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Josette Murphy

Developed-Country Agricultural Policies and Developing-Country Supplies: The Case of Wheat

by
Timothy Josling

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

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CONTENTS

Foreworo

1. Summary 11

2. Introduction 13

3. Developed Countries and the World Wheat Market 15

4. Impact of Developed-Country Policies on Wheat Trade Volume and World Price Levels 22

5. Impact of Developed-Country Policies on Market Stability 27

6. Responsiveness of Policies to World Market Conditions 32

7. Future Policy Directions 37

8. Implications for Developing Countries 45

Appendix 1: Wheat Policies in Selected Developed Countries 50

Appendix 2: Quantification of Policy Effects in the Wheat Sector of Selected Developed Countries 53

TABLES

1. Wheat production and consumption in selected developed countries, 1968/69 to 1977/78 — 16
2. Ending stocks and stock accumulation of wheat in selected developed countries, 1968/69 to 1976/77 — 17
3. Net export balance of wheat in selected developed countries, 1968/69 to 1976/77 — 17
4. Wheat imported by developing market economies, 1968/69 to 1977/78 — 18
5. Change over previous year of selected variables for wheat, 1969/70 to 1977/78 — 21
6. Policy-induced increase in wheat output of selected developed countries, 1969/70 to 1976/77 — 24
7. Policy-induced decrease in wheat consumption of selected developed countries, 1970 to 1977 — 24
8. Trade volume effect of policy-induced increase in net export of wheat in selected developed countries, 1969/70 to 1976/77 — 25
9. Changes in wheat stocks of selected developed countries and the U.S.S.R., 1967/68 to 1976/77 — 28
10. Policy-induced trade volume effects and changes of wheat stocks in selected developed countries (SDCs) and the U.S.S.R., 1969/70 to 1976/77 — 30
11. Regression of national wheat prices against world price in selected developed countries, 1968/69 to 1975/76 — 33
12. Regression of trade volume effect of policies against world price and implied trade neutral prices — 34
13. Relationship between world price and carry-over stocks of wheat in selected developed countries, 1968/69 to 1975/76 — 35

14. Implications for policy-induced trade volume and for carry-out of an increase of $10 per ton in world wheat price levels 36

15. Wheat producer subsidy equivalents and values for Australia, 1969 to 1977 54

16. Wheat consumer subsidy equivalents and values for Australia, 1969 to 1977 55

17. Wheat producer subsidy equivalents and values for Canada, 1968 to 1976 56

18. Wheat consumer subsidy equivalents and values for Canada, 1968 to 1976 57

19. Wheat producer subsidy equivalents and values for the European Community (6), 1968 to 1976 58

20. Wheat consumer subsidy equivalents and values for the European Community (6), 1968 to 1976 59

21. Wheat producer subsidy equivalents and values for Japan, 1968 to 1976 60

22. Wheat consumer subsidy equivalents and values for Japan, 1968 to 1976 61

23. Wheat producer subsidy equivalents and values for the United Kingdom, 1968 to 1976 62

24. Wheat consumer subsidy equivalents and values for the United Kingdom, 1968 to 1976 63

25. Wheat producer subsidy equivalents and values for the United States, 1968 to 1976 64

26. Wheat consumer subsidy equivalents and values for the United States, 1968 to 1976 65

FOREWORD

A major research thrust of the International Food Policy Research Institute concerns the policy measures needed to assure adequate food supplies to the low-income people of developing countries. This thrust considers not only how to encourage growth in food production and how to deal with the corresponding increase in demand but also how stable supplies can be assured in the face of wide, weather-induced variations in production. In researching these issues, the Institute is studying various international schemes for pooling risks among countries with differing weather patterns and hence differing fluctuations of supply. Because aggregate world food production fluctuates much less from year-to-year than that of individual countries, such schemes offer opportunities for large reductions in the cost of supplying sufficient food to developing countries. It is in this context that Timothy Josling has undertaken this analysis of the effects on developing countries of developed-country wheat policies.

The developed countries as a group produce a large portion of internationally traded grains. The massive purchasing power of these countries assures the stability of their own supplies. Therefore, any effective program for developing countries must take into consideration the powerful market actions of developed countries.

Josling examines the data on production, consumption, stocks, and prices to determine to what extent and how wheat availability in developing countries is destabilized by the developed-country policies. This information will serve as a basis for analyzing international programs aimed at mitigating the undesirable effects or for determining how the policies themselves might be modified as a contribution to solution of global food problems. The data suggest that these destabilizing forces are substantial and underscore the need for countervailing policies at the national and international levels.

Other research at IFPRI has studied various insurance and compensatory payment schemes for dealing with fluctuations in supplies (see Research Report No. 4, *Food Security: An Insurance Approach*). A conference held jointly with the International Maize and Wheat Improvement Center (CIMMYT) on the subject of Food Security for Developing Countries, the proceedings of which are being prepared for publication, drew together research on national and international aspects of this issue. Research continues and will culminate in a series of regional policy workshops designed to bring together researchers and policymakers committed to finding improved means of meeting the pressing food needs of low-income people. Timothy Josling's report adds considerably to the knowledge required to achieve this goal.

John W. Mellor

Washington, D. C.
February 1980

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1

SUMMARY

In recent years the agricultural policies of developed countries have often been accused of having a potentially destabilizing effect on world prices. Wheat is the most significant food commodity exported by the developed world to developing nations. It is therefore important to determine to what extent the wheat policies of the industrial nations have caused problems for the developing countries that purchase wheat on the world market.

This report examines the wheat sectors of Australia, Canada, the European Community, Japan, the United Kingdom, and the United States from 1969/70 to 1977/78. The changes in production, consumption, stock levels, and trade are discussed in detail, with emphasis on year-to-year variations in grain availability. The performance of the Soviet Union is also examined because Soviet demands on world grain markets have had a major impact on the availability of supplies for developing countries. Measures of the effects of developed-country policies are then incorporated into the analysis to see whether the policies themselves exacerbated the problem of supply variability, or whether they helped to stabilize world supplies. The report discusses possible future changes in these policies and recent international initiatives aimed at improving the performance of the world wheat market.

Variation in the wheat supply of developed countries is a serious problem for developing-country importers. For the selected developed countries (SDCs) studied in the report, the difference between high and low production during the period was 47 million tons, compared with less-developed-country imports of 20 to 35 million tons. The absolute variation in output in the U.S.S.R. was about 44 million tons during this period. For the Soviet Union consumption changes dampened the impact on current surplus (production less consumption) to 32 million tons, and apparent stock changes reduced the net trade variation to 21 million tons. For the SDCs the variations were 43 million tons in current surplus and 23 million tons in net trade. In some years, as in 1972/73, the SDC and U.S.S.R. trade balances in part offset each other, but the combined SDC and Soviet change in net surplus still amounted to 18 million tons. If some part of this variation can be attributed to developed-country policies, then there is a possibility that such policies contributed to world market instability.

Two aspects of policy are considered: the impact of support prices on production and consumption and the changes in stocks, whether private or government held. (In cases where stocks are privately held, it is assumed that domestic price supports have an impact on stock behavior over time. Stock changes would then reflect government price policy.) By calculating for each year the national effect on production and consumption of price policies it is possible to trace the impact of such policies on supply availability. Availability also varies from year-to-year. From an increase in aggregate net export availability (from the SDCs) of about 13 million tons in the years 1969/70 to 1972/73, this policy-induced surplus dropped to -4.6 million tons in 1974/75. In other words, availability decreased because price policies held back production and encouraged consumption. Supplies rose again to 5 million tons by 1976/77. If stock changes are included, price policies caused wheat supplies to range from a surplus of 31 million tons in 1972/73 to a deficit of 11 million tons in 1976/77. Clearly policy influences can be as important as production fluctuations to importing countries.

Linking these fluctuations with events on world markets suggests that domestic policies inadvertently exacerbated the problems arising from production variability. The high prices in 1973 were not caused by developed-country policies, but the change in prices would have been much less and the crisis would not have lasted as long in the absence of such policies. Stock policies tend to reinforce the impact of domestic price policies rather than to offset them. Stocks were released into world markets to

export domestic overproduction and were accumulated when price policies held production lower and consumption higher than would otherwise have been the case.

This analysis suggests that the root of the problem lies in the response (or lack of response) of domestic policy prices—and hence production, consumption, and stocks—to world market situations. National price levels in many countries adjust slowly to world market developments. Stock levels in many of the countries studied follow world price movements, which helps to destabilize world markets. Fortunately, stocks in Canada, the United States, and Australia act in a stabilizing way. During the period studied, an extra 2.3 million tons of grain were released by the SDC's for every $10-per-ton rise in world prices. This was just enough to offset the 1.5 million-ton contraction in supplies due to domestic price policies, leaving a stabilizing component of 0.8 million tons. Considering the much larger variations in world wheat production, such a response clearly cannot stabilize the world market.

From the point of view of international policy, some changes in the operation of domestic policies are needed. Ideally these changes would remove the element of instability in the world market caused by unresponsive domestic policy prices. Because such policy changes run counter to the domestic objectives of developed countries, they have never been the subject of serious international negotiations. As an alternative, stock policies could be revised to ensure that the impact on world markets of stable domestic prices for grain is benign. This might require stock releases of perhaps 4 million tons of wheat for a $10-per-ton rise in world prices. But negotiations on an International Wheat Agreement that included such stock rules have been abandoned.

To summarize, developing countries have a strong interest in the way in which stock and price policies interact in developed countries and in pursuing agreements to ensure that such policies do not result in further variations in the price and availability of foodgrains on the world market.

2

INTRODUCTION

The performance of the world's agricultural economy must be judged ultimately by the extent to which production increases can meet the needs of a growing population and the demand for a steady improvement in diets. Government agricultural policies all impinge upon the achievement of these objectives in some way. Many such policies encourage appropriate investment decisions and reduce uncertainty about agricultural production. Other policies offset these favorable effects by causing investment funds to be misdirected or by increasing market uncertainty. The charge is often made that developed-country farm policies, by promoting the production of high-cost foodstuffs in industrial countries and exacerbating the instability of world markets, make it difficult for developing countries (LDCs) to evolve their own food policies.

This study explores one aspect of this contention: the impact of the policies pursued by a group of industrial countries on the price and availability of wheat sold to developing countries. It identifies certain elements of these policies that have significance for other countries in general and for food-importing developing countries in particular. The aim is to allow those interested in the analysis of the food situation in food-deficit developing countries to understand and to monitor the most significant features of developed-country policy affecting grain supplies. Experiences of the past decade are evaluated as a useful perspective on these policies, and an attempt is made to foresee possible policy developments and indicate their potential impact.

One major impact of developed-country agricultural policies on the world economic system is their influence on the location of global agricultural production. Though it is in the long-run interest of all countries to use the world's agricultural resources in a way that minimizes the cost of providing essential foodstuffs, present patterns of agricultural production do not satisfy that criterion. Actions of developed countries to support farm income tend to distort the ability of the system to produce food at the lowest cost. In most developed countries, government support is concentrated on those sectors of agriculture that are not competitive with other countries. Support prices for these products are out of line with world market conditions when they are determined primarily by domestic inflation rates and income trends. Though there are, of course, cogent political arguments that encourage such countries to maintain protection for less-than-efficient domestic farm production, the arguments themselves are premised on the lack of competitiveness of the sectors in question. Thus the cost of these policies to national treasuries and to consumers is an indication of the extent to which governments go to avoid adjustments that would otherwise lower the resource cost of food production.

Second, developed-country agricultural policies can also affect the price and market instability of the world food system. Policies that fix domestic price levels for consumers and producers thrust short-run adjustments in the market onto unprotected groups in other countries. The mechanism for achieving domestic price stability—itself a major aim of these policies—varies from country to country. In general, whenever stock adjustments are not made that are equivalent to the suppressed changes in production and consumption (total domestic use), the country concerned is exacerbating international market instability.

Uncertainty of a different kind arises because many world prices for major products are heavily influenced by the marketing policies of governments, not least the storage and export-subsidy programs pursued by the exporting countries. Even in a period of price stability, uncertainty may be generated by concern that price levels are scarcely high enough to cover production costs even in efficient agricultural areas. Developing countries, where imports of cereals began to rise rapidly during the 1960s, understood that the attractive terms under which purchases were made were only possible as a result of

considerable developed-country subsidies in the form of farm programs and overseas aid. The price explosion that ended this era confirmed these fears as the same domestic policies that had generated surpluses began to squeeze world supplies in order to soften the impact of harvest shortfalls on the rate of inflation at home.

Price instability and policy uncertainty have serious short- and long-term implications, for resource use and investment decisions. The impact that the dramatic rise in cereal prices during 1973 had on attitudes toward agriculture throughout the world is still apparent today. In food-importing industrial countries, agricultural support was seen by many as necessary to insure against shortages, whereas in exporting countries the presumption grew that the higher price levels ushered in a period of economic prosperity and sellers' markets. In such an atmosphere, rational decisions on long-run resource deployment, both by governments and by individual farmers, were difficult to make. Such periods of price uncertainty resulting from a confused interpretation of world price movements clearly involve a world-wide cost.

This report concerns wheat trade and the policies that influence that trade, especially sales from developed to developing countries. It examines the effect of policies on trade volumes and on the level and stability of world prices. It looks at the linkages between such policies and world market conditions, concluding with a discussion of the possible range of impacts on developing countries. Chapter 3 outlines the place of the major developed countries in the world wheat market. This in turn leads to a detailed consideration of the effects of their farm policies on the availability and price of wheat over the past 10 years, and then to a discussion of national and international policy developments that have a direct bearing on the relationship between developed-country policy and developing-country food supplies.

3

DEVELOPED COUNTRIES AND THE WORLD WHEAT MARKET

The world wheat market has undergone a transformation in recent years. Trade has been concentrated increasingly in the hands of four exporters, Australia, Canada, France, and the United States. Argentina is the only other country with a considerable, regular wheat export trade. Among the importers, the old established markets, notably Japan and the United Kingdom, have stagnated while a group of developing countries have become importers on a steadily increasing scale. The Soviet Union and the People's Republic of China have also entered the market in an erratic but consequential way. Wheat, already the major traded foodgrain, has increased its influence as a link between the prolific temperate-zone farming regions and the crowded tropics. The ability of the world to feed its growing population and to upgrade present diets rests heavily on international flows of wheat. For good or ill, conditions in the wheat market are the most significant single determinant of world food security.

The expansion and redirection of wheat trade toward greater imports by developing countries from developed countries has heightened the importance of the industrial nations' government policies toward their farm sectors. These policies, largely the legacy of the Great Depression, influence the availability of wheat on world markets and its price. They determine to an important extent the structure of the market and hence its behavior as supply varies. Private and public institutions in the industrial countries play an important role in marketing wheat and other agricultural products. Their actions deserve scrutiny in relation to world food issues. To date, these policies themselves have been comprehensively described and analyzed in the context of their domestic environment, but attention to their external implications has been much less thorough. The events of 1972 to 1974, when world wheat prices jumped and supplies were scarce, dramatically illustrated the significance of these policies to the international market and in particular to developing countries, which rely on that market for a vital supplement to domestic food production.

PRODUCTION, CONSUMPTION, AND TRADE LEVELS

Before examining these policies, and evaluating their impact on the level of trade and the stability of prices, it is useful to determine the place of the developed countries in the wheat market balance. In order to keep the empirical analysis within bounds, no comprehensive coverage of developed countries and their policies was attempted in this study. Instead, a group of selected developed countries (SDCs) were identified as those likely to have the most influence on the world grain trade. These are Australia, Canada, the European Community (the original six members and the United Kingdom, which joined in 1973),[1] Japan, the United States, and the Soviet Union. Table 1 shows their levels of production and consumption between 1968/69 and 1977/78.

Because the impact of one country's policies on the fortunes of others is heavily influenced by the production and consumption of the country, it is worth noting the dominance of the Soviet Union in the wheat market. Soviet production was not far short of the combined total of Australia, Canada, the European Community, and the United States, and Soviet consumption exceeded the total for these countries. The United States, with production slightly more than

[1] Because of the period of time covered, the United Kingdom will be considered separately from the European Community throughout this report.

Table 1—Wheat production and consumption in selected developed countries, 1968/69 to 1977/78

Countries	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78
	(million metric tons)									
Production										
Australia	14.8	10.5	7.9	8.5	6.4	12.0	11.4	11.8	11.7	9.4
Canada	17.7	18.6	9.0	14.4	14.5	16.2	13.3	17.1	23.6	19.7
European Community (6)	30.0	28.5	26.5	30.5	32.2	32.5	35.0	28.4	33.9	32.5
Japan	1.0	0.8	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2
United Kingdom	3.5	3.4	4.2	4.8	4.8	5.0	6.1	4.5	4.7	5.2
United States	42.9	39.7	37.3	44.0	42.0	46.4	48.9	58.1	58.3	55.1
Subtotal	109.9	101.5	85.4	102.6	100.2	112.3	114.9	120.1	132.4	122.1
U.S.S.R.	93.4	79.9	99.7	86.0	109.8	83.9	66.2	96.9	100.0	
Total	203.3	181.4	185.1	201.4	186.2	222.1	198.8	186.3	229.3	222.1
Consumption										
Australia	2.3	2.4	2.6	2.7	3.2	3.1	3.0	2.7	2.8	2.6
Canada	4.3	4.6	4.7	4.8	4.8	4.8	4.6	4.8	5.1	5.6
European Community (6)	23.2	26.9	25.9	26.3	27.6	26.8	25.9	23.9	29.9	30.2
Japan	5.1	5.2	5.2	5.2	5.3	5.5	5.5	5.6	5.7	5.7
United Kingdom	7.9	8.2	9.4	8.6	9.2	8.0	9.3	8.2	8.2	8.6
United States	20.5	21.5	20.9	23.4	21.3	20.6	19.1	19.9	20.7	23.0
Subtotal	63.3	68.8	68.7	71.0	71.4	68.8	67.4	65.1	72.4	75.7
U.S.S.R.	85.9	93.6	101.0	93.5	98.3	95.3	93.4	83.8	88.4	97.5
Total	149.2	162.4	169.7	164.5	169.7	164.1	160.8	148.9	160.8	173.2

Source: U.S. Department of Agriculture, Foreign Agricultural Service, "Foreign Production, Supply and Distribution of Agricultural Commodities Tape," Washington, D.C., May 1978.

half that of the U.S.S.R., was followed by the European Community, which in turn produced about 70 percent more wheat than Canada. On the consumption side, the European Community overtook the United States as the second largest market for wheat, with the smaller users, Canada and Japan, following the United Kingdom. Production and consumption decisions in the United States, the U.S.S.R., and the European Community, and production decisions in Canada and to a lesser extent, Australia clearly have a major impact on the world wheat economy.

Table 2 gives data on the stocks of wheat held in these countries, though stock data is not of uniform quality.[2] Throughout most of this period the greatest quantities of wheat stocks were held by the United States, Canada, and the Soviet Union, with relatively low stocks in the importing countries, Japan, the United Kingdom, and Australia. The level of stocks in the European Community was also low relative to production and consumption levels. The figures for stock accumulation in Table 2 (where negative figures denote a rundown of stocks) indicate that both the United States and the U.S.S.R. changed their stock levels considerably from year to year. By contrast, stocks do not appear to have varied greatly in the importing countries and in the European Community.

The figures for net exports (Table 3) indicate that the United States increased its dominant position in the wheat market, exporting annually about twice as much as Canada. The European Community was a consistent net exporter, though it fell behind Australia.[3] Imports into Japan rose over the period, whereas those to the United

[2] Stock figures are notoriously incomplete. The Soviet figures are estimates made by the USDA that, although probably reflecting year-to-year changes reasonably well, may not accurately state the absolute levels. The different reporting periods for stock levels also make assessment of total stocks at any point in time hazardous.

[3] The European Community is a substantial importer of feedgrains and a market for some durum and high protein wheats: exports are of soft wheat.

Table 2—Ending stocks and stock accumulation of wheat in selected developed countries, 1968/69 to 1976/77

Countries	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77
				(million metric tons)					
				Ending Stocks					
Australia	7.6	7.5	3.7	1.6	0.6	2.0	1.7	2.6	2.1
Canada	23.2	27.5	20.0	15.9	9.9	10.1	8.0	8.2	13.3
European Community (6)	7.2	3.8	4.1	5.8	5.7	6.0	8.1	6.0	5.7
Japan	1.0	0.9	1.0	1.0	1.2	1.1	1.2	1.5	1.5
United Kingdom	1.3	1.1	1.2	1.0	1.2	1.1	1.5	1.4	1.3
United States	24.6	26.8	22.4	26.8	16.2	9.3	11.8	18.1	30.3
Subtotal	64.9	67.6	52.4	52.1	34.8	29.6	32.3	37.8	54.2
U.S.S.R.	31.0	12.0	4.0	7.0	9.0	23.0	12.0	4.0	16.0
Total	95.9	79.6	56.4	59.1	43.8	52.6	44.3	41.8	70.2
				Stock Accumulation					
Australia	5.8	-0.0	3.9	2.1	1.0	1.4	0.3	1.0	0.6
Canada	4.3	7.5	4.1	5.9	0.1	2.1	0.2	5.1	
European Community (6)	2.0	3.3	0.3	1.6	0.1	0.2	2.2	2.1	0.3
Japan	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.4	0.0
United Kingdom	-0.0	-0.1	0.0	0.2	0.2	0.0	0.4	0.2	0.1
United States	7.5	2.2	4.4	4.4	10.6	7.0	2.6	6.3	12.2
Subtotal	20.1	3.0	15.4	0.3	17.2	5.4	2.8	5.6	16.9
U.S.S.R.	2.0	19.0	8.0	3.0	2.0	14.0	11.0	8.0	12.0
Total	22.1	16.0	23.4	2.7	15.2	8.6	8.2	2.4	28.9

Source: U.S. Department of Agriculture, Foreign Agricultural Service, "Foreign Production, Supply and Distribution of Agricultural Commodities Tape," Washington, D.C., May 1978.

Note: Positive figures indicate accumulation over the year; negative figures indicate stock rundown.

Kingdom have fallen somewhat (see Table 4). The U.S.S.R., a consistent exporter at the beginning of the period, became a large but erratic importer; in 1972/73 its imports almost matched the export volume of Canada. This change had a major impact on trade patterns. From 1968/69 to 1971/72, the U.S.S.R. exported about 110 percent more wheat than was purchased on the largest single import market, the United Kingdom. From 1972/73 to 1976/77, the average imports to the U.S.S.R. were 41 percent

Table 3—Net export balance of wheat in selected developed countries, 1968/69 to 1976/77

Countries	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77
				(million metric tons)					
Australia	6.7	8.1	9.2	7.9	4.2	7.5	8.7	8.1	9.5
Canada	8.5	9.7	11.8	13.7	15.6	11.3	10.8	12.1	13.4
European Community (6)	4.8	4.9	0.3	2.6	4.7	5.5	6.9	6.6	3.7
Japan	-4.0	4.3	4.8	4.9	5.2	5.2	5.3	5.8	5.5
United Kingdom	-4.4	4.7	5.2	3.6	4.6	3.0	3.6	3.5	3.4
United States	14.9	16.0	20.8	16.2	31.3	32.8	27.2	31.9	25.4
Subtotal	26.4	29.9	32.0	31.8	46.0	48.8	44.7	49.5	43.7
U.S.S.R.	5.5	5.3	6.7	2.3	14.3	0.5	1.5	9.6	3.5
Total	31.9	35.2	38.7	34.1	31.7	49.3	46.2	39.9	40.2

Source: Author's calculations derived from basic data in U.S. Department of Agriculture, Foreign Agricultural Service, "Foreign Production, Supply and Distribution of Agricultural Commodities Tape," Washington, D.C., May 1978.

Table 4—Wheat imported by developing market economies, 1968/69 to 1977/78

Regions	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78
	(million metric tons)									
Asia[a]	9.0	9.3	8.9	8.7	9.3	11.5	13.1	14.7	11.8	8.9
Latin America	5.7	4.9	5.0	6.1	8.5	7.4	6.4	8.2	7.1	10.1
North Africa[b]	4.7	6.0	8.3	9.3	6.8	9.8	12.2	11.3	10.6	13.6
Africa	0.9	1.2	1.7	1.6	1.6	1.7	1.7	1.9	2.3	2.3
Total	20.4	21.4	23.8	25.7	26.1	30.5	33.4	36.0	31.9	34.9

Source: U.S. Department of Agriculture, Foreign Agricultural Service, "Foreign Production, Supply and Distribution of Agricultural Commodities Tape," Washington, D.C., May 1978.

[a] This includes centrally planned Asian countries

[b] This includes the Middle East.

higher than sales to the United Kingdom.

Table 4 shows imports into developing-country regions during this period. Total wheat imports increased steadily, particularly in Asian market economies, North Africa, and the Middle East, with total developing-country imports exceeding in all but two years (1972/73 and 1973/74) the wheat exports of the United States. In the earlier years of the period shown in the table, much of the wheat sold to developing countries went under concessional programs, notably the U.S. food-aid program. By the early 1970s the bulk of trade was on commercial terms.

VARIATIONS IN OUTPUT AND TRADE

Production, consumption, stocks, and trade illustrate the dynamic response of wheat trade to changing import requirements. But the instability of this market is equally significant. Wheat-growing areas suffer from unpredictable weather-induced variations in yield from year to year. This variability of production is apparent from the data in Table 1. It can be seen that the SDCs' production varied from 85.4 million metric tons in 1970/71 to 132.24 million tons in 1976/77, a difference of 47 million tons.[4] The difference between high and low production levels was about 21 million tons for the United States and nearly 15 million tons for Canada. Production was more stable in Australia and the European Community; the difference between high and low production levels during the decade was about 8.5 million tons for each—despite the fact that the level of European production was two to three times greater than that of Australia. U.S.S.R. production also varied widely from 66.2 million tons in 1976/77 to 109.8 in 1973/74 for an absolute variation of 43.6 million tons. A slight upward trend in both U.S.S.R. and developed-country production[5] implies that these absolute differences over a decade overstate somewhat the range of output that might be anticipated for the future, but it is clear that, compared with LDC imports of 20 to 35 million tons, the production variations are a considerable source of potential instability in the market.

Consumption in these developed countries tended to be much more stable. For the SDCs as a group, the highest level of consumption was in 1978 and the lowest was in 1969, partly reflecting a stronger upward trend than in production. This trend was particularly noticeable in Canada, the European Community, and Japan. Australian consumption peaked in 1973 and that of the United Kingdom in 1971. In the United States consumption was highest in 1972 and lowest three years later in 1975. In the U.S.S.R. it was highest in 1971 and lowest in 1976. The difference between high and low consumption levels in the decade

[4] "Tons" denotes metric tons throughout this report

[5] For the purposes of this report, the terms "developed countries" and "SDCs" exclude the U.S.S.R.

was 12.4 million tons in the SDCs as a whole and 17.2 million tons in the Soviet Union, with the European Community exhibiting the most variability in consumption (as measured by the absolute difference between high and low levels) of the developed-market economics, but still less than half that of the U.S.S.R.[b]

The potential external effects of production and consumption instability depend on whether peaks and troughs of production and consumption coincide, which can be seen by looking at the current surplus (production less consumption). For the SDCs this ranged from 60.0 million tons (1976/77) to 16.7 million tons (1970/71), a difference of 43.3 million tons, almost as high as the production variation of 47.0 million tons. Consumption changes appear to be almost independent of production variations, thus putting a greater burden on stocks if instability is not to be "exported." The same measure for the U.S.S.R. showed a variation of 32.1 million tons—much less than the absolute variation in production in that country—indicating that U.S.S.R. consumption was more closely attuned to production levels.

Stock variations may be examined either as a potential influence on the market in their own right or as a modifier of the impact of consumption and production variability. The absolute levels of stocks held in developed countries ranged from 32.3 to 67.6 million tons: in the Soviet Union the corresponding figures were 4.0 and 31.0 million tons. This lower proportion of production, however, may reflect in part the difficulty in obtaining comprehensive U.S.S.R. stock data. But from the point of view of the rest of the world, it is the annual accumulation or rundown of stocks that is more important than their absolute level. For the SDCs these stock changes ranged from an accumulation of 20.2 million tons (1968/69) to a rundown of 17.3 million tons (1972/73); for the U.S.S.R. changes ranged from an increase of 14.0 million tons (1973/74) to a decrease of 19.0 million tons (1969/70). Thus the differences between high and low annual stock changes were 37.5 million tons for the SDCs and 33.0 million tons for the U.S.S.R. The SDCs appear to be more flexible with respect to stock changes, as one would expect from a group of countries dominated by the large wheat exporters.

Whether this variation in stocks adds to or detracts from world stability depends on whether it is a response to world conditions or a reflection of the domestic situations. If the net trade balance is more stable than the current surplus (of production less consumption), then stocks probably are offsetting domestic market variations. For the SDCs this balance varied from 26.4 million tons (1968/69) to 49.5 million tons (1975/76), a difference of 23.1 million tons. In the U.S.S.R. the corresponding figures were 14.3 million tons (1972/73) and 6.7 million tons, for a difference of 21 million tons. The SDCs effectively depressed a domestic swing of 43.3 million tons to an external trade impact of 23.1 million tons. The net trade volume of the Soviet Union fluctuated by about the same amount as that of the SDCs as a whole, but this was a smaller reduction from the domestic (current surplus) variation of 32.1 million tons than the reduction of the developed-market countries.

In some years Soviet and SDC net-trade variations offset each other as in 1972/73 when the U.S.S.R. made a large purchase of western grain. But the net exports of both the U.S.S.R. and the SDCs also varied from year to year: the high was 49.3 million tons in 1973/74 and the low, 31.7 million tons in 1972/73, a difference of 17.6 million tons. To some extent the net exports from these countries corresponded to additional requirements by the LDCs, whose imports did indeed vary from 20.4 million tons (1968/69) to 36.0 million tons (1975/76). Moreover, the balance over and above LDC imports also varied from 18.8 million tons in 1973/74 to 3.9 million tons in 1975/76, a difference of 14.9 million tons. From these figures it is clear that developed-country and Soviet trade does not always act to stabilize world markets.

These absolute differences among high

[b] The question as to whether this consumption variability contributed to market stability is taken up later in the report.

and low production, trade, stock, and consumption levels from 1968/69 to 1977/78 may be summarized:

(million metric tons)

SDC consumption	12.4
LDC imports	16.4
U.S.S.R. consumption	17.2
U.S.S.R. net trade	21.0
SDC net trade	23.1
U.S.S.R current surplus	32.1
U.S.S.R. stock change	33.0
SDC stock changes	37.5
SDC current surplus	43.3
U.S.S.R. production	43.6
SDC production	47.0

Current surplus is production minus consumption in a particular year and stock changes are the accumulation or rundown of stocks, not the difference between high and low total stock figures. SDC consumption, LDC imports, and U.S.S.R. consumption appear as the variables with the least spread between extremes, whereas SDC production, Soviet production, and the balance between production and consumption in the SDCs had the greatest fluctuations. A prima facie case exists for the idea that stock changes or government policies in developed countries add to the instability in world wheat markets.

Of course production, consumption, stocks, and trade all are linked, not only by the workings of the market but also by the policies employed in the various countries. To hypothesize, one might expect in a country such as the Soviet Union, where price signals from the world market cannot directly affect domestic farm and food prices, the foreign exchange constraint is likely to dictate the response of consumption to production.[7] Thus a poor harvest would lead to a decrease in consumption. The same relationship might exist in more market-oriented economies through the influence of prices, but the ability of government policies to manipulate domestic price levels through trade, stocks, and subsidies would tend to mask this effect. Hence, in developed-market economies, production and consumption most likely would be much less closely correlated from year to year.

To examine these possibilities, the annual changes in the production, consumption, stock, and trade variables are presented in Table 5. Such a crude hypothesis warrants only a simple test. In the developed-market economies production and consumption changes had the same sign in only three of the nine sets of year-on-year changes shown. By contrast, in the Soviet Union production and consumption moved together in six of the nine years. Therefore it appears that the link between domestic production and consumption is weaker in the SDCs, again indicating a potentially greater destabilizing force in world markets.

The actual impact on other countries also reflects stock changes. According to the table, stock changes carried the same sign as production variations in every year for the SDCs, and net exports varied with production changes in only two of those eight years. For the Soviet Union stock changes followed production variations in five out of eight years, whereas the net trade balance for wheat varied with production in seven of these years.

The picture, then, is one of developed-market economies employing domestic policies that dampen price signals to the users of wheat, in part by allowing stock changes to reflect strongly the changes in production. Such production variations do not appear to be unduly imposed on overseas markets, and these stocks respond to trade demands as well as to the maintenance of consumption. The question is whether this responsiveness is enough to offset price pressures and therefore provide a positive stabilizing influence. Although the amount of stocks held by the U.S.S.R. also varies with domestic production, the Soviets primarily use the trade system to compensate for harvest fluctuations. Moreover, the Soviet Union imposes greater variation in availability on its consumers than do the market economies. To explore these influences further, it is necessary to examine the impact on the market balance of the policies pursued affecting price levels in domestic markets and stock changes.

[7] Transportation problems also influence the connection between production and consumption changes.

Table 5—Change over previous year of selected variables for wheat, 1969/70 to 1977/78

Year	Selected Developed Countries				U.S.S.R.				Less Developed Countries
	Production	Consumption	Stocks	Trade Surplus	Production	Consumption	Stocks	Trade Surplus	Net Trade
	(million metric tons)								
1969/70	-8.4	5.5	17.4	3.5	13.5	7.7	21.0	0.2	1.0
1970/71	16.1	0.1	18.0	2.1	19.8	7.4	11.0	1.4	2.4
1971/72	17.2	2.3	15.1	0.2	0.9	7.5	11.0	4.4	1.9
1972/73	2.4	0.4	17.0	14.2	12.8	4.8	1.0	16.6	0.4
1973/74	12.1	2.6	11.9	2.8	23.8	3.0	12.0	14.8	4.4
1974/75	2.6	-1.4	8.1	4.1	25.9	1.9	25.0	-1.0	2.9
1975/76	5.2	2.3	2.7	4.8	17.7	9.6	3.0	7.4	2.6
1976/77	12.3	7.3	10.7	5.8	30.7	4.6	20.0	-6.1	-4.1
1977/78	10.3	3.3	...	.	3.1	9.1	..	3.5	3.0

Source: Author's calculations derived from Tables 1, 2, and 3. Basic data for these tables supplied by U.S. Department of Agriculture, Foreign Agricultural Service, "Foreign Production, Supply and Distribution of Agricultural Commodities Tape," Washington, D.C., May 1978.

4

IMPACT OF DEVELOPED-COUNTRY POLICIES ON WHEAT TRADE VOLUME AND WORLD PRICE LEVELS

INTERACTIONS BETWEEN COUNTRIES THROUGH TRADE

The previous chapter discussed the place of developed countries in the wheat market and the incidence of variability in the system. Obviously one cannot blame all of the changes observed in the market, over a long period of time or from year to year, on policies. The process of separating observed events into those occurring from natural market fluctuations and those resulting from policy changes requires further analysis. It also moves the discussion from the firm basis of reported statistics to the more debatable area of assumptions about what would have happened if certain things were different.

Though a full analysis of the actors in the world market would involve a detailed economic model of private and governmental behavior, a simplified approach is sufficient to bring out the broad linkages. Because the world is a closed economic system, with no net trade flows, available supplies in any given time period, comprising new production and the carry-over from the previous period, must all be used either as present consumption (and waste) or as stocks carried into the next time period. This simple accounting identity is formalized in the equation:

$$S + C_0 = D + C_1,$$

where

- S = new supply,
- D = current consumption,
- C_0 = the carry-over from the previous period, and
- C_1 = the amount left to be carried out to the next period

It follows that changes in these variables must satisfy the same conditions. Rearranging the terms, the identity of such changes can be written as:

$$\Delta S = \Delta D + (C_1 - C_0).$$

The change referred to can be interpreted in a number of ways. Year-to-year changes can be used to examine questions of stability. Changes over a decade could also be expressed by the identity where ΔS would tend to equal ΔD, as can changes from week to week, where stock changes would be much more significant. But Δ can also refer to changes due to policies—the comparison of the situation with and without a particular policy measure or set of measures.

In order to examine a set of policies in one group of countries, the identity can be disaggregated and trade introduced as shown below:

For any country 1,

$$S^1 + M^1 + C_0^1 = D^1 + X^1 + C_1^1,$$

where superscript 1 refers to any given country (or group of countries) engaged in trade, M is current imports, and X is current exports. And adding the same relationship for country 2,

$$(S - D)^1 + (C_1 - C_0)^1 + (X - M)^1 + (M - X)^2 + (D - S)^2 + (C_1 - C_0)^2,$$

where superscript 2 refers to the region that together with 1 makes up the (closed) world market.

The impact of developed-country policies can be expressed as either $\Delta(S - D)^1$, $\Delta(C_1 - C_0)^1$, or $\Delta(X - M)^1$, where superscript 1 refers to developed countries, and Δ to the change brought about by their policies.

This in turn must induce a corresponding change in developing countries: either $\Delta(M - X)^2$, or $\Delta(D - S)^2 + (C_1 - C_0)^2$, where superscript 2 refers to developing countries and Δ is the impact of the policies in the developed countries.

Approaching the problem from this starting point, one can either look directly at trade impacts, $\Delta(X - M)^1$, or at the components, $\Delta(S - D)^1$ and $\Delta(C_1 - C_0)^1$. In discussing the wheat market in the light of domestic farm policies in industrial market economies the latter course commends itself. The impact of policies on production,

consumption, and stocks is more directly measurable. Only where quantitative trade controls were dominant, as in central-plan countries, might one choose to discuss trade flow changes directly. On the other side of the equation, tracing the impact to the supply, consumption, and stock levels of other countries might be satisfying, but requires a formidable amount of information and detailed analysis. Instead, $\Delta (M - X)$[2] can be taken as an indication of the availability of grain as influenced by developed-country policies.

The present study follows these precepts. The impact of developed-country policies on the components of net trade, the levels of production, consumption, and the accumulation or depletion of stocks is estimated in some detail. The influence of the Soviet Union on the world market is examined only through changes in that country's net trade position, whereas the accumulated impact of all these factors on developing countries is not quantified further than estimating the implications for wheat availability and the consequent influence on price levels and variability on world markets.[8]

IMPLICATIONS OF POLICY FOR PRODUCTION AND TRADE

In examining the impact of policies in developed countries on the world wheat market, the first task is to estimate the influence of such policies on domestic consumption and production in those countries.[9] This is not difficult conceptually but entails a number of calculations based on judgment. The method used in this study is to estimate from information on the individual policies the producer and consumer "subsidy equivalent" of these policies and to convert these by means of approximate elasticity values into output and consumption changes induced by the policies. Production changes are usually positive and consumption changes are usually negative, as most policies stimulate production and restrict consumption levels through higher internal prices. The method of calculation is given in Appendix 2, and only a brief summary is given here.

Broadly speaking, the subsidy equivalent for producers was estimated as the per-unit subsidy on production that would give the same level of receipts if the actual price support policies were removed and replaced by such a subsidy. Thus a 12 percent producer-subsidy equivalent (PSE) would imply that 12 percent of producer revenue came from the price-support policies of that country. This is not the same as saying that removal of the support program would have necessarily reduced receipts by 12 percent. In the case of countries large enough to influence world prices by their actions, world prices actually would rise to reduce the impact. Therefore the impact of subsidy withdrawal on receipts is overstated. This overstatement is done for a purpose. Because the procedure used requires adding all the unadjusted production (and consumption) impacts across countries and then calculating the resulting impact on world prices adjusting each subsidy equivalent for terms of trade changes in the initial calculation greatly complicates the task of aggregation. Consumer subsidy equivalents (CSE) were calculated separately. They represent the proportion by which domestic expenditure on the product is reduced as a result of the price support schemes and are usually negative in sign.

Generally, the subsidy equivalents were not derived from comparisons of world and domestic prices but from financial information and other data on the policies concerned. Thus a particular amount of levy revenue implied an average levy for a particular year (by dividing revenue by import volume) and was assumed to raise domestic prices by that amount. The cost to consumers is then the average levy applied to all consumption and the benefit of the levy to producers applied over all production. The policy transfers were added, input subsidy schemes incorporated, and the result compared with actual producer receipts and consumer spending to get the subsidy

[8] Some quantitative discussion of how these impacts might translate themselves into internal pressures within developing countries is included with the conclusions of this report.

[9] Appendix 1 gives background detail on the national policies considered.

Table 6—Policy-induced increase in wheat output of selected developed countries, 1969/70 to 1976/77

Year	Australia	Canada	European Community (6)	Japan	United Kingdom	United States	Total
			(million metric tons)				
1969/70	0.485	0.367	4.215	0.124	0.228	1.253	6.672
1970/71	0.354	0.563	4.311	0.106	0.208	1.628	7.170
1971/72	0.360	0.457	3.392	0.067	0.193	1.634	6.103
1972/73	0.410	0.727	4.941	0.068	0.341	1.580	8.057
1973/74	0.219	0.417	3.743	0.046	0.217	1.705	6.347
1974/75	0.372	0.049	3.242	0.021	0.132	0.858	2.554
1975/76	0.285	0.023	0.385	0.026	0.622	0.000	1.243
1976/77	0.080	0.004	1.981	0.029	0.264	0.000	1.670

Source: Author's calculations based on data from Appendix Tables 15 to 26.

equivalents.

Tables of subsidy equivalents are given in Appendix 2. The estimated output and consumption volume effects are shown in Tables 6 and 7, and Table 8 combines the two to give the net trade effect of the price policies, the trade volume effect (TVE). In calculating this trade effect, the assumption was made that it would take production one year to adjust to the absence of price policy. Thus the 1968/69 producer subsidy equivalent influences the 1969/70 production level. Consumption, however, was assumed to react during the same year. Because of lack of data, it was not possible to calculate these policy effects for the 1977/78 harvest year.

These approximate figures give an initial indication of the impact of national policies on the location of wheat production. Until 1973 about 4 million tons of extra wheat were produced in the European Community as a result of price-support policies. There was an additional output of about 1.6 million tons in the United States. The contributions of Canada and Australia brought the total additional production induced by price supports to between 6 and 8 million tons. Decreases in consumption caused by higher prices reinforced the impact on the world market. The European Community had the highest reduction of consumption, 4.6 million tons; the United States followed with a reduction of 2 million tons. The situation changed dramatically beginning with the 1973/74 crop year. Consumption was higher than it would have been with no price supports, and production was lower. The last year shown in the table, 1976/77, suggests that some return to the earlier surplus situation at the turn of the decade was under way. From an

Table 7—Policy-induced decrease in wheat consumption of selected developed countries, 1970 to 1977

Year	Australia	Canada	European Community (6)	Japan	United Kingdom	United States	Total
			(million metric tons)				
1970	0.121	0.164	4.592	0.382	0.0	1.362	6.621
1971	0.137	0.134	3.815	0.357	0.0	1.743	5.829
1972	0.157	0.537	4.205	0.418	0.046	1.727	7.090
1973	0.104	0.308	2.691	0.425	0.166	1.968	5.662
1974	0.707	0.279	0.264	0.223	0.048	0.068	4.493
1975	0.427	0.261	0.916	0.972	1.242	0.040	2.026
1976	0.092	0.228	1.441	0.492	0.487	0.013	0.130
1977	0.062	0.044	4.090	0.094	0.699	0.025	4.564

Source: Author's calculations based on data from Appendix Tables 15 to 26.

Table 8—Trade volume effect of policy-induced increase in net exports of wheat in selected developed countries, 1969/70 to 1976/77

Year	Australia	Canada	European Community (6)	Japan	United Kingdom	United States	Total
			(million metric tons)				
1969/70	0.606	0.531	8.807	0.506	0.228	2.615	13.313
1970/71	0.492	0.697	8.126	0.463	0.208	3.371	13.357
1971/72	0.517	0.994	7.597	0.485	0.239	3.361	13.203
1972/73	0.514	1.035	7.632	0.483	0.507	3.548	13.739
1973/74	0.488	0.138	0.479	0.177	0.265	1.637	1.854
1974/75	0.799	0.212	2.325	0.951	1.110	0.818	4.580
1975/76	0.377	0.204	1.156	0.466	1.109	0.012	1.012
1976/77	0.142	0.040	5.056	0.065	0.435	0.025	5.219

Source: Author's calculations based on data from Appendix Tables 15 to 26.

increase in aggregate net exports, caused by policies, of 13 million tons annually from 1969/70 to 1972/73, this figure dropped to a 4.6 million-ton decrease in 1974/75 and then rose again to an increased trade volume of 5 million tons by 1976/77.

Reporting these figures is straightforward; interpreting their significance is more problematic. Regarding the impact on prices, the size and in particular the change in the net trade effect during this period is important, as discussed below. But do these results indicate that the world is really paying too much in resource cost for its wheat? Overproduction of up to 8 million tons in these developed countries in 1972/73 still represented only 4 percent of their total wheat production in that year. If, for example, resources for marginal production in these countries cost about $75 per ton in the period 1969-72 compared to a world price of $60, resources for an extra 8 million tons would cost only an additional $60 million, a sum that quickly becomes lost in the billions of dollars that are involved in worldwide agricultural production. On the other hand, the numbers indicate that at the margin an additional ton of wheat produced under price-support programs may cost 25 to 30 percent more than necessary in use of resources. Because developed-country wheat output would be almost as high without price supports, the additional wheat generated by the support programs may be a costly source of food for the world.

Another perspective on the significance of these policy impacts can be gained by relating the volume of production and consumption induced by supports to developing-country import needs. As Table 6 shows, total wheat imports into the main developing regions of the world rose steadily during the past decade. At the beginning of the 1960s, the 13 million tons of "extra" wheat exports from developed countries corresponded to more than half the total developing-country wheat imports—indeed a significant part of those imports was directly related to surpluses generated by price supports and transferred as food aid. The situation has changed considerably since that time: during the 1973-75 short-supply period, developed-country price policies on the whole were a detriment to developing-country imports. By 1976-77 when surplus production began to reemerge, LDC imports had grown to such an extent that the trade effect of developed-country policies accounted for only about 15 percent of such imports.

IMPLICATIONS FOR PRICE LEVELS IN WORLD MARKETS

Does the net-trade impact as estimated here noticeably affect world price levels in general? Although a detailed model of the world wheat market would be needed in order to give precise estimates, the possible order of magnitudes can be indicated by making some broad assumptions. Suppose that in the absence of price-support policies in the SDCs a 10 percent price decrease raises world consumption an average of 2 percent and reduces supply by 3 percent. This implies a price elasticity of demand of 0.2 and of supply of 0.3, both of which are

within the range of empirical estimates. Assuming an average world price in the late 1960s of just less than $70 per ton and a quantity of world consumption and production of about 320 million tons, these elasticities indicate that additional net exports of 13.3 million tons of wheat (as in 1969/70) through restricted consumption or increased production would reduce world prices by $5.80 per ton. If, however, all countries other than those specified here had trade-restrictive devices that reduced their own price elasticities of demand and supply with respect to world prices to 0.1, prices would drop to $7.80 per ton. And, in the extreme, if all the production and consumption adjustment had to be made within the developed countries themselves, their policies would cause the price to fall $10.34 per ton. In other words, world prices during that period might have been $5 to $10 higher per ton if developed-country governments had not supported their wheat sectors as they did. This is a significant if not dramatic price effect. It raises the question whether price levels of, for instance, $75 rather than $68 per ton in the world wheat market in the 1960s would have significantly changed the pattern of agricultural development in other countries. Though this question can only be answered on a case-by-case basis, it seems inappropriate to put too much emphasis on either the disincentive effect that developed-country price policies might have had on developing countries' agriculture or on the benefits that consumers in those countries might have received as a result of lower world prices. On imports of about 22 million tons at the end of the 1960s, the net gain to developing countries on the terms of trade would have been between $110 million and $220 million each year.

5

IMPACT OF DEVELOPED-COUNTRY POLICIES ON MARKET STABILITY

ANNUAL CHANGES IN STOCKS AND POLICY EFFECTS

Whatever long-term effects protection in developed countries may have on the wheat market, the dominance of developed countries in wheat trade makes the short-run impact considerably important. To examine this question it is useful to reinterpret the relationship used in the previous discussion. Assume that $\Delta(S - D)^1$ $\Delta(C_1 - C_0)^1$ and $\Delta(X - M)^1$ refer to changes in the impact of policies from year to year, rather than to the difference between the existence or nonexistence of a policy. In the present context these annual changes can be called modifications to policy even though they frequently arise from a policy that appears domestically to be unchanged but that is exposed to different market conditions. From the viewpoint of other countries, it is as if policies had changed. To those outside a country, a policy does not change if it has the same effect on net trade from year to year, but to those responsible inside the country, the task of holding the effect on trade constant involves continual adjustment of domestic price policies. "Policy changes" in the discussion below should be considered in this light.[10]

The previous discussion downplayed the position of stocks in longer-run policy effects on world markets. It is possible, though by no means certain, that the general level of stocks influences average world prices. Stocks, however, come into their own when discussing short-term price behavior. In this chapter the effects of policies and stocks on world price pressures from one year to the next are considered.

The analysis of the policy effects in influencing year-to-year market balance follows from that of the previous section. For the individual developed-market economies, the consumption, production, and net trade effect of wheat policies were calculated in each year. But stock policies are by their nature more difficult to define. In some countries the government holds most of the stocks of wheat itself; others rely on storage subsidies to influence private reserve policies. One would expect changes of private stocks to be related to price movements on domestic markets, and therefore to be influenced indirectly by price policies. Although it stretches the meaning of government policy, it seems convenient to call the actual behavior of stocks the impact of stock policy implying that stock levels would be constant without such policies.[11]

Table 9 shows the behavior of wheat stocks during this period. In addition to the level of carry-out stocks and the stock accumulation, as discussed earlier, the table shows the annual change in stock changes, that is the changes in the rates at which stocks were built up or run down. The greater these figures are, the greater potential they have to affect stability. A positive figure in the table shows enhanced pressure on prices to rise (whether the prices themselves are rising or falling) and a negative figure indicates an increased pressure on prices to fall. For the SDCs this stronger downward influence is evident in a slower buildup in 1969/70, in a change from buildup to rundown in 1970/71, and in a faster rundown in stocks in 1972/73. In 1969/70 and 1970/71, the stock policy undoubtedly reflected domestic pressures

[10] If this terminology appears strained, the reader may wish to interpret "the effect of policy changes (as viewed from abroad)" as "the effect of policy constancy (as viewed from within the country)" in the following discussion.

[11] This emphasizes the external impact of policy. To the outsider stock behavior, insofar as it is related to public policy, is the manifestation of that policy. A policy "change" is thus a different level of stock accumulation or depletion.

Table 9—Changes in wheat stocks of selected developed countries and the U.S.S.R., 1967/68 to 1976/77

Year	Selected Developed Countries[a]				U.S.S.R.			
	Carry-out Stocks	Change in Stocks[b]	Rate of Change[c]	Cumulative Change[d]	Carry-out Stocks	Change in Stocks[b]	Rate of Change[c]	Cumulative Change[d]
	(million metric tons)							
1967/68	44.6	5.0	...	5.0	29.0	-2.0	...	-2.0
1968/69	64.8	20.2	15.2	25.2	31.0	2.0	4.0	0.0
1969/70	67.6	2.8	17.4	28.0	12.0	-19.0	-21.0	-19.0
1970/71	52.3	-15.3	-18.0	-12.7	4.0	-8.0	-11.0	-27.0
1971/72	52.1	-0.2	-15.1	-12.5	7.0	3.0	11.0	-24.0
1972/73	34.8	-17.3	-17.0	-4.7	9.0	2.0	1.0	-22.0
1973/74	29.5	-5.3	-11.9	-10.0	23.0	14.0	12.0	-8.0
1974/75	32.3	2.8	8.1	-7.2	12.0	-11.0	-25.0	-19.0
1975/76	37.9	5.5	2.7	-1.7	4.0	-8.0	-3.0	-27.0
1976/77	54.1	16.3	10.7	14.6	16.0	12.0	20.0	-15.0

Source: Author's calculations based on U.S. Department of Agriculture, Foreign Agricultural Service, "Foreign Production, Supply and Distribution of Agricultural Commodities Tape," Washington, D.C., May 1978.

[a] Australia, Canada, European Community, Japan, the United Kingdom, and the United States.

[b] Increases in stock levels from the previous season are shown as positive numbers; decreases are shown as negative numbers.

[c] Positive numbers indicate additional buildup or slower rundown of stocks; negative numbers are slower buildup or faster rundown.

[d] Refers to cumulative stocks relative to 1966/67. Positive numbers indicate stock levels higher than in that year and negative numbers indicate lower stocks.

to reduce accumulated surpluses, whereas in 1972/73 the response was to extraordinary Soviet demand. In all the years except 1970/71 and 1974/75, the Soviet rate of stock change increased or decreased when stocks in the SDC's did. Thus even when actual stock changes were in opposite directions (in seven years of the decade) the pressure on the rate of change of prices was broadly in step.

In this table, the cumulative change in stocks gives the stock level in each year of the decade relative to an arbitrary base period, 1966/67. Although the stock change figures show that SDC's released supplies onto the market during the period 1970/71-1973/74, first in reaction to high surplus-storage costs and then in response to increased foreign demand and higher prices, the cumulative figures show that more grain may have been available as a result of stockholding (relative to 1966/67) in every year up to 1971/72, and less was available from 1972/73 to 1975/76. If the accumulation of stocks itself affects price behavior, then these cumulative stock figures document the change in the situation in the wheat market during this period. By contrast, the Soviet Union only regained the level of stocks held in 1966/67 in one other year, 1968/69.

Continuing with the interpretation of stock changes as an aspect of government policy, either directly or indirectly, these changes can be compared with those resulting from price policies acting on production and consumption. Table 10 gives the TVE, the change in stocks (as a proxy for stock policy effects), and the sum of the two. Though they are clearly not independent because of their links with government domestic price objectives, they reinforce each other from the viewpoint of other actors in the market. This total stock-and-price-policy impact reached its peak in 1972/73, with an estimated 31 million tons of wheat generated by stock rundown and price-policy surpluses. By 1974/75 the corresponding figure was 7.4 million tons, with price policies reducing net availability and stocks beginning to be accumulated once again.

The table also shows the annual changes in these total figures. In 1973/74 this change was close to 24 million tons, and during the two-year period 1972/73–1974/75 the total policy impact was a reduction in net availability of 38.4 million tons. This does not mean that 38.4 million tons was in fact held off the market. Rather it means that, with no price-support policies in these countries and with constant stock levels, the price level on world markets would have been the same as if 38.4 million more tons of wheat had been available during these two seasons. Though this figure is considerable when seen in the context of the wheat market in these years, it should be interpreted with care. The charge cannot be sustained that the developed countries created the shortage by means of stock and price-support policies. Nevertheless, in a market dominated by these policies, production variability had the same effect on prices as a further drop of 38.4 million tons without these structural factors.

IMPLICATIONS FOR WORLD PRICE VARIABILITY

In the absence of price and stock policies, it appears that wheat prices would have been somewhat higher during the period through 1973/74, when the actual world price reached an average of $170 per ton. Stock releases and price protection in that year were still generating about 7 million tons of wheat more than might have been available if there were free markets and constant stocks in developed countries. After 1974/75 wheat prices would have been somewhat lower without developed-country policies. Although the high price in 1973 was not caused by the policies as such, the change in prices in 1973 would have been less extreme because earlier prices would have started from a higher base, not risen as far, and the duration of the crisis would have been diminished.

The Soviet purchase of 14 million tons of wheat (net of exports) in 1972/73 came at a time when stocks were adequate and price-supported surpluses existed. The opportunity afforded by the intervention in the market of the U.S.S.R. as an importer was welcomed by those exporting countries with stocks and expensive domestic programs. Soviet stocks had already been rundown in previous years. Without the developed-country stock release, market prices in 1972 would have risen considerably. However,

Table 10—Policy-induced trade volume effects and changes of wheat stocks in selected developed countries (SDCs), and the U.S.S.R., 1969/70 to 1976/77

Year	SDC Trade Volume Effect	Change in SDC Stocks[a]	Total SDC Stock and Policy Effects	Change From Previous Year[b]	Change in U.S.S.R. Stocks[a]	Total Effect in Stock Change Including U.S.S.R.	Total Change From Previous Year[b]
				(million metric tons)			
1969/70	13.3	-2.8	10.5	...	19.0	29.5	...
1970/71	13.4	15.3	28.6	18.1	8.0	36.7	7.2
1971/72	13.2	0.2	13.4	-15.2	-3.0	10.4	-26.3
1972/73	13.7	17.2	31.0	17.6	-2.0	29.0	18.6
1973/74	1.9	.53	7.2	-23.8	-14.0	-6.8	-35.8
1974/75	-4.6	-2.8	-7.4	-14.6	11.0	3.6	10.4
1975/76	-1.0	-5.6	-6.6	1.9	8.0	1.4	-2.2
1976/77	5.2	-16.3	-11.1	-4.0	-12.0	-23.1	-24.5

Sources: Trade volume effect calculated by author from data in Table 8. All of the other figures were calculated from data in Table 9.

[a] Positive numbers refer to stock rundown.

[b] Refers to the change in total stock policy effect. Positive numbers indicate an increase in supplies due to stock and policy changes.

this action rebounded the next year. The Soviet Union built up stocks from a good harvest, more than absorbing the further stock depletion in the SDCs and their remaining surplus production. The net effect of Soviet and SDC stock policies (and the price-support policies in the SDCs) was to reduce supplies by nearly 7 million tons in 1973/74. Again, it is the difference between this effect and that in the previous year that indicates the impact on price changes This difference amounted to nearly 36 million tons between 1972/73 and 1973/74. Coming at a time when developing-country production was down (and when the cost of other imports, notably energy, was sharply up) this squeeze on the market was clearly a major reason why the average export price increased 70 percent over the year.[12] The impact on prices in 1974/75 would have been worse if the Soviet Union had not released 11 million tons from stocks. This indicated a combined stock and policy effect of an additional 4 million tons, an improvement of 10 million tons over the previous year as far as other countries were concerned.

This leads to the conclusion that developed-country policies in this period inadvertently exacerbated the problems that arose from production variability. Stock policies did not offset the impact of domestic price policies. Instead they reinforced these effects, moving in the same direction in every year from 1970/71 to 1975/76. This is the heart of the problem. For world price stability, stocks must accumulate when domestic policies generate overproduction and must be run down when domestic price stability objectives dictate that an increase in home supplies is necessary. During the first half of the decade, policies did not respond in this fashion. Stocks were released onto markets as a way of exporting domestic overproduction and were accumulated when consumption was higher and production lower than would have been the case under freer markets. This is the major impact of domestic policies on world market price stability.

[12] This interpretation is consistent with the findings of other studies that have examined price movements over this period. See, for instance, Shun-Yi Shei and Robert L. Thompson, "The Impact of Trade Restrictions on Price Stability in the World Market," *American Journal of Agricultural Economics* 59 (November 1977): 628-638.

6

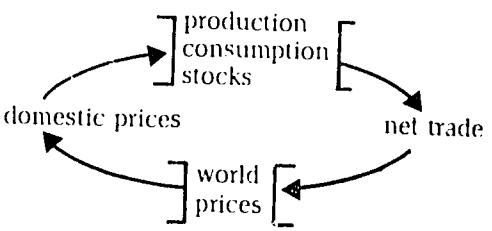
RESPONSIVENESS OF POLICIES TO WORLD MARKET CONDITIONS

WORLD PRICES AND DOMESTIC SUPPORT PRICES

The preceding chapter points out that domestic policy actions and stock management are poorly coordinated with world market conditions. Domestic developments are isolated from world developments in all the developed countries studied here, but not to the same degree. This suggests that one way to take the analysis further is to look directly at how world markets affect domestic policy and stock decisions. The strength of such response is a key indication to developing countries of the extent to which developed-country policies contribute to structural problems in the world wheat market.

The discussion previously revolved around the interactions of national price and stock policies in volume terms, with an indication of their impact on world prices. The more remote the link between domestic and world market prices, the greater the impact. For if low world prices implied low domestic prices then production would be curtailed, consumption increased, and stocks accumulated. The world price would still vary with market balance but would remain within bounds dictated by the price elasticities involved.[13] If, however, the link were weak, higher production, lower consumption, and stock accumulation would push world prices down.

One would expect some connection between world prices and domestic policy prices. Low price levels on world markets increase the cost of price supports in exporting countries and put pressure on domestic policy prices. High price levels will remove some of this restraint and allow domestic policy prices to rise in both importing and exporting countries to the extent possible under domestic counter-inflation programs. This indirect link is illustrated in the diagram below:



Under free trade conditions, world prices directly affect production, consumption, and trade decisions. Under government price-support policies this link is indirect, through domestic policy price levels. Thus a direct comparison of world and domestic policy prices might illuminate this problem of linkage, and hence market instability.

The relationship between domestic producer prices for wheat and world prices (as given by average unit value of exports) is shown in Table 11. The coefficient of this linear regression indicates the increase (in dollars per ton) in domestic prices that appears to be associated with a $1 per ton increase in world prices. With the exception of Japan, all these coefficients are less than unity. Japan apparently overreacted to higher world wheat prices by instituting large domestic price increases. Of the other countries, Canada (0.86) and the United States (0.84) experienced domestic price increases closest to those on world markets. Price increases were least responsive in France (0.59); the increases of other European nations and Australia lay between these extremes.

Once again caution should be used when interpreting the table. First, all the domestic prices are influenced by the

[13] Free trade provides a direct link but is not a necessary condition. Fixed tariffs (and subsidies) would also preserve the link, as would sufficiently rapid changes in administered prices in domestic programs.

progress of inflation during the period, though expressing these in dollars at least partly corrects for differential inflation rates. Because world prices rose rapidly during the period, some of the correlation observed might not hold true in a period of lower inflation or when world prices fell steadily. Second, the simple relationship between world and domestic prices does not do justice to the complexity of the actual linkage, which will be different for each country. It is only the observed implications of world price changes that are measured, not the exact chain of causality. But the results suggest broadly that domestic policy prices reflected world market conditions on a year-to-year basis during this period (even if they were fixed for a particular year) and therefore preserved an indirect link.[14]

The table shows two aspects of the domestic wheat policies of individual governments. The coefficient of response to world price changes was mentioned above. The higher this coefficient the more the burden of adjustments to world price is being borne internally. But the level of domestic prices relative to world prices gives broad indication of the amount of protection at various price levels. Because the constant term in the equation, P_n when $P_w = 0$, is of limited interest, the last column represents another way of ranking protection levels.[15] The domestic price level that would be implied by a world price of $100 per ton ($P_w = 100$) provides a more intuitive picture of the spread of protection implications.

On the basis of past performance, national prices would likely be set at about $237 per ton in Japan, $142 per ton in Italy, and $141 per ton in Germany if world prices were at $100 per ton. Because producers in exporting countries have not benefited historically from the full export value of wheat in high price periods, and in any case transport cost to ports will be deducted from their own returns, the implied prices for exporters are below $100. Though these levels of domestic price may not look too diverse (except for Japan), it is clear that the world prices at which countries would remove protection (i.e., P_n where $P_n = P_w$) are widely different: $130 per ton in the United Kingdom, for instance, and $288 per ton in Germany.

A combination of the level of domestic prices and their response to world price changes indicates that the major exporters, Canada and the United States, are both more responsive and less protective than the other developed countries. Australia is low on the scale of protection but is less price responsive than Germany and the United

Table 11 — Regression of national wheat prices against world price in selected developed countries, 1968/69 to 1975/76

Country	Constant	Co-efficient	R^2[a]	Level of Pn when Pw = 100[b]
		($/ton)		
Australia	14.83	0.66	0.85	80.8
Canada	12.80	0.85	0.66	98.8
European Community				
Italy	80.10	0.62	0.78	142.1
France	56.26	0.59	0.88	115.3
Netherlands	67.56	0.64	0.82	131.6
Belgium/ Luxembourg	65.72	0.64	0.81	129.7
Germany	63.48	0.78	0.83	141.5
United Kingdom	41.70	0.68	0.71	109.7
Japan	66.81	1.70	0.90	236.8
United States	1.59	0.84	0.74	85.6

Sources: World prices are derived from average unit export values in Food and Agriculture Organization of the United Nations, *1977 FAO Trade Yearbook*, vol. 31 (Rome: FAO, 1978). National prices are derived from Appendix Tables 15 to 26.

Note: Using the equation national price = a + b (world price).

[a] All coefficients are significantly different from zero at the 95 percent level.

[b] This column lists the level of national price when world price is equal to $100 per ton as implied by the regression equation.

[14] This relationship may change over time for various countries. The implication is not so much that these linkages are constant, but that the relationship between world and national prices is important and that changes in this relationship may change the structure and behavior of the world wheat market.

[15] Because the prices used are domestic producer prices, the level of protection measured is the nominal producer protection. This will not correspond to the total market protection, which must take into effect the impact on consumers as well. Use of producer prices in the present context assumes that domestic policies are aimed primarily at supporting farm incomes.

Kingdom. Italy, France, and the Benelux countries (Belgium, the Netherlands, and Luxembourg) appear more protective and less responsive to world prices than the other countries—though French protection levels are modest compared with those of other members of the European Community.

WORLD PRICES AND THE TRADE EFFECTS OF POLICIES

The analyses of the individual policy effects on trade volumes can also be used to explore the implications of the price responsiveness of domestic policies. Analytically the importance of price linkages between world and domestic markets is demonstrated by both the volume effect of policies as shown by production and consumption changes and by the influence on stock levels. The link between the effects of prices and policies on trade and world market conditions will be examined first.

It is clear that the TVE, as defined earlier, will be closely related to world prices if domestic price stability policies are widely used. Low world prices will correspond to high levels of surplus generated by domestic policy as measured by the sum of production increased and consumption reduced by price supports. Table 12 shows the results of a regression of TVE with world price levels. A coefficient close to zero indicates little change in protection levels over a range of world prices. Both Canada and the United Kingdom have low coefficients of TVE with respect to world price, followed in ascending order by Japan, Australia, the United States, and the European Community. The coefficient in the case of the European Community appears to be four times that of the United States. The overall effect of these policies may be gauged by looking at the sum of the coefficients for these countries. A $10-per-ton increase in world prices implies a 1.5-million-ton decrease in the impact of protection on trade. Thus if under relatively free market conditions an 8-million-ton production decrease caused prices to rise by $10 per ton, a 6.5-million-ton shortfall would have had the same effect under existing policies.

Table 12—Regression of trade volume effect of wheat policies against world price and implied trade neutral prices

Country	Constant	Co-efficient	R^2[a]	Trade Neutral Price
Australia	1.3095	0.0115	0.82	113.87
Canada	1.2916	0.0084	0.51	153.76
European Community	14.3990	0.0889	0.95	161.97
Japan	1.1746	0.0103	0.67	114.04
United Kingdom	0.8901	0.0084	0.31	105.96
United States	4.3899	0.0224	0.42	195.98
Total	23.4730	0.1499	0.77	156.59

Sources: World prices are derived from average unit export values in Food and Agriculture Organization of the United Nations, *1977 FAO Trade Yearbook*, vol. 31 (Rome: FAO, 1978). Trade volume effect figures are derived from Table 8.

Note: Using the equation: $TVE = a + bP_w$.

[a] Value of world price when TVE = 0. All coefficients except for those of the United Kingdom are significantly different from zero at the 95 percent level.

The intercept term (when $P_w = 0$) is again of minor interest, but the table shows the level of world price when the TVE is zero. This trade-neutral price is simply the price at which a government appears on past evidence to switch from protection of farm incomes to containment of consumer food costs. A low trade-neutral price, as in the United Kingdom, Australia, and Japan, implies that the country is attempting to control inflation by reducing protection. Canada and the European Community have somewhat higher trade-neutral prices, whereas the United States appears to be willing on balance to switch to consumer subsidy policies only at extremely high world prices. On average, protection will be zero in these countries when world prices are at $157 per ton, but the disparity of these trade-neutral prices indicates that wheat policy in different countries serves quite different objectives.

How does this aspect of policy performance square with the previous discussion of domestic and world prices? One might think that those countries that only remove protection from their farmers at very high prices might also be those that set a high and unresponsive domestic price. This does not appear to be the case. A

relationship between domestic and world prices close to unity implies a relatively fixed level of protection, and therefore a low response coefficient of the trade volume impact of policy to world price and a high trade-neutral price (as in the United States). Similarly, a system that establishes a high and relatively unresponsive price sees the level of protection diminish rapidly when world prices rise and usually requires consumer subsidy measures (such as export taxes) to hold that domestic price level steady (as in the European Community). Thus in view of world market price stability and the interests of developing-country importers, a high degree of domestic policy price responsiveness and a low degree of policy-induced trade volume variability to world price is the more palatable combination.

WORLD PRICES AND NATIONAL STOCKS

If stock policies can either offset or accentuate the effect of domestic price policies on world markets, stocks should respond to domestic prices to be a stabilizing influence on world prices. Just as the trade volume effect of policies can be related directly to world prices, so can stock levels. Whereas it is the stock change that is important in ascertaining the impact of one country's policies on market balance, it is the amount of carry-out that should be related to price levels. The carry-in is already determined in a particular year and becomes a part of available supply; the carry-out tends to be lower the higher the current price. The more easily this carry-out responds to world price levels, the more stability a particular stock policy gives to world markets.

A simple regression of carry-out levels for wheat against world prices is shown in Table 13. To contribute to stability, the coefficient should be negative (and significantly different from zero) as was the case in Canada and the United States. Canada in particular had a stock policy that responded to price. Together with the United States, the Canadians released about 2.4 million tons of wheat for each $10-per-ton increase in world price—almost the same as the total for the rest of the developed countries included in the table. This 2.4 million tons more than offset the 1.5-million-ton adverse impact of price policies. Total stock-plus-price policy effects were benign rather than harmful to world stability.

Table 13—Relationship between world price and carry-over stocks of wheat in selected developed countries, 1968/69 to 1975/76

Country	Constant	Coefficient	R^2 [a]
Australia	5.91	0.027	0.23
Canada	28.80	0.129 [b]	0.72
European Community			
Belgium, Luxembourg	0.11	0.002 [b]	0.40
Netherlands	0.02	0.002 [b]	0.69
France	0.71	0.007	0.29
Germany	2.20	0.003	0.04
Italy	1.09	0.001	0.01
United Kingdom	1.08	0.002	0.22
Japan	0.79	0.003 [b]	0.45
United States	30.43	0.097 [b]	0.38
U.S.S.R.	17.60	0.027	0.02
Aggregate, excluding U.S.S.R.	72.33	0.250 [b]	0.65
Aggregate, including U.S.S.R.	90.07	0.280 [b]	0.46

Sources: World prices are derived from average unit export values in Food and Agriculture Organization of the United Nations, *1977 FAO Trade Yearbook*, vol. 31 (Rome: FAO, 1978). Stocks data is derived from Table 2.

Note: Using the equation: end stocks = a + b (world price).

[a] All coefficients except for those of the United Kingdom are significantly different from zero at the 95 percent level.

[b] Significantly different from zero at the 95 percent level.

The evidence on the contributions of Australia and the U.S.S.R. is not clear. Though exhibiting negative price coefficients for carry-out, the parameters are not significant at normal levels of probability, and for both, world price does not seem to be a good explanatory variable for stock levels. The coefficients of world price were positive for Japan and the United Kingdom consistent with their positions as importing countries concerned with protecting supplies in high price periods. However, as with price policy effects, this negative influence on price stability is small in absolute terms, as one would expect from countries that, though

significant traders, trade little in comparison with the major producing nations.[16]

A more significant problem for world price stability regarding the price responsiveness of wheat stocks lies in the apparent behavior of the European Community. The coefficients were all positive, though for France, Germany, and Italy these parameters were not significantly different from zero. There is no evidence of any stabilizing influence from stocks. The relative stability of internal prices undoubtedly inhibits private-stock response to world price changes. Stock held by public agencies are regarded more as embarrassing surpluses bearing visible testament to the weaknesses of domestic price policy, than as buffers against local and worldwide shortages.[17] Added to inflexible domestic price policies, the lack of responsiveness of European Community stocks is a key aspect of the world wheat market.

To summarize the price policy and stock implications for the various countries, Table 14 shows the implications of a $10-per-ton increase in world price. The total effect is the impact of price policy on trade volumes minus the impact on stock carry-over. The aggregation of this total policy impact for the countries considered indicates a net contribution to stability of 830,000 tons of wheat released in response to a price rise of $10 per ton. This release was not large compared with supply variations of up to 40 million tons during the decade for this group of countries. But at least the effect was in the right direction.

The burden-sharing conflicts that arise are revealed starkly in the comparison between the Canadian contribution to stability of 1.21 million tons and the European Community contribution of 1.04 million. Australia and the United States also made positive contributions. The two small importers had mildly destabilizing policies. Though developing countries may not care who contributes to stability—so long as someone does—they clearly have an interest in the resolution of an imbalance that could lead to much more aggressive policies on the part of Canada and the United States if European domestic policy remains inimical to the interests of world price stability. Because burden-sharing is fundamental to international attempts to improve market stability, the differences among countries in their reactions to world price changes give a rational (if not political) basis for apportioning the costs of stability schemes. The proposition that countries should at least offset the external effects of their own price policies by more flexible stock management seems inherently reasonable in an interdependent world.

Table 14—Implications for policy-induced trade volume and for carry-out of an increase of $10 per ton in world wheat price levels

Country	Trade Volume Effect (1)	Carry-out (2)	Total Effect, (1) (2)
	(million metric tons)		
Australia	0.12	0.27	0.15
Canada	0.08	1.29	1.21
European Community (6)	0.89	0.15	
Japan	0.10	0.03	0.13
United Kingdom	0.08	0.02	0.10
United States	0.22	0.97	0.75
Total	1.50	2.33	0.83

Source: Author's calculations based on Tables 12 and 13.

[16] The figures in this table and the last are deliberately presented in absolute rather than percentage terms, as the size of a country's wheat sector is one of the most important determinants of its impact on other countries.

[17] The same was true to a large extent in the United States during the 1960s. But U.S. stocks did respond (or overrespond) to world market conditions, whereas European Community stocks have not done so. Even though administrators in the Community often refer to wheat stocks as a security reserve, the behavior of these stocks belies this intention.

7

FUTURE POLICY DIRECTIONS

The examination of the wheat market over the last decade and the influence of domestic price-support policies on that market indicates that both resource allocation and management of short-term crises can be improved. This chapter considers specific implications for the major countries and for international policy. The intention is not to provide specific recommendations for individual countries or for global agreements, but to indicate what kinds of policy modifications would be desirable from the viewpoint of developing countries. As a reflection of their importance in the grain trade, European Community and U.S. policies will receive greater attention than those of other developed countries.

POLICY CHANGES AT A NATIONAL LEVEL: THE EUROPEAN COMMUNITY

It is clear that the policies of the European Community have particular significance. To recognize this is neither to attack the concepts of the Common Agricultural Policy (CAP), nor to reflect on the desirability of economic and political integration in Europe. Indeed it is precisely because the CAP has been so successful in meeting its own goals that it is a major factor in world trade. Farm incomes (and consumer prices) have been more stable as a result of this policy, and the levels of rural incomes have in general kept pace with those in the nonfarm sector. This success has not been universally welcomed, particularly by countries with strong trading ties to the Community, but it carries with it the implication that changes in policy in the interests of international relationships are likely to be made reluctantly.[18]

European Community farm policy is in many respects similar to the policies of other industrial countries. It aims to increase and to stabilize the demand for domestically produced agricultural goods. The Community policy does, however, have some attributes not common to all industrial countries, and these peculiarities define issues of particular importance in the present context. First, trade controls, in particular the export subsidy and the variable import levy, are used more extensively to support and stabilize domestic markets. By implication, less reliance is placed on alternative measures such as direct payments, quantitative production controls, domestic marketing agencies, and stocks and reserve management. For the same level of protection, border devices have a greater trade impact than direct domestic market policies.[19] Therefore the price-depressing impact of any given level of protection is probably greater than if alternative methods were adopted.

The second distinguishing feature of European Community agricultural policy is the higher general level of protection, a distinction it shares with Japan, an importer. A link between world market conditions and the domestic price level of the major traded products in the European Community exists through budgetary pressures and consumer indignation, but does not appear strong enough to offset the

[18] The problems of overproduction and high budget cost have, on the other hand, become a major domestic concern in the Community and are generating their own policy response. The discussion here relates simply to the external impact of the CAP.

[19] Direct payments to farmers to supplement market income would, for instance, help to maintain consumption levels, thus lessening the trade impact. U.S. policy since 1973 has made extensive use of such payments in place of earlier instruments such as export subsidies. Quantitative production control, again a mainstay of U.S. policy, limits the world price impact of domestic market support, as does controlled marketing through government-sponsored agencies (used in Canada and Australia). Reserve management implies the arbitrage of surpluses over time, as opposed to the disposition of European Community surpluses accumulated through support buying. These are quickly placed on the world market, however weak, with the aid of an elastic export subsidy.

upward drift of producer prices caused by inflation in farm costs and the desire to maintain rural incomes. This drift is especially strong where governments, against the spirit of the CAP, compensate farmers for the effects of exchange rate appreciation, as in Germany and the Benelux countries.[20] The level of protection and the extent of European agriculture magnify the influences of policy decisions on world prices.

The third relevant attribute of European Community trade policy for agricultural goods is the nature of the levy and export subsidy policies employed. Because they block many of the adjustments in production, consumption, and private domestic stock management that would otherwise assist in promoting world market stability, they contribute to short-run instability problems in other countries. Thus the emphasis on trade measures, the level of protection, and the use of variable levies and subsidies all accentuate the impact of European Community policy on world markets.

The development of European Community farm policy and the resulting implications for developing countries revolve around three main issues. Foremost is the extent to which the European Community is able to control domestic prices set under the CAP. Within the European Community there is growing concern for the financial implications of present high prices. The Community has been through two periods of rapid increases in farm prices, the first in the mid-1960s to ease the formation of the CAP, and the second a decade later as a response to domestic inflation. In between was a period of price stability. This cycle could repeat itself, although a precipitate return to uniform prices through the dismantling of the present exchange rate arrangements for agriculture or a further increase in inflation rates would discourage this. Also of concern is the rise of de facto European Community protection with the decline of the dollar—another facet of the tenuous link between agricultural prices in Europe and on world markets. Continued weakness of the dollar or strength of the deutschmark would exacerbate this problem.

The second issue is the extent to which European Community policy can be made consistent with the operation of international commodity agreements and more generally with the development of trading relationships discussed in the GATT. The Community, long a proponent of commodity agreements to regulate world markets, finds itself unable to negotiate effectively on both sugar and wheat, despite its significant self-interest in trade in those commodities. The stumbling block has been the extent to which domestic policy can be modified (or be committed in advance to modification) under the terms of such agreements. In the case of wheat, the Community would have been expected to agree in advance to take steps to accumulate stocks and ultimately limit production in periods of chronic oversupply.[21] Such international obligations do not sit well with the perceived primacy of domestic market considerations and the use of international markets as safety valves for the release of pressures generated by domestic policies. Progress in the multilateral trade talks was limited, as in previous negotiations, on much the same issues. An effective code of conduct on export subsidies, for instance, comes into direct conflict with the mode of operation of the CAP.

The third issue is the method of price support used by the Community. In the grain sector no attempt has been made either to shift to a program (such as the use of deficiency payments) that allows more price flexibility in internal markets or to introduce supply controls through acreage

[20] This has two effects on protection levels. It increases average European prices, though these are often offset by the opposite effect in depreciating countries such as the United Kingdom and Italy. It also raises institutional prices overall, by giving strong-currency countries more influence on annual pricing decisions. See Theodor H. Hendlues et al., *Common Prices and Europe's Farm Policy* (London: Trade Policy Research Centre, 1978).

[21] The agreement reached in the Geneva negotiations on wheat between the United States and the European Community would not have had a major impact on European stock policies or on production control. Perhaps recognizing this, the developing countries failed to endorse the pact, and the negotiating session was adjourned in February 1979.

or marketing limitations or by linking support prices with market conditions. Deficiency payments in grain markets would have significant internal advantages but suffer from the so-far decisive drawback of transferring the massive burden of support from users to the budget. The distributional implications for member countries are formidable, and if additional financial transfers were made through Community institutions, it would cause political problems. In addition, supply control is politically difficult when significant quantities of hard wheat and feedgrains are imported into the European Community.

As happens so often with well-established policies involving complex issues, no single development improving the compatability between domestic and international aspects of the CAP seems to have much chance of success, but the status quo seems equally untenable. The pressures to modify the operation of the policy come largely from within and involve not the indignation of consumers and taxpayers with high support costs, but the inequities of transfers between the members of the Community through the Community budget and the terms of trade. The resolution of these issues depends on the extent to which the protectionist policies presently imposed on the Community by the national interests of the exporting members are countered by the reactions of those countries within the European Community who import agricultural products and pay the costs of common price-support programs. These issues are being brought into focus because the farm budget is already pushing Community expenditures up to the limit of automatically available revenues. Moreover, the prospect of further costs arising from the accession of three new members, Greece, Spain, and Portugal, must be faced. Whereas the efficiency and stability of world markets are not a major internal issue, a period of change in European agricultural policy could provide an opportunity to adjust the external as well as the internal aspects of the CAP.

POLICY CHANGES AT THE NATIONAL LEVEL: THE UNITED STATES

The United States faces problems very different from those of the European Community. As a willing rather than a reluctant exporter, the United States looks upon world markets as a necessary adjunct to domestic demand. Policy pressures include the price levels set under domestic support policies, the stock policies pursued under these programs, the possibility of coordination among exporters, and a related issue, the extent of government control over marketing.

The increased flexibility provided by the 1973 Agricultural Adjustment Act through the ability to set target prices with income objectives in mind and loan rates with an eye to market conditions has lessened actual or potential conflict between domestic policy and overseas trade. Yet the concept of setting the loan rate in the light of world market trends is itself somewhat ambiguous. To a significant extent the loan rate for grains is an international price, at least when world markets are adequately supplied. Other countries know this price represents a floor below which U.S. production tends to be accumulated by the Commodity Credit Corporation (CCC), which administers and finances U.S. farm programs.[22] This underlines the fact that the 1977 Act specifies a minimum level of 115 percent of the loan rate at which CCC stocks can be sold. Indeed when the farmer-owned reserve program is in operation, CCC stocks can only be liquidated at 150 percent of the loan rate. The present legislation puts strict limits on the extent to which exports from these stocks can be subsidized, thus implying a commitment to hold stocks until prices improve. Under such conditions, world prices may be expected to remain higher than U.S. loan rates, but will probably not rise much above 150 percent of such levels unless supplies are extraordinarily short.[23] Thus U.S. policy sets a price range for international prices in a real sense.

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[22] An export subsidy could still be paid (though not on CCC stocks) if supplies accumulated at the loan rate, driving the world price still lower. However, this presumes an extended period of weak market demand in other countries.

[23] In practice it is likely that CCC stocks would not be sold off before the release of farmer-owned reserves. Therefore, the price level could rise to 180 percent of the loan rate under the present policy.

U.S. target prices have a different impact on world markets. Though not directly influencing selling prices in any given year, they almost certainly affect the future market balance. They determine relative profitability of grain in the world's most prolific producing region, and therefore underwrite a large part of world trade. In international policy the level of U.S. target prices is as important in the long run as the loan rate is in the short run. Future administrations will face a dilemma. From the standpoint of program costs, there will be pressure to keep down target prices, to raise loan rates, or to restrict acreage. Moreover, unless inflation is controlled in the future, target prices are destined to rise. Indeed under the current law they must increase along with farm costs. This will bring upward pressure on loan rates, risking a loss of competitiveness to other exporters. Further acreage limitations would then be necessary, though these may now be losing some of their effectiveness as a means of raising prices, both because other developed countries can expand their own production and because developing- and middle-income country markets may be quite price responsive.

The way in which the categories of U.S. stocks are administered will also affect world markets. Whereas a greater level of reserves than has been held over the past few years would undoubtedly add to stability, too high a carry-over in the United States (and other countries) might itself lead to a destabilizing change in policy. The danger exists of a precipitate rundown of stocks if they are felt to contribute to low domestic prices. From the viewpoint of world market stability, the key relationship is the flexibility of domestic stocks to world prices. A subsidy paid to farmers who hold stocks and a penalty for the release of such stocks below a predetermined price level related to the lower rate are the main economic provisions of the U.S. farmer-owned reserve. The storage subsidy may not in itself influence the response to world price, but the penalty provision implies a band over which less stocks will be released in response to a higher price. Thus it is uncertain that this part of U.S. stocks of grain will effectively depress price movements on international markets.[24] The danger of destabilizing flows arises more from the temptation to liquidate all stocks onto a firm market in order to relieve budgetary pressure, which might leave world markets as vulnerable as they were in 1973.

Other problems are exporter coordination and government involvement in marketing. Although it is fair to say that a rigid exporter cartel is unlikely in wheat, coordinated marketing among the major exporters has considerable domestic appeal and some previous history. The concept is based on two premises. First, competitive selling into importing markets by the exporters lowers the revenue that they collectively receive, and hence agreement to lessen this competition is beneficial to farm income aims underlying domestic programs. Second, countries with relatively rigid domestic price levels invite a higher selling price thereby capturing for the exporter revenue that otherwise would accrue to the importing country as levy receipts. Moreover, fixed-domestic-price countries are also committed to the aggressive use of export subsidies when domestic surpluses threaten internal price levels, thus putting in doubt their own ability to participate in any pricing agreement. They benefit from the reduced competition among other exporters, but are not reliable partners in such collaboration. The importing countries could themselves expand production by enough to offset the advantage of higher world prices to the exporter if they are concerned with the foreign exchange cost of imports. Without attempting to weigh the evidence on this question, it is clear that decisions about exporter-inspired pricing agreements will be of considerable interest to those developing countries participating in the world wheat market.

Any agreement among exporting-country governments implies a degree of control over trade far greater than that presently held by the U.S. administration. Besides the domestic political implications of such an agreement, the international implications are likely to be significant. The

[24] At present just under one half of U.S. wheat stocks are in the farmer-owned reserve; the "free" stocks can, of course, still react to market price. If world market prices were to stay high relative to U.S. support prices, the penalty provision would have a reduced impact on stock behaviors.

impetus to increase domestic production in countries with higher costs than the United States, to guard against the implied hegemony, might be considerable. Thus one of the forces acting to keep the wheat market competitive is the difficulty of collusion itself. The inability of the European Community to control its surplus production, the fear of reactions by importing-country governments dissipating the advantages of exporter pricing agreements, and the political weight of those in the United States who would prefer the government not to become directly involved in grain marketing all serve to discourage agreement.

The importance to the U.S. economy of regular and expanding export sales of agricultural products stimulates the development of the world wheat market. Besides any perceived disadvantage of greater import dependency by developing countries, danger arises more from the reluctance of other countries to take seriously the problems of the wheat market. Whether U.S. policy can continue to blend domestic objectives with the needs of the world market depends crucially on the absence of conflicts, particularly among developed countries, which would call into question the present orientation of U.S. policy toward exports.

POLICY CHANGES AT THE NATIONAL LEVEL: OTHER COUNTRIES

Policy directions in the other major wheat trading countries will be largely determined by the actions of the European Community and the United States. Canada and Australia can, of course, act independently, and indeed their attitudes toward such moves as the setting of common export prices are crucial. But by their nature U.S. and European policies provide the context in which the other countries act. Australia, a relatively small exporter, is unlikely to attempt to stabilize prices on world markets by increasing its holding of stocks, though it is possible that stocks levels could rise as more long-term bilateral contracts are made, perhaps with the People's Republic of China. Australian policy is likely to continue to be geared toward domestic income stability coupled with diplomatic attempts to increase the level of trade in wheat and other products. Canada, in contrast to Australia, has already demonstrated a willingness, in fact if not by intention, to hold stabilizing stocks to the benefit of other countries. Therefore, developing countries see a risk in an inward-looking change in Canadian policy that would offset this benefit.

There is no indication that Japanese wheat policy will be modified in the future in a way that would materially influence world market behavior. The constraint lies not so much in the wheat market itself but in the links between wheat and rice. As long as more rice is produced than is required, Japan will encourage wheat production and discourage wheat consumption. If a surplus rice problem in Japan coincides with a shortage of wheat in the world this works to the advantage of developing countries. Yet changes in Japanese wheat policy are unlikely to have a major impact on the availability of foodgrains to developing nations.

On the other hand, because of the sheer size of the Soviet wheat sector, any Soviet policy giving increased priority to wheat production would soon have a marked impact on world prices. Any shift in stock policy, either toward more aggressive internal stabilization of consumption or more responsiveness to world market conditions would likewise be significant. In other words, Soviet production variations affect internal consumption more than in most other countries. The purchases of wheat in 1972 have been interpreted as a shift in policy toward maintaining consumption levels, whether for food or animal feed.[25] As a consequence greater stock variability is required if the impact is not to be transmitted to world markets. But the record of stock changes indicates that Soviet policy has either not affected or slightly improved price stability. Soviet policy toward trade, consumption,

[25] This shift in policy actually began in the 1960s, when the Soviet Union bought significant quantities of Canadian wheat and smaller amounts from the United States. By 1972 consumer expectations of continued improvements in diet probably left the Soviet government little choice but to import grain to cover the harvest shortfall.

production, and stocks of wheat is clearly of major importance in international markets. The absence of adequate information about how such decisions are made is a serious gap in the understanding of world grain trade.

INTERNATIONAL INITIATIVES IN THE GRAIN MARKET

In agricultural trade the primary task of international discussions is to establish market conditions that are considered reliable and fair by the major trading nations. The reward is a trading system that actively encourages low-cost production, reasonable stability, and a degree of security in food supplies essential if other economic and social objectives are to be more easily reached. Developing countries would like to be able to plan their own development with reasonable assurance that the international food system will not unexpectedly turn against their interests. Exporters should be able to anticipate needs and develop markets without fear of arbitrary closures, unreasonable competition from heavily subsidized surpluses, or discriminatory trade policies introduced for short-term political gain. Importers press for assurances that temptations to exploit market shortages will be resisted and that world market conditions will provide a reliable basis for domestic resource-use decisions.[26]

The performance of the food-trade system needs two improvements, both of which would be to the advantage of developing countries. The first is more stable world market prices. This would influence the ability of developing countries to pursue trade-oriented food policies and would diminish the disruptive impact of sudden changes in import prices. The second is a system allowing individual countries to purchase foodstuffs on world markets when their own production is deficient. This means that such imports must be available, not locked into bilateral trade agreements with other countries, and that the importing countries themselves can afford the purchases.

Several approaches to these problems have been discussed in recent years. One approach to stability would attempt to increase the level and price responsiveness of stocks held in developed countries. This plan has taken several forms, including coordination of stock management among governments and the ownership of reserves by an international body. Another approach would increase the variability of consumption in developed countries by means ranging from encouraging abstinence during scarcity to reform of domestic farm and food-price policies. Regarding developing-country purchasing power, some have suggested tackling the problem from a financial viewpoint, advocating some form of payments aid to alleviate foreign exchange problems, whereas others would rely on the improvement of food-aid programs. Each of these strategies has some advantages of political attractiveness, of economic impact, and of the distribution of costs, but progress on all these problems has been slow. As with domestic policies, change comes reluctantly.

The stock method was the basis for the negotiations on a new International Wheat Agreement. Under a coordinated reserve scheme, both importing and exporting countries would agree to accumulate reserves when world prices fall to certain levels and to release them when higher trigger-prices are reached. Such a scheme would have economic costs, compounding the political difficulties of reaching an accord. The stock-holding profits for an individual importing country, particularly if its market is small, would come basically from speculating about world market price changes. Few countries have been willing to take the risks. To reach domestic market stability other policy alternatives are available giving the same degree of security at a lower cost. The large importer of grain might feel constrained to carry reserves if there was the likelihood that greater-than-average purchases would push up the import price considerably.[27] Generally, importers are not

[26] Such conditions would encourage central-plan economies to be more open about their own requirements as the rewards for secrecy diminish; they might also lead to a depoliticizing of agricultural trade. The surfacing of political issues such as the strategic use of food exports impedes sensible discussion of the underlying difficulties.

[27] The marginal import cost might be high relative to the marginal cost of grain from storage—an economic justification for the political feeling that stocks enhance supply security.

likely to be keen participants in schemes imposing target levels of stocks.

Grain exporters have their own motives for holding reserves, in particular to retain credibility as a supply source. Stock coordination schemes among countries are designed to reduce the burden reserves place on exporters. For any given set of trading conditions the ability of importing countries to use trade flows rather than domestic stocks to offset production variability rests on the existence of variable stocks elsewhere in the world and especially in the exporting countries. Attempts to redress this apparent imbalance expose direct conflicts of interest among the nations concerned and have so far not been blessed with success.[28]

The underlying question is whether the international coordination of stock policies brings greater benefits than those arising from the existence of stocks held under national initiative. There is a strong presumption among proponents of stock schemes that just as private stocks within a country may be inadequate for that country, national stocks may be inadequate for the world. A risk shared is a risk reduced. It appears that in the political mind the loss of autonomy over national policies has outweighed any general benefits. It may take another shock to the world grain economy to resolve this issue. At a time of seemingly adequate stocks, there is little incentive to find agreement on such matters.

The second main class of solutions to instability issues concerns greater consumption adjustments in developed countries. The analytical section of this report poses this as a direct alternative to the manipulation of stocks in order to smooth out production variability. State-trading and central-plan countries can adjust world-market purchases, should they wish, to avoid straining available supplies in times of shortage. They can increase imports when supplies are more than adequate. Countries that rely more on the price mechanism, whether or not it is distorted by trade barriers, for deciding on imports are expected to allow price changes to stimulate consumption adjustments directly.[29]

The problem with this approach is that it clashes with strong stability motives in these countries, not only concerning the consumer price level but also the cyclical behavior of the livestock sector. Nevertheless, this approach has the major advantage of bringing into the open the interrelationship between developing-country and developed-country policies in the world food economy. The degree to which this approach can reconcile policies determines the need for other measures such as stock management and foreign exchange facilities.

Initiatives that address the foreign-exchange problems of developing-country food importers and suggest direct action to deal with them have received increasing attention in recent months. Some of these schemes relate foreign-exchange assistance directly to developing-country import patterns. They envisage either a set of financial transfers linked to the variability of food-import costs, designed to improve the balance of payments of the importer and reduce that country's budget burden, or an additional line of credit to enable commercial imports to be paid for at a later date. This kind of solution is different from those involving stock and consumption adjustments. It does not in itself address the problem of living with production variability. To the extent that it allows countries to continue and strengthen policies that protect domestic consumption, it increases the need for (and the profitability of holding) stocks. It aggravates the global adjustment problem and, without more flexible stocks or developed-country consumption adjustments, destabilizes prices. Combined with more stock flexibility or with developed-country consumption adjustments, such an approach allows for both international stability and domestic food security. Alone, it promotes the latter at the expense of the former.

The more traditional approach to purchasing-power problems is to rely on concessional terms for food sales, both bilateral and multilateral. Discussions

[28] To persuade countries to agree to run their own stock policies is, of course, not so difficult. The International Undertaking on World Food Security, in place since 1974, does this but makes no attempt to coordinate reserves.

[29] The somewhat weaker mechanisms of moral suasion and voluntary abstinence have also been suggested as means of adjusting developed-country consumption.

about these schemes have emphasized the desirability of weakening the connection that has existed between food-aid flows and domestic farm policies. Food aid that is dependent upon erratic surpluses in developed countries is generally not considered to be a sound basis for food planning in developing countries. To be more reliable, food aid should be made more directly a function of developing-country needs, such as those that result from domestic harvest fluctuations. A guarantee of supplies to cover such needs would ensure that developing countries avoid holding large domestic reserves, either of grain or of foreign exchange.

The stocks necessary to underwrite such an insurance policy would presumably be held by the exporter. The impact on price stability would depend on whether the net change in stock-flexibility was adequate to allow greater consumption stability. A policy of this kind therefore has implications for the commercial as well as the concessional markets. As with more direct import-assistance schemes, the greater level of consumption stability engendered by the policy, or the reduction in recipient stock-level changes, would impose a greater burden on the rest of the trading system either in consumption adjustment or in stock management. The objective, to make the developing countries more secure, must be met by assuming corresponding responsibilities elsewhere in the market.[30]

As this discussion indicates, there has been no lack of concern for problems in the wheat market. Progress has been limited in part because easier market conditions have diminished the sense of urgency apparent five years ago. The problems are still there. They stem from the structure of a market dominated by inward-looking domestic policies, particularly in developed countries. It is difficult to see how these realities can be modified by anything other than coordinated action at the international level.

[30] A fuller discussion of reserve schemes, insurance proposals, and foreign exchange facilities for food imports is to be found in a report of the IFPRI-CIMMYT International Conference, Alberto Valdés, ed., "Food Security for Developing Countries," forthcoming, and a detailed review of international activity regarding these issues is contained in the World Food Council report, *Towards a World Without Hunger Progress and Prospects for Completing the Unfinished Agenda of the World Food Conference* (Rome: World Food Council, 1979).

8

IMPLICATIONS FOR DEVELOPING COUNTRIES

THE NATURE OF INTERDEPENDENCE IN WHEAT MARKETS

Developed-country price policies have evolved in response to internal pressures and with rather limited concern for external market developments. These policies do change but are broadly nonnegotiable internationally. Their impact on world markets and on developing countries is largely incidental to their main purpose. This does not imply, however, that knowledge of the external effects of developed-country policies is of little use. An understanding of the wheat market may be essential to good commercial decisions. Moreover, the actions of developing countries can have a profound long-run impact on agricultural decisions in developed countries. Particularly in the wheat market, where the importance of the developing-country market is already widely recognized, the way developing countries view the reliability of the trading system has an important bearing on the direction of farm policy in industrial countries.

This interdependence among policies is an important facet of the world food system. Besides acting as a caution against too simple a definition of the interests of developing countries, it emphasizes the dynamic nature of policy decisions. Although it is much easier to estimate the impact of policies in the short run—on prices or trade—the long-run picture is also necessary to give perspective. The following discussion attempts in a qualitative and limited way to interpret the empirical results in this broader context.

It seems appropriate in defining the nature of this interdependence to view the combined wheat (or agricultural) policies as part of a system with certain characteristics. Wheat producers, widely scattered through the temperate and tropical zones, rely largely on sales either to government agencies or to markets where prices are controlled by public policy. The prices paid to producers tend to be higher in developed countries, especially in those where wheat production requires price-supports to compete with other crops. Producers in developing countries commonly receive few price incentives, and often find themselves taxed to pay for social programs.[31] Therefore the evidence may be interpreted as showing a bias toward stimulating production in high-income countries at the expense of farmers elsewhere. Whether this bias affects the optimum location of production is a complex matter: not enough is known about relative costs to be certain of its impact. But it undoubtedly influences the magnitude and direction of trade and the context in which policies operate.

On the consumption side the incentives are largely reversed. High-income consumers usually pay more, in part to maintain the income levels of farmers in developed countries. Developing-country consumers often benefit from fixed prices and from subsidies that reduce the cost of basic foodstuffs. In addition they profit from the lower world prices resulting from developed-country farm programs, including the effect of concessional sales.[32] Taxpayers in developed countries often supplement the implicit transfers from consumers by under-

[31] If one allows for the often higher prices of imports such as fertilizer, this difference in price levels among countries is even more marked. For an attempt at international price comparison (not restricted to wheat), see Willis L. Peterson, "International Farm Prices and the Social Cost of Cheap Food Policies," *American Journal of Agricultural Economics*, 61 (February 1979), pp. 12-21. Many of the policies used in develping countries, and the reasons for such policies, are discussed in the contributions to Theodore Schultz, ed., *Distortions of Agricultural Incentives* (Bloomington: Indiana University Press, 1978).

[32] Food aid is conveniently considered in this context as a part of trade, and hence as part of the system. Food-aid flows were, of course, included as trade in the earlier, empirical sections of this report.

writing foreign sales and domestic storage. In developing countries the tax burden is more likely to be for consumer rather than producer subsidies.

In such a system the internal transfers have external effects. Higher prices to developed-country farmers in effect lower consumer prices and lower the tax burdens of developing-country importers. Consumer subsidies in low-income countries similarly tend to expand the market for developed-country farmers and relieve their taxpayers of some of the burden of price supports. Other linkages could also be adduced. The outcome is that decisions in one part of the system affect other parts, influencing the decisions of other individuals and governments.

It may be useful to identify five sets of influences that manifest the linkages among policies: those operating through the terms of trade, those related to income distribution and employment levels, those influencing resource allocation, those working through payments imbalances, and those affecting government budget costs. Of these, the terms of trade influences are perhaps the most direct. Developed-country wheat policies have generally favored, by means of lower international prices, those countries that import cereals from the world market. In addition, food aid provides a further subsidy to recipients that may be included as a direct and favorable influence on the terms of trade. Grain exporters, particularly in Argentina, have correspondingly suffered from lower prices on world markets as a result of developed-country policies, and possibly from loss of markets caused by food aid. Because developing countries as a whole are net importers of wheat, it seems likely that the terms of trade for developing countries have been improved by developed-country price policies over the years.

It follows from consideration of the terms of trade impact of developed-country farm protection that any additional variability in international prices for these products generated by such protective policies destabilizes these terms of trade. The result is a more or less arbitrary redistribution of purchasing power, accentuating natural shortages and surpluses. This undoubtedly impairs the ability of developing-country governments to manage their own food policies and strains their capacity to prevent such fluctuations from imparting costly shocks to the domestic economy. In many countries the internal domestic market is not closely linked to world price developments; their influence may not extend beyond ports and major cities. Moreover, many developing countries also have policies that effectively separate domestic and international markets. In these cases the impact of world prices on domestic agriculture may be indirect, dominated by the influence on government planning and on the importation of other products. When wheat prices rise at the same time as those of other commodities, as in the early 1970s, the impact on developing countries is reduced. A price rise occurring when coffee, cocoa, tea, and sugar prices are depressed could have much more serious repercussions.

The impact of events in the world wheat market on income distribution within developing countries is more complex but equally important. Such an impact may be apparent in any developing economy regardless of its net trade position. It may be especially important where rural unemployment is a severe problem that in turn may be related to a lack of purchasing power that leaves productive capacity idle. Government policy might call for the injection of funds into agriculture not only to generate more output but to stimulate the nonagricultural economy. Such policies are similar to those used to support rural income in developed countries during the depression of the 1930s. They are a stimulus for national and regional economic development. However, these efforts may be blunted if not entirely thwarted by substantial transfers to developed-country farmers. It seems unlikely that the additional food consumption thus generated would be adequate to absorb the extra production from subsidized agriculture in both developed and developing countries. In this sense agricultural policy in industrial areas may preempt the transfer of rural income transfers, which might otherwise be considered desirable development policy.

A similar conclusion emerges from consideration of the more traditional question of resource allocation. Under the bold assumption that labor within countries is mobile and employment is reasonably high, overproduction in high-cost areas, sponsored by generous price supports,

implies a high total resource cost in world agriculture and reduces the total output of nonagricultural goods. Because price protection for agriculture appears to be a luxury enjoyed mainly by the developed industrial nations, the implication is that such subsidies reduce world income and add to overall food costs even though they put the major burden on their own consumers and taxpayers and relieve their counterparts in the nonindustrial world.

This conclusion is reinforced by the notion of social resource cost, which may differ from private (producer) cost particularly in the presence of unemployment. Such unemployment is likely to be greater in developing countries, where the industrial sector cannot handle the prevailing degree of excess labor capacity from agriculture. The social cost of agricultural output might be lowered still further by maintaining higher prices or other incentives to produce in developing countries than in industrialized nations. Once again the present pattern of world agricultural policies may be against the developing-country interest.

These conclusions are modified by emphasizing foreign-exchange rather than resource-cost considerations. Balance-of-payments constraints, for instance, suggest that low prices for wheat and other basic foods help to relieve the Third World of a balance-of-trade burden, at least if governments can control import quantities and thus take the terms of trade benefit directly in the form of lower import costs. With this interpretation there is little doubt that developed areas have contributed something to the economic management of nonindustrial nations by easing financial constraints, though they have also added to their difficulties by means of policies tending to destabilize world prices.

Looking at the financial cost of government agricultural policies and considering that administrators, constrained by the size of the taxation base and the political acceptability of tax levels, can inject only limited amounts of subsidy into the food and agricultural system, lower world prices again seem to benefit developing countries. The size of the developed-country tax burden (made up of subsidies on exports and any direct payments to farmers over and above their returns from market sales), acts to limit the level of prices granted to domestic producers. Higher grain prices on world markets reduce some of this budgetary pressure. On the other hand, high world cereal prices add to the financial burden on developing countries, leading either to increases in domestic food prices or further taxation of the agricultural base. In other words, there is a strong possibility that lower world agricultural prices benefit the fiscal policy of developing countries and restrain farm policies in developed countries.

In summary, developed-country farm policy, by depressing world trade prices for products such as wheat, might harm developing countries (both importing and exporting) if their development is constrained by a lack of agricultural purchasing power; it might reduce total nonagricultural output by misallocating resources, keeping food costs high, even though developing-country food consumers might benefit; it might help developing-country importers to finance the purchase of other products, but correspondingly injure the aims of exporters; and it might facilitate the subsidization of food for consumers by developing-country governments. By destabilizing world prices, the potential benefits are reduced and the injuries are made more apparent. This broad assessment of the impact of developed-country policies in the wheat market should be interpreted in this light: the actual effects will, of course, vary widely from country to country.

CONCLUSIONS

With these linkages in mind, the following conclusions may be put forth with varying degrees of certainty.

Production fluctuations in wheat in developed countries can be a potential problem for the rest of the world. Price and income-support policies may in themselves reduce such instability, but some changes in production directly reflect policy decisions. Greater stability in production levels would be to the advantage of developing countries in planning their food supplies. Policies designed to this end could more directly benefit developing countries than the various stock and trade policies commonly discussed at international gather-

ings. Reducing the absolute variations in production may require developments in technology and husbandry. Eliminating the policy-induced variations is an important priority for the international community.

In developed countries, consumption variations are generally less than production variations as a result of stock and trade variability. The more aggressively developed countries try to stabilize consumption, the more stocks have to be held to counter their impact on trade. Consumption varies more when there is a large market for wheat as animal feed, especially in Europe and the U.S.S.R. Feedgrain policies themselves need to respond to conditions in the wheat market to avoid undue fluctuations in the livestock sector. More movement in the relative price of wheat and other grains may be necessary in this regard.

Total stock-policy changes, including those caused by price changes, do help to offset the impact of price policies on world-market stability, but this appears to be due largely to price-flexible Canadian and (to a lesser extent) U.S. stocks (see Table 14). Although this response to world price changes seems to show that the effects of price policies are partially absorbed in stock-level decisions, other evidence indicates that this effect is not strong enough to counter the underlying relationship between stock changes and price-policy impacts (see Table 10). In most years, stock rundown accompanies price-policy surpluses and stock accumulation accompanies shortages. The situation would be improved if, with the same (or more) responsiveness of stocks to world prices, stocks could also be used to counter the actual impact of price policies.

Therefore, changes that benefit developing countries would be excessive rundown of stocks in low price periods—even if domestic production appears to warrant this—and forgo a rapid increase of stocks when prices are high—even though production levels are high enough to allow for stock rebuilding. In the last decade the former situation occurred in 1970/71 and in 1972/73, and the latter in 1974/75 and 1975/76.

The implications for domestic price policy are clear. Producer (and consumer) prices must be able to fall if stock changes are to play a full role in stabilizing world markets. With an underlying balance in world markets, stock changes can offset year-to-year disturbances. Without such a balance they can destabilize the markets as they are designed to correct price-policy errors. If prices could rise, perhaps temporarily during shortages (permanently if the shortage persists), they would relieve stock policies in high-price periods from again having to rescue domestic price objectives.

Without such price-policy flexibility, stock changes will have to be even greater than in the past decade. This implies a higher average level of stocks, a greater capacity to hold them, and a greater response to price changes. This increase in stocks could be achieved if those countries not now holding price-responsive stocks (the European Community and Japan in the case of wheat) were to assume such responsibilities. If price policies continue as in the past but countries carry and manage stocks in such a way as to offset fully the impacts of these policies on trade, then the total amount of stock released after a $10-per-ton increase in world prices might reach 3.8 million tons rather than 0.8 million tons. This development would in turn decrease the probability of such changes in world price levels (see Table 14).[33]

These are the key points to consider in assessing wheat policy developments in industrial countries. Positive developments would include reduction of production variation, greater response of consumption to such output changes, greater response of stocks to world prices, and more consistent absorption of policy-induced surpluses in stocks, leading in turn to policy changes to offset those surpluses. Price policies should allow prices to follow world price trends even when prices are fixed within a marketing season. It may be necessary to coordinate stock policies to ensure that all countries use stock changes in an internationally constructive way. Negative developments would include

[33] If food security in developing countries is enhanced, for example, by increasing the availability of credit to buy foodgrains when domestic production is low, then this response of stocks to price might have to be even higher—perhaps 5 million tons per $10 price increase.

further isolation of prices, such as arise from renewed use of export subsidies to move surpluses and bilateral trade deals to maintain consumption in developed importing countries when prices are high (unless consumption was also reduced in the exporting nations).

APPENDIX 1

WHEAT POLICIES IN SELECTED DEVELOPED COUNTRIES

This appendix briefly introduces the policies of the countries discussed in the text. It does not go into detail about their administration or operation, but illustrates their nature as they affect world markets.

U.S. policies are derived from the Agricultural Adjustment Act of 1933 and the substantial modifications to it enacted since it was passed. They represent an attempt to reconcile the desire for individual and corporate economic liberty with the overriding concern of successive administrations with the health of the agriculture industry. The sector is to be saved from itself but not actively planned or regulated. A major innovation in early U.S. policy was control of the supply of most significant commodities through acreage allotments and marketing quotas. Much of this legislation remains today. Two federal agencies, the Agricultural Stabilization and Conservation Services (ASCS) and the Commodity Credit Corporation (CCC), are responsible for administering and financing farm programs.

Price-support schemes are mandatory for the basic commodities, including wheat. Supply has been controlled during much of the period to regulate output to meet domestic and foreign demand.

Another outlet, food aid, was added in the 1950s to relax the pressure on accumulated surpluses and for more altruistic motives. The surpluses themselves indicated the failure of supply control to limit output. As a consequence support prices (limited to those farmers who participated in acreage reduction schemes) were lowered and partially replaced with direct payments. Acreage controls for cereals were relaxed to meet shortages in 1967 and 1968, reintroduced in 1969, made more flexible (the "set aside" arrangements) in 1971-73, dropped again when world markets became firmer in 1973, and revived in 1977. Policy changes reflected export-demand developments and the associated budgetary costs incurred in price-support payments, export subsidies, and storage charges. In recent years the primary aim has been to control such costs arising from the obligation to support farm prices by attempting, on the one hand, to maintain and expand export markets and, on the other, to avoid pricing domestic output too high relative to market demand.

Canadian policy has had to keep in step with its neighbor and trading partner to the south. The Canadians are even more concerned with overseas cereal markets, but the methods they have employed have differed from those of the United States. Acreage control has only been attempted once for the major arable crops crops in the LIFT program of 1970. Instead a comprehensive system of delivery quotas, by farm, has been in operation since 1940, allowing Canadian wheat producers in the Prairie Provinces little choice in their farming patterns. In return farm output is marketed with the weight of the Canadian Wheat Board (CWB). Set up in 1936, the CWB can adjust deliveries to meet anticipated domestic and export outlets. In general the CWB has been self-financing; it is relieved of the "residual buyer" obligations of the CCC in the United States and the intervention agencies in the European Community.

Australian policy resembles Canadian policy, though modified by a more distant relationship with the United States. The wheat market is dominated by a federal agency, the Australian Wheat Board (1948), which has only recently instituted individual farm quotas (1970). It is "grower controlled" to a greater extent than the CWB, the CCC, or the European Community intervention agencies. It was intended to be self-financing, like the CWB, but has relied on government funds during periods of low world prices. Domestic and overseas markets are separated to enhance earnings from sales of the crop.

The policies of the European Community have a simplicity of form based on a relatively short history and a complexity of motive accounted for by their intergovernmental nature. The main difference between the instrumentals of European Community policy and those of other countries is that the European Community emphasizes border controls because its imports of major products are of much greater significance. A

comprehensive system of threshold prices backed by variable levies to prevent direct price competition by overseas suppliers from weakening domestic markets has been the cornerstone of the Common Agricultural Policy (CAP). Where such border protection is ineffective, as it is for wheat, support buying on the internal market guarantees a floor price. Produce so acquired is usually exported with the aid of subsidies (export restitutions) financed by central funds. Marketing agencies at a national level are not at present a major feature of policy, and no Community-wide marketing bodies exist. Protection for grainfed livestock products is related in part to the size of the levy on grain. Soybeans enter freely, with a modest tariff on the related oils and meals. Domestic intervention-buying and export subsidies support the soft wheat market whereas deficiency payments help to maintain the incomes of durum wheat producers. The "guarantee" section of the European Agricultural Guidance and Guarantee Fund (FEOGA) is responsible for expenditures incurred in price support operations.

Prior to joining the European Community, the United Kingdom operated under a different system. The returns to wheat farmers were lifted to a guaranteed price level by a deficiency payment when market prices were below that level. Until 1964 imports entered the United Kingdom relatively unhindered; after that time minimum import prices were set with the agreement of major suppliers to limit the financial cost of domestic policy. Since 1973 the British have used the policy mechanisms of the CAP. However, prices have remained below the Community average because administered (common) prices have been translated at an over-valued "green" rate of exchange.

In regulating its market, Japan uses a single agency responsible for buying both domestic wheat from farmers and wheat from abroad. This state agency, the Food Board, sells to domestic millers and other users of wheat at a price determined by such factors as the price of rice, the expenditure of consumers on food, and the wage rate. Deficits or surpluses on the Food Board account constitute subsidies or taxes to farmers and consumers and on foreign trade. Japan also encourages wheat production with policies designed to reduce the dependency of the arable sector on rice production. Consumption of rice has declined markedly in favor of wheat in recent years, contributing to the accumulation of large surpluses of the more traditional crop.

The wheat market provides an interesting cross-country comparison of the way particular problems have determined policies. The problems faced by the United States, Canada, and Australia are basically similar. Wheat markets are subject to instabilities arising mainly from the influence of the weather, but they are also affected by changes in feeding patterns. Wheat's place as the world's major traded foodstuff imposes additional obligations on major exporters. As a consequence policies are expected to keep the incomes of their own producers stable, to ensure supplies for countries where domestic output is especially vulnerable to yearly fluctuations, and to be consistent with the overall demands of economic policy. Because wheat farms in these countries are usually of reasonable size and use modern technology, the problem of low absolute farm incomes does not directly arise. In Europe, by contrast, small-scale wheat farming has been preserved, particularly in Germany, Denmark, and the Netherlands. The wheat policy of the European Community does not have to cope with variations in yield to the same extent as do those of the new continents, but prices set under the CAP have reflected and encouraged the generally higher costs of production. Japan's farms also are small, but wheat policy is dominated by another consideration—the relationship of that commodity to rice. For these countries wheat is not a significant factor in the trade balance, nor do they feel a pressing obligation concerning world food security.

All of these countries have pursued policies that attempt to deal with the problem of chronic overproduction (in Japan's case, of rice) at policy price levels. Canada and Australia control farm output with delivery quotas, facilitated by their near-monopoly selling agencies. Though apparently satisfactory to farmers, it is doubtful whether this parastatal trading really confers much market power. Output in these countries may not in fact be much less than if farmers were free to choose production levels, and the boards consequently may not be selling significantly less grain than if the market structure were more competitive. The major benefits have

probably come from orderly marketing of the domestic crop, rather than from the manipulation of output quantity. In both the United States and the European Community, state buying agencies impose a floor on prices and as a consequence accumulate stocks when world prices are low. Direct export subsidies are then needed to sell unwanted reserves on overseas commercial (and concessional) markets. The United States uses acreage controls with significant payments to induce farmer participation to limit wheat output in surplus periods. Although they effectively control the costs of storage and export subsidy programs, these land-diversion policies have probably not kept world prices up in the long run. Any firming of the price of U.S. wheat encourages additional output in other countries.

The stock policies of these countries have not been noted for their consistency and articulation. Wheat accumulates on farms in Canada if harvests are good in comparison to CWB delivery quotas. The government pays certain storage costs, and farmers adjust their next year's production to account for the stock they carried over. Though such a system isolates farm income from fluctuations of domestic yield, it is not certain that it is effective enough to be the stock instrument an internationally coordinated set of reserves might require.

Similarly, Australia pursues no active reserve policy. The policy of the Wheat Board is to maintain working stocks, but there are no government-owned reserves as such. On-farm storage is not as prevalent in Australia as in Canada or the United States. European Community storage policy is essentially a by-product of the intervention-buying system. The intervention agencies have to accept grain offered to them, subject to quality and other standards. They may dispose of this grain on tender to exporters who benefit from a subsidy. It would be possible to regulate stock holdings by varying this subsidy, but this is not done. One or two individual member countries are reported to have their own emergency stocks, but these have no importance for market stability.

The United States employs a more sophisticated stock system, with payments for on-farm storage and administration by the CCC of grain stocks purchased under price-support programs. In recent years the volume of commercial stocks has increased compared with government stocks, and there has been a reluctance to incur the costs involved in extensive storage programs. There appears to be no storage policy articulated for wheat in Japan. Rice stocks and a healthy foreign exchange position are two possible reasons for this. Nevertheless, as a major importer Japan has recently been reconsidering its vulnerability to uncertain outside supplies.

APPENDIX 2

QUANTIFICATION OF POLICY EFFECTS IN THE WHEAT SECTOR OF SELECTED DEVELOPED COUNTRIES

This appendix describes briefly the method used to estimate the impact of the major farm-policy instruments used in Australia, Japan, the European Community, Canada, and the United States on the level of trade in wheat.[34]

For each country the level of production and the average producer price are assembled for the years 1968/69 to 1976/77. The addition of any direct payments (or subtraction of taxes) not already included in the product price gives the total producer value. The corresponding wholesale price and consumption volume are combined to give an estimate of consumer expenditure on wheat. The policy effects are then estimated as transfers in the sense that part of both total producer value and total consumer expenditure on wheat are accounted for by the policies.

The policy-transfer volumes themselves are derived by examining the major effects of the policies under consideration. Because qualitative information on policies comes in different forms, the transfer element was calculated using one of several procedures.

If the policy involved a per-unit payment, then the impact of the policy was applied over the relevant volume of output. Thus a per-unit producer subsidy was multiplied by production and the total listed as a transfer to producers. For a tariff or levy, the per-unit figure was applied to production to give the transfer to producers, and to consumption to give the transfer to consumers.

If the data were more conveniently recorded as financial totals such as the cost of subsidies on a particular product, then this was allocated directly, but where the financial data related to trade taxes, levy receipts, for example, then it was first converted to a per-unit figure by relating it to trade volume and applying the procedure explained above.

If the policy involved price discrimination, such as the maintenance of higher domestic than export prices through marketing control, then the price difference was calculated. This was then multiplied by production (consumption) in the high price market and allocated to producer (consumer) transfer.

If the policy involved trade quotas, then the difference between internal and external prices was calculated, and treated accordingly. This was the only case where world prices were used explicitly in the calculations.

An input subsidy was allocated directly to producers, as for a price subsidy.

The impact of the transfers was accumulated to give the total producer (consumer) subsidy value. To estimate the trade impacts, the transfers were converted to a percentage base, relative to total actual revenue from or expenditure on wheat. This percentage was then applied to the elasticity estimates, as indicated in the text, to get the policy-induced production and consumption changes; and the production and consumption impacts were added. The production effect was lagged by one year to indicate the slower adjustment to policy changes. A set of tables follows, showing the steps in calculations for each country. Further information on the method used is available from the author on request.

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[34] A previous attempt to make such estimates was reported in Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975). The estimates reported here have been updated and revised for this study. The earlier study included estimates for maize, barley, dairy products, and sugar, as well as for wheat, and should be consulted for details of the calculations employed.

Table 15--Wheat producer subsidy equivalents and values for Australia, 1969 to 1977

Year	Production	Producer Price[a]	Producer Price[a]	Total Producer Receipts	Policy Transfers: Guaranteed Export Price[b]	Policy Transfers: Domestic Price Support[c]	Policy Transfers: Devaluation Compen-sation	Policy Transfers: Fertilizer Subsidy[d]	Total Transfers		Subsidy Per Unit	Subsidy Equiv-alent
	(million metric tons)	(Australian $ metric ton)	(U.S. $ metric ton)	(U.S. $ million)	(Australian $ million)				(Australian $ million)	(U.S. $ million)	(U.S. $ metric ton)	(percent)
1969	14.8	45.46	50.92	753.5	29.0	34.5	10.5	(12.5)	86.5	96.9	6.6	12.9
1970	10.5	43.85	49.11	515.7	27.5	23.6	...	(11.2)	62.3	69.8	6.7	13.5
1971	7.9	46.30	52.50	414.8	32.1	26.7	...	(7.7)	66.5	75.4	9.6	18.2
1972	8.5	48.50	57.81	491.4	40.1	31.5	...	(8.0)	79.6	94.9	11.2	19.3
1973	6.4	49.86	70.95	454.1	12.4	22.3	...	(8.9)	43.6	62.0	9.7	13.7
1974	12.0	104.35	105.37	1,804.4	...	167.5	...	(11.3)	155.7	224.4	18.7	-12.4
1975	11.4	104.61	137.04	1,562.3	...	118.7	...	...	118.7	155.5	13.6	-10.0
1976	11.8	96.65	118.40	1,397.1	...	30.6	...	...	30.6	37.5	3.2	2.7
1977	11.7	83.42	92.51	1,082.4	...	...	...	...	...	24.1	...	2.2

Sources: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A.10. Figures for the years 1975-77 were updated on the data of that report.

Note: Years begin on December 1.

[a] Producer price is the amount distributed to growers. (Prior to 1975 it was termed the average return to growers.)

[b] Represents contributions of the Australian government to the stabilization fund in order to support the guaranteed price on export-quota wheat. After 1974/75 the guaranteed price was replaced by the stabilization price and for the 1975/76 season, quotas were suspended.

[c] The difference between the fixed home consumption price and the average export return multiplied by total domestic consumption gives the transfer from consumer to producers. Calculations for the years 1970-73 have been adjusted to take into account the lower consumption price fixed for wheat going into nonfood use.

[d] Estimates were based on a rate of A $12.9 per metric ton of superphosphates used annually by the wheat industry. These subsidies were discontinued after January 1, 1975.

Table 16—Wheat consumer subsidy equivalents and values for Australia, 1969 to 1977

Year	Consumption	Consumption Price[a]	Consumption Price[a]	Total Consumer Costs	Policy Transfers: Domestic Price Support[b]	Policy Transfers: Total Transfers	Policy Transfers: Total Transfers	Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	(Australian $ metric ton)	(U.S. $ metric ton)	(U.S. $ million)	(Australian $ million)	(Australian $ million)	(U.S. $ million)	(U.S. $ metric ton)	(percent)
1969	2.3	62.83	70.37	161.9	34.5	34.5	38.6	16.30	24.0
1970	2.4	58.43	65.44	157.1	23.6	23.6	26.4	11.01	16.8
1971	2.6	58.44	66.27	172.3	26.7	26.7	30.3	11.65	-17.6
1972	2.7	59.97	71.48	193.0	31.5	31.5	37.5	13.89	-19.4
1973	3.2	64.67	92.02	294.5	22.3	22.3	31.7	9.91	10.8
1974	3.1	71.10	102.46	317.6	167.5	167.5	241.5	77.87	76.0
1975	3.0	83.40	109.25	327.8	118.7	118.7	155.5	51.83	47.4
1976	2.7	99.32	121.67	328.5	30.6	30.6	37.5	13.88	11.4
1977	2.8	105.40	116.89	327.3	...	...	24.1	...	7.4

Sources: Figures for the years 1969-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A. 11. Figures for the years 1975-77 were updated based on the data of that report.

[a] Fixed home prices for the years 1969, 1970, and 1975-77 apply to all domestic consumption, whereas prices for the four years, 1970-73, have been weighted to reflect the different prices for wheat used as food and wheat used as feed and other nonfood uses.

[b] The difference between the fixed home consumption price and the average export return multiplied by total domestic consumption gives the transfer from consumers to producers. Calculations for the years 1971-74 have been adjusted to take into account the lower consumption price fixed for wheat going to nonfood uses.

Table 17—Wheat producer subsidy equivalents and values for Canada, 1968 to 1976

Year	Production	Producer Price[a]	Producer Price[a]	Total Producer Receipts[b]	Policy Transfers: Feed Freight Assistance	Policy Transfers: Export Credit[c]	Policy Transfers: Wheat Reserves Act[d]	Policy Transfers: Domestic Food Price Maintained[e]	Total Transfers		Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	(Canadian $/bushel)	(U.S. $/metric ton)	(U.S. $ million)	(Canadian $ million)				(Canadian $ million)	(U.S. $ million)	(U.S. $/metric ton)	(percent)
1968	17.7	1.70	57.96	900.7	2.1	6.0	55.9	16.8	80.8	75.1	4.24	8.3
1969	18.6	1.57	53.59	865.0	5.1	8.7	71.3	27.8	112.9	104.9	5.64	12.1
1970	9.0	1.67	58.85	463.6	6.6	8.6	62.1	20.7	98.0	94.0	10.44	20.3
1971	14.4	1.60	58.20	729.4	5.5	8.9	30.8	103.9	149.1	147.6	10.25	20.2
1972	14.5	2.15	82.00	1,077.3	6.0	8.0	17.5	91.2	122.7	123.9	8.54	11.5
1973	16.2	4.58	171.00	2,641.8	6.0	5.0	...	42.3	31.3	31.3	1.93	1.2
1974	13.3	4.47	168.00	2,128.1	4.7	2.0	...	22.0	15.3	15.7	1.18	0.7
1975	17.1	3.75	135.40	2,138.5	2.9	...	...	...	2.9	2.9	0.17	0.1
1976	23.6	3.19	111.72	2,636.6	2.3	...	...	...	2.3	2.2	0.09	0.1

Sources: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A. 20. Figures for the years 1975-77 were updated based on the data of that report.

[a] The total prices received for sales to the Canadian Wheat Board are given for 1968 to 1975. 1976 is based on five months.

[b] Deductions for transportation and handling charges of C$ 7.62 per million metric tons (1968-72), C$ 6.81 per million metric tons (1973-74), and C$ 10.52 per million metric tons (1975-76) are incorporated.

[c] These are estimated figures.

[d] Wheat Reserves Act was terminated during the 1973/74 season.

[d] Calculated as the difference between the export price of wheat for flour and the fixed domestic price to get a subsidy per unit.

Table 18—Wheat consumer subsidy equivalents and values for Canada, 1968 to 1976

Year	Consumption	Consumption Price[a]	Consumption Price[a]	Total Consumer Costs	Policy Transfers: Export Credit[b]	Policy Transfers: Domestic Food Price Maintained	Total Transfers		Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	Canadian $/ bushel)	(U.S. $/ metric ton)	(U.S. $ million)	(Canadian $ million)		(Canadian $ million)	(U.S. $ million)	(U.S. $/ metric ton)	(percent)
1968	4.3	1.95	64.79	278.7	-6.0	-16.8	22.8	21.2	-4.93	...
1969	4.6	1.81	61.78	284.2	8.7	-27.8	-36.5	-33.9	7.37	...
1970	4.7	1.79	63.08	296.5	-8.6	-20.7	29.3	-28.1	-5.98	...
1971	4.8	1.69	61.48	295.1	8.9	103.9	-112.5	111.4	-23.20	...
1972	4.8	2.63	97.60	468.5	-8.0	91.2	-99.2	-100.2	-20.87	...
1973	4.8	5.50	201.89	969.1	5.0	193.3	188.3	188.1	39.20	...
1974	4.6	5.26	197.69	909.4	-2.0	170.1	168.1	172.0	37.39	...
1975	4.8	4.68	169.02	811.3	...	130.2	130.2	128.0	26.67	...
1976	5.1	3.25	119.80	610.9	...	31.0	31.0	30.0	...	...

Source: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A. 21. Figures for the years 1975-77 were updated based on the data of that report.

[a] Prices given for 1968 to 1972 are for No. 1 Manitoba Northern wheat. Those for 1973 to 1976 are No. 1 Canadian Western Red Spring wheat.

[b] These are estimated figures.

Table 19—Wheat producer subsidy equivalents and values for the European Community (6), 1968 to 1976

Year	Production[a]	Production Price[b]	Production Price[b]	Total Producer Receipts	Policy Transfers: CAP Import Levies	Policy Transfers: CAP Export Levies/ Subsidies	Total Transfers		Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	(unit of account metric ton)	(U.S. $ metric ton)	(U.S. $ million)	(million unit of account)		(million unit of account)	(U.S. $ million)	(U.S. $ metric ton)	(percent)
1968	30.0	95.20	95.20	2,856.0	1,603.5	...	1,604	1,604	57.47	56.2
1969	28.5	96.10	96.10	2,660.6	1,656.6	...	1,657	1,657	58.14	60.5
1970	26.5	100.40	100.40	2,660.6	1,362.7	...	1,363	1,363	51.43	51.2
1971	30.5	98.80	99.10	3,022.6	1,496.5	455.8	1,952	1,958	64.20	64.8
1972	32.2	100.95	101.89	3,280.9	984.1	529.0	1,513	1,527	47.42	46.5
1973	32.5	110.39	131.58	4,276.4	13.8	1,446.5	1,433	1,708	-52.55	-39.9
1974	35.0	112.94	141.85	4,964.8	514.7	687.8	173	217	-6.20	-4.4
1975	28.4	(123.10)	162.49	4,614.7	650.4	323.4	974	1,286	45.28	27.9
1976	...	...	...	...	...	...	...	...	...	...

Sources: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations. *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment.* C75-LIM-2 (Rome. FAO, October 1975), p. A. 30. Figures for the years 1975-76 were updated based on the data of that report.

[a] This is production of soft wheat and excludes production of durum wheat.

[b] This is the average of the six individual countries "prices received by farmers."

Table 20—Wheat consumer subsidy equivalents and values for the European Community (6), 1968 to 1976

Year	Consumption[a]	Consumption Price[b]	Consumption Price[b]	Total Consumer Costs	Policy Transfers: Import Levies[c]	Policy Transfers: Export Levies[d]	Policy Transfers: Denaturing Premiums	Total Transfers		Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	(unit of account, metric ton)	(U.S. $/ metric ton)	(U.S. $ million)	(million unit of account)			(million unit of account)	(U.S. $ million)	(U.S. $/ metric ton)	(percent)
1968	23.2	100.8	100.80	2,339	1,240.1	...	...	1,240	1,240	53.45	-53.0
1969	26.9	102.7	102.70	2,763	1,570.9	...	...	1,571	1,571	58.40	-56.9
1970	25.9	105.2	105.50	2,732	1,337.7	...	...	1,338	1,342	51.81	-49.1
1971	26.3	105.5	106.45	2,800	1,549.0	...	69.8	1,479	1,493	56.77	-53.3
1972	27.6	111.6	133.03	3,672	1,122.9	...	121.1	1,002	1,194	43.26	-32.5
1973	26.8	116.6	146.40	3,925	14.2	1,267.1	17.3	1,270	1,595	59.51	40.6
1974	25.9	120.3	158.80	4,113	513.5	770.4	0.4	257	340	13.13	8.3
1975	23.9	136.1	188.36	4,502	736.0	57.5	0.6	678	938	39.25	-20.8
1976	...	...	...	...	...	...	...	...	...	...	...

Sources: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM. 2 (Rome: FAO, October 1975), p. A. 31. Figures for the years 1975-76 were updated based on the data of that report.

[a] This is consumption of soft wheat for total domestic use.

[b] Represents the average of market prices.

[c] Represents import levies multiplied by consumption.

[d] Represents export levies multiplied by consumption.

Table 21—Wheat producer subsidy equivalents and values for Japan, 1968 to 1976

Year	Production	Producer Price[a]	Producer Price[a]	Total Producer Receipts	Policy Transfers: Wheat Production Subsidies[b]	Policy Transfers: Food Agency Marketing Control[c]	Policy Transfers: Production Effect[d]	Total Transfers		Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	Yen/ metric ton)	(U.S. $/ metric ton)	(U.S. $ million)		(Yen billion)		(Yen billion)	(U.S. $ million)	(U.S. $/ metric ton)	(percent)
1968	1.0	54,850	152.37	154.2	...	22.8	4.7	27.5	76.4	76.40	49.5
1969	0.8	56,466	156.86	118.9	...	18.4	4.3	22.7	63.1	78.88	53.1
1970	0.5	59,200	164.46	78.0	...	12.7	2.3	15.0	41.6	83.20	53.5
1971	0.4	63,133	482.64	80.4	...	13.5	2.8	16.3	46.5	116.25	57.8
1972	0.3	65,517	212.93	60.5	...	9.6	1.7	11.3	36.7	122.33	60.7
1973	0.2	74,433	273.17	55.2	...	6.2	0.1	6.3	23.1	115.50	41.8
1974	0.2	94,750	324.99	98.3	9.7	12.0	-7.0	14.7	50.4	252.00	51.3
1975	0.2	105,000	353.75	104.5	10.0	14.3	6.3	18.0	60.6	303.00	58.0
1976	0.2	...	...	110.7	...	...	...	...	70.8	...	...

Source: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A-42. Figures for the years 1975-76 were updated based on the data of that report.

[a] Denotes government purchasing price to producers, including packing charge, but excluding bonuses.

[b] These measures, introduced in 1973, combine a contract bonus, a production bonus, and, beginning in 1976, diversion payments made on paddy fields sown to wheat. These payments are also included in total producer value.

[c] Calculated as the difference between the government purchase price and the government selling price of domestic wheat, multiplied by total domestic production.

[d] Calculated as the difference between the government selling price of domestic wheat and the government purchasing price of imported wheat, multiplied by domestic production.

Table 22—Wheat consumer subsidy equivalents and values for Japan, 1968 to 1976

Year	Consumption	Consumption Price[a]	Consumption Price[a]	Total Consumer Costs	Policy Transfers: Protection Effects[b]	Total Transfers		Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	(Yen/ metric ton)	(U.S. $/ metric ton)	(U.S. $ million)	(Yen billion)	(Yen billion)	(U.S. $ million)	(U.S. $/ metric ton)	(percent)
1968	5.1	34,838	96.78	493.6	-39.3	-39.3	-102.18	-20.03	-20.7
1969	5.2	34,617	96.17	500.1	-44.1	44.1	-122.51	-23.56	-24.5
1970	5.2	35,143	97.63	507.7	-41.9	-41.9	-116.40	-22.38	-22.9
1971	5.2	35,278	100.58	523.0	-49.2	-49.2	-140.27	-26.98	-26.8
1972	5.3	34,347	111.52	591.1	-48.6	-48.6	-157.80	-29.77	-26.7
1973	5.5	38,222	140.43	772.4	-28.2	28.2	103.61	18.84	13.4
1974	5.5	45,572	156.31	859.7	152.5	151.5	523.08	95.11	...
1975	5.6	46,124	155.39	870.2	144.0	144.0	485.14	86.63	...
1976	5.7	65,050	...	...	...	...	...	...	...

Source: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C76/LIM/2 (Rome: FAO, October 1975), p. A. 43. Figures for the years 1975-76 were updated based on the data of that report.

[a] Calculated as the weighted average of the government's wholesale selling price of domestically produced wheat and the government resale price of imported wheat.

[b] Calculated as the difference between the government selling price of domestic wheat and the government purchasing price of imported wheat, multiplied by consumption.

Table 23—Wheat producer subsidy equivalents and values for the United Kingdom, 1968 to 1976

Year	Production	Producer Price[a]	Producer Price[a]	Total Producer Receipts	Policy Transfers: Deficiency Payments	Policy Transfers: Fertilizer Subsidy[b]	Policy Transfers: U.K. Import Levies[c]	Policy Transfers: CAP Import Levies[d]	Total Transfers		Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	(£/metric ton)	(U.S. $/metric ton)	(U.S. $ million)	(£ million)				(£ million)	(U.S. $ million)	(U.S. $/metric ton)	(percent)
1968	3.5	26.99	64.78	227	17.7	6.8	...	...	24.6	59	16.86	26.0
1969	3.4	28.54	68.50	233	17.4	6.3	...	...	23.7	57	16.76	24.5
1970	4.2	30.76	73.82	310	14.9	9.8	...	...	23.7	57	13.57	18.4
1971	4.8	32.09	78.62	377	34.5	8.8	0.5	...	43.8	107	22.29	28.4
1972	4.8	34.50	86.32	414	12.3	7.4	10.2	...	29.9	75	15.63	18.1
1973	5.0	45.23	100.90	555	..	3.9	...	20.1	24.0	59	11.80	10.6
1974	6.1	61.16	143.05	873	...	1.9	...	-154.0	152.1	-356	58.36	-40.8
1975	4.5	60.86	135.23	609	...	...	...	-64.5	-64.5	-143	-31.78	-23.5
1976	4.8	73.36	132.49	636	...	...	...	-22.2	-22.2	-40	-8.33	-6.3

Source: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A. 50. Figures for the years 1975-76 were updated based on the data of that report.

[a] Uses guaranteed price 1968 to 1971, market price, 1972, and average producer returns, 1973 to 1976.

[b] Allocated in proportion to annual wheat tillage. This policy was terminated in 1974.

[c] Represents total levy receipts under 1971 policy, divided by import volume, and multiplied by production.

[d] Represents application of CAP levies, modified by accession and monetary compensations, to total production.

Table 24—Wheat consumer subsidy equivalents and values for the United Kingdom, 1968 to 1976

Year	Consumption[a]	Consumption Price[b]	Consumption Price[b]	Total Consumer Costs	Policy Transfers: U.K. Import Levies[c]	Policy Transfers: CAP Import Levies[d]	Policy Transfers: Denaturing Premiums	Total Transfers		Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	(£ metric ton)	(U.S. $ metric ton)	(U.S. $ million)	(£ million)			(£ million)	(U.S. $ million)	(U.S. $ metric ton)	(percent)
1968	7.9	22.51	54.02	427	...	...	...	...	...	...	...
1969	8.2	23.31	55.94	459	...	...	...	...	...	...	...
1970	9.4	27.20	65.28	614	...	...	...	...	...	...	...
1971	8.6	23.72	58.11	500	3.8	...	...	-3.8	-9	-1.05	-1.8
1972	9.2	34.50	86.32	794	19.1	...	...	-19.1	-48	-5.22	-6.0
1973	8.0	58.54	143.54	1,148	...	21.3	32.1	-10.8	-26	-3.25	-2.3
1974	9.3	57.61	134.75	1,253	...	...	234.7	234.7	549	59.03	43.8
1975	8.2	65.40	145.32	1,192	...	...	117.6	117.6	261	31.83	21.9
1976	8.5	84.50	152.61	1,297	...	...	39.4	39.4	71	8.35	5.5

Source: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A/51. Figures for the years 1975-76 were updated based on the data of that report.

[a] Represents total new supply (production + imports − exports).

[b] This is the market price.

[c] Represents levy receipts under 1971 policy divided by volume.

[d] Represents application of CAP levies, modified by accessionary and monetary compensations to total consumption.

Table 25—Wheat producer subsidy equivalents and values for the United States, 1968 to 1976

Year	Production	Producer Price[a]	Total Producer Receipts	Policy Transfers: Diversion[b]	Policy Transfers: Marketing Certificates[b]	Policy Transfers: Export Subsidy[c]	Total Transfers	Subsidy Per Unit	Proportional Subsidy
	(million metric tons)	(U.S. $/ metric ton)	(U.S. $ million)	(U.S. $ million)			(U.S. $ million)	(U.S. $/ metric ton)	(percent)
1968	42.9	45.56	2,700.5	...	746.0	5.1	789.1	18.39	29.2
1969	39.7	45.56	2,664.5	71.6	784.3	188.2	1,093.0	27.53	41.0
1970	37.3	49.24	2,707.5	62.5	808.5	276.8	1,187.2	31.83	43.8
1971	44.0	48.87	3,036.0	...	885.7	177.8	1,090.5	24.78	35.9
1972	42.0	64.67	3,574.8	132.2	726.5	591.4	1,450.1	34.53	40.6
1973	46.4	145.14	7,212.8	103.1	375.2	53.8	532.1	11.47	7.4
1974	48.9	148.45	7,259.2	...	...	...	...	...	...
1975	58.1	129.34	7,514.7	...	...	...	...	...	...
1976	58.3	101.9	5,940.8	...	...	...	...	...	...

Source: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A. 59. Figures for the years 1975-76 were updated based on the data of that report.

[a] This is the average producer price, excluding government payments. 1976 is the average of eleven months May to March 1977.

[b] The producer receipts for 1968 to 1973 were made up of the diversion payments and the marketing certificates. In 1974 these were abandoned in favor of a new voluntary program and target prices. No payments have yet been made.

[c] The value of export payments on commercial exports (made by the Commodity Credit Corporation) divided by the total export value gives the average subsidy per metric ton. This multiplied by total production equals the producer subsidy equivalent. These payments have been suspended or sharply curtailed since mid-1972.

Table 26—Wheat consumer subsidy equivalents and values for the United States, 1968 to 1976

Year	Consumption	Consumption Price[a]	Total Consumer Costs	Policy Transfers: Milling Certificates[b]	Policy Transfers: Export Subsidy[c]	Policy Transfers: Domestic Donations[d]	Total Transfers	Subsidy Per Unit	Subsidy Equivalent
	(million metric tons)	(U.S. $/ metric ton)	(U.S. $ million)	(U.S. $ million)			(U.S. $ million)	(U.S. $/ metric ton)	(percent)
1968	20.5	64.67	1,715.7	390.0	2.5	25.7	-366.8	-17.89	-21.4
1969	21.5	67.24	1,835.7	-390.0	101.9	27.5	-464.4	-21.60	-25.3
1970	20.9	69.81	1,849.1	390.0	-155.1	30.2	514.9	-24.64	-27.6
1971	23.4	60.99	2,817.3	390.0	-93.7	36.6	-447.1	-19.11	24.6
1972	21.3	81.94	2,135.3	-390.0	301.3	33.8	657.5	30.87	-30.8
1973	20.6	167.92	3,459.2	...	23.9	39.4	15.5	1.91	1.1
1974	19.1	165.35	3,158.2	...	...	7.9	7.9	1.13	0.3
1975	19.9	137.42	2,734.7	...	...	4.5	4.5	0.18	0.2
1976	20.7	110.50	2,287.4	...	...	9.8	9.8	...	0.4

Sources: Figures for the years 1968-74 were taken from Food and Agriculture Organization of the United Nations, *Agricultural Protection and Stabilization Policies: A Framework of Measurement in the Context of Agricultural Adjustment*, C75/LIM/2 (Rome: FAO, October 1975), p. A. 61. Figures for the years 1975-77 were updated based on the data of that report.

[a] Price given is for U.S. Minneapolis No. 1 Dark Northern Spring wheat (ordinary protein).

[b] The milling tax of 75 cents per bushel (U.S. $27.5 per metric ton) was multiplied by 14 million metric tons, the approximate level of wheat consumed as human food in these years to arrive at the transfer from consumers. This was revoked in July 1973.

[c] The value of export payment on commercial exports (made by the Commodity Credit Corporation) divided by the total export volume gives the average subsidy per metric ton. This multiplied by consumption gives the consumer subsidy equivalent.

[d] Represents the sum of donations and payments in kind.

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67