EXPRESSED AS PERCENTAGES OF THE VALUE OF TOTAL MERCHANDISE TRADE IN 1978

COMMODITY	COUNTRY			
	<u>U.S.</u>	<u>CANADA</u>	<u>ARGENTINA</u>	<u>AUSTRALIA</u>
Total grains	7.7	4.6	31.5	11.6
Wheat and wheat products	2.9	3.7	9.5	8.1
Oilseed and products	5.2	1.0		
All agricultural products	19.3	9.3	89.0	46.5

Sources: Economic Information on Argentina, No. 100; Sept./Oct. 1979

Agriculture Canada: Agriculture Abroad, June/Oct. 1979

USDA: Agriculture Outlook, A0-49 Nov./1979

counted for under ten percent of all merchandise exports in 1978, they were almost 90 percent of Argentina's exports, 47 percent of Australia's and a surprising 20 percent of the USA's. Not only is the U.S. the major grain exporter and producer, its climate and soil are such as to allow around 60 percent of its cultivated land to be used for grain cultivation. As a result, changes in growing conditions and movements in relative grain prices in the U.S. can have substantial effects on world supplies, and on the prices of traded grain.

The dominance of the U.S. in the export market of wheat emerged after the second world war. Previously Canada had shared the top spot as the major wheat exporter. Despite their proximity, the growing conditions and transportation in the two countries are markedly different. The large wheat belt in the U.S., stretching from Kansas to St. Louis and Chicago has a wider range of climatic conditions than the Canadian Prairies. The three Canadian Prairie provinces account for 95 percent of Canada's wheat receipts, Saskatchewan alone accounting for an average of 65 percent. The U.S. grain belt has not only been able to produce more varied grain crops; it is also served by a radial transportation network, including extensive land, rail and water networks. In contrast, the Prairies are much further from the consuming areas. The transportation is east/west, to the distant ports. In Australia and Argentina the growing areas are much nearer the ports than they are in Canada. Furthermore the growing season in Canada is such as to result in an intense peak in the demand for transportation. It lasts for only three to four weeks each year.

In recent years the prairie rail network has been unable to handle all the grain designated for export. In 1978/9 1.5 million tonnes of grain exports had to be deferred because of the inability of the grain handling system to move all that was demanded for export. According to the Canadian Wheat Board,<sup>4</sup> a yearly volume of about 21 million tonnes of grain is the maximum that the present grain handling system in Canada is capable of accommodating. Yet in 1978 there was a potential of 25 million tonnes for export and, according to the CWB, by 1985 Canada has the potential to export 20 million tonnes of wheat and 10 million tonnes

of coarse grains. If these potential exports are to be realized there will be a need for reinvestment in the transport and handling system. This is likely to involve a reconsideration of the extent and incidence of the benefits and costs involved in the statutory determined Crows Nest pass rates which still apply to grain moving to export position.

As its share of the world's exporters of grain indicate, the U.S. has been the dominant influence on the price of internationally traded grains. This was marked in the sixties. Its policies with respect to stock, production and pricing were largely effective in the sixties in containing the price of internationally traded grain within a price band, the floor of which was set at the U.S. government loan rate<sup>5</sup> and the ceilings at a percentage of the loan rate, usually in excess of 100 percent. This price band was maintained by the Commodity Credit Corporation (CCC), which acquired or disposed of stocks, and by government policies which affected the acreage devoted to grain production. By the seventies, however, the major grain importing countries of the EEC, Japan and the Eastern block showed themselves to be sufficiently large to have considerable effect on the volume and price of traded grain.

The countries of Western and Eastern Europe, the USSR and Japan purchased over 40 percent of wheat exports and 70 percent of coarse grain exports at the start of the seventies. Although their share of wheat had dropped to 32 percent by 1978, they remained a dominant influence in the trade of coarse grains. Furthermore, although each country and trading block had its own policies, there were a number of characteristics which they all had in common. They maintained relative price stability in their domestic markets by equating the supply of grain with the demand by varying their imports (and exports).

As a result, an understanding of the movements in the international grain market during the sixties and seventies requires an acquaintance with details of the grain policies of the major producers and traders of grain. Primarily this involves a consideration of the U.S. policy, and of the determination of the U.S. loan rate, the U.S. selling price of grain stocks and the relationship of the world's price to the support levels in

the major importing countries. While these are the main "parameters" within which the world's market in grains has operated, there is also a need to be acquainted with the policies of the other major exporters, primarily Canada, Australia and Argentina, as well as those of the major CPEs.

#### 2.2.1 Regulation of Production and Consumption in the Exporting Countries

The production of wheat in all the major exporting countries has, and continues to be, subject to considerable regulation.<sup>6</sup> This is not the place to present a detailed account of these policies and their changes. Instead, emphasis is placed on current and recent policies pursued in the four major grain exporting countries and on the distinctive differences between them.

The U.S. system is perhaps the most distinctive in that, unlike Canada and Australia, it does not possess a central marketing agency which transports and sells grain for export. It does have a central buying and selling agency, but this is not the dominant influence that the wheat boards exercise in Canada and Australia. Farmers themselves hold wheat and grains in the U.S., and there is also a substantial amount of grain traded by the private sector. The U.S. grain growing industry is also subject to supply management and income stabilization schemes. Australian and Canadian policies have also aimed at regulating supply and stabilizing farmers' incomes, although the means of achieving these objectives have differed.

The present regulation of grain production in the U.S. takes its particular form from the programmes contained in the Food and Agriculture Act of 1977.<sup>7</sup> A number of the instruments used to regulate production, prices and incomes have, however, been deployed in previous programmes. There are, in the present programmes, six major policy instruments: target prices and deficiency payments, commodity loans and support prices, extended farmer-held grain reserves, crop acreage reductions and land diversion payments.



The minimum loan rates, which have been in operation for four decades, place a floor under the market prices of grain. The target prices are used to determine deficiency payments and form part of the mechanism by which farmers receive income protection. They also affect the amount of grain planted. When the crop has been determined, however, the market price is left to move in response to world demand and supply.

Under the 1977 Act target prices are determined on a "cost of production" basis. The latter includes normal expenses, and a four percent return on land based on its current price. This formulation, however, was by-passed in 1978, when in May of that year the Emergency Agriculture Act increased the target price of wheat to \$3.40 per bushel. In 1979 and onwards, the cost formula has not included a factor for changes in the cost of land. The loan rate is, in effect, a support price, although it is described as a "loan" because of the mechanism by which farmers lend the grain to the Commodity Credit Corporation (CCC). The non-recourse commodity loans, as they are known, are obtained by farmers when they pledge a given amount of the grain to the CCC. In return they obtain loans, which are equal to the quantity lent multiplied by the loan rate. The loan is specified for a given period - usually between nine and ten months, such that at the day of termination the farmer may choose to repay the loan by paying the interest and storage costs. If he chooses not to pay the loan in this way, he may satisfy it by delivering the grain to the CCC. In such transactions the farmer does not pay for the interest but he does pay the costs.

The Secretary of Agriculture sets the loan rates, but in the case of wheat and corn, there is a stipulation as to how low the rates can go. These are \$2.00 per bushel for wheat and \$1.75 for corn. In those years in which the market prices fall as low as 105 percent of the loan rate, the secretary is allowed to reduce the loan rate for the following year by up to 10 percent, as long as it does not fall down to the stipulated minimum rate.

In 1977 the national average loan rate for wheat was \$2.25 per bushel. The target price was \$3.40. The deficiency payment rate that was made was the smaller of the difference between the national average market price for wheat received by farmers during the first few months of the 1977-78 marketing year - or the loan level of \$2.25 per bushel and the target price of \$2.90 per bushel. The national average market price during the harvesting period of June to October in 1977 was below \$2.25 per bushel, and so the deficiency payment of \$0.65 per bushel on the eligible production came from the difference between the loan rate and the target price. In 1978/79 the market price for wheat averaged \$2.94, and exceeded the target price. In those years in which there are deficiency payments there is also the possibility that the limits on these payments will be reached. For 1978, a farmer could only receive total deficiency payments for all three crops (wheat, feed grain, and cotton) of \$40,000.

As well as these instruments, the government has also applied restraints on the supply of grain. There are three supply control schemes under the 1977 Act: set-aside schemes and diversions, land diversion payments and crop acreage reductions.

In the case of wheat the set-aside schemes are important, for as with other grains, compliance with the set aside schemes determine the amount of the deficiency payments that are received along with the payments for crop disasters and loans. The scheme is operated by the Secretary of Agriculture. He establishes a national programme average and then stipulates a percentage of the actual acreage of wheat that has been planted. This is then set-aside. For 1978 the set-aside for wheat was 20 percent, 10 percent for feed grains (see Table 2.4). Those farmers meeting this set-aside requirement receive deficiency payments. These are calculated on a minimum of 80 percent of the actual planted acreage multiplied by the farmer's programme yield, which is established for each farmer.

Those farmers who "voluntarily" reduce the planted acreage by at least the percentage specified by the Secretary of Agriculture can obtain deficiency payments of 100 percent of their normal production on their planted acreage. As well as this "voluntary" crop acreage reduction,

Table 2.4

U.S. COMMODITY PROGRAMMES: 1978 AND 1979

Commodity	Target Price \$ per bu.		Loan Level \$ per bu.		Set-Aside percent		Diversion percent		Diversion Payment \$ per bu.		Voluntary Reduction percent		National Programme Average millions acres	
	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979	1978	1979
Wheat	3.4	3.4	2.35	2.35	20	20	--	--	--	--	20	15	58.8	57.1
Corn	2.10	2.20	2.0	2.0	10	10	10	10	.20	.20	5	10	67.6	63.7
Sorghum	2.28	2.30	1.90	1.90	10	10	10	10	.12	.10	5	10	13.7	13.2
Barley	2.25	2.14	1.63	1.63	10	20	10	--	.12	--	20	30	7.5	6.5
Soybean	4.50	4.50												

Source: USDA, Agriculture Outlook, Jan./Feb. 1979.

there are also a set of payments that are made when land is diverted to approved conservation practices. This is achieved by farmers indicating the annual payments per acre they would accept for such changes. In this way a bidding process is encouraged. In previous schemes the Secretary did not activate such a process and, instead, he simply stated the payments that he considered sufficient to bring about the desired amount of diversion.

Finally, there is the operation and control of the stocks of grain held by the CCC. As we have seen, the loan rate of the CCC provides a floor price. In the past the CCC has had the authority to release or sell its stocks at prices close to the prevailing loan rate. Since 1971, however, resales of grain could not occur at less than 115 percent of the current loan rate, although exceptions were made for export sales in certain years. In the 1977 Act the 115 percent limit was applied to export sales and, also, it introduced provisions for the founding of a second storage programme. This is known as the farmer-held grain reserve programme and it allows not the CCC, but farmers, to hold grain reserves. It is achieved by providing for loans to farmers to store grain for periods of three to five years. If the farmer does not hold the grain for this period - or until a stipulated release price has been reached, the farmer will be subject to penalties involving the repayment of larger fees and penalties. The release price for wheat is 140 percent of the current loan rate. For feed grains it is 125 percent (see Table 2.5). When the market price reaches 175 percent of the current loan rate for wheat and 140 percent for feed grains the loans are recalled.

This programme operates alongside the CCC's loan programme. As a result of the extended farmer holds reserve, however, the CCC is not able to dispose of any grain until all of the loans under the latter are liquidated. One result of this is that the former loan limit of 115 percent of the loan rate is now raised to 150 percent. The loan rate for wheat in 1979 was \$2.35 per bushel (Table 2.4) which means that if there were no farmer-held grain reserve programmes the selling price would be \$2.70. Due to the farmer-held grain reserve programmes the minimum selling price is \$3.52, which is 150 percent of the loan rate.



Table 2.5

U.S. FARMER OWNED RESERVE: STATUS, SEPT. 28/79

Commodity	Release(1)		Call(2)		Quantity in Reserve		Quantity Redeemed Sept. 28
	Price	Date	Price	Date	Originally	Sept. 28	
	\$		\$		(million bushels)		
Wheat	3.29	May 16	4.11	-	413.2	253.5	159.7
Feed Grains:							
Barley	2.04	June 5	2.28	June 26	41.2	32.6	8.6
Corn	2.50	June 4	2.80	-	732.1	540.4	191.7
Oats	1.29	Sept 30	1.44	-	39.3	30.9	8.4
Soybean	4.24	Sept 6	4.75	-	44.4	28.3	16.1

Notes: (1) Release prices are those that the farmer may repay the CCC loans or alternatively which he may sell without penalty.

(2) Call - farmers must repay loans 30 days after notification, unless they are extended because commerial storage or adequate transport is not available. Assessments to determine extensions are made for each county.

Call price levels are 140 percent of the loan rates for the feed grains and 175 percent of the loan rates for wheat.

Source: U.S. Dept. of Agriculture: Agriculture Outlook, No. 48, Oct./79.

Under the farmer-held reserve programmes the objective was to store 17 million tons of feed grain and eight to nine million tons of wheat. These limits have not been kept. In March 1978 a six million metric tons of wheat reserve for "for international humanitarian disaster uses only" was announced.

In summary the U.S. system attempts to provide price supports and income protection as well as attempting to affect the supplies of substitutable grains. It has attempted to achieve these objectives by providing loan rates and deficiency payments which are obtained by the producers so long as they abide by the supply restrictions. The deficiency payments, in fact, have been the means of making effective the supply control programmes. The levels set for the target prices of closely substitutable grains and their relationship to their loan rates have also been employed to affect the supplies of grain. The level of the target prices and their relationship to the loan rates show that wheat has been set the highest targets and the largest potential deficit payments. These are rates which can be expected to expand wheat production relative to corn, barley, and soybean production.

Canada has a centralized marketing authority, the Canadian Wheat Board (CWB). Until 1974 it had sole authority to market wheat, oats, and barley produced in the three Prairie Provinces and the Peace River area of British Columbia. In that year the New Feed Grains Policy resulted in the removal of the authority of the CWB over the interprovincial marketing feed grain (barley, oats and feed grades of wheat). Even so, the CWB retains authority over all sales of all three grains on the international market. It authorizes the delivery of the grain from the farmers through the marketing system on to the ships.

The CWB is, however, more than just a marketing agency. It sets initial prices which it guarantees to farmers and it sets quota levels. The initial prices are differentiated according to the grade of the wheat. The farmer receives the initial prices for the grade of wheat produced, net of the transport and handling charges. The farmer has, at the start

of the season, specified the acreage assigned to grain production. The CWB, however, sets quotas which specify the bushels of grain which can be delivered by the assigned acreage.

The setting of the initial price involves foresight as to the movement of prices in the forthcoming 15 months or so. It is an important decision, for along with the quotas that the CWB sets, it influences the amount of seeding the farmer undertakes. Nevertheless, over the year the revenue the farmer receives and the quota the farmer is assigned may change. During the course of the crop year quota levels for the grains are adjusted in order to bring supplies in line with export requirements. If, for instance, the initial delivery price is below the expected final market price, farmers receive interim payments. At the end of the season the total revenues for each grain pool are adjusted for the initial and interim payments and the CWB operating charges are deducted. The net balance is then spread between grades of wheat and distributed to the farmer. The final price received by the farmer therefore depends on the farmer's location and his grade of wheat.

A centralized marketing agency with control over all exports (and imports of grain) and with the authority to set initial prices and quotas forms the set of instruments used in Canada. Over the years, however, Canadian governments have instituted programmes which have not only used these instruments but have also supplemented them. The purposes of these programmes have varied, ranging from the control of production to crop insurance. In 1973, for instance, in response to the rapid increase in grain prices in the world market, the government passed the Two Price Wheat Act. It was aimed at reducing the effect of the price increases on the Canadian consumer. A maximum price for wheat for domestic milling purposes was introduced. If the realized price for wheat rose above this maximum the government reimbursed the CWB for the difference in sales to the domestic market. As a result, the consumer, during such periods, was subsidized by the government.

The Crop Insurance Act of 1959 was introduced to reduce the effects of variations in production. Farmers pay 50 percent of the insurance



premium, the other half being paid by the federal government. In the Prairies the provinces pay for the administration of the programmes. As a result, the programme provides an all-risk insurance at subsidized premiums.

A major programme affecting the stability of grain farmers' incomes came with the passing of the 1976 Western Grain Stabilization Act (WGSA). Prior to the WGSA the protection of the income of grain farmers was limited primarily to insuring against variations in yields. The WGSA presents provisions which cover variations in yields, production levels and grain prices. It is a voluntary plan. The volunteer has to contribute two percent of his gross grain receipts to the stabilization fund. In return the WGSA guarantees that the appropriate, prairie wide gross margin (costs receipts minus cash expenses) for the six major grains combined in any one year will not be below the previous five year average of this margin. The federal government contributes four percent of total grain receipts to the fund and pays the costs of administration.

In 1970 the programme known as LIFT (lower inventories for tomorrow) was introduced in response to the very high level of stocks that had been built up and which were depressing the prices of traded grains. Farmers were paid \$10 per acre to take wheat out of production and into summer fallow or permanent forage. It was successful, for acreage dropped by more than 50 percent and production by 48 percent.

A major change in the Canadian feed grain markets was signalled with the passing of the New Feed Grains Policy in 1974. Up to this date the CWB was solely responsible for the interprovincial trade of feed grains (feed wheat, oats, and barley). During the surplus year of the late sixties, the CWB regulated the market in feed grains such that there was in effect a two price system. Quotas were tight on the Prairies, with the result that farmers disposed of their extra output by feeding it to their cattle or by selling it in the intraprovincial, off-board markets. Prices in these markets were very low, yet in the east, where farmers received their supplies from the CWB, prices were higher. Then in the early seventies shortage occurred, and the quota was lifted in 1974 and 1975. In



the following year, an agreement between the CWB, the federal government and the Canadian Livestock Feed Board was made. It took the form of a pricing formula. This formula related the price of feed grain supplied by the CWB to the domestic market to the price of U.S. corn and soybeans.

Australia, like Canada, has a single marketing body with authority to market all wheat produced and sold off-farm. Founded in 1948, the Australian Wheat Board (AWB) uses the state bulk-handling facilities to move the wheat from the farm to export points. Like the CWB, at the start of each season the AWB establishes a guaranteed price for exported grain of a given quality and, at the same time, it establishes a fixed home consumption price for domestic sales of wheat. The payment of the guaranteed price involves the services of the Reserve Bank. The AWB makes advanced payments to growers soon after delivery, the credit being supplied by the Reserve Bank on the basis of federal government guarantees. The farmer receives an initial price, less his freight costs from the point of delivery to the export point. After the Bank's loan has been repayed, the farmer receives any additional payments that have resulted from the sales. The return to a farmer depends on the quantity delivered and the average price realized by the pool. Payments from the pool can take a number of years before they are fully realized.

The guaranteed prices were originally established on the basis of estimated costs of production. At the end of the sixties this changed and they were, instead, reestablished in line with overseas prices. These prices apply to a given maximum amount of exports from the pool for any one year. The fixed home consumption price is established according to a cost of production formula which, over the years, has undergone changes. The guaranteed price and the home consumption price are adjusted annually by the same amount, according to changes in the cost formula. If the export prices for a pool's wheat exceed the guarantee price by more than a specified amount, the surplus is paid into a fund, the Wheat Prices Stabilization Fund. When the average export price falls below the guaranteed price, the deficiency on the given amount of exports is made up by drawing on the fund. If this is inadequate - or if the fund is exhausted - the federal government provides the money to meet the guaranteed price.

Until the mid-sixties Australia pursued a policy of pricing to sell all its wheat available for export. In the period 1961-65, for instance, Australia's exports as a percentage of total supply (production plus carry-over stocks) averaged 69 percent. This changed in the mid-sixties, partly as a result of the export price war in the 1965/66 season. Stocks were increased, so that in the period 1966/67 to 1971/72, Australia's carry-over stocks ranged from 1.4 to 7.3 million tonnes, compared with what were in effect transaction stocks of half a million tonnes during the preceding six years. This increase in stocks was facilitated by a silo construction programme which added almost 5 million tonnes to the storage capacity in 1969. In this same season, and in response to the substantial over-supply of wheat, the government agreed to support a system of wheat delivery quotas. The scheme operated by means of allocating production quotas to each state. The AWB was advanced finances by the Reserve Bank to facilitate the purchases. In the 1968/69 season some 5.8 million tonnes were added to the stocks. Yet by the end of the 1971/72 season, deliveries to the AWB fell well short of the quota levels and the opening stock for the following season had fallen by almost five million tonnes over the previous year.

The Argentine wheat sector has experienced considerable changes in policies during the 1970s. In the 1972/73 season, during which grain and oil seed prices rose considerably, the government instituted export taxes on grains and oil seeds entering the export trade. The tax on wheat, for instance, was as much as three times that of the producer price. As the prices received by producers were substantially less than the prevailing export price the result was that supply failed to fully respond to the higher level of international prices.

This policy changed in the 1975/76 season, when the government adjusted upwards the producer price of wheat. This coincided with the closure of the EEC borders to Argentinian beef, resulting in a switch out of coarse grains into wheat. The supply of wheat jumped upwards. It was marketed on the domestic and international markets by the National Grain Board. This had been established in 1974. Its performance was poor, and

in 1976 the grain marketing function was returned to the private trade. In the last crop year, domestic prices reflected levels in the international market.

### 2.2.2 Major Importing Countries

Of the major grain importers, Japan's price and production policies are fashioned to the objective of maintaining a high degree of self sufficiency in food grains and to preserve the role of rice as the principal foodgrain. The primary instruments of this policy are high support prices for grains and import quotas. The Japanese food trading company purchases wheat on international markets and then sells the wheat to domestic millers at a price which is usually much higher than the price at which it purchases. Domestic producers, however, receive substantially more than the price received by domestic millers. Given the low production levels of domestic wheat, the profit accruing from the sale of imported wheat more than compensates for the loss taken on domestic wheat sold to domestic millers. For instance, the trading company recently purchased wheat at around \$US 3.50 per bushel c.i.f. at Japanese ports and then sold the commodity to millers at around \$US 7.00 per bushel. In July 1978 domestic wheat producers received the extremely high support price of \$US 22.00 per bushel. Feed grains enter tariff free, with the exception of barley, and domestic prices reflect international prices. The objective of this policy is aimed at developing the domestic livestock industry.

The agricultural policy decisions made in the European Economic Community (EEC) are the result of the Common Agricultural Policy (CAP). To support farm incomes EEC domestic prices are usually kept higher than world prices. The support prices which achieve these differences are fixed in the annual farm price negotiations, and are set in terms of units of account (ua). This is an accounting device, and so common prices in ua are then expressed in national currencies before being applied to each of the nine states.<sup>8</sup> This is achieved by applying the "green rates," which are special agricultural conversion rates. They are based on the values of the national currencies over a period in the past. These green rates vary in differing extents from the various currencies' market ex-



change values, with the result that there are a series of national markets with a system of monetary compensatory amounts (MCAs) which are paid in order to maintain the level of intervention prices as expressed in national currencies.

CAP prices and regulations are subject to the approval of the Commission of the European Communities, which has the sole right to make proposals, and the Council of Ministers, which is the legislative body. Final approval must be sought from the European Parliament.

Once the annual price review has been agreed, the next important task is the allocation of the overall price changes among the commodities. It is this breakdown of the overall increase into individual commodity increases which, perhaps more than any other process, causes controversy.<sup>9</sup> The difficulties arise when price increases are given to sectors which are currently over-supplied. These problems have been especially troublesome during periods of currency appreciations, when countries experiencing such changes argued that price rises were necessary in order to raise the overall level of increases in farm prices.

The regulations covering a unified method for grains in the EEC came into effect on July 1st, 1975. The instruments of the pricing policy, however, have remained the same. They consist of three regulated prices: target prices, intervention prices and threshold prices.

Target prices are set annually by the CAP, and they are the prices which grain producers in the EEC are paid. The price is established as the desired price in the main deficit area, which is Omers (Northern France) for wheat and Duisburg (W. Germany) for other grains. The intervention price is a price which is set to support producer prices, for it triggers the intervention agencies of the Member States to buy grain grown in the community. This happens when the market prices in a given area fall below the intervention price. The latter is established in each intervention and marketing centre in the EEC and is based primarily on the price in the main deficit area less freight costs from other producing



areas. Other considerations are the area's surpluses or deficits and its import and export potential from and to the non-members of the EEC.

The intervention price for soft wheat in the 1978/79 crop year was, on average, about 25 percent below the target price. A slightly higher intervention price, of around 15 percent, prevails in the small hard bread wheat market.<sup>10</sup> Until the mid-1970s a considerable amount of wheat was purchased at the intervention price. Since this period the amount has dropped considerably.

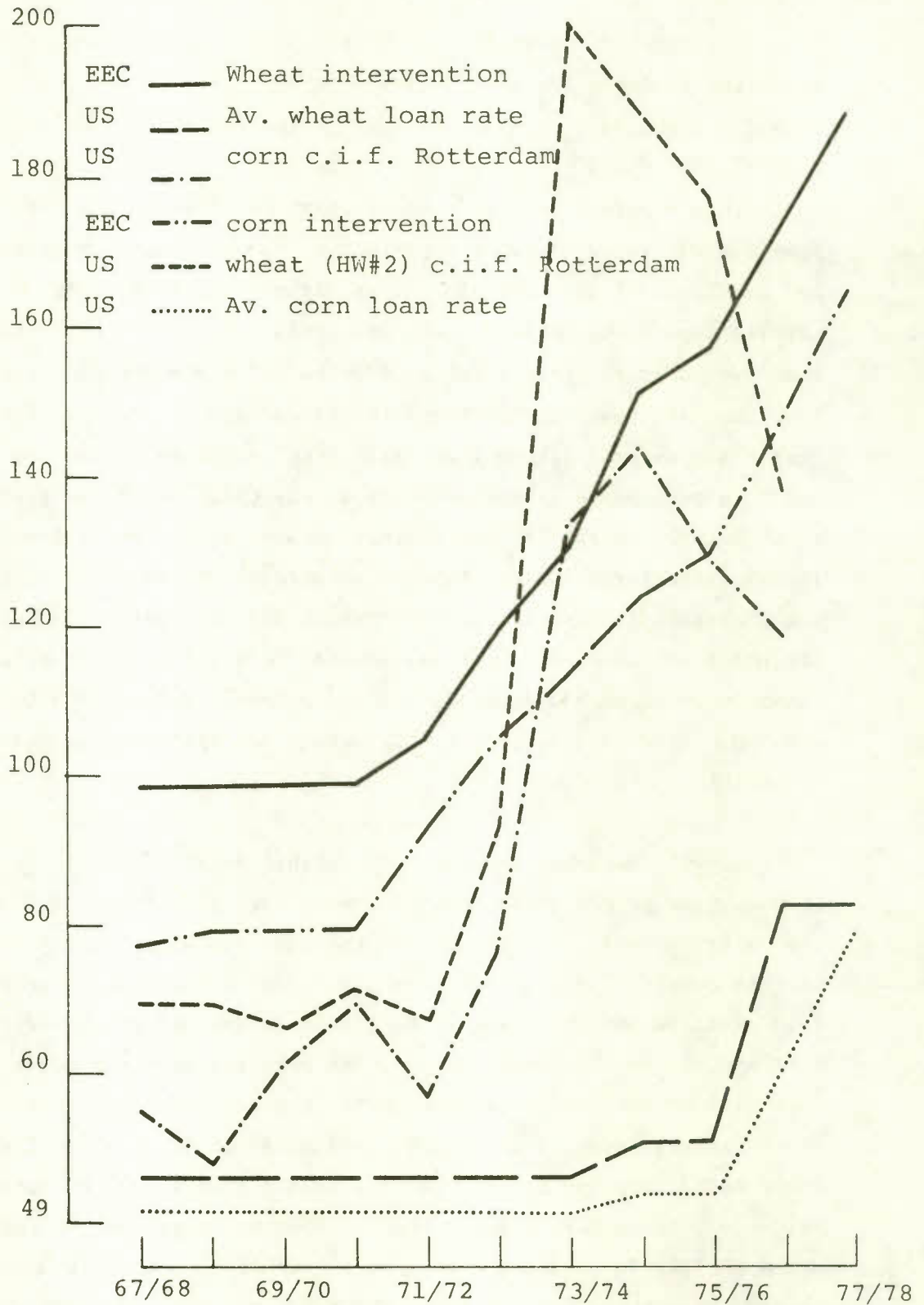
The third price which is regulated is the threshold price, whose objective is to protect the domestic farm price system from disturbances on the world market. The threshold price (basis Rotterdam) is established for standard quality EEC wheat and is derived by deducting from the target price trans-shipment costs at Rotterdam, transport costs between Rotterdam and the deficit centre (see above) and an importer profit margin. In this way the port-location equivalent of the target price is established and in turn is used as the price at which foreign grain is allowed to enter the EEC. As world prices vary,<sup>11</sup> and are usually below the EEC's target prices, variable import levies are used to restrict the flow of foreign imported grain. These levies, which can be changed on a daily basis, are based not necessarily on the absolutely cheapest landed price, but on the lowest representative price, after adjustments, to equate the quality with that of locally produced EEC grain. Once this price has been established, it is then converted to an equivalent price for EEC standard quality wheat. The import levy, representing the difference between the threshold and the equivalent EEC wheat price is then imposed on all wheat imports.

Finally, CAP also deals with subsidies applied to grain exports. These are generally available for all grains, but are used primarily for wheat flour and for those particular types of grain for which there is either a localized or an aggregate EEC surplus.

As Chart 2.1 indicates, before the 1973-74 season the import prices of grain were much below the structure of prices in the EEC. Then in September 1973 this changed, for in that month, until April 1974, and again

CHART 2.1 IMPORT PRICES & EEC INTERVENTION  
PRICES FOR SOFT WHEAT & CORN

U.S. \$/ton



SOURCE: USDA data

between July 1974 and December 1974, import levies on wheat were zero. Similarly, corn import levies were reduced to zero over a similar time period.

The rise in import prices during this period was sufficient to reverse the position for the first time since the EEC's policy had been in operation. Domestic consumer prices in the EEC were below import prices.

This reversal in prices was in part financed by transforming the previous subsidies on grain exports into export taxes. Whereas consumers had previously found domestic prices higher than import prices, thus causing imports to be less than they would have been without the controls, the lower domestic prices caused imports to be greater than they would have been if consumers had faced the higher import prices. The result was that this "excess" demand translated into increased demand for imports, which in turn added to the increase in the price of traded grains. The maladjustment in the EEC was further encouraged by the failure of CAP to increase the target prices paid to farmers for grain. As Table 2.6 shows, the increases in target prices for wheat and corn failed to keep pace with the price increases of imports. In real terms, the target prices for these commodities had probably fallen, a result which added to the increased demand for the imports of grains, and particularly coarse grains, by the EEC.

It will be noted that except for this brief period in the 1973/75 seasons, the prices charged to consumers for grain in the EEC had exceeded the import prices. [This was also the case for wheat in Japan, although in that country farmers have been given much higher target prices, while feed grain is imported free of tariffs.<sup>12</sup>] The effect, however, was that except for this brief period, the policies of these major importing countries were to place their domestic produce and consumer prices above import prices so as to choke off the demand for imports.<sup>13</sup> This was achieved by imposing tariffs so that import prices equaled domestic prices. This in turn reduced the price of internationally traded grain below the levels it would have been if such import tariffs had not been imposed. In the situation where the price of imported wheat exceeded the

Table 2.6

TARGET PRICES FOR WHEAT AND CORN IN THE EEC COMPARED WITH  
MOVEMENTS IN THE PRICE OF IMPORTED WHEAT AND CORN  
(\$U.S. and unit of account per metric ton)

Season	Wheat			Corn		
	Target Price	Import Price \$U.S.	Price u.a.	Target Price	Import Price \$U.S.	Price u.a.
1970	106.2	71.2	71.2	95.9	69.1	69.1
1971	109.4	66.7	63.3	96.9	57.0	54.1
1972	113.8	92.5	81.4	101.7	77.1	67.8
1973	114.9	200.3	164.2	102.7	132.9	108.9
1974	121.8	189.8	149.9	112.0	144.8	114.4
1975	130.0	177.5	133.1	126.4	128.8	96.6
1976	152.0	138.0	107.6	137.8	119.5	93.2

Source: USDA: Foreign Agriculture Circular: Grains FG 7-78.



domestic consumer price, the effect was to increase the demand for imports. This in turn increased the price of internationally traded grain.

### 2.2.3 Centrally Planned Economies

Of the centrally planned economies the USSR is by far the largest grain producer and trader. Its trading activities are of particular interest, for in the past it has swung from being an exporter to being an importer. In fact, in the early sixties it was thought that the USSR might become a significant world exporter. This changed in the 1971/72 season. Since this date it has been a net importer from the west, and a significant one. In October 1975, the U.S. and the USSR signed a Grain Agreement for a five-year period, becoming effective on October 1, 1976. It was agreed that during the 1975/76 marketing year, the USSR could increase its import commitment by seven million tons of U.S. grain.

These increases in imports and their variability reflect not just varying production from year to year but significant changes in policy. The latter refers to the USSR's aim of increasing its consumption of meat. Policies aimed at such an objective were introduced in the early seventies, with the results that an increasing share of the grain harvest is now finding its way into the feeding of cattle. Underlying this change is the high variability in the production of grain (see Table 1.9). This appears to be due to the highly variable rainfall in large parts of the growing area and differences in the growing practices which neglect to use summer fallows. It is further exaggerated by an inadequate stock piling capacity.<sup>14</sup>

Despite the variability in production, the retail prices of meat and milk have been kept at 1962 levels. The prices of livestock have been allowed to increase, the ensuing gap between demand and supply having been bridged by the expenditure of large subsidies. The growth of real income and the low meat prices have put strains on the feed grain supplies, which has meant that the government purchasing agency has often had to enter the world market for imports.

It is interesting to compare this system of prices with that operated in the EEC. In the latter, high domestic support and retail prices exist. As the support prices have usually been in excess of world prices, it has meant domestic production in excess and imports less than there would have been if world prices had prevailed. In the USSR, although domestic support prices for meat are even higher than in the EEC, the low retail prices mean that domestic demand is greater than if they reflected higher world prices. Grain imports tend, therefore, to be larger as a result of the low retail price of meat and tend to be a compensating factor against the reduced EEC imports. The large production variation in the USSR, however, means that the timing and the magnitude of USSR imports are such that they do not necessarily act as a compensating factor.

Like the USSR, China has made timely entries into the world grain market via its sole purchasing agency. It became a major importer in 1961 following the failure of the "Great Leap Forward." In contrast to the USSR, however, its imports have not shown any high degree of variability. This could be in part due to the past policy of the Chinese to balance their trade so as not to incur foreign debt. If this is the case, then, imports of grain were in large part determined by its exporting capacity, which in turn remained steady.

### 2.3 Domestic Policies and the International Trade in Grains

The prime underlying sources of instability in the grain markets are the unreliability of the weather which affects supply, and the demand price inelasticity for grains. While irregularity of supply provides one of the main sources of instability, the form and extent by which the markets adjust to unexpected shocks has been considerably affected by the regulation of the production and the trade in grain by exporting and importing countries. In conditions of unrestricted trade, unexpected shocks to supply, whether in the exporting or importing countries, would be transmitted through the world market such that both importer and exporter would share in the adjustment. The form of the adjustment, whether it is largely in price changes or in the volume of trade depends on the response of the (excess) supply in the exporting countries and the (ex-

cess) demand in the importing countries to price changes. The more elastic the excess supply and excess demand the greater is the adjustment in the volume of trade and the smaller is the price adjustment in response to a unexpected shock, such as a harvest failure.

Exporting and importing countries, however, have been inclined not to pursue such unrestricted trading policies. They appear not to wish to incur the movements in their domestic prices that accompany the adjustments resulting from unrestricted trade. Instead, they have implemented policies which have severed the link between domestic and world trading prices. Faced with say a harvest failure in an importing country, exporting countries are inclined to reduce the rise in their domestic prices by restricting the quantity exported, either by imposing export quotas or by introducing export taxes. The importing country, in order to reduce the rise in its domestic prices, is inclined to restrict the upward movements of domestic prices and to increase imports. Such policies cause the excess supply and excess demand for grain to be less price elastic, with the result that the prices adjustment required to clear the world market is increased.

As Table 2.7 indicates, during the seventies prices in the domestic Canadian and U.S. markets were below export levels. The domestic support prices in the EEC and Japan, in contrast, were considerably above the import price of wheat. The exception was the period 1973-75, when support prices in the EEC were kept lower than the import prices. The movement in prices, as measured by the annual percentage changes in prices in Table 2.8, indicated that export and domestic prices moved closely in the same direction in Canada and the U.S. Despite the large fluctuations in export prices, the support prices for wheat in the EEC showed steady, yearly increases. The support price increases in Japan were less regular but, nevertheless, they showed very little response to the changes in import prices. Both Japan and the EEC, however, did apply import levies which served to decrease the protection received by their domestic producers when the world prices increased, and to increase protection when they decreased.



Table 2.7

WHEAT PRICES: EXPORT AND DOMESTIC PRICES  
[\$.U.S. per metric tonne]

Crop Year	EXPORT PRICES					DOMESTIC PRICES			
	Argentina	Australia	Canada	United States	Support Levels	Market Prices			
	Trigo Plan (1)	(2)	(3)	(4)	Japan (5)	EEC (6)	U.S. (7)	Canada (8)	
1970-71	57	58	67	63	164	99	57	50	
1971-72	62	58	65	62	175	101	48	49	
1972-73	86	91	92	92	217	114	63	69	
1973-74	NA	195	202	178	282	128	158	167	
1974-75	163	167	198	170	334	148	182	154	
1975-76	144	147	174	161	354	163	158	133	
1976-77	104	113	130	118	401	183	107	103	
1977-78	116	119	124	117	NA	163	87	93	

- Notes:
- (1) Argentina, Trigo Plan, IWC sources.
  - (2) Australian Wheat Board Selling Price (f.o.b.), Australian Standard White, IWCs.
  - (3) CWB official "in store" price converted to f.o.b. at current fobbing rates
  - (4) F.o.b. Gulf, U.S. No. 2, Hard Winter. IWC sources.  
(Thunder Bay). Canadian Western Red Spring. IWC sources.
  - (5,6) These are those used for government guaranteed prices. IWC sources.
  - (7) Northern Plains, average farm prices (spring wheats). Average first few months USDA sources.
  - (8) Prairie, average farm prices for all wheat sales, including sales of wheat not through the CWB but sold on the off-board market. Prices converted into U.S. dollars by average annual exchange rate. Stats. Canada sources.

Sources: International Wheat Council  
Stats. Canada: Average Farm Prices, Handbook of Agriculture Statistics, USDA, Wheat Situation



Table 2.8

WHEAT PRICES: ANNUAL PERCENTAGE MOVEMENTS IN DOMESTIC AND EXPORT PRICES  
DURING THE SEVENTIES

Year	<u>Annual Percentage Changes in Prices</u>				<u>Annual Percentage Change</u>	
	<u>U.S.</u>		<u>Canadian</u>		<u>in Support Levels</u>	
	<u>Domestic</u>	<u>Export</u>	<u>Domestic</u>	<u>Export</u>	<u>ECC</u>	<u>Japan</u>
1971-72	(15.7)	( 1.5)	( 2.0)	( 3.0)	2.0	6.7
1972-73	31.2	48.3	41.8	41.5	12.8	24.0
1973-74	150.7	93.4	142.0	119.5	12.2	29.0
1974-75	15.1	( 4.4)	( 7.7)	2.0	15.6	18.4
1975-76	(13.1)	( 5.2)	(13.6)	(12.1)	10.1	5.9
1976-77	(32.2)	(26.7)	(22.5)	(25.2)	12.2	13.2
1977-78	(18.6)	( 0.8)	( 9.7)	( 4.6)	(11.0)	NA

Note: ( ) denotes a negative.

Source: Table 2.8.

The export price fluctuations of the seventies were considerable, even when placed in the perspective of the last thirty years.<sup>15</sup> The export prices of the period 1973-75 were exceptionally high - so high that they highlight the long term relative strength of the importing and exporting countries. The long term movements of trade and prices suggest that the protective policies of the importing countries lowered the demand for grain imports below the level they would have achieved had they allowed imports to sell at world prices, while the exporting countries have had difficulty in regulating their outputs. The tendency has been for the exporting countries to over-produce, causing trading prices to drop, stocks to build up and expensive farm income support schemes to be implemented. In many years the exporting countries subsidized their exports, for the market prices fell below the supported floor prices. In the U.S., for instance, a major cause of the low market prices was because the high target prices led to high rates of production. The high target rates, accompanied by the deficiency payments, were a means of providing higher incomes for farmers. Such policies, aimed at sustaining farm incomes, had their cost, for the high output that resulted was not sold on the world markets at the loan rates. As a result, market prices dropped, export subsidies increased and stocks went up.

The U.S. and Canada had traditionally been the residual suppliers in the international market. For the most part, both countries were willing to store current production rather than to undercut one another in the export markets. Australia and Argentina, however, had not the storage capacity during the sixties to conduct such policies. Instead, their policies were to export as much of their excess supply as possible during the season. When bumper harvests occurred in these countries, as they did in Australia in the 1964/65 and 1968/69 seasons, world prices dropped considerably. The price "war" in the 1968/69 season occurred at a time when Canada and the U.S. had very high levels of stocks, which in themselves acted on "overhang," depressing world prices. The market price fell below the U.S. support price. The U.S. government responded by extending subsidies on grain exports and started to initiate production cut-backs. The set-aside programme was intensified. In Canada LIFT was started while in Australia production quotas were introduced. In the

exporting countries land moved out of grain production, stocks declined absolutely and so did the ratio of stocks to production. Then, in the early seventies, the harvests failed, just at the time that the stock ratios were at their lowest for many years. The stocks in North America were insufficient to contain the rise in market prices. Domestic grain prices in the U.S. and Canada rose, causing the destabilization of the grain-using beef, hog and poultry sectors.

In the early seventies the major trading nations had moved from fixed onto floating exchange rates. The changes in exchange rates which followed caused the trading sectors to be subject to increased adjustments as the relative prices of imports and exports changed with the movements in exchange rates. The dollar depreciated against the Yen and the major European currencies just at the time of the poor harvest. This exchange rate adjustment in favour of the major importing countries, added to their policies of holding down domestic wheat prices, furthered the increase in the demand for wheat imports and drove up further the world price.

Although three countries provide around 75 percent of the world's exports of wheat, this has not been transformed into long-term, effective control of exports. World prices have not been sustained substantially above marginal costs for any significant period of time over the last 20 years. There have been periods when the exporters have restricted their exports, but there have also been, as in the late sixties, times when they have competed by using extensive export subsidies. There has not been an effective cartel formed by the exporting countries. Unlike the oil exporters of OPEC, the wheat exporting countries have been unable to restrict wheat exports. Controlling the production of a commodity which is produced by many farm units, and one which is highly affected by unpredictable weather, has proven to be difficult. Governments have also attempted to effect exports in ways which satisfy the goals of their domestic agriculture sector. They have been less concerned with attempting to maximize national income by restricting their wheat exports.

In contrast, the major importing countries have restricted effectively their imports of wheat. They have protected their domestic sectors

and increased their productivity. Their gains from such restrictionist policies have been considerable,<sup>16</sup> and probably sufficient for them to resist the adoption of a freer trade in grain. This presents a problem for the exporting countries, for the reduction of the restrictionist policies in the importing countries probably offers them the most lasting and substantial gains from among their options.



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1. The problems of comparison are recognized, as are the difficulties of using figures measuring changes in developing countries. The purpose of the figures is to give an idea of the degree of relative change.
2. Note that the large food price increases experienced in the U.S. and Canada in 1978 and 1979 were due in part, to the rise in food grain prices in 1973-74, during which the beef price cycle was set on an upward course.
3. 1972 is distinguishable from 1974 and 1975 in that in the importing countries it was a good harvest year, in which production was above the trend. Prices of imports were well below the trend, indicating the high production in the exporting countries. Hence, the drop in imports in 1972 in Asia was likely due to the good harvest, while in 1974 the poor harvests in the exporting countries pushed up the export prices of wheat. Production fell also in Asia, suggesting that imports would increase. The distinctiveness of the drop below the trend in 1975 is that import prices rose considerably.
4. See F. Bjarnson [1].
5. In many years, however, this rate exceeded the price of internationally traded grain. In response, the U.S. government provided subsidies to compensate exporters from buying at the higher loan rates and selling at the lower market rates.
6. This section examines only the major importers and exporters. For details of the regulatory policies of these countries see [3].
7. See Gale Johnson [4] for an account of the 1977 Agriculture Act.
8. Denmark, Great Britain and Ireland joined the original six in 1973.
9. See Harris and Swinbank [7] for an analysis of these problems.

10. CAP has gradually moved to a common level of support for feed grains, with a separate, high level for wheat and rye of bread-making quality. The structure is known as the "cathedral" or "silo" system.
11. "World" prices to the EEC also vary because of: varying exchange rates, because threshold and target prices rise each month to protect seasonal carrying charges and also because the dollar equivalent threshold price varies.
12. Note that the high food price increases in Japan which were noted in Table 2.1, are likely to be due to the very high support prices for domestic food, and because in the mid-1970's Japan's livestock industry felt the full brunt of the increased price of imported feed grains.
13. It will be noted that until the mid-seventies the target prices in the EEC were above world prices and, only during the rapid price increase during the 73-75 period, were they below import prices.
14. See Gale Johnson [5] for a summary of the USSR grain industry.
15. An examination of the prices of No. 2 hard red winter wheat at Kansas City, deflated by 1967 dollars, reveals that the high prices were \$3.89 per bushel in 1947 and \$3.63 in 1973. The low points were 1969 and 1970, when the price was \$1.27. In 1932 it was \$1.20. See Grenner and Johnson [6], Table 1, page 575.
16. Carter and Schmitz [2] have suggested that the importing countries have been able to introduce optimal tariffs on wheat imports. If this is so, then the welfare gains to them are greater than that under free trade.

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## Chapter Three

### STABILITY AND INSTABILITY

#### 3.1 Introduction

The first two chapters have described the major disturbances in the grain market over the last decade. The emphasis has been on the instability of the market. This chapter removes itself in part from the actual account of this market and instead concentrates on the concept of stability and the benefits and costs that are likely to be experienced by consumers and producers if stability is introduced into the grain market. For in the context of the world grain market the word, stabilization, produces a number of questions. What is being stabilized, is it revenue or prices? Who gains and who loses from the form of stabilization under consideration? What are the means of achieving the chosen stabilization? The answers, however qualified, provide a necessary prelude to the consideration of the past and present schemes that have been undertaken to stabilize the world grain market.

#### 3.2 The Gainers and the Losers from Stability

To the exporter, stabilization is likely to mean the stabilization of revenue. This may, however, not be attainable.<sup>1</sup> It may also be opposed by consumers who may prefer price stability. The likely result of pursuing the latter is that prices will be pegged at a given price or between a price range and kept there by various devices, including the use of stocks. The latter will be added to when prices drop below the chosen price, because of say an increase in supply, and spent when the prices rise above this price. The chosen price or price band, however, may not necessarily coincide with the stabilization of revenue. This will depend, in part, on the elasticities of the demand and supply curves and the shift in the curves. Many of these conditions show that the chosen ranges within which price is stabilized will not result in the stabilization of revenue. This is a result which suggests that many price stabilization



schemes have trade-offs in the form of the levels and the instability of revenue.

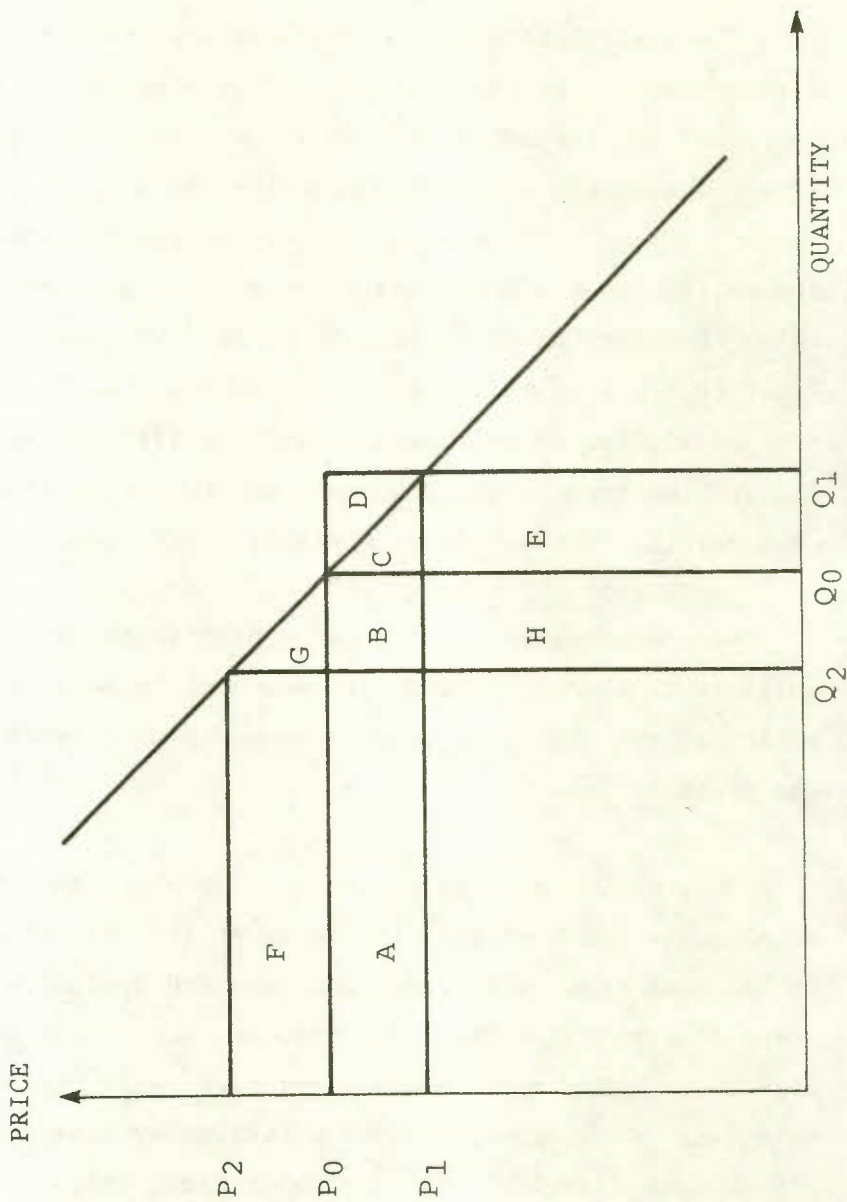
Price stabilization schemes also bring forth the question as to who gains from the price stabilization, the consumer or the producer? The following simplified example<sup>2</sup> illustrates the conditions and assumptions that are usually used in answering such a question.

Suppose that the grain market is unstable because of shifts in the supply curve. It is further supposed that the supply curve is perfectly inelastic, and that price is stabilized at one price (price  $P_0$  in Chart 3.1) by means of a buffer stock which has no storage costs. At price  $P_0$ , quantity  $Q_0$  of grain is purchased. Now suppose the quantity supplied shifts outwards to  $Q_1$ , a movement which would cause the price to drop to  $P_1$  without the buffer stock. Instead of this happening, purchases are made to augment this buffer stock at the price  $P_0$  and so the price is maintained at  $P_0$ . Producers gain from such action, and this is represented by the area  $(A + B + C + D)$ . The cost to the buffer stock is  $(C + D + E)$ . In contrast to the producer, consumers forego lower prices, and they incur a loss in welfare, measured by the area  $(A + B + C)$ . The total net benefit of this action is  $(-C - E)$ .

Suppose now that supply contracts to  $Q_2$ , which would send the price rising to  $P_2$  without the buffer stock. The latter, however, is sold at the price  $P_0$  and the market price is reduced to this level. Consumers now benefit from lower prices. They consume more at the lower prices. The increase in benefit is represented by  $(F + G)$ . Producers, in contrast, forego high prices, and they incur the loss of  $(-F)$ . The value of the drawing down of the buffer stock is  $(B + H)$ . The total benefit is the sum of these three components, and it sums to  $(B + G + H)$ .

If the possibility of shifts in the supply curve to  $Q_1$  and  $Q_2$  are equally likely, and if a zero discount for time is assumed, the total benefits to each of the three groups - the producers, the consumers and the stock holders - is the sum of those obtained from buffer stock operations with supply at  $Q_1$  and at  $Q_2$ . For consumers the sum is

Chart 3.1  
GAINS AND LOSSES FROM PRICE STABILIZATION



$F + G - A - B - C$ , while for producers it is  $A + B + C + D + E - F$ . For the holders of stocks, it is  $B + H - C - D - E$ , which sums to zero. The net total benefit is represented by  $B + G + H - C - E$ , which is a positive sum.

The distribution of the net benefits between consumers and producers will depend on the shape of the demand and supply curves, and on the source of the instability.<sup>3</sup> In other words, the question of who gains or who loses from price stabilization can only be answered by empirical investigation. Notice also that the analysis assumes that the benefits or the welfare of producers and consumers can be measured by the sums of money that they would be willing to pay for these benefits, and that these benefits are weighted equally. It should also be noted that the analysis is partial, for it considers only the welfare changes of price stabilization incurred by the producers and consumers of grain. It does not consider the effects of price stabilization beyond this market.

We shall return to this last point in the next chapter; in the meanwhile it is useful to summarize some of the more recent analytical and empirical work that has been conducted on the demand and supply curves in the grain market.

In situations where the demand curve can be considered linear and the supply curve is inelastic in the short run and subject to random shifts, it has been shown that consumers gain and producers lose as a result of price instability. Chart 3.1 presents the limiting case of such a market. Conversely, consumers lose and producers gain when there is a large supply shortfall in those markets characterized by demand which is inelastic as prices move upwards.<sup>4</sup> In such conditions, which are likely to exist when stocks are low relative to consumption,<sup>5</sup> consumers will benefit from a buffer stock which stabilized prices.

The more recent work in this area has introduced various refinements into the analysis by considering adaptive expectations<sup>6</sup> and by differentiating between exporting and importing countries. Under fairly demanding conditions,<sup>7</sup> it has been shown that a country can gain from

price stabilization if the source of the instability is domestic and can lose if the source is foreign.

The permutations of demand and supply elasticities and of the form and source of the instability are considerable, and so are the answers as to who are the net gainers and losers of price stabilizing policies. These results nevertheless can be of some help in understanding the positions taken by the producing and consuming countries in response to the high price fluctuations in the world market in the mid 1970s. This analysis is limited, however, in that the action of the countries and the sectors concerned depends upon how they perceive their welfare to have been affected by the price instability. From the behaviour of the EEC and Japan for instance, it would appear that these importing countries were more concerned with stabilizing their domestic prices and in supporting their domestic farming sector than they were in the consequences of such policies on the prices in the world market. In the case of the exporting countries, and particularly in Canada and the U.S., conflict of interest arose between producers and consumers about price stabilization. An example was when the prices of grains started to rise in the early and mid-seventies. The ensuing discussions also caused the distinction to be made between the instability of prices in the grain markets and the consequences of this instability in the meat markets. The prime impact on the economy was the effect that high grain prices had on the beef, pig and poultry cycles and the destabilizing effects they had on the prices of these meats.

The significance of this observation is that the stability of price in the wheat market is important in an indirect way, in that wheat is a close substitute for coarse grains in the feeding of animals. These grains are also grown together, so that fluctuations in supply move together.

Returning to our analysis of the market stability, we see that the approach which considers the wheat market in isolation is only partial in that it does not consider the effects of unstable prices of wheat on the price of coarse grains and the consequences that these have for the price



of meat. The consequences of such a chain of reactions are considered in the next chapter.

### 3.3 Stocks as Stabilizing Instruments

In the foregoing analysis of price stabilization, stocks of grains were the instruments by which prices were stabilized. No mention was made, however, of whether the stocks were held privately or by a government agency. In fact, in an unregulated market with many buyers and sellers, it is likely that the stocks would be privately held, for there would be a return from holding stocks. Private holders would store grain until the expected increase in price received for the stored grain upon release equalled the expected increase in the marginal cost of storage. In this way the annual carryover would be held in private hands and would provide a measure of price stability. There would appear to be no need for the government to hold stocks.

Such a market with privately held stocks could work efficiently, stabilizing prices and distributing the grain to the areas of shortage. In countries faced with a famine after a harvest shortfall, the issue is often a question of equity rather than a question of the efficiency of the market. The issue is whether a poor country could and should pay "the going market price," rather than about the efficiency of the marketing system.

Few grain markets have operated exclusively with privately held stocks. Joseph of Egypt stored during the seven fat years against the seven lean years to come. Other governments have found the cycles less predictable than they apparently were in biblical times. They have, however, been mistrustful of the ability of privately held stocks to stabilize prices after exceptionally good or poor harvests. In some countries stocks have been held by governments as part of policies aimed at stabilizing domestic prices at levels above or below world prices. In the U.S., for instance, large stocks were held during the 1960s. These, however, were the results of commodity support programmes.

The latter were introduced to maintain higher prices for the grain growing farmers. The price of grain in the 1960s had been low. This was, in part, due to the domestic policies of the major consuming and importing countries of the EEC, the USSR and Japan. The domestic outputs of the EEC and Japan were increased and imports decreased by raising domestic support prices above world prices. Import levies and stocks were the instruments by which the high, stabilized domestic prices were maintained. The build up of large stocks in the exporting countries acted as an overhang, depressing prices such that measures were taken to reduce the supply of grain. As we have seen, the reduced acreage and the reduced stocks coincided with a number of poor harvests in the early 1970s. Prices in the world market rose dramatically, a considerable part of this being due to the reversal of the policies of the large importers, who then used their stocks to keep their domestic prices below world prices and so encouraged the consumption of grain during a period when the flow of grain was considerably reduced. It was this rise in prices, along with the poor harvests in the LDCs which led to the renewed call for an effective, internationally controlled buffer stock which would stabilize prices and act as an insurance against famine in the LDCs.

This analysis shows some of the reasons why stocks of grain have been held and used by governments in the recent past. In the EEC they have been used, along with import levies, as a means of supporting and stabilizing domestic prices. In the U.S. and Canada they have, in part, been the result of policies aimed at countering depressed world prices, caused in part by the policies of the EEC and Japan. The present call for internationally held stocks is a result of the instability caused and accentuated partly by trading policies which have been made effective by the use of government held stocks. These distortions created by trading policies pose a special problem when considering the objectives of an international wheat agreement which is aimed at stabilizing world prices. If the distortion has been created by such policies and if government held stocks have been used as instruments of such policies, will the introduction of a scheme of internationally held stocks reduce or aggravate the problems it is designed to alleviate?

This is a question which shall be discussed in the final chapter. The fact is that stocks are held by governments and they are used to stabilize prices. This poses problems of devising rules of operation for these government held stocks.

### 3.4 Stock Management Rules

The major problem with the management of stocks is how and when to decrease or augment the reserve.<sup>8</sup> When the stock is being used to stabilize prices between a price band, a number of rules can be applied in managing the stock.

One set of rules defines the price at which purchases are made to the stock and the price at which sales are made. The size of this differential indicates the degree of price stability that is required. The narrower the differential the smaller the desired fluctuation but the larger the size of the required stock. If the stocks start to rise over time, then it is an indication that the purchase and the release price are too high, while if they start to fall, it indicates that the purchase and release prices are too low.

The size of the stock is of some importance, for there is a cost of holding the stock. The net direct cost in financial terms is equal to the return from this sale of the stock minus the cost of the grain when it was acquired, and minus the storage costs. The latter costs are related to the quantity stored, the facilities used, the carrying charges on the stored grain and the deterioration of the grain during the storage period. The total costs of storage will vary with the length of time for which a given volume of grain is stored. For large volumes of grain stored for long periods of time, the storage costs could exceed the benefits derived from the stabilizing effects of the stocks, a result which makes it important that the desired price stability is related to the quantity of stocks likely to be needed to satisfy this stability.

There are also two other important effects of the size of government held stocks. The first one is the effect of the size of the stock on the



market price - will it depress the market price? The second effect is whether government held stocks will cause privately held stocks to disappear.

The answer to the first question depends primarily on whether the rules of the stock management are closely understood by the market and are also faithfully adhered to by the stock managers. If the latter have discretion as to the quantities they can purchase and at prices which they can specify, then uncertainty is introduced into the market. The larger the stocks, the greater the impact on prices of the action of regulators whose behaviour is not fully predictable. In the case of the second effect, government held stocks can, and have, reduced the incentive for private holdings of grain. The importance of this substitution is that the operation of the government held stocks can result in unwanted instability. As governments acquire stocks in order to maintain a floor price, private holdings are released, placing a downward pressure on price, which further forces the government to acquire more in order to maintain prices.

Management of an international stock programme involves devising rules of management which will be acceptable to not only producers and consumers in a number of countries. Furthermore, the costs of sharing the stock holdings, and therefore the costs of the stocks, have to be agreed to between the countries. As Chapter 5 indicates, these and other problems associated with international wheat agreements have shown themselves to be difficult to solve.



References

1. With knowledge of demand and supply such an objective could be achieved by establishing the world price at the point on the world's demand which is of unitary elasticity.
2. This simplified analysis has been drawn from Behrman [1], chapter 2.
3. See the work of Massel [3], Oi [4], and Reutlinger [5].
4. For a consideration of the welfare implications of the gainers from stabilization compensating the losers see Samuelson [6].
5. As stocks fall then spot prices relative to futures can be expected to increase. See Sarris and Taylor [7] for a discussion of this point and for a summary of the recent empirical work supporting the suggestions of an increasing inelasticity of demand for grain as prices rise.
6. See Turnovsky [9].
7. See Heuth and Schmitz [2].
8. See Sharples and Walker [7] and Wilson [10] for an extensive discussion of these points.

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## Chapter Four

### PRICE STABILITY AND THE EXPORTING COUNTRIES

#### 4.1 Introduction

The stability of grain prices is of interest to the grain exporting countries not only because of the effects of prices on their export revenues, but also because they have sizeable domestic meat sectors. The costs of producing meat are considerably affected by the price of feed grain. The cycles of the beef, hog and poultry industries are susceptible to sharp changes in feed grain prices. Instabilities in feed grain prices are transmitted to these markets, with the result that meat prices show instability. The benefactors of the removal of large grain price fluctuations will likely be consumers in the major exporting countries. Such stability in food prices is of considerable importance to Canada.

This chapter explores the links between wheat and feed grain prices through to final food prices. It then outlines some of the approaches that have been made to measure the benefits to the economy accruing from commodity price stabilization schemes.

#### 4.2 The Impacts of Large Fluctuations in Grain Prices on the Economy of Canada

The impact of grain price fluctuations on the economy can be appreciated when it is realized that grain is not only an input used in the production of cereals and bread, but is also an important input used in the meat sector. The price of bread, cereals, poultry, eggs, milk and beef are all affected by grain prices. As a result, the price of food is considerably influenced by the price of grain. These items of food, however, are influenced by changes in grain prices in different ways and to different degrees. There are two major reasons for these differences: the different reproductive cycles of different animals and the regulatory controls deployed in the sectors.

When the price of grain increases, the prices of bread and cereals are increased directly. The prices of meat and animal products are affected in a less direct way. Poultry, egg and milk product prices are determined, in part, by the target returns set by the respective marketing boards. The cost indices used in these calculations include items for grain, and so movements in grain prices are reflected in movements in the consumer prices of chickens, turkeys, eggs and dairy products.

The impact of grain price movements on beef and pork product prices are via the effect they have on the rate of animal reproduction rates. As a result, there are substantial time spans before they run their course. This is, in part, because these markets are not subject to the marketing board controls that characterize the poultry and dairy sectors. Both markets, however, are subjected to lags in supply in response to price changes - a result of the time it takes to breed and rear cattle and hogs. Feed grain is used extensively in both sectors to fatten livestock so that a rise in price adversely affects the demand for livestock. In the immediate short run this could cause an increase in cattle slaughtering and a consequent lowering in beef and hog prices. Over time, however, fewer cattle and hogs will be demanded, fewer will be brought to slaughter and beef and hog prices will rise.

The magnitude and duration of these responses will depend to some degree on the stage of the beef and hog cycles at the time of the grain price increases. Estimates of the livestock sector in Canada show that the long run elasticity of livestock prices (steers, hogs, etc.) with respect to the price of grain in Canada is in the order of 0.3.<sup>1</sup> Changes in livestock prices are completely reflected in livestock product prices at the retail level after two to three quarters.

Using these relationships, along with Statistics Canada's price input-output model for 1974, suggests that a doubling of wheat and coarse grain prices will raise the food item of the consumer price index by 9.3 percent.<sup>2</sup> The consumer price index will rise by 2.7 percent.<sup>3</sup> During 1973 and 1974 the actual rise in feed grain price was 80 percent, a



rise which suggests this played some significant part in the high inflation of this period.

In the U.S., a number of observers have not only presented estimates of the effect of grain price increases on the overall consumer price level, but have provided interpretations of the effects on the U.S. economy. Sanderson [6], for instance, provides an interesting interpretation of the workings of the U.S. economy:

"... the grain price increase accelerated the rate of increase in the food component of the U.S. Consumer Price Index from 4% to 20%. Since food accounts for about 25% of the CPI, the effect was to double the general rate of inflation, from 4% to 8% in 1973, i.e., before the effects of the energy crisis were felt. Further grain price increases in 1974 added to the inflationary effects of the oil increase. These inflationary effects are irreversible as they get locked into the wage and price structure of the non-agriculture sector which is flexible only upward. They are then transmitted to the agricultural sector, raising food costs permanently in proportion to the general rate of inflation. Inflation, in turn, brought on unemployment and recession. These costs greatly exceed the costs of maintaining adequate grain reserves."<sup>4</sup>

A comparison of Sanderson's estimates for the U.S. with those made above for Canada suggest that his are much higher. His interpretation of the process of inflation, however, is one which has some support as an explanation of the effects of large jumps in the price of raw materials on the rate of inflation in the industrial countries. It is also one which is used by some<sup>5</sup> in outlining the gains to the economy of reducing the inflation which has been induced by increases in food prices. A brief summary of the assumptions in this analysis is worth making.

The economy is seen to consist of two distinct sectors; the primary sector, which includes agriculture, and the industrial sector. The primary sector is perceived to be a market in which prices act as a clearing device, serving to match demand with supply. In the industrial sector adjustments in demand are not accommodated by price movements, but by changes in inventories. In contrast to the primary sector, increases in costs in the industrial sector are passed on in the form of higher prices.

The workings of this economy can be illustrated by comparing its adjustments to a change with those that would occur if the whole economy behaved as the primary sector is perceived to behave.

Suppose there is a shortage of food caused by an act of nature. If prices act as a clearing device then the shortage is accommodated by a movement in relative prices and in temporary wage reduction. In the "two sector" economy adjustment does not take place in this way. The existence of strong unions and the adoption of certain monetary policies are two reasons why the adjustment will be different. The strength of the unions will be applied to resisting a downward push to wages. They will push for wage increases to compensate for the food price rises. The maintenance of real wages will be accommodated if the monetary authorities increase the supply of money. If this happens, the increases in wages will result in increased costs, causing the industrial sector to increase prices. The so-called "ratchet effect" will be now set in motion, in which the inflationary effects of food price increases will be irreversible as they become locked into the wage and price structure which is flexible only in an upwards direction. The general increase in costs in turn will affect the primary sector which will be using higher cost inputs.

This interpretation of the effects of the structure of the economy on the process of inflation has received consideration in the seventies.<sup>6</sup> Interest grew in the middle of the decade, following the quadrupling of crude oil prices, the tripling of grain and soybean prices, and the sharp increases in sugar and coffee prices. As a result, a number of studies were conducted which examined the macroeconomic benefits that could be achieved by stabilizing the prices of raw materials. A study by Behrman(1), for instance, suggests that if the prices of 10 core<sup>7</sup> commodities imported into the U.S. could have their fluctuations kept within a range of plus or minus 15 percent of their historical trends, inflationary pressure in the U.S. might be reduced by at least 0.2 to 0.4 percent for two or three years in the course of a decade. In order to avoid such a degree of inflation he considered the alternative of increasing unemployment and reducing real output. Available estimates of the Phillip's curve suggested that unemployment would have to increase by 0.03 to 0.3 percent for a similar reduction in prices to be achieved. He estimated this as

representing, in foregone output, about 0.1 to 0.9 percent of real GNP. Taking the middle of this range, he produced an estimate of around \$9 billion in each such year for the U.S. economy.<sup>8</sup>

The figures indicate substantial gains could be obtained by reducing price fluctuations by means, for instance, of using stocks. So substantial were these gains, in fact, that Behrman suggested that the benefits obtained from reducing inflation in the consuming and largely industrialized countries would be considerably greater than the gains in revenue to the producing nations and the financial deficits incurred in operating the buffer stocks.<sup>9</sup> These claims, and the assumptions that underlie them, however, are subject to a number of reservations.

The assumptions made in the explanation are substantial, spanning those concerning the pricing behaviour of firms, the actions of trade unions and the monetary policies of central banks. To interpret and to measure the effects of price stabilization schemes within this framework is not fully justifiable. The behavioural relationships are not as clearly defined as are implied in Behrman's reasoning. The ratchet effect is questionable as a mechanism by which cost increases are transmitted.<sup>10</sup> The calculations made by Behrman are also open to challenge. Even assuming the relationship established by the Phillip's curve is accepted increasing unemployment is not the only, and possibly not the most, effective means of reducing inflation. A perhaps more effective means would be to reduce the price increases faced by consumers by subsidizing the price until the unregulated market prices reach acceptable levels. In short, raising unemployment is not the only alternative means of reducing price increases, and it should not be regarded as the alternative to price stabilization schemes.

Despite reservations concerning the behaviour of price function in the economy, the impact of sharp upward shifts in grain prices and, in turn, on food prices on the aggregate price level is sufficient to cause both importing and exporting countries to seek alleviation. It is the difference in their policies to this alleviation which has been one of the major causes of disagreement between them, and one which we shall examine in the next chapter.



References

1. See Appendix A for details.
2. See Appendix A, Table A.2. According to Table A.5 feed prices rose by 80 percent in 1973 and 1974.
3. It is interesting to note that the use of the same model suggests that doubling the price of domestic and imported crude oil will increase the CPI by just under 2 percent. See Ellison[2], Table 3.3, page 47. Note, however, that the price input-output model measures the total price effect, i.e., the direct and indirect effects of crude oil price increases and of grain price increases. It does not measure the induced effects of these increases on other factor prices, such as wages.
4. Sanderson [6] page 269.
5. See for instance Behrman [1].
6. See for instance Kaldor [5] for an exposition of these set of conditions.
7. These commodities are: coffee, cocoa, tea, rubber, jute, sisal, copper, tin, bananas and bauxite.
8. See Behrman [1] page 39.
9. See Behrman [1] pages 37 and 38. He estimates the finances needed to support stocks in order to stabilize prices within the desired price band is \$10.4 billion.
10. See Finger and Dean DeRosa [3] for an empirical study into the ratchet effect. They concluded that "the available evidence indicates that the ratchet-effect argument fails to provide a valid economic justification for commodity-price stabilization." Page 201.



11. See Gordon [4] for a theoretical treatment of the effects of sharply rising resource costs on an industrial economy.

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## Chapter Five

### INTERNATIONAL WHEAT AGREEMENTS

#### 5.1 Introduction

The international grain price increases in the mid-seventies were startling because in the previous decade they had been low, and largely stable. The lowest average annual export price of wheat in the sixties was \$US 1.45 per bushel, the highest was \$US 1.80, which was reached in 1963 and 1966, figures which contrast with the high of \$US 4.80 in 1973 (see table B.4). The harvest failures which accompanied these high prices were of sufficient severity to cause worldwide repercussions affecting trade, the prices of foodstuffs and the pace at which developing countries grew. The developed industrial world, as well as the developing world, were affected. An outcome of these developments was that there were renewed efforts to establish effective international mechanisms to attenuate future sharp fluctuations in the grain markets.

The trends in world production and consumption indicate that while the trends have been upwards, fluctuations about these trends have been such as to periodically plunge the world grain market into short run gluts and deficits. These have had long run effects on the rate of productivity and of growth, and they have activated changes in the meat cycles. They have also influenced the type of instruments used to ameliorate the fluctuations and they in turn have affected the severity of proceeding fluctuations. Schemes, for instance, which have attempted to manage surplus grain in the exporting countries, have affected the capabilities of regulators to control the upward movements in prices that have occurred in deficit years.

The fluctuations in price that occur in the market for traded grain can be diminished by reducing the inelasticities of demand for and supply of grain. Stock management schemes are one means of achieving increased elasticity in supply and demand. Such schemes allow the variability in demand and production to be absorbed by the accumulation and running down

of stocks. Another means of increasing the elasticities of demand and supply is to remove trade restrictions, such as export subsidies, import tariffs and quotas.

There has been no lack of interest from countries willing to engage in international cooperation as a means to controlling the level and the fluctuations of the prices and trade in grain. The trade in grain has been an integral part of restrictions in a number of international fora. So important is the grain trade and so interdependent is the world economy, that arrangements concerning trading agreements in grain have repercussions on the form and extent of aid to developing countries, on the extent of the trade surplus of exporters and importers and, in turn, on the strength of their bargaining positions in general trade and tariff negotiations. The pivotal negotiations have centred around the international wheat agreements (IWA), of which there have been a number since the last world war. Many of these agreements were designed primarily to secure a floor price for traded grain. The instruments have included various forms of price and sale quotas. The distinctive feature of the negotiations after 1974 is the serious consideration that has been given to the use of internationally coordinated stocks of grains as instruments of stabilizing the upward as well as the downward movements of grain prices.

While the earlier international wheat agreements differ in the instruments they employed from those envisaged in the recent negotiations, they nevertheless provide an insight into the workings of the grain market. As a result, these earlier IWAs will be briefly examined in the next section. This will then prepare the way for a consideration of the post 1974 stock utilization schemes.

## 5.2 Internal Wheat Agreements and the Stability of the World Grain Market, 1960-74

The first international wheat agreement after the war was established in 1949, and was the culmination of 18 years of effort, incorporating seven international wheat conferences and innumerable less formal meetings and discussions.<sup>1</sup> The agreement was of the "multilateral

contract" type; that is, maximum and minimum prices were negotiated, importing countries made a commitment to purchase "guaranteed" quantities, or a definite proportion of their imports from member exporting countries within the price range, whilst exporting countries undertook to provide definite quantities of the commodity at a price no higher than the agreed maximum.

Five international wheat agreements of the "multilateral contract" type were in effect between 1949 and 1968. Argentina and USSR, two major exporters, did not participate in the first IWA. The U.K. (then, the world's largest commercial importer) was a notable omission from the signatories of the revised IWA (1953). Argentina joined the re-revised agreement (1956), but the U.K. again remained outside.

During the mid-1950s, there was growing concern, among the exporting countries about mounting surpluses of grain. An international group was established, (FAO Group on Grains) to provide a standing forum for inter-governmental consultations on economic problems over the entire grains sector. The group provided the groundwork for a modified multilateral contract agreement. It was adopted and formed the basis of the 1959 IWA. The agreement was continued in 1962 for a further three years, with the addition of the USSR as a wheat exporter, and then extended by two more years to 1967. In 1968, the International Grain Arrangement (IGA) came into force and incorporated a Wheat Trade Convention and a Food Aid Convention. The former included maximum and minimum pricing provisions and importer/exporter sale/purchase commitments. The IGA, if not actually stillborn, had a very short life, and was much less ambitious than initially intended.

Under the 1968 IGA, the stabilization of prices within a prescribed price range remained an objective of the Wheat Trade Convention, but the price level represented by the new range was increased by about 20 cents per bushel over that in the 1962 Agreement and greater precision was given to the determination of maximum and minimum prices by the negotiation of quality differentials for certain wheats. The Food Aid Convention, included within the arrangement, stipulated that principal commercial ex-



porters and importers would agree to provide 4.5 million tons of grain a year, or the cash equivalent, as aid to developing countries.

The 1968 International Grain Agreement was negotiated at a time of rising prices and short supplies, but by the time it came into force, in July 1968, supplies were ample and prices were falling. The floor had been fixed at \$1.95½ a bushel, with No. 1 Manitoba acting as the reference. It proved to be too high, and was undermined by subsidized exports. The agreement expired at the end of June 1971, and a new International Wheat Agreement came into force on July 1971. Since then, IWAs have been of a consultative, rather than of the multilateral contract type.

The 1971 Agreement contained both a Wheat Trade and a Food Aid Convention. The former had the same objective as its predecessor, to contribute "to the fullest extent possible to the stability of the international wheat market in the interests of both importing and exporting countries." Unlike previous agreements, however, the Wheat Trade Convention did not contain minimum or maximum price obligations or purchase and supply commitments. It provided a forum for the consultation of market developments and included the provision for the possibility of incorporating price provisions at a suitable time. This latter provision was never pursued. The Food Aid Convention was substantially the same as its predecessor of 1967. The objective was "to carry out a food aid program with the help of contributions for the benefit of developing countries." The nine participating countries pledged minimum annual contributions "as food aid to the developing countries wheat, coarse grains or products derived therefrom, suitable for human consumption ... or the cash equivalent thereof." In total this amounted to annual donations of more than 4 million tons of wheat and other grains as food aid, of which Canada's contribution was 495,000 tons.

Some commentators have been generous in their evaluation of the performance of the IWAs. According to an FAO Study<sup>2</sup> between 1949 to 1970 the IWAs succeeded in

- (1) guaranteeing supplies to importers at reasonable prices under conditions of storage;

- (2) provided some assurance of markets for members exporters;
- (3) contributed to price stability during the years from 1949 to 1967; and
- (4) provided an international framework for cooperation between trading countries and a forum in which to discuss their international trading difficulties.

The above summary would appear to be rather generous in its appreciation of the stabilizing role of the IWAs. The world market for grain for most of the fifties and sixties was characterized by support prices in the exporting countries which brought forth outputs which were cleared at prices below these support levels. The prices of traded grain were low. Exports were extensively subsidized<sup>3</sup> by governments. Sometimes these governments competed in their subsidies, resulting in lower prices. The attempt to maintain farm incomes by means of support prices which were above those needed to clear the market also resulted in the accrual of large stocks of grains in the exporting countries. When these stocks grew sufficiently to depress further the market in internationally traded wheat, they were reduced.<sup>4</sup> This reduction in stocks was immediately and unfortunately followed by the widespread failure of harvests in the exporting and importing countries.

The international agreements of the seventies were powerless to contain the ensuing price rises. Stocks were low relative to consumption, and insufficient to provide an effective buffer to the price rises. The past has been marked by low and stable prices for internationally traded grain. They were low primarily because the exporting countries maintained high support prices. This resulted in high outputs, additions to stocks and low market prices. They remained stable, for in most years the leading exporters did not undercut one another by competing with export subsidies. When prices did rise rapidly, however, there was a noticeable increase in interest from the LDCs and the major industrial importing countries in a system of international agreements that would be effective in containing price rises. The exporting countries, not unnaturally, were interested in an agreement that would contain declines in price.

### 5.3 International Negotiations Following the "Food Crisis" of 1974

The rise in grain prices in the 1973-74 season activated renewed interest in the use of internationally controlled grain stocks as an instrument with which to alleviate a number of pressing problems that had worsened as a result of the harvest failures of the early seventies. Disagreement about the methods of alleviating and correcting these problems existed among producing, consuming and developing countries. Despite these differences, internationally controlled grain stocks were considered by most countries as an instrument that could be effectively used in the attainment of a number of objectives. There appeared to be three major objectives. These were: to achieve price stability in the grain market, to use stocks as a means of alleviating supply problems during emergency food shortages and to provide a reliable source of food aid.

The first major international meeting to examine these objectives was the conference in Rome, held in 1974, known as the International Undertaking on World Food Security. A well intentioned set of objectives concerning the establishment of stability in the world grain market were espoused. At the same time there were no limits set on the choice of formulae for international cooperation. Since this time discussions on international cooperation have taken place in four major international bodies: the FAO and its World Food Security Committee (WFSC), the International Wheat Council (IWC), GATT with its multilateral trade negotiations and, finally, UNCTAD has included talks within its Integrated Programme for Commodities.

While the number and type of such bodies indicate the importance of the international grain trade, it is primarily in two fora that grain reserve policies have been considered. These are the IWC and the FAO (and its WFSC). To a certain extent they have concentrated on different aspects, the IWC concentrating on market shares and trade, while the WFSC stresses the need for the international support for those developing countries which produce and store grain.



Following the Rome conference in 1974, discussions began in March 1975 in the IWC in London on an IWA that might have a system of grain reserves as an integral form of its mechanism. At the Ministerial Council of the OECD in May 1975, the U.S. outlined a proposal for an international system of reserves. This was presented in greater detail in September to the IWC. Discussions have continued since this date, the latest round of talks were started in February 1978, reconvened during the fall and again at the beginning of 1979.

The U.S. proposals were interesting because they formulated a system of international reserves. In their submission to the IWC in September 1975 the U.S. proposed a coordinated system of national foodgrains, totalling 30 million tons, of which 25 million would be wheat and five million would be rice. The reserves were defined as "holdings in excess of normal working stocks," which were calculated to be 10 percent of national production or consumption, whichever is the larger.<sup>5</sup> The burden of holding the stocks was to be shared among the participating countries according to their production, trading and financial capacity. Coordinated use of the stocks was to be based not on price triggers but on "quantitative" triggers which were based on the deviation of world supplies from the trend. Two stages were differentiated: a warning stage and a shortage stage. The former was a period for consultation rather than for activating the stocks. In the shortage stage, participants would be obliged to release reserve stocks up to their holding commitments.

The proposals met with disagreement in the subsequent talks at the IWC. The EEC preferred to see the negotiations take place in the multilateral trade negotiations in Geneva, and there was disagreement over the trigger mechanism. Some members considered the lagged quantitative triggers would give the U.S. exporters unacceptably high gains when prices shot up in a market which was short of supply.<sup>6</sup> In the meanwhile, the market in grain changed and so did the Administration in Washington. World production rose in 1976 and prices eased, and with them eased the U.S.'s enthusiasm for a free market. In the final days of the Ford Administration the support price of wheat was raised and with it rose the accumulation of stocks under government loan.



The advent of the new Administration in Washington brought forth a new food grains reserve programme. In March 1977, the Secretary of Agriculture announced a domestic food grain reserve programme target of eight million tons of wheat and rice. In August of the same year a feed grain reserve target of 17-19 million tons was announced. The reserves are being built up by providing incentives for farmers to hold grain off the market for three years - or until prices reach a specified release level, and to sell when that level is reached or exceeded.

While the U.S. has been again building up its reserves, the target figures suggest that although they may be sufficient to stabilize U.S. domestic prices, they are insufficient to stabilize world prices. The Democratic Administration's international policy recognized this point. On the 28th of June, 1977, the U.S. presented a proposal to the IWC which was similar to the 1975 proposal in that the suggested reserve was 30 million tons. In the new proposals, however, world prices were seen as the mechanism with which to trigger movements in the stock.

The reaction to this set of policies from other countries came with the renewed negotiations of IWA, following the ending of the last IWA in June 1978. At this meeting, which was reconvened in the fall, and again in early 1979, three separate negotiations were undertaken. The negotiations concerned a new wheat agreement, a consultative agreement for coarse grains and a new Food Aid Convention. Agreements were secured on the latter two, but success was eluded on the first and most important element.

Despite the decision of the EEC countries to have a coarse grain agreement, which would include price and reserve stock commitments, this did not prevail. Instead a consultative agreement for coarse grains was established, in which there were no economic provisions. The agreement involved a regular exchange of information on production, trade and stocks and an undertaking to coordinate policies when the market is under pressure.

The Food Aid Convention raised the level of obligations from the commitment of around 4.2 million tons to around 8 million. The developing countries had hoped to obtain a figure of nearer 10 million, while some estimates<sup>7</sup> suggest that this figure will have to be raised to at least 15 million tons to meet the increasing needs of the world's poorest nations by the 1980s.

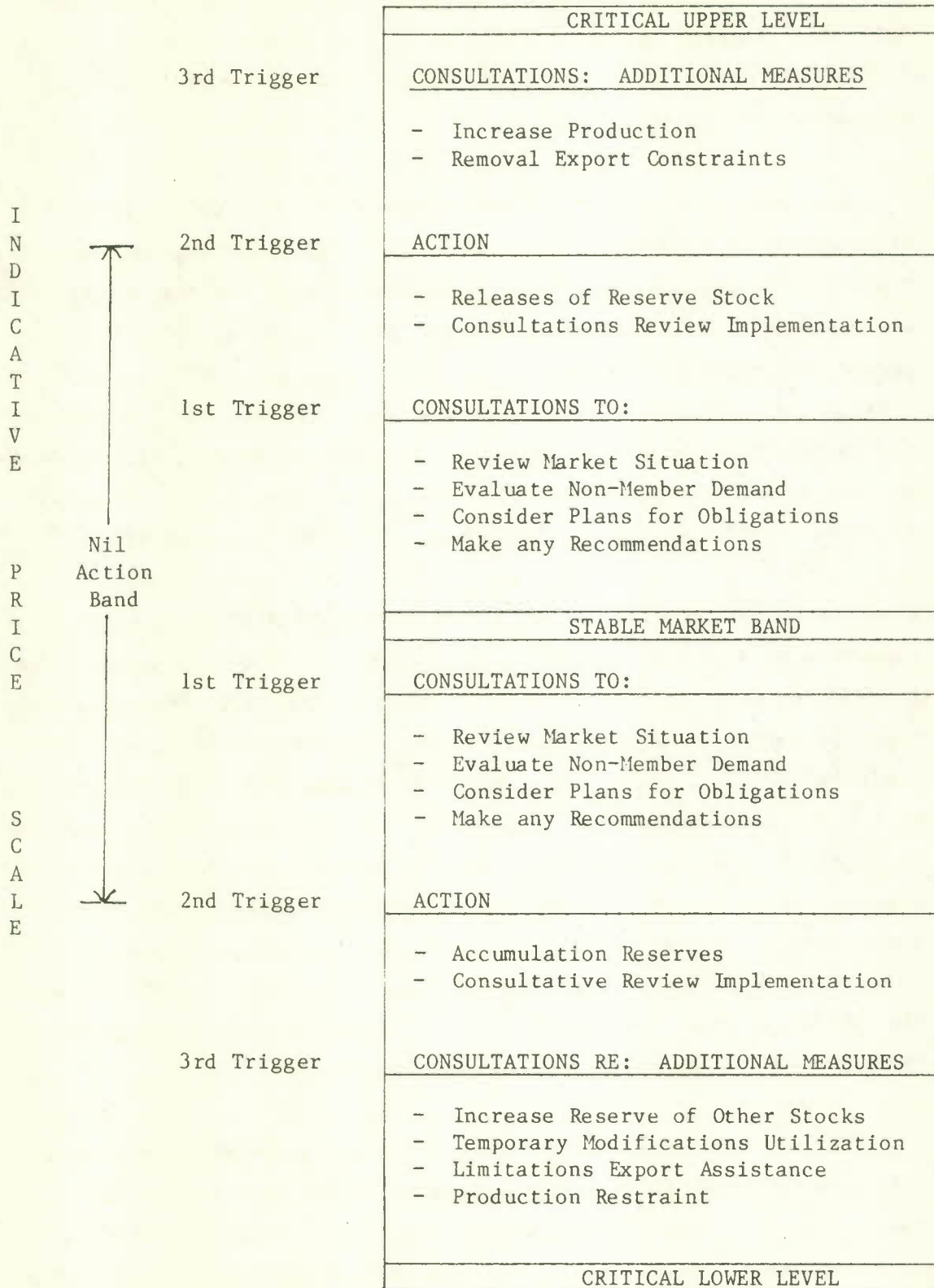
The negotiations over the wheat agreement consisted of three blocks of countries with similar interests: the large producing and exporting countries (primarily the U.S.A., Canada, Australia and Argentina), the large industrialized importing nations, and the LDCs. While there was general agreement on the use of nationally held and internationally coordinated grain stocks as a source of food security for the LDCs and as an instrument to be used to stabilize world grain prices, disagreement centred around the specific size of the global reserve and the price indicator levels at which it was hoped the market would stabilize.<sup>8</sup>

The mechanism around which these points of detail were negotiated consisted of a system of nationally held reserve stocks which were to be coordinated on an international basis through the IWC. The intention was that the market would move freely between a band consisting of a price indicator level at which stocks would be accumulated when supplies were excessive to demand, and a higher price level at which stocks would be released when the market grew tight. If prices moved beyond these bands, a second price indicator level was recognized at which consultations would take place to stabilize the conditions. It is important to note that the price trigger points in this mechanism are indicators of price levels and they do not represent a firm floor or ceiling. (Chart 5.1 presents an outline of the proposed price indicator mechanism.)

The position of the market on any one day would be determined by taking an average of the price quotations of the main traded wheats on an f.o.b. basis. The price was referred to as the "basket" indicator price. Countries were expected to agree on the amount of wheat that they would be willing to accumulate, and only to release them when prices rose to the

Chart 5.1

PROPOSED PRICE ACTION POINTS IN THE 1978-79 I.W.A. NEGOTIATIONS



Source: Miner [5], page 30.



upper release point. Differences, however, arose over the size and distribution of the stock and over the price indicator levels.

The exporting countries generally supported the U.S. position that the target level of 30 million tons should be attained if an effective mechanism was to operate. In this figure they had the support of the LDCs, although a large number of these countries had supported<sup>9</sup> a figure of around five to six per cent of world grain consumption as the appropriate size of the stock. (This would mean a stock of around 50 to 60 million tons of grain. The importing countries of the industrialized economies considered 30 million tons of grain as too high a figure in view of the costs that would be incurred by them in storing the grain. They supported a stock of around 15 million tons.) It is also interesting to note that while Argentina and Australia supported the stock figure of 30 millions tons, they wished to find a clause which would recognize their variability of production by allowing them relief from carrying stocks when they had a crop shortfall. In this way they hoped to maintain expected levels of commercial trade. The U.S. and Canada were not amenable to this concession, and instead they took the position that the stocks should be accumulated and then used for the purposes the agreement stipulated.

The size of the reserve depends to a significant extent on the price at which it is accumulated. The price levels, however, proved to be one of the most disputed parts of the proposal. The importing countries advocated that the stock accumulation level should be in the range of \$US 100 - 115 a metric ton. The Japanese were thought to favour the lower figure, while the EEC favoured the upper one. The grain exporters sought much higher prices. Canada suggested a trigger price of \$155, Argentina wanted \$145 while Australia and the U.S. started at \$140 and then moved up to \$145. As an indication of how far these two "bargaining groups" were distanced from one another, the importing countries' offer roughly equated with the then current U.S. loan rate of \$2.35 per bushel on the farm. If the mechanism was to stabilize the market at levels acceptable to the producers, then they would have needed to have been offered rates which exceeded their current costs of production. Furthermore, without a higher



price it is unlikely that needed production increases would have been forthcoming. In contrast, the range \$145 - 155 equated with the then current U.S. target price.

The disagreement over the price levels was not resolved. Indeed the importing countries, and particularly the EEC, had not been in favour of price triggers and instead had preferred firm price ceilings and floors. Such a scheme fitted in with their domestic support prices which are in part related to the level of import prices. Such disagreements proved to be substantial and they were not resolved at the March meeting, with the result that the world grain market remains without an agreement to use internationally controlled grain stocks as a stabilizing mechanism.

#### 5.4 The Likely Efficacy of the Proposed 1978-79 IWA

Although the 1978-79 IWA negotiations appear to have foundered it is useful to explore whether the terms of the agreement would have offered an effective mechanism in stabilizing the grain market and in providing a source from which food aid and supply shortfalls could be effectively accommodated.

The proposed IWA was set around the principle that the joint management of stocks would be used to absorb changes in production and consumption. An important question, therefore, is whether the proposed figure of 30 million tons would have been adequate to stabilize wheat prices between the proposed price levels and adequate to provide a source of food aid in times of emergency.

The figure of 30 million tons is small by past standards - smaller than the stock of wheat and coarse grains held by the U.S. and Canada, for instance, in 1972. A number of recent studies have suggested that the figure of 30 million is not only historically low, but inadequate to meet the stock agreements of the near future. Trezise [7], for instance, calculated that 20 million tons alone would be needed to give insurance to the poorest countries in the event of a crop failure. His further calculations of the probable supply shortfalls in the consuming countries

and in the U.S. produced a stock figure in the order of 60 million tons.<sup>10</sup> Even though the stocks of grains depend on the price range, adopted as the price "band," it would appear that the figure of 30 million would have been inadequate for the price range that was considered in the IWA.

Another question concerns the ability of the stock of wheat to stabilize effectively the price of feed grains. The hope was that in stabilizing the world price of wheat the price of feedgrain would likewise be stabilized. The degree of substitutability between wheat and the major coarse grains would suggest that this assumption has some plausibility. The difficulty with the proposed arrangement, however, is that this high degree of substitutability is likely to mitigate the actions of the stock managers. With a shortage of grain, the demand for feedgrain would have put pressure on grain prices and grain stocks. In contrast, with a glut, to stockpile wheat would cause its price to rise in relation to feedgrain prices and less of it would be used for feeding purposes. In both cases, the degree of substitutability would likely have put strains on the effectiveness of such a small stock as 30 million tons of grain.

In the case of the LDCs, the agreed to Food Aid Convention presents a question of not only whether the stocks are adequate for such purposes, but also whether stocks should be used for food aid purposes.

It is the underlying domestic deficits in grain and the high variability of their crops which places the LDCs in a vulnerable position when the extremes of world production coincide with their own. A poor domestic crop necessitates higher than usual imports. If the exporting countries also incur poor harvests, the LDCs find that they are bidding along-side affluent importing countries for higher priced imports. With limited foreign exchanges they are often unable to satisfy their requirements at the higher prices, an outcome which has often necessitated the mobilization of international relief programmes.

At the other extreme, when high harvests are reaped in the exporting countries, there is an attraction for the exporting countries in exporting part of the surplus, in order to reduce the depressing effect on prices of

large "overhanging" stocks. In such circumstances, providing food aid to the LDCs becomes an attractive alternative. The LDCs save foreign exchange otherwise spent on imports and they are able to sell the grain at domestic prices and add to their revenues. The effect on domestic prices in the LDCs of importing this food aid is likely to cause them to fall. Local farmers, faced with lower prices, are likely to reduce their planned supplies. The longer term results of above average harvests in exporting countries when accompanied by extensive food aid exports to LDCs, are depressed prices in both the exporting and the LDCs markets, causing farmers in both to plan for lower supplies, a development which serves to exacerbate the upward movements in prices following unexpectedly poor harvests.

The longer term alleviation of the problems of the LDCs will have to come from increased agricultural productivity. To provide food aid could result in short run setbacks to increasing domestic supplies in these countries.

The failures of the negotiations highlight the considerable difficulties of using internationally regulated stocks of grain to absorb changes in production and consumption. The other alternative, which is to coordinate measures to allow the adjustment of consumption and production in response to changing worldwide market conditions, has also proven to be very difficult to achieve. Trade negotiations continue to take place to handle these problems. The major obstacle in their way of success, as in the case of the IWA, is that countries deem it in their interest to seek domestic stability even when the cost is increased international instability.

#### 5.5 The Interests of Canada in International Grain Stabilization Schemes

Canada is interested in the level and stability of grain prices in domestic and international markets, for not only is it a large producer and consumer of meat, but also because it is a major grain producer and exporter.<sup>11</sup> As a country containing producers of grain and consumers of food it is interested in the price of grain stabilizing within a range



which affords Canadian farmers a compensating return for their endeavors and also one which does not lead to increases in the price of food and so adds to the rate inflation.

In pursuing policies favourable to its interests Canada has to face the present realities of the world grain market. On the supply side, recognition has to be given to the dominant position of the U.S. as the major producer and exporter of grain. Small movements in the target prices for wheat and corn can have substantial effects on the supply of these substitutable grains and, in turn, on the price at which they are traded in world markets. The support given to the domestic grain sector of the EEC and Japan, and the import policies that they pursue, also have an effect on the demand for grains. By adjusting their imports (and exports) of grains they have been able to maintain price stability in their domestic markets, but this has also meant an increase in the inelasticity of demand for traded grain. By increasing the inelasticity of demand they have added to the potential price instability in the traded grain market.

The major grain importing countries have been reluctant to move towards a freer trade in grain. Their policies have been successful at maintaining domestic price stability. At the recently concluded Tokyo Round of GATT the trade concessions needed to decrease the inelasticity of demand for grain were not obtained from Japan and the EEC.<sup>12</sup> It would appear that, in the case of the EEC, the prospect of change in their import policies will come from member countries who are reluctant to incur the costs involved in their continuation.

The retention of these restrictionist trading policies results in the continued possibility of unstable prices in the market in traded grain. The use of an international buffer stock as a means of containing ensuing price movements has been rejected. This leaves the exporting countries with the task of satisfying the requirements of their farmers for higher and more stable incomes and, at the same time, of earning steady revenues from their grain exports. They do not want unstable prices because of the effects they have on the revenues of their farmers and on the costs of their food. As a member of the group of exporting countries, it would



appear to be in the interests of Canada to support a stabilizing mechanism which will contain the world price within a price band with as little cost to Canada as it can negotiate. The price band would have as its floor a level which would provide adequate returns to Canadian farmers, and an upper level which, while it would allow Canadian farmers to enjoy a generous return, would not be so high as to drive up sharply the price of food.

One approach, which could go some way to raising the price of traded grain, would be for Canada to cooperate closely with the U.S. The cooperation would be based on the objective of obtaining the financial benefits of the price inelasticity of demand for grain. By jointly restricting exports, the two countries could push up the price on the world market, up to the U.S. (and Canadian) target prices. Such action would increase the revenue derived from the exports, it would reduce the deficiency payments, and thus the income support afforded farmers by the governments, and remove the need for export subsidies.

There are difficulties, however, of obtaining such apparently desirable results. The maintenance of a market price above previous levels will initially result in an expansion in production, which will necessitate an increase in stock holdings and the imposition of effective cut-back programmes. In the longer run importing countries will react to higher import prices by increasing their production. The elasticity of supply of their production will cause the inelasticity of demand for North American grain imports to be reduced.<sup>13</sup> The importers may also find other exporters, such as Argentina and Australia, willing to undercut the prices of North American exports. The recent experience of the U.S. in restricting grain exports to the USSR in retaliation for the invasion of Afghanistan, offers an example of this difficulty. So far the U.S. has been unable to persuade Argentina to curtail its scheduled grain exports to the USSR.<sup>14</sup>

In short, to raise market prices involves reducing exports, production and stocks. Such reductions involve international cooperation in apportioning production quotas to each exporting country. It would ap-

pear, however, that it is as difficult to achieve agreements to apportion reductions among exporters as it is to form agreements to share the holdings of grain between exporting and importing countries.

If an agreement could be reached to reduce exports, the resulting reductions in production and stocks would raise market prices, but it would also increase the difficulty of containing rapid, upward movements in price. While the potential price instability of a grain market subject to trading restrictions would remain, the stocks needed to contain an unexpected rise in prices would not be available. In fact, at the end of the seventies, the grain stocks in the exporting countries had reached low levels - low, that is, in relation to the demands that could be placed on them as a result of failures in the world's harvests.<sup>15</sup> These low stocks have been the result of production and stock reductions in the exporting countries, aimed at raising the low market prices that have prevailed following a number of bountiful harvests. Meanwhile, the low market prices gave the EEC and Japan the strength to negotiate low adjustment points during the negotiations of the IWA. These were considered unacceptably low by the exporting countries.

The size of the recent harvests and the failure to build up stocks provides a measure of the failure of the importing countries to come to a working arrangement to share the costs of an effective stock stabilizing mechanism. The market in grain enters the eighties without substantial reductions in trading restriction and without an agreement to share grain stocks between importing and exporting countries. As world stocks are unlikely to be able to contain a substantial price rise, the possibility of substantial increases in food prices in Canada are likely to follow from a harvest failure. There is no international wheat agreement and no internationally held stocks to act as a safeguard. The hope is that the harvests will remain reliable.

References

1. For a description of the evolution of the international cooperation in wheat and feedgrains see FAO [2].
2. See FAO [2] page 27.
3. In the U.S., for instance, the grain exporters were subsidized for selling grain at prices less than they bought it. The compensation was determined by the difference between wheat prices in the inland of the U.S. and the gateway price at which foreign customers bought it at the ports. Luttrell [4] estimates that from 1949 until 1972, the subsidy programme totaled \$4.3 billion involving the export of around 10.5 billion bushels of wheat.
4. See Tables B.8 and B.9 for the movements of wheat and coarse grain stocks during this period. Table B.8 shows the drops in the stocks held by the world's four leading exporters. Note the low stocks held by the exporting countries in proportion to world production and consumption in the period 1972-74. This is in noticeable contrast to the ratio in 1969. Table B.9 examines whether the importing countries compensated for the fall in the exporting countries stocks of grain by increasing their stocks. The annual percentage change in stocks suggest that importing countries decreased and increased their stocks in line with the exporting countries. Of the period examined, only in 1973-74 did the rest of the world increase their stocks when the major exporters decreased theirs.
5. See IWC: Summary Record of the Third Meeting of the Preparatory Group Held on 29th and 30th September 1975, PREP (75)7 (IWC, October 10, 1975: processed).
6. The U.S. support for quantity triggers is based partly on the proposition that demand for grain becomes inelastic at low levels of stocks. The implication is that prices rise rapidly, even abstracting from panic purchases, after an unexpected crop failure.



The numbers actually denoting the movement of stocks and flows, however, appear only after some delay, with the result that gains can be made from the lag in the quantitative triggers. The reduction in export revenues as stocks are released after the data arrives is likely to be much lower than it would be under a prompt stock adjustment under a price trigger. See Sarris and Taylor [6] page 969.

7. This figure comes from Brij Khindaria, the correspondent of Financial Times of London in Geneva, quoted in the Globe and Mail Tuesday, March 27, 1979, page B6. The estimate is accredited to an unnamed FAO official.
8. See Miner [5] for a discussion of the issues upon which the IWA foundered.
9. See the Group of 77 developing countries FAO [1].
10. Trezise estimated that the costs of purchasing 30 million tons of wheat and 30 million tons of coarse grains in 1975 dollars would be \$6 billion. The assumption was that the buying prices averaged \$110 per ton for wheat and \$100 for coarse grains. The carrying costs were estimated at \$6.40, on the assumption that interest charges in real terms were 3 percent and storage charges, including recycling, were \$7.50 per ton. See Trezise [7], pages 37-38.
11. The values of wheat and coarse grain exports, expressed as a percentage of the total value of merchandized exports during the seventies, have ranged from a high of 7.8 percent in 1975 to a low of 5.1 percent in 1977. See Table 2.4 for details of the export values of the major exporting countries in 1978.
12. The non-tariff agreements resulting from the Tokyo Round of the GATT multinational trade negotiations were announced in April 1979. These include measures to correct such actions as dumping and export subsidies. Details of the results of the tariff negotiations were



presented later in the summer. They did not contain substantial concessions for grain exports.

13. According to D. Harvey's estimates, the value of the combined rest of the world total demand elasticity with respect to the world price would need to be absolutely less than  $-0.03$  in the short run for it to be in Canada's interests to restrict exports in order to raise revenues. This assumes the importing countries do not respond by increasing their supplies. The corresponding figure for the U.S. is  $-0.07$ , and for North America (Canada and the U.S.)  $-0.11$ . See D. Harvey [3], Appendix 1.
14. Following the invasion of Afghanistan by the armies of the USSR, the President of the U.S. imposed a ban on the exports of grain. This was issued in January 1980, and applied to grain exports in excess of the amount agreed to in the Grain Agreement between the two countries. This is thought to involve 14 million metric tons of corn, wheat and soybean. The U.S. government has offered to compensate farmers and traders for their losses. The chances of the USSR obtaining the grain it requires, however, have been enhanced by the failure of U.S. government in persuading Argentina to forgo its grain exports.
15. Table B.2 shows that the estimates of beginning year stocks of wheat and coarse grains in 1978-79 were lower than those in 1972-73.

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Appendix A

GRAIN PRICE SIMULATIONS

This appendix presents the results of the cereal and grain price simulations conducted on Statistics Canada's price input-output model<sup>1</sup>. The model has a fairly detailed breakdown into feed grain and cereal commodities.<sup>2</sup> They number some six in all; barley, oats, rye, corn and grain and wheat (unmilled). Added to this list are the important feed commodity groups of oil seeds, nuts and kernels. While the model provides this detail, there is a problem in that agriculture is treated as a separate "industry."

According to the model the cereals and coarse grains are commodities, which, along with other agricultural commodities, are the inputs into the agricultural industry. Although feed grain is used in the production of cattle<sup>3</sup> there is no separate cattle rearing subsector of the agricultural industry. Nor are there subsectors of the hog, poultry or dairy sectors, all of which use feed grain in the production of hogs, chickens, milk etc.

In order to observe the impact of feed grain prices it is therefore necessary to postulate the impact of feed grain prices on the price of cattle, hogs etc. Once these have been established it is then possible to observe the impacts of the increases on the prices of food and non-food. This requires an empirical understanding of the effects of grain prices on these forms of meat. In a recent publications,<sup>4</sup> Agriculture Canada produced models of the pork, beef, dairy and poultry sectors which go some way to providing such information.

Consideration of these models and the estimated lags in response to feed grain price changes provided an acceptable working set of assumptions. These were that the long run elasticity of livestock prices (steers, hogs etc.) with respect to the price of grain in Canada can be assumed to be around 0.3;<sup>5</sup> secondly, that changes in livestock prices

are completely reflected in livestock product prices at the retail level after 2-3 quarters.

While these were considered as reasonable estimates of the price responses of the meat and milk sector to changes in feed grain costs, it should be further underlined that these are estimates and that they are being used to provide a likely picture of the response of retail food and non-food prices. Table A.1 sets down in some detail the simulations that were conducted on the 1974 input-output tables. Two points were considered when selecting the simulations. The first one was to separate out the effect of grain and cereal prices on industrial and final prices from those changes in meat and milk prices which resulted from the increase in feed grain prices. This was achieved by running the cereal and grain price simulations separately and then together with the meat and milk price increases. In recognition of the distinctiveness of the oil seed commodity group it was separated out, and then run together with the meat and milk price increases. The second point concerned the behaviour of imported cereal, feed grain and meat and milk prices. Despite Canada's largely "open" economy, recognition was given to the possibility that import controls and tariffs can lead to differences between domestic and import prices. Hence, two sets of simulations were considered. The first set (simulations 1-4) assumed domestic prices increased, while imported prices were held constant. Simulations 5-8 considered the possibility that import prices also rose by the same amount as domestic prices.

Before describing the results of the simulations it is useful to consider the underlying assumptions of the input-output model, and the relationship of these assumptions to the assumed behaviour of the meat and milk sectors to changes in feed grain costs. The input-output model describes an economy in which enterprises are faced with production functions which they are unable to adjust by substituting more of one factor for less of another. Yet the results from the simulations are assumed to occur instantaneously, as if all the adjustments which normally occur over "the long run" have taken place. In short, the assumption is that enterprises are able, if they wish, to engage in factor substitution.



While these differences add caution to the interpretation of the results, the simulations considered the long run effects on the price of meat and milk of increases in feed grain costs. As mentioned earlier, the assumption was that the long run supply elasticity was 0.3, suggesting that in the long run, a rise of 100 percent in feed grain prices will result in a rise in the price of meat and milk of some 33 percent. In the simulations a doubling of feed grain prices was considered, a rise which compares with the estimated increase of 53 percent in 1973.<sup>6</sup> The long run price impact of a doubling of prices was considered on the meat and milk commodities, and these were increased by 33 percent.

The results of these 8 simulations are displayed in Tables A.2, A.3 and A.4. Each of these provides a different dimension to the price impact of the grain and meat price increases. Table A.2 shows the impact of the increases on the CPI and on its constituent groups. Not surprisingly the food sub-group shows the highest increases in all the simulations, with tobacco and alcohol showing the largest increases among the non-food group. Table A.3 displays the impact of the price increases on the price of industry outputs. Those industries displaying the most substantial changes were selected and, again not unexpectedly, the agricultural, food processing, distilling and vegetable oil industries showed the most increases. Table A.4 breaks down into more detail the price changes on the items of final consumer expenditure. Again food and alcoholic beverages head the lists, followed by expenditures in restaurants and non-durable household supplies.

An examination of the eight simulations shows that the comparable increase of import prices with domestic prices did not have very dramatic effects, largely because the import content in these commodities was small in 1974. The doubling of wheat and coarse grains pushed up feed grain manufacturing costs, distillers and flour and breakfast cereal producers' costs, but the CPI rose by only 0.5 percent (0.7 if import prices were also doubled). The really larger increases were noted when the meat and milk price increases of 33 percent were considered (simulations 3 and 7). Larger increases were recorded in the meat processing industries, and to a much lesser extent, in the tanning industries. The

recorded increases in the CPI were 1.6 in both cases, the impacts of meat and milk being sufficiently small to have only fractional effects on most items. Adding the cereal feed grain price increases to those of meat, as was done in simulations 4 and 8, provided the model with the task of measuring the full long run price impacts. Predictably these yielded the highest price increases, of 2.4 and 2.7 in the CPI. The latter provides the upper estimate of the long run impact on the CPI of doubling cereal and grain prices.

Table A.1

SIMULATIONS UNDERTAKEN ON THE 1974 PRICE INPUT-OUTPUT MODEL

<u>Simulation No.</u>	<u>Simulation</u>
1	Doubling of the domestic price of barley, oats, rye, corn and grain (008)
2	Doubling of the domestic price of wheat, unmilled (007), barley, oats, rye, corn and grain (008) and oil seeds, nuts and kernels (018). Import price held constant.
3	Increasing by 33% the domestic price of cattle and calves (001), sheep and lambs (002), hogs (003), poultry (004), other live animals (005) and eggs in shell (01).
4	Increasing by 33% the domestic price of cattle and calves, sheep and lambs (002), hogs (003), poultry (004), other live animals (005), wheat, unmilled (007), barley, oats, rye, corn, grain (008), eggs in shell (01) and oil seeds, nuts and kernels (018).
5	Simulation 1 except that import prices are also doubled along with domestic prices.
6	Simulation 2 except that import prices are also doubled along with domestic prices.
7	Simulation 3 except that import prices are also increased by the same percentage as domestic prices.
8	Simulation 4 except that import prices are also increased by the same percentage as domestic prices.

Note: The number in brackets refer to the commodity number. For details of the commodity and industry breakdown see: Statistics Canada (4).

Table A.2

IMPACTS OF GRAIN AND MEAT PRICE INCREASES ON THE PRICE OF  
SELECTED ITEMS OF CONSUMER EXPENDITURES 1974

Simulation No.:	1	2	3	4	5	6	7	8
CPI	0.5	1.1	1.6	2.4	0.7	1.4	1.6	2.7
<u>Sub Items:</u>								
Food	1.6	3.8	5.6	8.4	2.2	4.8	5.8	9.3
Non Food	0.1	0.2	0.2	0.4	0.2	0.3	0.2	0.5
Housing	-	0.1	0.1	0.1	-	0.1	0.1	0.2
Clothing	-	0.1	0.3	0.4	-	0.1	0.4	0.4
Transportation	-	-	0.2	0.2	-	0.1	0.2	0.2
Health	0.1	0.2	0.3	0.5	0.1	0.3	0.3	0.6
Recreation, Education and Reading	0.6	1.0	0.6	1.5	0.8	1.3	0.6	1.8
Tobacco and Alcohol	0.7	0.9	0.3	1.2	0.9	1.3	0.3	1.5

Source: Statistics Canada (5).



Table A.3

## IMPACT OF GRAIN AND MEAT PRICE INCREASES ON THE PRICES OF INDUSTRY OUTPUTS 1974

Industry/Simulation Number:	1	2	3	4	5	6	7	8
Agriculture	10.4	39.4	12.5	49.5	11.5	40.6	12.5	50.0
Slaughtering & Meat Processors	2.5	4.8	21.3	22.2	3.3	6.5	22.1	23.4
Poultry Processors	2.7	4.5	23.3	23.5	3.6	5.8	23.7	23.9
Dairy Factories	2.2	4.0	0.5	4.5	3.0	5.3	0.5	5.8
Fruit & Vegetable Processing	0.9	2.0	1.2	3.0	1.2	2.7	1.2	3.7
Feed Manufacturers	23.5	38.1	1.6	39.2	31.3	48.7	1.7	49.8
Flour & Breakfast Cereal Industries	5.8	55.3	0.5	55.5	7.8	56.8	0.5	56.9
Biscuit Manufacturers	1.2	6.0	1.1	6.9	1.5	6.8	1.2	7.7
Bakeries	1.7	10.6	0.8	11.2	2.3	11.3	0.8	11.9
Confectionery Manufacturers	0.7	4.2	0.3	4.5	0.9	6.8	0.3	7.1
Vegetable Oil Mills	1.9	50.6	0.4	50.7	2.5	87.2	0.4	87.3
Miscellaneous Food Industries	8.1	13.0	0.9	13.7	10.8	17.9	0.9	18.6
Soft Drink Manufacturers	0.1	0.3	0.1	0.4	0.2	0.4	0.1	0.5
Distillers	11.6	11.7	0.2	11.8	15.4	15.6	0.2	15.7
Breweries	1.2	2.3	0.2	2.4	1.6	3.0	0.2	3.1
Wineries	0.6	1.0	0.1	1.1	0.8	1.3	0.2	1.4
Leaf Tobacco Processing	3.2	5.3	0.6	5.8	4.2	6.9	0.6	7.4
Tobacco Products Manufacturers	1.1	2.0	0.2	2.1	1.5	2.5	0.2	2.7
Leather Tanneries	0.3	0.6	2.1	2.3	0.4	0.8	2.2	2.6
Manufacturers of Soap & Cleaning Comp.	0.2	2.1	0.7	2.7	0.3	3.5	0.7	4.0
Retail Trade	0.1	0.3	1.2	1.3	0.2	0.4	1.3	1.4

Table A.4

IMPACTS OF GRAIN AND MEAT PRICE INCREASES ON THE PRICE OF SELECTED ITEMS OF  
CONSUMER EXPENDITURE: 1974

Consumer Expenditure (1)/Simulation No.:	1	2	3	4	5	6	7	8
Food & Alcoholic Beverages	1.9	4.4	5.6	9.2	2.6	5.7	5.7	10.1
Alcoholic Beverages	1.1	1.4	0.1	1.5	1.5	1.8	0.1	1.9
Tobacco	0.3	0.6	0.2	0.7	0.4	0.7	0.2	0.9
Mens & Boys Clothing	-	0.1	0.4	0.4	0.1	0.1	0.4	0.5
Women & Childrens Clothing	-	0.1	0.4	0.5	0.1	0.1	0.4	0.5
Footwear & Shoe Repair	-	0.1	0.4	0.5	0.1	0.2	0.5	0.5
Semi Durable Household Furniture & Supplies	-	0.1	0.4	0.5	0.1	0.2	0.5	0.6
Non Durable Household Supplies	0.3	0.8	0.4	1.1	0.4	1.1	0.4	1.4
Hospital Care	0.2	0.4	0.5	0.9	0.2	0.5	0.6	1.0
Drugs & Sundries	-	0.3	0.5	0.7	0.2	0.4	0.5	0.8
Auto Repairs and Parts	-	0.1	0.5	0.6	0.1	0.2	0.5	0.6
Recreational Services	0.1	0.2	0.2	0.4	0.1	0.2	0.3	0.5
Jewellery, Watches & Repairs	-	0.1	0.4	0.5	0.1	0.2	0.4	0.5
Toilet Articles, Cosmetics, etc.	-	0.4	0.4	0.8	0.2	0.6	0.5	1.0
Expenses in Restaurants & Hotels	0.4	1.0	2.0	2.7	0.6	1.3	2.1	3.0

Notes: (1) Selected items which showed a significant increase in price.

Source: Statistics Canada (5)

Table A.5

ANNUAL RATES OF CHANGE, FARM INPUT PRICE INDEXES  
1970-78

	1970	1971	1972	1973	1974	1975	1976	1977	1978
	(percent)								
Farm building replacement	1.0	6.8	11.6	14.6	10.2	6.7	8.6	9.5	9.5
Farm building repairs	2.3	4.9	9.7	12.0	13.4	8.6	11.0	7.8	9.0
Farm machinery	2.7	2.3	3.1	4.1	12.0	15.6	5.7	6.7	6.7
Petroleum products	1.2	3.4	2.2	6.1	15.0	19.6	14.9	8.8	4.8
Hired farm labour	5.0	4.9	6.9	13.4	17.7	15.5	15.0	9.9	6.1
Fertilizer	-2.5	3.3	3.4	12.0	42.1	23.8	-2.7	0.25	5.2
Seed	-3.1	-0.6	-3.3	27.4	64.4	14.2	-7.4	3.4	3.6
Feed	0.1	2.0	0.5	53.0	28.4	1.4	-0.9	0.25	1.3
Feeder Cattle	7.1	1.5	14.0	31.0	-10.3	-5.6	4.6	2.2	52.5
Small tools and supplies	2.5	3.2	7.7	6.7	12.0	13.3	5.7	5.0	3.9
Mortgages:									
Mortgage rate			5.2	21.6	41.1	24.2	23.8	8.6	
Mortgage rate			1.9	4.4	10.7	1.1	6.5	0.8	
Non-mortgages:									
Non-mortgage interest rate			-0.4	32.2	38.5	4.7	14.1	-7.4	
Non-mortgage interest rate			-5.7	12.2	20.4	2.6	5.8	-11.3	
Total Farm Inputs	1.6	3.2	4.5	16.3	17.1	12.2	5.9	6.0	10.0

Note: 3rd quarter 1978: taken over same period 1977.

Source: Statistics Canada (6)

References

1. For details of the model see: Statistics Canada [5].
2. For the commodity details see: Statistics Canada [4].
3. Feed costs typically take up to 60 percent of beef and dairy enterprise operating expenses.
4. See Agriculture Canada [1] and [2].
5. Note that the final adjustment to changes in grain prices occurs after 6 quarters in the hog sector but only after 12-16 quarters in the beef sector. See MacAuley and Spearin [3].
6. Note that the model is a linear one, so that a 100 percent increase is useful for illustrative purposes. Table A.5 presents estimates which suggest that feed costs rose by 53 percent in 1973 and over 28 percent in 1974.



Bibliography

- [1] Agriculture Canada: Commodity Forecasting Models for Canadian Agriculture, Vol. 1 publication No. 78/2 See: An Analysis of Quarterly Provincial and Regional Hog Supply Function, Table 3, page 10. An Economic Forecasting and Policy Analysis Model of the Canadian Dairy Industry.
- [2] Agriculture Canada: Commodity Forecasting Models for Canadian Agriculture, Vol. II, publication No. 78/3, Dec. 1978. See: A Forecasting Model for the Canadian and U.S. Pork Sectors, table 4, page 11; A Forecasting Model for the Canadian and U.S. Beef Sectors, table 3, page 48 and table 7, page 51; and An Analysis of the Economic Relationships in the Canadian Broiler Industry Table 2, page 74.
- [3] MacAuley, T.G. and Spearin, M.: Dynamic Characteristics of a Recursive Spatial Equilibrium Model of the Pork Sector, presentation to the Annual Meeting of the Canadian Agricultural Economics Society, Guelph, Aug. 1977.
- [4] Statistics Canada: The Input-Output Structure of the Canadian Economy, 1961-71. S.C. Catalogue No. 15-506E, Occasional, March 1977.
- [5] Statistics Canada: Users Guide to Statistics Canada. Structural Economic Models, Nov. 1974.
- [6] Statistics Canada: Farm Input Price Indexes. Catalogue No. 62-004.

Appendix B

Table B.1

WORLD WHEAT: SUPPLY AND DEMAND  
(million metric tons/hectares)

Year	Area Harvested	Yield MT/hs	Beginning Stocks	Production	Exports	Total Utiliz.	Stocks as % Utiliz.
60-61	204.0	1.18	77.1	240.5	43.9	238.4	32.3
61-62	203.1	1.12	79.2	226.6	47.2	237.4	33.3
62-63	208.2	1.23	68.4	256.5	45.8	251.1	27.2
63-64	207.9	1.15	73.8	238.3	58.3	246.8	29.9
64-65	217.0	1.27	65.3	275.6	54.4	265.5	24.5
65-66	216.3	1.22	75.4	264.7	61.6	283.5	26.5
66-67	214.6	1.44	55.2	309.0	58.0	282.2	28.7
67-68	219.3	1.35	82.0	287.0	53.2	288.6	30.6
68-69	224.2	1.46	90.4	328.2	49.2	304.2	36.9
69-70	217.8	1.42	114.4	309.7	55.7	326.7	29.2
70-71	207.0	1.52	97.4	315.5	56.2	338.9	21.2
71-72	212.9	1.64	74.0	348.8	56.0	341.2	23.6
72-73	210.8	1.63	81.1	343.2	71.7	361.1	16.9
73-74	216.8	1.72	63.1	372.4	72.8	364.7	19.3
74-75	219.9	1.62	70.3	357.2	68.1	363.3	17.6
75-76	225.0	1.56	63.6	350.1	73.7	350.7	18.0
76-77	232.5	1.79	63.0	415.1	70.2	379.6	25.9
77-78	225.9	1.69	98.4	381.9	75.1	398.1	20.7
78-79	226.0	1.93	82.3	435.8	75.3	412.0	25.8

Notes: (1) Based on the aggregation of differing local marketing year and should not be construed as representing world stock levels at a fixed point in time. P.R.C. excluded as well as part of Eastern Europe.

(2) Based on the aggregation of differing local marketing years and will therefore differ from July-June data appearing elsewhere.

(3) For countries for which stocks are not available (Ex. USSR), utilization estimates represent "Apparent" utilization: i.e. they are inclusive of annual stock level adjustments.

Source: 1960-66 Foreign Agricultural Circular, USDA FC various issues.

Table B.2

WORLD WHEAT AND COARSE GRAIN: SUPPLY AND DEMAND  
(million metric tons/hectares)

Year	Area		Yield	Beginning		Production	Total		Stocks or % Of	
	Harvested	Stocks		Exports	Utilization		Utilization	Utilization		
1960-61	540.6	168.1	1.29	696.8	70.0	685.6	24.5			
1961-62	532.8	180.3	1.25	663.5	81.0	688.9	26.1			
1962-63	537.1	153.9	1.34	716.8	78.4	713.6	21.5			
1963-64	543.0	157.1	1.30	706.7	94.5	712.0	22.0			
1964-65	550.2	151.9	1.36	748.9	92.3	745.4	20.3			
1965-66	545.3	155.4	1.38	752.8	109.1	788.6	19.7			
1966-67	535.5	130.0	1.55	830.4	101.2	802.6	19.0			
1967-68	545.7	157.8	1.55	848.0	97.7	830.7	20.4			
1968-69	549.7	175.1	1.60	879.8	84.8	851.8	23.1			
1969-70	547.1	203.1	1.62	885.8	103.3	902.1	20.0			
1970-71	537.3	186.8	1.66	891.2	109.5	931.2	15.1			
1971-72	544.9	146.8	1.79	977.6	111.8	955.6	16.9			
1972-73	540.3	167.2	1.76	952.1	141.0	987.9	12.7			
1973-74	560.5	131.4	1.86	1040.7	153.6	1037.4	12.9			
1974-75	561.6	134.2	1.75	985.1	137.1	995.8	12.2			
1975-76	574.5	121.5	1.73	994.7	161.5	997.2	11.9			
1976-77	584.7	119.2	1.91	1117.7	158.9	1062.7	16.4			
1977-78	577.6	174.2	1.87	1079.0	169.7	1086.8	15.3			
1978-79	574.4	166.4	2.04	1173.5	164.2	1126.2	19.0			

Source: USDA. Foreign Agricultural Circular FC various issues.



Table B.3

WORLD TOTAL GRAINS SUPPLY AND DEMAND  
(WHEAT, COARSE GRAIN AND RICE)  
(million metric tons/hectares)

Year	Area Harvested	Yield	Beginning Stocks	Production	Total Exports	Total Utilization	Stocks as % Of Utilization(1)
1966-67	660.8	1.65	140.2	1008.3	108.6	982.1	15.6
1967-68	672.7	1.68	166.4	1040.5	104.6	1019.9	16.6
1968-69	678.0	1.72	187.0	1075.2	96.6	1044.0	18.9
1969-70	679.1	1.75	218.2	1088.4	110.8	1102.1	16.4
1970-71	668.6	1.80	204.5	1100.1	117.4	1139.2	12.4
1971-72	676.5	1.91	165.4	1189.5	119.9	1170.2	13.8
1972-73	670.3	1.87	183.1	1156.2	149.2	1197.7	10.5
1973-74	695.3	1.96	141.6	1259.7	161.3	1254.1	10.7
1974-75	699.6	1.89	146.3	1212.5	144.5	1223.0	11.0
1975-76	717.5	1.89	133.9	1237.9	169.6	1235.2	11.1
1976-77	726.0	2.02	136.9	1353.7	169.0	1300.2	14.6
1977-78	721.1	2.00	190.4	1325.8	179.0	1329.5	14.0
1978-79	718.8	2.15	186.7	1425.2	173.4	1373.2	17.4

Note: (1) Stocks as % of utilization is the ratio of marketing year ending stock and total utilization.

Source: USDA. Foreign Agricultural Circular FG various issues.

Table B.4

PRICES OF EXPORTED GRAIN

Crop Year	Wheat: Export Prices	Corn: Export Prices
	Winter Wheat No. 2; 13½% \$U.S./bushel f.o.b.	Gulf Ports No. 2 yellow \$U.S./bushel f.o.b.
1960-61	1.69 (1)	1.27 (5)
1961-62	1.71	1.30
1962-63	1.75	1.44
1963-64	1.80	1.49
1964-65	1.74	1.52
1965-66	1.59	1.52
1966-67	1.80 (2)	1.55
1967-68	1.56 (3)	1.30
1968-69	1.71	1.38
1969-70	1.45	1.52
1970-71	1.64	1.66
1971-72	1.63	1.44
1972-73	2.47	2.31
1973-74	4.81	3.11
1974-75	4.46	3.26
1975-76	4.13	2.91
1976-77	3.08	2.50
1977-78	3.13 (4)	2.31

- Notes: (1) The crop year is from August to July.  
 (2) The crop year is from August to June.  
 (3) The crop year is from July to June.  
 (4) An estimate of the period July 77 to Feb 1978.  
 (5) The season is October-December for corn.

Sources: USDA. Foreign Agricultural Circular: Wheat, various issues.  
 Feed situation, various issues.

Table B.5

ANNUAL AVERAGE GROWTH RATES FOR WHEAT AND COARSE GRAINS:  
 PRODUCTION AND TRADE  
 1960/61 - 1976/77

(Percentages) Country/Region	Production		Trade	
	Wheat	Coarse Grains	Wheat	Coarse Grains
U.S.	2.9	1.97	2.2	9.8
Canada	3.2	3.4	1.4	10.3
Australia & Argentina	4.6	4.3	4.2	9.4
EEC-9	2.4	2.6	-1.4	6.4
Japan	-11.3	-13.7	4.2	14.2
Centrally Planned Economies	3.4	4.4	4.5	12.7
India	6.5	0.8	1.1	-
Rest of the LDCs	3.4	3.1	2.5	8.2

Source: USDA. Foreign Agricultural Circular: Wheat, various issues.

Table B.6

BEGINNING OF THE YEAR WHEAT STOCKS HELD BY THE  
MAJOR PRODUCING AND CONSUMING COUNTRIES  
(Metric Tons)

	1969/70- 1971/72	%	1972/73	%	1973/74	%	1974/75	%	1975/76	%	1976/77	%
<u>Exporting Countries</u>												
U.S.A.	22057		26807		16302		9226		11703		18071	
Canada	23538		15887		9945		10089		8038		8035	
Australia	6049		1584		565		1982		1788		2814	
Argentina	589		370		269		1026		714		742	
Total	52233	53.3	44648	55.7	27081	43.5	22323	31.7	22243	34.9	29662	47.0
<u>Importing Countries</u>												
EEC-9	6300		7000		5800		7300		9700		7500	
Japan	937		1000		1170		1110		1150		1500	
Total	7237	7.6	8000	10.0	6970	11.2	8410	12.0	10850	17.0	9000	14.2
<u>Others</u>												
India	4300		7000		5000		2800		2500		5600	
Rest of the World	30530	32.3	13452	16.7	14149	22.7	13667	19.4	16007	25.1	14733	23.3
World Total (1)	94300		80100		62200		70200		63600		63000	

Note: (1) These figures differ slightly from the stock measures used elsewhere in the tables. This is due to rounding and to differences in the growing season. Note that they exclude the centrally planned economies.

Source: USDA. Foreign Agricultural Circular: Wheat, various issues.



Table B.7

WHEAT AND COARSE GRAIN (1) PRODUCTION OF MAJOR EXPORTERS  
SHARE OF WORLD PRODUCTION (%)

Year	Argentina		Australia		Canada		U.S.	
	Wheat	W & C.G.	Wheat	W & C.G.	Wheat	W & C.G.	Wheat	W & C.G.
1960	1.8	1.8	3.1	1.5	5.9	3.6	15.4	25.7
1961	2.5	2.2	3.0	1.4	3.4	2.3	14.8	24.3
1962	2.2	1.7	3.3	1.5	6.0	3.9	11.6	22.3
1963	3.8	2.6	3.7	1.6	8.3	4.6	13.1	24.3
1964	4.1	2.6	3.6	1.7	5.9	3.6	12.7	21.1
1965	2.3	2.2	2.7	1.3	6.7	4.1	13.5	23.9
1966	2.0	2.0	4.1	2.0	7.3	4.5	11.5	21.8
1967	2.5	2.1	2.5	1.1	5.4	3.4	13.8	24.3
1968	1.7	1.9	4.5	2.1	5.4	3.7	12.9	22.6
1969	2.3	2.4	3.4	1.6	5.9	3.9	12.7	22.8
1970	1.6	2.3	2.5	1.5	2.9	3.0	11.6	20.7
1971	1.6	1.6	2.5	1.5	4.1	3.8	12.6	24.1
1972	2.0	2.4	1.9	1.1	4.2	3.5	12.2	23.7
1973	1.8	2.4	3.2	1.6	4.3	3.4	12.5	22.6
1974	1.7	2.0	3.2	1.6	3.7	3.0	13.7	20.4
1975	2.3	2.0	3.4	1.8	4.9	3.6	16.6	24.6

Note: (1) Corn, sorghum, oats, barley and rye.

Source: USDA. Foreign Agricultural Circular: Wheat, various issues.

Table B.9

PERCENTAGE ANNUAL CHANGE IN THE STOCKS OF WHEAT AND COARSE GRAINS: 1969-74  
(Beginning of the Year Stocks)

Year	Wheat		Wheat and Coarse Grain			
	Four Major Exporters(1)	Rest of the World	World Total	Major Exporters	Rest of the World	
1969-70	+11	-37	-14	+ 4	-22	- 8
1970-71	-25	-22	-23	-25	-15	-21
1971-72	+ 1	+21	+ 9	+18	+ 7	+13
1972-73	-40	- 1	-22	-36	--	-21
1973-74	-16	+32	+11	-20	+22	+ 2

Notes: (1) Australia, Argentina, Canada and the U.S.A.

Source: USDA. Foreign Agricultural Circular: FG various issues

Table B.8

CHANGES IN WHEAT STOCKS HELD BY THE FOUR MAJOR  
EXPORTING COUNTRIES  
(Million Metric Tons)

Year	End of Year Carry Over of Stocks by the Four Majors Exporters	Stocks of Four Major Exporters as % of:		
		World Stock	World Production	World Consumption
1969	58.7	60	19	18
1970	43.9	59	14	13
1971	44.6	55	13	13
1972	26.8	42	8	7
1973	22.3	32	6	6
1974	22.3	35	6	6
1975	29.5	47	8	8
1976	46.8	47	11	12
1977	44.1	53	11	11

Note: (1) The four major exporters are: Argentina, Australia, Canada and U.S.A.

Source: USDA. Foreign Agricultural Circular: FG various issues.

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