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developing countries in the world wheat market will be assessed, and the impact of wheat price instability on developing countries noted.

In Chapter 3, the several causes of wheat market instability and the attempts to determine the origin of price instability will be discussed. Although no firm conclusions can be drawn, the apparent contribution of different factors to the rapid increase of world wheat prices between 1972 and 1974 will be noted. Recent market stabilization proposals arising in part from the instability of the early 1970s, and their limitations will also be outlined. This discussion will highlight the destabilizing impact of national wheat related policies, and the failure to reduce this impact through international negotiation.

The mechanisms by which wheat exporting country programs affect the level and variability of world wheat prices are outlined in Chapter 4. Using this framework, the world market impact of Canadian policies affecting wheat production, consumption, storage and exports will be assessed in Chapter 5. The findings presented in this chapter, that Canadian policy has fostered price instability in the world wheat market, will be contrasted with the Canadian position of support for market stabilization initiatives at the international level.

WORLD WHEAT MARKET INSTABILITY AND THE
DEVELOPING COUNTRIES:

THE IMPACT OF CANADIAN POLICY

by

Alan Douglas Williams, B.A.

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A Thesis submitted to the Faculty of
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ABSTRACT

This paper examines the effect of Canadian wheat production, consumption, storage and export policies on the level and variability of world wheat prices for the period 1968 to 1978. The impact of fluctuating world wheat prices on developing countries is discussed, and the failure of international action to deal with the causes of wheat price instability is outlined. Using a framework derived from micro-economic theory, an assessment is offered of the impact of Canadian wheat related policies on world wheat prices between 1968 and 1978, a period of particular wheat market turbulence. The conflict between the world market destabilizing impact of Canadian policy and the stated Canadian objective of world wheat market stabilization is noted.

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developing country vulnerability to unstable wheat import prices and expenditures, it will be argued, has a detrimental impact on individual well-being and economic growth.

The Theoretical Analysis of the Impact of World Market Instability on Developing Countries

Two general approaches in the economics literature to the examination of the impact of world market instability on importing and exporting countries will be surveyed here. The first, surplus analysis, has been widely used to assess the distribution of the benefits of price stabilization in world markets. It will be presented below in relation to the issue of the impact of unstable wheat prices on developing countries, together with a number of shortcomings which suggest it may have relatively limited application to this issue. The second approach, derived from the work of Brook, Grilli and Waelbroeck,¹ deals with the impact of fluctuating world prices on the stability of export revenues (or import expenditures) of market participants. While it too is subject to important limitations, conclusions drawn from this analysis may be more readily applicable in this case.

¹Ezriel M. Brook, Enzo R. Grilli, Jean Waelbroeck, Commodity Price Stabilization and Developing Countries: the Problem of Choice. Staff Working Paper 262 (Washington: World Bank, July 1977).

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CHAPTER 1

INTRODUCTION

The turbulence in the world wheat market during the mid 1970s has served as the starting point for the analysis presented in this paper. Widespread production shortfalls, declining carryover stocks and sharply increased world wheat prices contributed to the neo-Malthusian prospect of mass starvation in the food importing countries of the Third World. The expression of such concerns at the international level at the 1974 World Food Conference led to negotiations for the establishment of an international wheat reserve, intended to buffer consumption from the effects of production shortfalls and sharp wheat price increases. International concern also prompted the formation of the World Food Council in 1975, the increasing focus of development assistance programs on the problems related to agricultural production in developing countries, and the renewed attention accorded agricultural trade issues in the Multilateral Trade Negotiations.

This study will focus on one part of the broad food issue: the problems associated with, and the causes of, price instability in the world wheat market. It will be argued that the fluctuating price of wheat, the principal grain

entering world trade, has had a particularly severe impact on wheat importing developing countries, destabilizing their wheat import expenditures, hindering economic growth, distorting food policies and adversely affecting individual well-being. Price instability it is suggested, has been generated by two sets of factors: those inherent in the nature of the wheat market, including the inflexibility of wheat supply and demand, and the chronic instability of wheat production in many regions; and those related to world market destabilizing policies adopted by the principal wheat trading nations. It is argued that Canada has exacerbated world wheat price fluctuations by pursuing policies which have affected the production, consumption, storage and export of wheat. The years selected for study, 1968 to 1978, have been chosen as they encompass not only sharp fluctuations in world wheat prices, but also, marked changes in Canadian wheat policy.

Recent international negotiations to increase the stability of the world wheat market, focussing on the creation of an internationally controlled wheat reserve, have attempted to deal with only the first set of factors outlined above. It is argued, consequently, that the successful stabilization of the world wheat market must involve more than the creation of a reserve; it must also necessarily encompass the dismantling of national agricultural policies which, in effect, stabilize domestic markets at the expense

of increasing the fluctuation of prices in the world market. For Canada, it is imperative that national agricultural policies be reconciled to the objective of increasing the stability of the world wheat market.

The impact of fluctuating world wheat prices on the stability of developing country wheat import expenditures is assessed using the simple two country model of the world wheat market outlined by Brook, Grilli and Waelbroeck.¹ In turn, the argued impact of unstable wheat import expenditures on developing countries is based on the argument outlined by MacBean in relation to export revenue instability.² The discussion of the mechanisms by which exporting country production, consumption, storage and trade policies affect the level and variability of world wheat prices is based on microeconomic analysis and in large part is derived from the work of Corden.³ Finally, within this framework Canadian wheat related policies are assessed, and conclusions drawn concerning the impact of Canadian policy on the level and variability of world wheat prices during the study period.

Clearly, this study cannot offer a detailed and comprehensive assessment of the causes and consequences of

¹Ezriel M. Brook, Enzo R. Grilli, Jean Waelbroeck, Commodity Price Stabilization and the Developing Countries: the Problem of Choice, Staff Working Paper 262 (Washington: World Bank, July 1977), pp. 6-8.

²Alisdair I. MacBean, Export Instability and Economic Development (Cambridge, Mass.: Harvard University Press, 1966).

³W.M. Corden, The Theory of Protection (Oxford: Oxford University Press, 1971).

world wheat price instability. The impact of such instability on developing countries is discussed only in theoretical terms, and utilizing aggregate level data. Unavoidably, the differing experience of individual developing countries between 1968 and 1978 is concealed to some extent. This paper also makes no attempt to determine the relative contribution of different causal factors to the instability of world wheat prices between 1968 and 1978. Canadian policies are only one factor amongst many to be considered when examining wheat price instability, and no conclusion can be reached as to the 'share' of world wheat price fluctuation generated by Canadian actions.

This paper has been organized in the following manner: The impact of world wheat price instability on developing countries is discussed in Chapter 2. The surplus analysis approach, commonly used in assessing the distribution of benefits from price stabilization, will be outlined, and its shortcomings noted. In view of its limitations, an alternative approach will be employed to assess the impact of unstable wheat prices on developing countries, based on the examination of the impact of price fluctuations on the stability of import expenditures. In this connection, the extensive literature on export revenue instability will be surveyed as it offers a valuable introduction to the consideration of the parallel issue of import expenditure instability. Following this discussion, the recent experience of

developing countries in the world wheat market will be assessed, and the impact of wheat price instability on developing countries noted.

In Chapter 3, the several causes of wheat market instability and the attempts to determine the origin of price instability will be discussed. Although no firm conclusions can be drawn, the apparent contribution of different factors to the rapid increase of world wheat prices between 1972 and 1974 will be noted. Recent market stabilization proposals arising in part from the instability of the early 1970s, and their limitations will also be outlined. This discussion will highlight the destabilizing impact of national wheat related policies, and the failure to reduce this impact through international negotiation.

The mechanisms by which wheat exporting country programs affect the level and variability of world wheat prices are outlined in Chapter 4. Using this framework, the world market impact of Canadian policies affecting wheat production, consumption, storage and exports will be assessed in Chapter 5. The findings presented in this chapter, that Canadian policy has fostered price instability in the world wheat market, will be contrasted with the Canadian position of support for market stabilization initiatives at the international level.

CHAPTER 2

THE IMPACT OF WORLD WHEAT MARKET INSTABILITY ON WHEAT IMPORTING DEVELOPING COUNTRIES

Introduction

The impact of wheat exporting country policies on instability in the world wheat market is of clear importance because of the harmful impact of such instability on wheat importing countries. In this chapter, the theoretical basis of this statement, and an assessment of the recent experience of developing countries in the world wheat market will be presented.

Firstly, the theoretical arguments which suggest that importing countries suffer adverse effects from world market instability will be outlined. Following this discussion, the extensive literature on export instability and its impact on developing countries will be surveyed. This literature serves as a valuable introduction to wheat market issues as its argumentation and limitations have some applicability to the consideration of wheat market instability. The impact of price fluctuation in the world wheat market on developing countries will also be assessed, indicating that developing countries have been relatively more susceptible to world wheat price fluctuations than developed states. This

developing country vulnerability to unstable wheat import prices and expenditures, it will be argued, has a detrimental impact on individual well-being and economic growth.

The Theoretical Analysis of the Impact of World Market Instability on Developing Countries

Two general approaches in the economics literature to the examination of the impact of world market instability on importing and exporting countries will be surveyed here. The first, surplus analysis, has been widely used to assess the distribution of the benefits of price stabilization in world markets. It will be presented below in relation to the issue of the impact of unstable wheat prices on developing countries, together with a number of shortcomings which suggest it may have relatively limited application to this issue. The second approach, derived from the work of Brook, Grilli and Waelbroeck,¹ deals with the impact of fluctuating world prices on the stability of export revenues (or import expenditures) of market participants. While it too is subject to important limitations, conclusions drawn from this analysis may be more readily applicable in this case.

¹Ezriel M. Brook, Enzo R. Grilli, Jean Waelbroeck, Commodity Price Stabilization and Developing Countries: the Problem of Choice. Staff Working Paper 262 (Washington: World Bank, July 1977).

Surplus Analysis

The concept of economic surplus has often been used to evaluate the impact of government policy measures. In one of its more widely used applications, this approach has been employed to ascertain the gains and losses to both producers and consumers associated with measures designed to stabilize commodity markets. On this basis, analysts have advanced general conclusions concerning the desirability of commodity price stabilization.

In assessing the impact of price stabilization, or conversely, the impact of unstable prices, changes in the consumers' and producers' surplus are generally taken as measures of the net benefits received by the respective groups. The surplus received by consumers has been defined as the excess of the total utility afforded by the consumption of the commodity, over the utility foregone from the consumption of other commodities.² Similarly, the producer is considered to receive a surplus from the production and sale of a commodity, defined as the excess of the utility given up in order to produce the commodity.³ Money is generally taken as the measure of utility, and the magnitude of the surplus is shown diagrammatically for consumers as

²J.M. Curry, J.A. Murphy, A. Schmitz, "The Concept of Economic Surplus and its Use in Economic Analysis," Economic Journal, Vol. 81 (December 1971), p. 742.

³Ibid., pp. 753-754.

the triangle above the price and below the product demand function, and for producers, as the triangle below the price and above the product supply function.

The framework for analyzing the distribution of price stabilization gains and losses between producers and consumers put forward by Massell in 1969, has served as the basis for subsequent elaboration.⁴ Drawing on earlier work on the impact of price stabilization on consumers⁵ and producers,⁶ he demonstrated that, in a model of a closed economy with linear supply and demand functions and additive market disturbances, producer and consumer gains and losses following price stabilization will depend on the source of instability. If price instability is generated by a shift in the supply function, the stabilization of price brought about by a buffer stock will provide a net benefit to producers and a net loss to consumers. Conversely, if price instability arises from shifts in the demand schedule, consumers receive a net benefit, and producers suffer a net loss from price stabilization. In both cases, however, stabilization gains exceed losses, and both groups could gain from stabilization if compensation were paid.

⁴Benton F. Massell, "Price Stabilization and Welfare," Quarterly Journal of Economics, Vol. 83, No. 2 (May 1969).

⁵Frederick V. Waugh, "Does the Consumer Benefit from Price Instability?" Quarterly Journal of Economics, Vol. 58, (August 1944).

⁶Walter Oi, "The Desirability of Price Instability Under Perfect Competition," Econometrica, Vol. 29 (January 1961).

Massell's approach has been broadened by Hueth and Schmitz to incorporate international trade.⁷ Following Massell, the authors specify linear supply and demand functions and additive market disturbances in the importing and exporting countries. They go on to examine the impact of price instability arising from, first, a shift in the supply function of the importing country, and second, a shift in that of the exporting country.

The first case is illustrated in Figure 2.1. The two importing country supply functions, S_1 and S_2 , shown in Figure 2.1a, occur with .5 probability, and correspond to the excess demand functions Ed_1 and Ed_2 , and the two world prices, P_1 and P_2 , shown in Figure 2.1c. In place of this fluctuation, world price could be stabilized through the action of a buffer stock. When the importing country supply and excess demand functions are S_1 and Ed_1 respectively, quantity q_1' would be traded, and $q_1' - q_3$ stored by the buffer stock authority at the stabilized price, P_a . When the importing country supply and excess demand functions shift to S_2 and Ed_2' , quantity q_2' would be traded and $q_3 - q_2'$ sold by the stock authority, leaving the buffer stock empty.

From a comparison, before and after stabilization, of the producers' and consumers' surpluses in the two coun-

⁷ Darrell Hueth, Andrew Schmitz, "International Trade in Intermediate and Final Goods: Some Welfare Implications of Destabilized Prices," Quarterly Journal of Economics, Vol. 86, No. 3 (August 1972).

Figure 2.1

Surplus Analysis: the Excess Demand Shift Case

2.1a Importing Country 2.1b Exporting Country

2.1c World Market

Source: D. Hueth, A. Schmitz, "International Trade in Intermediate and Final Goods: Some Welfare Implications of Destabilized Prices," Figure II, p. 354.

tries. In the case of the exporting country, the impact of of fluctuating, as opposed to stabilized, prices can be summarized as follows:

- the net consumer gain equals $t - r$ (the consumers' surplus gained from the price falling from p_a to p_1 , minus the consumers' surplus lost from the price increasing from p_a to p_2), (greater than zero):

- the net producer gain equals $r + s - (t + u)$ (greater than zero); and
- the net gain to the exporting country as a whole equals $s - u$ (greater than zero).

For the importing country, the impact of fluctuating prices can be noted as follows:

- the net consumer gain equals $d + e + f - (a + b + c)$ (greater than zero);
- the net producer gain equals $a - (d + e)$ (less than zero); and
- the net gain to the importing country as a whole equals $f - (b + c)$ (less than zero).

The net benefits of fluctuating, as opposed to stabilized, prices are positive for both producers and consumers in the exporting country, and for consumers in the importing country. Producers in the importing country, however, benefit from stabilized prices. As a whole, the exporting country prefers fluctuating prices while the importing country prefers stabilized prices (provided domestic compensation is paid) when price instability originates in the importing country.

The second case examined by Hueth and Schmitz deals with the impact of a shift in the supply function of the exporting country, and is shown in Figure 2.2. The two exporting country supply functions, and the corresponding excess supply functions and world prices, shown in Figures 2.1a and 2.2c, occur with .5 probability. In a manner similar to that described above, a buffer stock could stabilize price at p_a .

From Figure 2.2, the impact of fluctuating, rather than stabilized, prices in the exporting country can be summarized as follows:

- the net consumer gain equals $(c+e)-a$ (greater than zero);
- the net producer gain equals $(a+b)-(c+d+e+f)$ (less than zero); and
- the net gain to the exporting country as a whole equals $b-(d+f)$ (less than zero).

For the importing country, the impact of fluctuating prices can be noted as follows:

- the net consumer gain equals $(t+u)-(r+s)$ (greater than zero);
- the net producer gain equals $r-t$ (greater than zero); and
- the net gain to the importing country as a whole equals $u-s$ (greater than zero).

Figure 2.2

Surplus Analysis: the Excess Supply Shift Case

2.2a Importing Country 2.2b Exporting Country

2.2c World Market

Source: D. Hueth and A. Schmitz, "International Trade in Intermediate and Final Goods: Some Welfare Implications of Destabilized Prices," Figure III, p. 357.

In this case, the net benefits of permitting prices to fluctuate are positive for consumers in both countries, positive for producers in the importing country, and negative for producers in the exporting country. Taken as a whole, the importing country receives a net benefit from, and thus prefers, price fluctuation, while the exporting country experiences a net loss and prefers price stability (again, provided domestic compensation is paid) when price instability originates in the exporting country.

The consideration of a multi-country, as opposed to a two country, model, as suggested by Lord,⁸ may change this distribution of benefits associated with price instability. He suggests that a shift in the import demand of a second importing country, leading to the fluctuation of world price, will affect the first importing country in the same way as a shift in the supply of exports. This finding leads to the conclusion that, as long as world price instability is generated by other participants in the world market, an importing country will prefer fluctuating to stabilized prices.

The Shortcomings of Surplus Analysis

The conclusions drawn from this analysis have been challenged on two grounds. The first concern relates to the difficulty encountered in determining the appropriate speci-

⁸Montague J. Lord. "The Impact of International Price Stabilization Schemes on Primary Producing Countries." Washington, March 21, 1980 (mimeographed).

fication of the supply and demand functions. Hillman, Johnson and Gray, in a 1975 report to the United Nations Food and Agriculture Organization, for example, noted the difficulty in determining whether the prevailing high level of world grain prices was the product of structural shifts in demand and supply functions, or rather, the result of a demand function which was steeper at high than at low price levels.⁹ Should the latter be the case, it is apparent that the benefit to consumers and the cost to producers of price stabilization are likely to be greater than demonstrated above under the assumption of linear supply and demand functions. Following this work, Turnovsky has demonstrated in a model of a closed economy,¹⁰ and Just et al. in a two country model,¹¹ that the shape of the demand and supply functions are crucial determinants of the distribution of benefits and costs of price stabilization between consumers and producers.¹²

A second, and more fundamental concern, relates to the validity of surplus analysis, and both the producers' and consumers' surplus concepts have been subject to consi-

⁹ Jimmye Hillman, D. Gale Johnson, Roger Gray, Food Reserve Policies for World Food Security: A Consultant Study on Alternative Approaches, ESC: CSP/75/2.

¹⁰ Stephen J. Turnovsky, "The Distribution of Welfare Gains from Price Stabilization: A Survey of Some Theoretical Issues," in Stabilizing World Commodity Markets, Analysis, Practice and Policy, F. Gerard Adams, Sonia A. Klein (eds.), (Lexington, Mass.: Lexington Books, 1978).

derable attack. Controversy surrounding the producers' surplus has focussed on the assumptions on which it is based (such as, for example, the assumption of perfectly elastic input supplies)¹³, its ambiguities (whether the surplus accrues to firms or to factors of production)¹⁴, and the relative merits of other approaches (Mishan suggests the examination of economic rents is more appropriate).¹⁵

Criticism of the consumers' surplus approach is directed primarily at its underlying assumptions. It is based on the key assumption that the marginal utility of money to all consumers does not vary as price increases. That is, the rate of increase of the utility derived by a consumer from the addition of an extra dollar to the consumer budget when the budget is spent in such a way as

¹¹ Richard Just, et al., "The Distribution of Welfare Gains from Price Stabilization: An International Perspective."

¹² Turnovsky has also shown that a change in the assumption concerning the form of the market disturbance - i.e., the assumption of multiplicative rather than additive shifts in the supply functions - will change the distribution of gains and losses between producers and consumers. See Stephen J. Turnovsky, "The Distribution of Welfare Gains from Price Stabilization: The Case of Multiplicative Disturbances."

¹³ Noted by Richard E. Just, "Theoretical and Empirical Possibilities for Determining the Distribution of Welfare Gains from Stabilization," American Journal of Agricultural Economics, Vol. 59, No. 5 (December, 1977), p. 915.

¹⁴ Noted by Currie, et al., "The Concept of Economic Surplus," p. 754.

¹⁵ See, for example, E.J. Mishan, "What is Producers Surplus," American Economic Review, Vol. 58 (December, 1968).

¹⁶ H.A. John Green, Consumer Theory. (London: Macmillan, 1976), pp. 100-101.

to maximize consumer utility, remains constant as price increases.¹⁶ It, and two associated assumptions, that the item in question represents a small part of total consumer expenditure, and that the marginal utilities of all items purchased by consumers move independently, permit the use of money as measure of utility, and allow the use of the triangle below the demand curve and above the price as a measure of the consumers' surplus. The extent that these assumptions hold, the consumers' surplus is a valid analytical tool.

Cochrane challenges the use of surplus analysis, claiming it has not,

...in the past made, and will not in the future make any recognizable contribution to the making of decisions by the United States, other developed countries, the less developed nations, or the international agencies either to initiate commodity stabilization proposals or to reject them.¹⁷

Cochrane's criticism, based in part on the inappropriate nature of the assumptions noted above, is particularly appropriate given the characteristics of developing countries. Together with the uncertainty about the proper specification of the supply and demand functions, it suggests that any conclusions concerning the developing country interest in fluctuating wheat prices that is based

¹⁷Willard W. Cochrane, "Some Nonconformist Thoughts of Welfare Economics and Commodity Stabilization Policy," American Journal of Agricultural Economics, Vol. 62, No. 3 (August, 1980).p.508

¹⁸Brook, et al., Commodity Price Stabilization, pp.6-8.

on surplus analysis may be incorrect. As a result, it is argued that it may be more valid to base such judgements on the assessment of both the effect of fluctuating prices on the stability of wheat import expenditures and the impact of import expenditure instability on individual well-being and economic growth in developing countries.

Price and Revenue Instability

The impact of price instability on the variation of export revenues and import expenditures has been shown by Brook, Grilli and Waelbroeck to depend on the source of the price fluctuation and the price elasticity of demand.¹⁸ In a two country model, when price instability is generated by a shift in the importing country's demand for imports, price stabilization at P_a will stabilize import expenditures only when the price elasticity of demand for imports is low, as illustrated in Figure 2.3a. If the demand for imports is price elastic, as shown in Figure 2.3b, however, import expenditures will be more stable if prices are allowed to fluctuate freely.

If, on the other hand, world price instability is a product of fluctuations in the supply of exports in the world market, price stabilization would increase the instability of import expenditures if both import supply and demand were price inelastic. This situation is outlined in Figure 2.4b. If the price elasticity of import demand is higher, however, as shown in Figure 2.4a, import expenditures will be less stable if price is stabilized at p_a .

Figure 2.3

Revenue Stability: the Excess Demand Shift Case

2.3a Price Inelastic Excess Demand

Price stabilization is Revenue stabilizing

$$\frac{(Op_2 \times Oq_2)}{(Op_1 \times Oq_1)} < \frac{(Op_2 \times Oq_2)}{(Op_1 \times Oq_1)}$$

2.3b Price Elastic Excess Demand

Price stabilization is Revenue destabilizing

$$\frac{(Op_2 \times Oq_2)}{(Op_1 \times Oq_1)} > \frac{(Op_2 \times Oq_2)}{(Op_1 \times Oq_1)}$$

Figure 2.4

Revenue Stability: the Excess Supply Shift Case

2.4a Price Elastic Excess Demand

Price stabilization is import expenditure destabilizing

$$\frac{(Op_2 \times Oq_2)}{(Op_1 \times Oq_1)} > \frac{(Op_2 \times Oq_2)}{(Op_1 \times Oq_1)}$$

2.4b Price Inelastic Excess Supply and Demand

Price stabilization is import expenditure stabilizing

$$\frac{(Op_2 \times Oq_2)}{(Op_1 \times Oq_1)} < \frac{(Op_2 \times Oq_2)}{(Op_1 \times Oq_1)}$$

Again, following the reasoning of Lord, price instability generated by a shift in the import demand of a second importing country will affect the first importing country (which experiences no change in import demand) in the same way as price instability caused by a shift in export supply.

Few estimates of the price elasticity of wheat import supply and demand are available, unfortunately. It has been suggested, though, that the price elasticity of demand for U.S. agricultural exports is greater than 6.0,¹⁹ while the price elasticity of wheat export supply for both the United States and Canada is estimated at 2.5.²⁰ These two estimates suggest that conclusions drawn from the two examples in which import demand is price elastic will be appropriate in the case of the world wheat market.

Export Market Instability and the Developing Countries

The perception that developing countries are particularly susceptible to unstable export earnings, and that this instability adversely affects their development prospects, is firmly rooted. Writing in 1966, Mason stated that:

¹⁹ Estimates of the price elasticity of demand for U.S. agricultural exports have been summarized by Maury EE. Bredahl, William H. Meyers, Keith J. Collins, "The Elasticity of Foreign Demand for U.S. Agricultural Exports. The Importance of the Price Transmission Elasticity," American Journal of Agricultural Economics, Vol. 61, No. 1 (February, 1979).

Few propositions in recent economic history have been more generally accepted than that the less developed countries, which are exporters principally of primary products, suffer particularly violent fluctuations in their export earnings, and it is often said that these fluctuations constitute a serious impediment to economic growth.²¹

The bases of this argument, that the export earnings of developing countries are more unstable than those of developed countries, that this characteristic can be attributed to the developing country reliance on primary commodity exports, and that export earnings fluctuations adversely affect developing country economic growth, have been noted to have a strong intuitive appeal.²² Attempts to empirically verify these relationships, however, have led to conflicting conclusions. A survey of this argument and the controversy it has generated, is presented as necessary background to a consideration of the parallel issue of wheat market instability and its impact on wheat importing developing countries.

The case for supposing that developing countries are especially prone to export earnings fluctuations which hinder economic growth is straightforward and has been outlined by MacBean.²³ In part, the particular instability

²⁰U.S. Department of Agriculture, Alternative Futures for World Food in 1985 (Washington, D.C.: U.S. Department of Agriculture, Economics, Statistics and Cooperatives Service, 1978). Cited in World Bank, Price Prospects for Major Primary Commodities, Report No. 814/80 (Washington, D.C.: World Bank, January, 1980), Table 16, p.159.

²¹Edward S. Mason, Foreword to Alisdair I. MacBean, Export Instability and Economic Development. (Cambridge, Mass.: Harvard University Press, 1966), p.9.

of developing country export earnings is attributed to their reliance on the export of primary products, the prices of which are considered inherently more variable than the prices of manufactured goods because of the relative inflexibility of commodity output and demand. The slow short-term response of output to price changes in the case of agricultural commodities, is a consequence of the long lead time required to adjust the production of both annual and perennial crops. This response may be somewhat more rapid in the case of mineral commodities. Mineral output may still be relatively inflexible in the face of changing prices, though, because of high overhead costs associated with mineral production, and because of a predisposition to continue production as long as returns cover variable costs. The response of the total supply of a commodity export to price changes may be little different, due to the generally limited domestic demand for the commodity (implying that a price increase, while leading to a reduction in domestic consumption of the commodity, will not add greatly to the supply available for the export market), and the difficulty and high cost of stockholding.

²²Leslie Stein, "Export Instability and Development: A Review of Some Recent Findings", Banca Nazionale del Lavoro Quarterly Review, Vol. XXX, No. 122 (September, 1977), p.286.

²³MacBean, Export Instability, pp. 23-28. The argument put forward in the following two pages is derived from this source.

Similarly, the demand for most primary products is considered to be relatively unresponsive to price changes. In the case of food and beverages, price variations have been shown to have relatively little impact on the level of consumption. These commodities either form part of national preferences, that price changes induce little change in consumption patterns. For those commodities which serve as inputs to industrial processes in developed countries, the cost of the commodity forms only a small part of the cost of the final good. Changes in the price of these inputs will have an insignificant influence on the price of the final good, and therefore little impact on the quantity of the commodity demanded.

These two characteristics -- the limited response of supply to price changes (low price elasticity of supply), and the limited response of demand to price changes (low price elasticity of demand) -- imply that the prices of primary products should be highly variable. A reduction in the supply of a commodity, such as that following a flood or drought in the case of agricultural commodities, or a reduction in demand, such as that which takes place during a recession in industrialized countries in the case of mineral commodities, can lead to sharp price changes. Developing countries, because of their relatively greater reliance on primary commodity exports, can be expected to experience sharper fluctuations on their export receipts than developed countries as a result.

Other factors to which the greater fluctuation of developing country export earnings has been attributed include their relatively greater reliance on the export of a small number of products (the commodity concentration of exports), and their reliance on one or two countries as markets for their exports (the geographic concentration of export markets). Both factors, it is suggested, increase the risk that developing country export earnings will be disrupted.²⁴

The harmful impact of these fluctuations in foreign exchange earnings on the economic growth of commodity exporting developing countries is considered to follow from their effect on incomes, investment, employment and prices. If, as suggested, the share of national income generated by commodity exports is large for many developing countries, the sensitivity of national income to export earnings fluctuations should be great. In particular, the income of individuals and firms active in the commodity export sectors should be affected by such fluctuations, and changes in their levels of consumption and investment will have repercussions for other sectors of the economy.²⁵ Furthermore, the unstable supply of foreign exchange may reduce a country's capacity to purchase imports, and may curtail the investment and expansion plans of industries not otherwise tied to the commodity export sector.²⁶ In the more

²⁴. Both arguments have been summarized by Stein, "Export Instability and Development: A Review". pp.283-84.

industrialized developing countries, foreign exchange shortages may even disrupt established industrial activity if firms are unable to purchase vital imported inputs. The ensuing uncertainty in the national economy, it is suggested, could further discourage farmers and businessmen from undertaking new investments.²⁷ The combination of these income and investment effects of large variations in export returns could lead to changes in national income in the same direction as, but more than proportional to, the change in export earnings.²⁸

Export earnings instability could be expected to have some impact on employment as well, particularly in the commodity exporting sector. Such effects may be small, however, due to the relatively capital intensive nature of resource extraction, and the ease of movement in many developing countries between wage and subsistence activity in rural areas.²⁹ In addition, employment in other industries

²⁵ MacBean, Export Instability, pp. 28-29.

²⁶ This point is suggested by Odin Knudsen and Andrew Parnes, Trade Instability and Economic Development, (Lexington: D.C. Heath, 1975), p.5, and Alisdair MacBean, Export Instability, pp. 29-30.

²⁷ MacBean, Export Instability, p.30.

²⁸ Ibid., p.26.

²⁹ Ibid., pp. 26-27.

may be adversely affected if instability leads to the curtailment of investment, and if foreign exchange shortages threaten the activity of firms reliant on imported inputs. The price effect of export earnings fluctuations may be equally significant. If incomes are affected by changes in the level of export earnings, a certain amount of 'sympathetic price fluctuation' could be expected to take place: if incomes fell in response to a drop in export earnings, the demand for many goods would be reduced, and prices would fall. Similarly, if export earnings increased, prices could be expected to rise.³⁰

Developing countries are considered especially vulnerable to fluctuations in their export returns, according to the widely accepted argument put forward by MacBean, because of their inability to pursue countercyclical policies.³¹ Central banks may have little control over the supply of credit; governments may be unwilling to adopt the necessary budgetary measures, and may be unable to enact quick changes to taxation or expenditure programs in any case; and social security systems are usually weak or non-existent and unable to offset changes in income.³²

³⁰ Ibid., p.27

³¹ Ibid., pp.26-27

³² Ibid., p.27

Despite the noted appeal of this argument, empirical analyses have not unanimously confirmed the existence of the relationships suggested above. Rather, the key points of the argument -- that the export receipts of developing countries are more unstable than those of developed countries, that their reliance on primary commodity exports is a prime cause of this greater degree of fluctuation, and that there exists a negative relationship between instability and developing country levels of income and investment -- have been the subject of sharp controversy in a debate that often resembles a dialogue of statisticians.

To some extent, a qualified acceptance of the first proposition can be discerned from surveys of the empirical literature.³³ MacBean noted, for example, that for the period 1946-1968, the mean instability index for 45 developing countries was 23.1, as opposed to the developed country mean of 17.6,³⁴ leading him to conclude that there existed a tendency, albeit weak, "for underdeveloped countries to have less stable export earnings."³⁵ Subsequent analyses, however, have noted more pronounced differences in the

³³See, for example, Stein, "Export Instability and Development: A Review", and Knudsen and Parnes, Trade Instability, pp. 1-9.

³⁴MacBean, Export Instability, Table 2.1, p.35. The data used by MacBean were obtained by Joseph D. Coppock, International Economic Instability, The Experience After World War II, (New York: McGraw-Hill, 1962), Table A-2.

³⁵MacBean, Export Instability, p.36.

instability of export earnings between the two groups of countries, with estimates of developing country export instability ranging from between 50 and 117.7 per cent greater than developed country instability.³⁶ While some care must be exercised in comparing the results of different studies, due to the use of differing measures of instability,

³⁶ From MacBean's calculations, the mean developing country instability index exceeded that of developed countries by approximately 31 per cent. The instability index used by both Coppock and MacBean is a log variance index, created to remove the trend element in time series data. It has been criticized by Knudsen and Parnes because, due to the way it is formulated, the instability index is determined by the first and last observation in the time series. Erb and Schiaro Campo, using the same measure of instability and country sample, but a different time period (1954-1966), found the developing country instability index (13.4 percent) to be 117 percent greater than the developed country instability index (6.2 percent). Massell, using a least squares method of trend removal, estimated the instability of developing country merchandise exports to be 50 percent more variable than those of developed countries. Glezakos, also using a least square method of trend removal and examining data for the period 1953-1966, finds the instability indices for developing country export volumes and unit values to be more than twice as large as those of developed countries.

See MacBean, Export Instability, p.36; Coppock, International Economic Instability, pp. 23-25; Knudsen and Parnes, Trade Instability, p. 12; Guy Erb and Salvator Schiaro-Campo, "Export Instability, Level of Development and Economic Size of Less-Developed Countries", Bulletin of the Oxford University Institute of Economics and Statistics, Vol.XXXI (November, 1969); Benton F. Massell, "Export Instability and Economic Structure", American Economic Review, Vol.60 (September, 1970); Constantine Glezakos, "Export Instability and Economic Growth: A Statistical Verification", Economic Development and Cultural Change, Vol. 21, No. 4, Part 1, (July, 1973); and Stein, "Export Instability and Development, A Review", pp.282-83.

a generally consistent conclusion emerges that developing country export returns are more subject to fluctuation than those of developed countries.

More limited support, however, has been voiced for the proposition that the fluctuation of developing country export earnings can be attributed to their focus on the production of commodities for export. Although as shown in Table 2.1 commodity prices and export revenues are marked by large variations in many instances, in general, little relationship has been found between export instability and primary product specialization,³⁷ and several studies have noted little difference in the variability of primary and manufactured export revenues.³⁸ A recent study by Lancieri in fact, contradicts conventional wisdom.³⁹ Although total developing country export earnings are calculated to be more unstable than developed country export earnings (12 percent versus 5 percent over the period 1961-1972), the agricultural export earnings of the two

³⁷ MacBean found a low and insignificant correlation between the primary product specialization of a country's exports and the degree of instability. Massell found a low though statistically significant relationship. See MacBean, Export Instability, pp. 39-41; B.F. Massell, "Export Concentration and Fluctuations in Export Earnings: a Cross-Section Analysis," American Economic Review, Vol. 54, No. 1 (March 1964), p. 57.

³⁸ Coppock, for example, calculated the instability index of world primary commodity trade to be 3.8 and that of world manufactured trade to be 6.8 for the period 1948-58. Sundrum corrected Coppock's calculations and found the indices to be 5.6 for primary, and 5.7 for manufactured products. See Coppock, International Economic Instability, p. 34; and R.M. Sundrum, "The Measurement of Export Instability" (unpublished manuscript), 1967, p. 16, cited by Stein, "Export Instability and Development: A Review," p. 284.

Table 2.1
Export Revenue Instability Indices - 1950-74

Commodity	Rank	Index A	Rank	Index B	Rank	Index C
Sisal	2	17.50	3	13.87	1	31.51
Cocoa	4	13.76	4	10.48	4	19.58
Copper	3	16.44	1	14.62	3	21.28
Rubber	1	17.96	2	14.00	2	23.04
Wool	5	13.18	8	9.40	11	15.79
Jute	7	11.96	5	10.20	12	15.23
Sugar	8	11.93	6	9.88	7	17.79
Rice	10	10.74	10	8.17	8	16.99
Cotton	12	8.41	12	6.68	13	12.34
Tin	11	8.82	11	6.90	5	18.42
Coffee	16	6.64	13	5.50	10	15.98
Iron Ore	6	11.98	7	9.84	6	17.85
Wheat	9	11.15	9	9.00	9	16.64
Beef	14	6.75	16	4.97	16	9.14
Tea	13	7.03	15	5.08	14	11.81
Bauxite	15	6.66	14	5.24	15	9.93
Bananas	17	4.06	17	3.31	17	8.29

Export Unit Value Instability Indices - 1950-74

Commodity	Rank	Index A	Rank	Index B	Rank	Index C
Sisal	1	18.90	1	15.53	1	30.24
Cocoa	2	17.80	2	14.87	2	27.14
Copper	3	16.42	3	14.70	3	23.88
Rubber	4	15.67	4	12.44	5	18.26
Wool	5	14.22	5	9.70	8	16.61
Jute	6	12.87	6	9.64	10	14.57
Sugar	7	11.96	7	9.04	6	18.05
Rice	8	11.32	8	8.40	7	17.93
Cotton	9	9.15	11	6.76	9	14.71
Tin	10	8.87	10	7.02	11	13.33
Coffee	11	8.86	9	7.07	4	20.33
Iron Ore	12	7.89	12	6.18	12	13.29
Wheat	13	7.39	14	4.51	14	11.61
Beef	14	6.32	13	5.28	13	11.79
Tea	15	6.19	15	4.06	15	10.64
Bauxite	16	4.13	16	3.12	17	4.70
Bananas	17	3.58	17	2.85	16	7.91

$$A = \sqrt{\frac{1}{T} \sum_{t=1}^T \left(\frac{x_t - \bar{x}_t}{\bar{x}_t} \right)^2}$$

$$B = \frac{1}{T} \sum_{t=1}^T \left| \frac{x_t - \bar{x}_t}{\bar{x}_t} \right|$$

$$C = \sqrt{\frac{1}{T} \sum_{t=1}^T u_t^2}$$

where: x = the actual value; $\bar{x}_t$ = the 5 year moving trend value; and $u_t = \log x_t - \log \hat{x}_t^*$, where $\hat{x}_t^*$ = the least squares trend estimate.

Source: Stuart Harris, Mark Salmon, Ben Smith, Analysis of Commodity Markets for Policy Purposes, Thames Essay No. 17 (London: Trade Policy Research Centre, 1978), Table 4, p. 31, and Table 9, p. 43.

groups of countries are calculated to be almost equally variable (12 percent vs 11 percent over the same period).⁴⁰ In addition, little confirmation has been provided for the suggested link between export instability and the commodity concentration of exports⁴¹ and the geographic concentration of export markets.⁴²

Perhaps the greatest controversy, however, has been generated in the debate over the relationship between export revenue instability and economic growth. MacBean, for example, found no significant correlation between indices of export instability and income, investment and price instability.⁴³ MacBean's conclusions have been confirmed by Kenen and Voivodas⁴⁴, and most recently by Knudsen and

³⁹Elio Lancieri, "Instability of Agricultural Exports: World Markets, Developing and Developed Countries", Banca Nazionale del Lavoro Quarterly Review, Vol. XXXI, No. 130 (September 1979).

⁴⁰Ibid., p. 306.

⁴¹MacBean and Massell found no significant relationship between commodity concentration and export instability although in a later study, Massell found evidence to support the suggested relationship. They are supported in this conclusion by Knudsen and Parnes. See MacBean, Export Instability, pp. 41-43; Massell, "Export Concentration", p. 61; Massell, "Export Instability and Economic Structure", p. 627; and Knudsen and Parnes, Trade Instability, p. 71.

⁴²MacBean and Massell have found small, negative associations between the geographic concentration of export markets and export instability. See MacBean, Export Instability, p. 44; and Massell, "Export Instability", p. 628.

⁴³MacBean, Export Instability, pp. 96, 127.

⁴⁴P.B. Kenen, C. Voivodas, "Export Instability and Economic Growth", Kyklos, Vol. XXV, Fasc. 4, (1972), p. 801-802.

Parnes.⁴⁵ On the other hand, his conclusions have been questioned on methodological grounds by Maizels, who, after omitting several countries he considers 'special cases' from MacBean's sample, concludes that the data confirm a negative relationship between the degree of instability and the rate of growth of GDP.⁴⁶ MacBean's conclusions, furthermore, have been contradicted by Glezakos who finds that export instability has a significant relationship to the growth rate of real per capita income in developing countries.⁴⁷ He also finds that export instability is harmful to economic growth only in developing countries--this relationship does not hold for developed countries.

These contradictory findings, however, should not detract from the validity of the argument that developing countries are adversely affected by sharp fluctuations in export revenues. It may not be possible to establish a

⁴⁵Knudsen and Parnes, Trade Instability, p. 132.

⁴⁶Maizels' principal criticisms of MacBean's work relate to the inadequacy of the statistical information on which it is based, the incorrect use of statistical tests in several instances, and the bias introduced by the inclusion in the study of all countries for which data was available despite its possible inaccuracy or the country's status as a special case. He furthermore questions the wisdom of drawing firm conclusions from such cross-sectional studies due to the 'implicit assumption that there is a single, unique, relationship between a given degree of fluctuation in exports and the resultant change in the growth rate of GNP for all countries. A. Maizels, "Book review of Export Instability and Economic Development by Alisdair I. MacBean," American Economic Review, Vol. LVIII, No. 3, Part 1 (June 1968), p. 579.

⁴⁷Glezakos, "Export Instability and Economic Growth," pp. 676-77.

firm statistical correlation between measures of export instability and changes in income, investment, prices and the growth of GNP in developing countries because of the role many other factors may have in influencing these variables. The suggested impact of export revenue instability on developing countries, as outlined (and discounted) by MacBean, accordingly will serve as the basis for an examination of the impact of wheat price instability on the import expenditures, and thus on individual well-being and economic growth in the wheat importing developing countries.

World Wheat Market Instability and the Developing Countries

Although receiving only limited empirical confirmation, the proposition that the fluctuation of export revenues has a disproportionately severe impact on developing countries has formed part of the set of issues leading to calls for a New International Economic Order. The creation of international commodity agreements with price stabilizing buffer stocks, funded by a Common Fund, is a key element of the Integrated Programme for Commodities (IPC)⁴⁸ and has served as the focus for the recent international consideration for the problems of commodity market instability.

Although wheat and other cereals are not included in the eighteen commodities for which action within the framework of the IPC is considered essential, the interest of developing countries in the food issue is noted in both the IPC and the Programme of Action on the Establishment of a New International Economic Order.⁴⁹ The IPC, for

example, recognizes

...the urgent need for substantial progress in stimulating food production in developing countries and the important bearing of international commodity policies on this aim,⁵⁰

while the Programme of Action calls for efforts to

ensure that developing countries can import the necessary quantity of food without undue strain on their foreign exchange resources and without unpredictable deterioration in their balance of payments...⁵¹

The conduct of the 1978 -79 discussions under the auspices of UNCTAD for the renegotiation of the International Wheat Agreement, which was to include a sizeable buffer stock with price stabilizing objectives, as well as recent calls by both the World Food Council⁵² and the FAO⁵³ for the establishment of reserves reflect this perception that the stabilization of the world wheat market would serve the interest of developing countries.

Recent arguments, however, have questioned the contribution of price stabilization measures to the stabilization

⁴⁸ UNCTAD, "The Integrated Programme for Commodities" (TD/RES/93IV) May 30, 1976. Reprinted in Jere R. Behrman, International Commodity Agreements: An Evaluation of the UNCTAD Integrated Commodity Programme, Monograph No. 9 (Washington: Overseas Development Council, 1977), pp. 77-82.

⁴⁹ United Nations, General Assembly, Programme of Action on the Establishment of a New International Economic Order (A/RES/3202 S-VI) 1974.

⁵⁰ UNCTAD, "Integrated Programme for Commodities", p. 78.

⁵¹ United Nations, General Assembly, "Programme for Action", p. 5.

⁵² World Food Council, Food Crisis Contingency Planning, Report by the Executive Director (WFC/-980/4) (Rome: World Food Council, February 20, 1980)

⁵³ World Food Council, World Food Security for the 1980s Addendum, Plan of Action on World Food Security (WFC/1979/5/Add.1) (Rome: World Food Council, June 20, 1979)

of developing country expenditures on wheat imports, challenging this accepted wisdom. Following an examination of recent wheat market trends, including an assessment of the relative instability of developed and developing country wheat imports, these arguments will be outlined, together with indications to the contrary, that world market instability does indeed affect the interests of food importing developing countries. Mindful of the many problems encountered in attempting to empirically establish relationships between indices of export instability and measures of income and economic growth, already noted, no attempt will be made to verify such relationships involving the instability of wheat imports. Rather, arguments will be presented that tend to confirm that wheat market instability may affect individual well-being, deter economic growth, and influence the evolution of agricultural policy in food importing developing countries.

The Magnitude of Wheat Market Instability

Wheat and Cereal Production. According to one estimate, approximately half of the world's annual food production by weight consists of cereal grains.⁵⁴ Of the grains, wheat is clearly the most important in terms of production, accounting for 27.9% of total world cereal production in 1978, followed by rice and maize. In trade terms as well, wheat is the most significant of the cereal grains, accounting for 44.4% of 1978 cereal exports.

Of the total 1978 wheat production of 441,474 metric tons, 84,963 metric tons, or 19.3 percent, was exported by producing countries, compared to 18.8 and 2.6 percent of the total production of maize and rice respectively that entered world trade. (See Table 2.2)

Table 2.2

Production and Export of Cereal Grains, 1978

	Production		Exports		% of production exported
	Volume (000 metric tons)	% of total cereals	Volume (000 metric tons)	% of total cereals	
Total Cereals	1,580,822		191,197		12.1
Wheat	441,474	27.9	84,963	44.4	19.3
Rice	376,448	23.8	9,746	5.1	2.6
Maize	362,971	23.0	68,401	35.8	18.8
Barley	196,123	12.4	14,428	7.6	7.4
Rye	32,389	2.1	744	.4	2.3
Oats	50,463	3.2	1,370	.7	2.7
Millet+Sorghum	106,816	6.8	11,546	6.0	10.8

Sources: FAO, 1978 Production Yearbook, 1978 Trade Yearbook.

⁵⁴North-South Institute, World Food and the Canadian "Breadbasket," Canada North South 1977-78, Vol. 4, (Ottawa: North-South Institute, 1978), p. 1.

⁵⁵See Appendix Table 2.12.

While wheat is characteristically a product of temperate countries (the countries of North America, Eastern and Western Europe and Oceania together accounted for 68.7 percent of 1978 world wheat production),⁵⁵ the production of wheat for export is even more highly concentrated. Three countries, Canada, Australia and the United States, accounting for 19.6 percent of world wheat production in 1978,⁵⁶ provided 73.7 percent of wheat exports in that year.⁵⁷ Imports, on the other hand, are more widely dispersed. Three distinct groups of importers can be distinguished: the high income importers, including Japan and the countries of Western Europe, centrally planned importers, and the developing country importers of Africa, Asia and Latin America. Since the Second World War, this last group has emerged as the most important in terms of the annual volume of imports, accounting for slightly over 50 percent of world wheat imports in 1978.⁵⁸

The post-war production record for both wheat and total cereals has been one of large, and generally consistent increases, in contrast to that of many other primary commodities. Current International Wheat Council estimates place the 1980 wheat production at 433 million metric tons,⁵⁹ nearly three times the 1949 production of 158.9 million metric tons.⁶⁰ Between 1969 and 1977, world wheat production increased at an annual rate of 3.26 percent, while total cereal production increased at a rate of 2.99 percent. In both cases, the most rapid growth of output was recorded for North America, Oceania, Latin America, the Near and Far East, and

the Centrally Planned Economies. Lower rates of increase characterized wheat and cereal production in Western Europe, Other Developed Countries (a designation that includes Japan), and Africa. (See Table 2.3)

Not only has the recorded growth of output been high. In addition, as shown in Table 2.4, the yearly fluctuation of output has been small, an indication of the relative stability of wheat and cereal production at an aggregate level.⁶¹ As measured by Index A, which gives equal weight to all deviations from the three-year moving average, annual world wheat production varied by 4.44 percent, and world cereal production by 2.53 percent over the 1969 to 1977 period. Using Index B, which is constructed to give greater than proportional weight to large deviations from the moving average, yearly output fluctuations were calculated to be 4.98 percent and 2.74 percent for wheat and cereals respectively. The variability of developed and developing country production was found to be little different in the case of wheat;

⁵⁶ Data from FAO, 1978 FAO Production Yearbook, Volume 32, (Rome: FAO, 1979), Table 10.

⁵⁷ Data from FAO, 1978 FAO Trade Yearbook, Vol.32, (Rome: FAO, 1979), Table 37.

⁵⁸ Ibid.

⁵⁹ "Soviet Grain", The Globe and Mail (Toronto), November 25, 1980, p.B3.

⁶⁰ International Wheat Council, 1980 World Wheat Statistics, (London: International Wheat Council, 1980) Table 1d.

⁶¹ Harris, Salmon and Smith note the importance of the choice of the method of calculating trend values for the estimate of the deviation of actual from trend values. In this paper, only one trend estimate is used: the three year moving average. However, two methods of calculating

Table 2.3'
The Annual Rate of Increase of Wheat and Cereal
Production, 1969-1977¹

	Cereal Production Annual Rate of Increase, 1969-1977	Wheat Production Annual Rate of Increase, 1969-1977
World	2.99	3.26
Developed Market Economies	2.89	3.00
North America	3.62	4.18
Western Europe	2.00	1.90
Oceania	2.77	2.04
Other	.59	1.01
Developing Market Economies	2.46	4.52
Africa	1.18	~.50
Latin America	3.29	3.63
Near East	3.40	4.99
Far East	2.24	5.34
Centrally Planned Economies	3.51	2.88
Asian C.P.E.'s	3.79	6.81
Eastern Europe and U.S.S.R.	3.26	2.21

¹ Rates of increase have been calculated using the average annual production data for the three years centred on 1969 and 1977.

Source: As for Tables 2.12 and 2.13.

Table 2.4
The Variability of Wheat and Cereal
Production, 1969-1977¹

	<u>Index A</u>		<u>Index B</u>	
	<u>Wheat</u>	<u>Cereals</u>	<u>Wheat</u>	<u>Cereals</u>
World	4.44	2.53	4.98	2.74
Developed Market Economies	4.53	3.66	5.61	4.60
Developing Market Economies	4.23	1.65	5.04	2.05
Eastern Europe and U.S.S.R.	8.98	6.90	10.19	8.45

¹Variability is measured as the deviation of actual production volumes from trend volumes, as determined using a three-year moving average. Index A is calculated according to the formula $A = \frac{1}{n} \sum_{t=1}^n \left| \frac{x_t - \bar{x}_t}{\bar{x}_t} \right|$ and Index B according to the formula $B = \sqrt{\frac{1}{n} \sum_{t=1}^n \left(\frac{x_t - \bar{x}_t}{\bar{x}_t} \right)^2}$, where x_t is the actual value, $\bar{x}_t$ is the trend value based on a three-year moving average, and n is the number of observations. The use of these indexes has been suggested by Stuart Harris, Mark Salmon and Ben Smith, Analysis of Commodity Markets for Policy Purposes, Thames Essay No. 17 (London: Trade Policy Research Centre, 1978), Table 4, page 31.

Source: Data obtained from FAO, FAO Production Yearbook, various.

total cereal production in developed countries, though, was over twice as variable as that of developing countries, as measured by both indices. Production in Eastern Europe and the USSR, however, was characterized by far greater than average fluctuations over the 1969-1977 period. (See Table 2.4)

Wheat and Cereal Trade. Paralleling the expansion of wheat and cereals output since the Second World War has been the growth of world trade on these products. In 1949, 21.5 metric tons of wheat were exported, equivalent to 15.3 percent of world wheat production.⁶² By 1978, as already noted, 84,963 million tons, 19.3 percent of the world wheat output, was exported by producing countries. While the principal exporting nations have maintained their position in the world wheat market, the relative importance of the major groups of importing nations has shifted. In the early post-war years, Great Britain was the most important importer⁶³, while in 1978, the developing countries taken together have come to dominate a much larger market.

deviations are employed. Index A assigns equal weight to all deviations of actual from trend values. Index B is calculated to give greater weight to large than small deviations. If large fluctuations of wheat import volumes, prices or total costs are considered more harmful to developing than to developed countries, a point brought out in a subsequent section of this chapter, it proves useful to establish an index which captures the effect of these large fluctuations.

⁶²Data obtained from FAO, 1952 Trade Yearbook, Rome: FAO, 1953), Table 7; FAO, 1952 FAO Production Yearbook (Rome: FAO, 1953) Table 7.

In contrast to the relative stability that characterizes wheat and cereal production, indices of variability indicate that wheat trade is subject to considerable fluctuation from year to year. The results of past studies of the price, volume and value of wheat exports are set out in Table 2.5. Some care must be taken in comparing the results of different studies, due to the many methods used to calculate instability indices, outlined in the notes to Table 2.5. For this reason, and to facilitate comparison with the measures of production variability already presented, indices of the variability of export prices and the volume and value of wheat imports have been calculated, based on the measurement of deviations from a three-year moving average. Again, two instability indices have been calculated, one, Index A, giving equal weight to all deviations from the moving average, and the other, Index B, giving greater weight to large deviations. The results are summarized in Table 2.6.

It is apparent from these data that the volume of world wheat imports is subject to considerably greater fluctuation than the volume of world wheat production. Using Index A, the measure of the variability of wheat imports, at 5.47 percent, is almost 25 percent greater than the measure

⁶³In 1949, for example, Great Britain imported 4.9 million metric tons of wheat, and Europe in total imported 13.8 million metric tons of wheat, equivalent to 23.0 percent and 65.0 percent respectively of world wheat imports. Data from FAO, 1952 FAO Trade Yearbook, (Rome: FAO, 1953), Table 7.

Table 2.5
Indices of the Price, Volume and Value of Wheat Exports

<u>Time Period</u>	<u>Price</u>	<u>Volume</u>	<u>Value</u>	<u>Source</u>
1920-38	12	8	16	1
1948-57	11	8	12	1
1950-61	5	13	13	2
1947-62	9.39	7.08	-	3
1950-65	5.5	37.4	37.3	4
1953-65	5.2	30.4	31.0	4
1950-74	7.39	-	11.15	5
1950-74	4.51	-	9.00	6
1950-74	11.61	-	16.64	7
1955-76	3.8	-	-	8
1955-76	7.3	-	-	9
1968-72	8.26	17.28	-	10
1974-78	11.70	10.01	-	10

¹United Nations, World Economic Survey 1958 (New York: United Nations, 1959), Table 13, page 40. The trend was eliminated using the least squares method, and the index calculated by computing and averaging the average annual percentage change in the series, with the trend eliminated.

²United Nations, World Economic Survey 1963 I. Trade and Development: Trends, Needs and Policies (New York: United Nations, 1964), Table 6.1, page 145. The index was calculated as the average annual percentage change between 1950 and 1961, with no steps taken to eliminate the trend.

³R.C. Porter, "Who Destabilizes Primary Product Prices?" Indian Economic Journal, Vol. XVI, No. 4 (April-June 1969), Table 1, pp. 396-397. The index was calculated as the average percentage deviation of actual from trend values, with the trend calculated using the least squares method.

- ⁴ International Monetary Fund and International Bank for Reconstruction and Development, The Problem of Stabilization of Prices of Primary Products, A Joint Staff Study, Part 1 (Washington: IMF and IBRD, 1969), Table 16, page 56. The index was calculated as the average percentage deviation of actual from trend values. The method of trend estimation is not outlined, although it is noted to have a constant compound rate of change.
- ⁵ Stuart Harris, Mark Salmon and Ben Smith, Analysis of Commodity Markets for Policy Purposes, Thames Essay No. 17 (London: Trade Policy Research Centre, 1978), Table 4, page 31 and Table 9, page 43. The index was calculated according to the formula
$$I_{inst} = \sqrt{\frac{1}{n} \sum_1^n \left(\frac{x_t - \bar{x}_t}{\bar{x}_t} \right)^2},$$
 where $\hat{x}_t$ is the actual value, $\bar{x}_t$ is the trend value based on a five-year moving average, and n is the number of observations.
- ⁶ Harris, et al., Analysis of Commodity Markets, Table 4, page 31 and Table 9, page 43. The index was calculated according to the formula
$$I_{inst} = \frac{1}{n} \sum_1^n \left| \frac{(x_t - \bar{x}_t)}{\bar{x}_t} \right|,$$
 where x_t is the actual value, $\bar{x}_t$ is the trend value based on a five year moving average, and n is the number of observations.
- ⁷ Harris, et al., Analysis of Commodity Markets, Table 4, page 31 and Table 9, page 43. The index was calculated according to the formula
$$I_{inst} = \sqrt{\frac{1}{n} \sum_1^n u_t^2},$$
 where $u_t = \log x_t - \log \bar{x}_t$, x_t is the actual value, and $\bar{x}_t$ is the trend value based on a least squares estimate.
- ⁸ Harris, et al., Analysis of Commodity Markets, Table 1, page 3. The index was calculated as the average percentage deviation of actual from trend values, with the trend calculated using a three-year moving average.
- ⁹ Harris, et al., Analysis of Commodity Markets, Table 1, page 3. The index was calculated as the average percentage deviation of actual from trend values, with the trend calculated using a five-year moving average.
- ¹⁰ FAO, Commodity Review and Outlook: 1979:80 (Rome: FAO, 1980), Table 10, page 14. The index was calculated as the average percentage fluctuation of actual values from the mean value for the four-year period.

Table 2.6
The Instability of Wheat Export Prices and the Volume and Value
of Wheat Imports, 1962-1977

	<u>Price</u>	<u>Volume</u>	<u>Value</u>
Index A:			
1962-1977	5.69	5.47	6.12
1962-1971	2.59	5.17	4.64
1972-1977	10.58	6.30	8.59
Index B:			
1962-1977	7.87	6.69	7.62
1962-1971	2.98	6.10	5.47
1972-1977	12.05	7.58	10.24

Sources: Export Prices - The export prices for which instability indices are calculated are those for No. 1 CWRS, basis in store, Thunder Bay. Prior to 1971, the prices used are those for No. 1 and No. 2 Manitoba Northern. International Wheat Council, 1980 World Wheat Statistics (London: International Wheat Council, 1980), Table 14.
Export volumes and values: FAO, FAO Trade Yearbook, various.

of production variability, 4.44 percent. The difference between the two, using Index B, is even greater, exceeding 34 percent, indicating that the volume of wheat imports is more subject to large year to year variations than the volume of wheat production. Moreover, in comparing the measures of wheat import variability for the 1962-71 and 1972-77 periods, it is evident that wheat imports were more unstable in the latter period.

The changing relationship between the measure of price and volume instability, and its impact on the fluctuations of the value of wheat imports is also worthy of note. For the 1962-71 period, the variability of export prices was less than that of import volumes, and the two were correlated in such a way that the variability of the value of wheat imports was less than that of the volume. During the 1972-77 period, however, the reverse appears to have been the case. Price fluctuations exceeded import volume fluctuations, and the correlation between the two was such that the fluctuation of the value of imports exceeded the volume fluctuation.

To begin assessing the impact on developing countries of world wheat market instability it is necessary to present disaggregated indices of the instability of the value and volume of wheat imports, and examine relative degrees of instability. Data presented in Tables 2.7 and 2.8 have been calculated to measure the variability of the volume and value of wheat and total cereal imports for the world and three country groupings (developed and developing market

Table 2.7
Variation in the Volume and Value of Wheat Imports

	<u>1962-1977</u>		<u>1962-1971</u>		<u>1972-1977</u>	
	<u>Volume</u>	<u>Value</u>	<u>Volume</u>	<u>Value</u>	<u>Volume</u>	<u>Value</u>
Index A:						
World	5.47	6.12	5.17	4.64	6.30	8.59
Developed Market Economies	3.11	4.81	3.93	2.71	1.75	8.30
Developing Market Economies	5.28	8.79	3.73	4.40	7.85	16.11
Eastern Europe and U.S.S.R.	17.81	18.62	16.49	16.70	20.00	21.83
Index B:						
World	6.69	7.62	6.10	5.47	7.58	10.24
Developed Market Economies	3.66	6.69	4.36	3.54	2.00	9.93
Developing Market Economies	6.67	12.37	4.64	5.07	9.10	19.12
Eastern Europe and U.S.S.R.	22.93	22.54	19.22	19.88	28.04	26.39

Source: Calculated from data contained in FAO, FAO Trade Yearbook, various.

Table 28
Variation in the Volume and Value of Cereal Imports

	<u>1960-1977</u>		<u>1960-1971</u>		<u>1972-1977</u>	
	<u>Volume</u>	<u>Value</u>	<u>Volume</u>	<u>Value</u>	<u>Volume</u>	<u>Value</u>
Index A:						
World	3.52	4.23	2.72	2.41	5.13	7.98
Developed Market Economies	2.26	4.31	2.22	2.82	2.32	7.30
Developing Market Economies	4.85	5.54	4.03	2.95	6.50	10.71
Eastern Europe and U.S.S.R.	13.10	13.31	11.32	11.07	16.66	17.80
Index B:						
World	4.08	6.10	3.23	2.92	5.40	9.72
Developed Market Economies	2.56	6.27	2.55	3.17	2.58	9.89
Developing Market Economies	6.02	8.16	5.08	3.51	7.56	13.23
Eastern Europe and U.S.S.R.	17.30	15.47	13.67	12.73	22.90	19.85

Source: Calculated from data contained in FAO, FAO Trade Yearbook, various.

economies, and Eastern Europe and the USSR), for three time periods.

Many of the general conclusions drawn from the world level data are also applicable to the three country groupings. The variability of wheat and cereal import volumes is greater than the variability of production for the developing and Eastern European countries, for example, although this does not hold true for the developed countries. In addition, the variability of import volumes increased between 1962-71 (1960-71 in the case of total cereals) and 1972-77, although again for the developed countries this was not the case.

It is from the consideration of changes in the relative level of wheat import volume and value fluctuations, however, that particularly valuable conclusions can be drawn. During the 1962-71 period, the value of wheat imports was considerably less variable than the import volume for the developed country grouping, consistent with the relationship at the world level, and indicating that the fluctuation of prices counteracted the variation of developed country import volumes to some extent. For the developing country grouping, however, the value of imports was slightly more variable than the volume of imports, suggesting that price fluctuation in this case did not tend to reduce the fluctuation in the value of the group's imports.

During the 1972-77 period, however, while the var-

iation in the volume of developed country wheat imports fell, the variation in developing country import volumes rose to a level approximately double that of the preceeding period. For both developed and developing country groupings, however, the fluctuation in the value of imports exceeded the fluctuation in import volumes by a large margin, in contrast to the earlier period. This difference indicates the role played by international price fluctuations over the 1972-77 period in magnifying the financial impact on importing countries of variations in import volumes. The effects experienced by the developing country grouping can be shown to have been especially severe, due to the particularly high degree of variability of both wheat import volumes and values (7.85 percent and 16.11 percent respectively, using Index A), and the large margin by which value fluctuations exceeded volume fluctuations.

In summary, from the information presented in this section, it is evident that although developed and developing country wheat production, in aggregate, have been approximately equally variable, developing country wheat imports have been subject to the greater fluctuation, particularly between 1972 and 1977. Moreover, the coincidence of increased developing country import demand and rising world wheat prices has been such that the value of developing country wheat imports has been especially unstable during this period. Thus, the argument that developing countries

would benefit from a reduction in the fluctuation of prices on the world wheat market, receives empirical support from an examination of aggregate level data.

The Impact of Instability on Food Importing Developing Countries

Any conclusion that developing countries, taken together, should have a particularly strong interest in the stabilization of wheat prices has been challenged by a recent study by Valdés and Konandreas,⁶⁴ reported by Morrow.⁶⁵ The two authors examined the contribution of world wheat price fluctuations to the variability of the food import bill of twenty-four developing countries, and the extent to which fluctuating food import costs strained the foreign exchange resources of these countries between 1965 and 1976. For many developing countries, they conclude that domestic production variation, and not the variation in world wheat prices, has been the major cause of fluctuations in the food import bill. Furthermore, for relatively few of the developing countries included in the study is the fluctuation of food import costs considered to have had a significant impact on the overall balance of payments situation. World

⁶⁴Alberto Valdés, Panos Konandreas, "Assessing Food Security in Developing Countries", in Food Security in Developing Countries, ed. Alberto Valdés, (Boulder, Colorado: Westview Press, forthcoming).

⁶⁵Daniel T. Morrow, The Economics of the International Stockholding of Wheat, Research Report 18, (Washington: International Food Policy Research Institute, 1980).

wheat prices variations were found responsible for more than 25 percent of the total food import cost fluctuation, and food import costs exceeded 15 percent of total export revenue in only three of the twenty-four study countries.⁶⁶ The authors suggest, as a result, that although the stabilization of wheat prices would reduce the fluctuation of food import costs for a small number of developing countries, the implementation of measures to ensure that developing countries have the financial capacity to purchase food imports would have a more widely spread and significant beneficial impact.

Such a conclusion, according to which wheat price fluctuations have a minimal impact on developing countries, is open to question, however. The finding that domestic production fluctuations account for the major part of the variation of food import costs for many developing countries itself does not seem consistent with recent findings of Reutlinger and Knapp.⁶⁷ In seeking to determine the factors that lead to consumption fluctuation in developing countries, they note that "imports (were) not used ... extensively to offset deviations in production", between 1961 and 1972.⁶⁸ Moreover, the large difference in the magnitude of fluctuations in the volume and value of developing country imports between 1972 and 1977, outlined previously, indicates that

⁶⁶ These countries were Sri Lanka, Egypt and Senegal. Morrow, The Economics of International Stockholding of Wheat, p.34.

⁶⁷ Shlomo Reutlinger, Keith Knapp, Food Security in Food

wheat price fluctuations did indeed have a significant impact on the instability of the aggregate developing country wheat import bill, and hence, on the total food import bill.

Several additional factors can be cited which suggest that world wheat market instability has a detrimental impact on wheat importing developing countries. Among these factors are: the burden that fluctuating wheat and cereal import bills can impose on foreign exchange-short developing countries; and the effect fluctuating world markets may have on the evolution of developing country food production and trade policies. Furthermore, the increasing developing country participation in, and openness to, world wheat and cereal markets is likely to lead to the intensification of these negative effects.

The conclusion that developing country economic growth is hindered by unstable expenditures on food imports associated with fluctuating world wheat prices is supported by data presented in Table 2.9. The rapid rise in world cereal prices between 1972 and 1975, together with an increased volume of developing country imports, led to a more than three-fold increase in the cereal import bill of developing countries between 1971 and 1975. The total food import bill of non-OPEC developing countries increased dramatically as a consequence, from \$6.8 billion in 1971 to \$17.4 billion in 1975, at the same time as their energy import bill increased (from \$5.4 billion in 1971 to \$28.3 billion in 1975), and as their merchandise trade deficit rose

Deficit Countries, World Bank Staff Working Paper

No. 393, (Washington: World Bank, 1980).

⁶⁸Ibid., p.8.

Table 2.9
The Trade Position and Food Imports of Non-OPEC
Developing Countries, 1970-1977
(f.o.b. US\$millions)

<u>Year</u>	<u>Exports</u>	<u>Imports</u>	<u>Merchandise Trade Balance</u>	<u>Total Non-Fuel Imports</u>	<u>Food Imports</u>	<u>Food Imports as a % of Non- Fuel Imports</u>
1970	37,050	48,360	-11,310	43,805	6,340	14.47
1971	38,760	53,970	-15,210	48,595	6,800	13.99
1972	45,850	61,000	-15,150	54,515	7,630	14.00
1973	67,640	85,280	-17,640	76,870	11,460	14.91
1974	99,080	136,560	-37,480	108,360	16,700	15.41
1975	97,740	143,630	-45,890	115,380	17,350	15.04
1976	118,150	153,540	-35,390	120,190	15,920	13.25
1977	137,670	176,220	-38,550	138,920	16,960	12.21

Source: United Nations, Statistical Yearbook, 1975 (New York: United Nations, 1976), Table 151; Statistical Yearbook, 1978 (New York: United Nations, 1979), Table 150.

(from \$15.2 billion to \$45.9 billion). Food imports, when expressed as a proportion of total non-fuel merchandise imports also increased somewhat (from 13.99 percent in 1971 to 15.41 percent in 1975), supporting the conclusion that price instability on the world cereal market can disrupt the trade balance of developing countries, possibly displacing other necessary imports and leading to a future reduction of the rate of economic growth.

World market instability has also been suggested to exert a significant impact on the formation of food-related policy in developing countries,⁶⁹ although opportunities for the empirical verification of the relationship are noted to be few.⁷⁰ World cereal price fluctuations may discourage developing country governments from adopting programs to increase the consumption levels of the poor for fear they cannot be sustained. Similarly, governments may choose to maintain stabilized regulated domestic food prices by varying the volume of imports, rather than risk encountering externally generated price instability.. Policies to protect agricultural producers may also be introduced in reaction to world market instability. Such policies, insulating domestic production and consumption from world

⁶⁹ This relationship has been suggested by Morrow, The Economics of International Stockholding of Wheat, and D. Gale Johnson, "Food Reserves and International Trade Policy", in International Trade And Agriculture: Theory and Policy, J.S. Hillman and Andrew Schmitz, eds., (Boulder: Westview Press, 1979).

⁷⁰ Morrow, The Economics of International Stockholding of Wheat, pp. 34-35.

market trends, could well be self-reinforcing: as more countries adopt isolationist agricultural production and trade policies, the variability of the residual world market would be accentuated, and the incentive to further raise protective barriers increased.⁷¹

It is also evident that the impact of wheat price instability on developing countries is increasing, due to the rapid growth of developing country wheat and cereal imports, and the increasingly important role these imports are coming to play in the total developing country wheat and cereal supply.

Between 1961 and 1978, developing country wheat and other cereal grain imports increased at an annual rate of 4.64 percent and 6.82 percent respectively -- a rate of growth above that of developed country imports, and above that of the total world market. The growing importance of developing countries in world cereal markets is also evidenced by the increase in their share of total world imports over this period. Their 1961 imports of wheat, 16.5 million metric tons, equivalent to 37.5 percent of total world imports, increased to 40.6 million metric tons in 1978, equivalent to 50.0 percent of world imports.⁷²

Perhaps more indicative of the increasing importance of wheat and cereal imports to food importing developing

⁷¹This point is discussed in greater detail in Chapter 3.

⁷²FAO, 1978 FAO Trade Yearbook, Table 37.

Table 2.10
The Annual Rate of Increase of the Volume of Total Cereals,
Wheat and Other Cereals Imports, 1961-1978¹

	<u>Total Cereals</u>	<u>Wheat</u>	<u>Other Cereals</u>
World	4.85	3.25	6.43
Developed Market Economies	3.60	.58	5.12
Developing Market Economies	5.33	4.64	6.82
Eastern Europe and U.S.S.R.	8.10	4.91	11.31

¹ Rates of increase have been calculated using the average annual production data for the three years centred on 1962 and 1977.

Source: Calculated from data contained in FAO, FAO Trade Yearbook, various.

countries, however, is the high growing proportion of apparent domestic consumption (ADC), accounted for by imports, shown in Table 2.11. In developing countries, when taken together, imports accounted for 29.8 percent of wheat consumption in 1976-78, a proportion which exceeded that of both the developed (18.8%) and centrally planned economy country groupings (10.3%). In addition, while the proportion of wheat ADC provided by imports in the developed countries changed little between 1968-70 and 1976-78, the developing country proportion increased, from 27.6 percent to 29.8 percent. The sharpest increase took place in Africa and the Near East, while a decline was recorded for the Far East. The proportion of total cereal consumption provided by imports, however, was somewhat lower for almost all country groupings, although again, an increase was recorded for most groups between 1968-70 and 1976-78. It is interesting to note that in this instance, the proportion was greater in developed countries than in developing countries (17.0% vs 11.8% in 1976-1978), although in a number of developing country groups (Africa and the Near East), the proportion of domestic consumption accounted for by imports nearly doubled between 1968-70 and 1976-78.

The human consequences of world cereal market instability become even more readily apparent when the role of cereals, when consumed directly, as a source of calories and protein in developing countries is recognized. FAO

Table 2.11

Wheat and Cereal Imports as a Percentage of Apparent
Domestic Consumption, 1968-1970 and 1976-1978

	<u>Wheat</u>		<u>Total Cereals</u>	
	<u>1968-1970</u>	<u>1976-1978</u>	<u>1968-1970</u>	<u>1976-1978</u>
World	14.11	18.83	8.69	11.48
Developed Market Economies	18.86	18.77	14.28	17.00
North America	.11	.06	.57	.46
Western Europe	23.94	22.75	25.39	28.36
Oceania	.47	.83	.49	.63
Other	68.97	73.33	38.02	53.01
Developing Market Economies	27.57	29.76	8.84	11.83
Africa	35.01	56.56	8.55	16.82
Latin America	41.70	44.63	12.72	17.65
Near East	17.45	24.64	11.53	20.40
Far East	26.66	21.28	6.76	6.59
Centrally Planned Economies	8.00	10.31	3.82	7.15
Asian C.P.E.s	18.27	15.09	3.52	3.98
Eastern Europe & USSR	5.35	8.55	4.13	10.04

Source: Calculated from data contained in FAO, FAO Production Yearbook, various, and FAO Trade Yearbook.
various.

estimates indicate that for the 1972-74 period, of the average per capita calorie consumption in developed countries, 67 percent was obtained from vegetable products and 33 percent from animal products.⁷³ The corresponding figures for the developing countries designated as 'most seriously affected' by oil price increases were 90 percent and ten percent, with cereal products alone accounting for 52 percent of total calorie consumption.⁷⁴ The role of cereals as a protein source in MSA countries is even more significant: they account for 63 percent of total protein consumption as opposed to 26 percent in the developed countries.⁷⁵ Given this important role of cereals as a source of protein and caloric requirements in developing countries, the increasing reliance of developing countries on world markets for their wheat and cereal needs, noted previously, and the exclusive use of wheat for direct human use in developing countries⁷⁶, it can be concluded that world market instability which limits the availability of commodities, or leads to rapidly rising prices, will have an important impact on the nutritional well-being of Third World populations.

⁷³FAO, The Fourth World Food Survey, (Rome: FAO, 1977), Table I.4.1, p. 21.

⁷⁴Ibid.

⁷⁵Ibid., Table I.4.3, p. 25.

⁷⁶International Wheat Council, Trends in Grain Consumption, Secretariat Paper No. 9, (London: International Wheat Council, 1970). Table 14, p. 21. The authors note that the data are only rough approximations.

Conclusion

As indicated in this discussion, the use of surplus analysis may not be appropriate for the examination of the impact of wheat price instability on developing countries, given the assumptions on which it is based. The theoretical examination of the impact of wheat price fluctuations on the stability of import expenditures suggests, however, that developing country expenditures on wheat imports should be destabilized as a result of price fluctuations that are externally generated. From the data presented in this chapter, it can be concluded that wheat importing developing countries have been more susceptible to unstable wheat prices than the wheat importing developed countries, particularly during the 1970s. In addition, during this period, price fluctuations have coincided with changes in developing country import requirements in such a way, that the fluctuation in the value of developing country wheat imports has been greater than the fluctuation in the volume. Thus, it is evident that wheat price fluctuations since 1972 have exacerbated the instability of developing country wheat import expenditures.

The impact of such import expenditure instability on the wheat importing developing countries, it has been argued, should be similar to that related to the instability of developing country export revenues in some respects. Data have been presented which demonstrate that unstable

wheat prices during the 1970s led to a discernible change in the aggregate developing country food import bill and as a result may have affected developing country economic growth. It is also suggested that wheat price instability has had a harmful impact on individual well-being and the formation of food policy in some developing countries. These undesirable consequences of wheat price instability may also be increasing for, as developing country wheat imports have risen, their openness to world market developments has increased. To argue therefore, that factors which contribute to wheat market instability have a particularly adverse impact on wheat importing developing countries appears plausible. This suggests, in turn, that developing countries should have a particular interest in measures to promote the stability of the world wheat market.

Table 2.12
Wheat Production, 1968 - 1978

(Million metric tons)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
World	331.2	315.2	318.4	353.8	346.8	377.3	360.3	355.8	419.7	385.7	441.5
Developed	129.6	121.2	103.7	126.3	121.8	133.2	138.7	142.7	153.8	140.7	154.5
N. America	60.1	45.8	54.4	58.4	56.6	62.9	62.2	71.2	81.9	75.3	70.1
W. Europe	51.8	50.1	47.7	56.7	56.1	55.6	62.9	53.0	57.2	53.4	63.4
Oceania	15.2	11.0	8.2	8.8	6.8	12.5	11.6	12.2	12.0	9.7	18.7
Other	2.5	2.2	2.0	2.3	2.5	2.3	2.1	2.3	2.7	2.3	2.3
Developing	59.9	64.6	64.4	71.2	78.4	71.0	72.4	81.3	94.7	83.6	90.9
Africa	5.9	4.5	4.9	5.4	6.1	4.8	4.7	5.5	5.6	3.8	5.6
Latin America	10.5	12.8	11.1	11.9	12.3	12.1	13.5	15.0	19.3	11.5	14.8
Near East	20.0	21.4	20.5	23.0	26.0	21.4	24.3	28.3	31.4	29.3	30.4
Far East	23.6	26.0	28.1	30.9	33.9	32.8	30.0	32.4	38.3	39.0	40.6
Centrally Planned	141.7	129.3	150.3	156.3	146.6	173.0	149.1	131.8	171.2	161.4	196.1
Asian CPES	27.3	28.7	31.3	32.9	34.8	36.5	37.4	41.5	45.6	40.6	44.8
Eastern Europe & U.S.S.R.	114.4	100.6	119.0	123.4	111.8	136.5	111.8	90.3	125.6	120.8	151.3

Source: FAO, FAO Production Yearbook, various.

Table 2.13

Cereal Production, 1968 - 1978

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
	(Million metric tons)										
World	1179.4	1197.5	1212.9	1315.7	1278.7	1376.0	1333.1	1366.0	1487.4	1476.1	1580.1
Developed	417.6	418.2	383.6	466.9	451.9	465.8	442.0	481.0	489.1	504.6	538.1
N. America	237.1	242.0	215.8	276.7	263.7	274.3	235.4	286.1	302.5	306.2	315.0
W. Europe	132.5	134.0	128.4	148.4	148.1	150.6	159.1	146.9	142.4	153.1	167.3
Oceania	19.8	15.0	13.5	15.4	11.5	17.9	17.1	18.6	18.3	15.4	26.4
Other	28.2	27.2	26.0	26.5	28.6	22.9	30.4	29.5	26.0	29.8	29.4
Developing	343.6	357.5	374.9	378.4	368.6	387.6	378.7	416.8	424.8	432.7	449.0
Africa	42.0	42.9	41.9	42.7	44.9	38.7	44.1	44.8	48.4	42.9	48.0
Latin America	62.1	64.5	70.8	73.4	67.8	73.9	78.1	79.4	86.3	85.5	84.0
Near East	40.6	43.1	40.7	44.2	47.8	41.2	45.3	53.0	56.1	51.9	54.6
Far East	198.9	206.9	221.4	218.0	208.0	233.8	211.3	239.6	233.9	252.4	262.4
Centrally Plan- ned	418.2	421.8	454.4	470.4	458.2	522.6	512.4	468.4	573.6	538.9	593.7
Asian CPES	195.6	204.5	219.6	227.7	222.9	235.0	249.1	259.7	279.8	272.9	593.7
E. Europe & U.S.S.R.	222.6	217.2	234.8	242.7	235.3	287.6	263.3	208.4	293.7	266.0	312.1

Source: FAO, FAO Production Yearbook, various.

CHAPTER 3

WHEAT MARKET INSTABILITY: AN ASSESSMENT OF CAUSES AND PROPOSED SOLUTIONS

Introduction

Policy action to resolve the problems associated with wheat market instability, particularly as they affect the developing countries, has been a key concern in the wake of the rapid wheat price increases of 1972-73. The oft-discussed creation of internationally controlled reserves, mentioned briefly in the previous chapter, has been only one of several policy responses to the perceived problems of wheat market variability. Others have included past efforts within the International Wheat Council to create a system of multilateral contracts in order to stabilize world wheat prices, the negotiation of agricultural trade issues in the successive rounds of Multilateral Trade Negotiations held under GATT auspices, and the recent discussion within the I.M.F. of a Food Financial Facility, designed to assist importing countries with unstable food import bills.

Any balanced policy discussion, however, must rest on an appreciation of the roots of the instability which has given rise to calls for remedial action. It is apparent that there are two principal, though not completely separable, sets of factors generating price

fluctuation on the world wheat market. The first is inherent in the functioning of the market, and includes the nature of the economic parameters of supply and demand, leaving the market susceptible to sharp price changes. It also includes other factors, such as the particular instability of wheat production in many regions, and the impact of changing incomes on wheat consumption, which can lead to changes in the supply of, and demand for, traded wheat.

The second set of factors relates to the changing impact of national policies in the major wheat trading nations on the stability of the world market. The 1950s and 1960s were characterized by the relative stability of wheat prices, considered the outcome of production, stock and trade policies pursued by major exporters. The 1970s, in contrast, have been marked by changes in these exporting country policies, and the rise of trade destabilizing policies in the principal wheat importing countries. The impact on the world wheat market of these two sets of factors, those inherent in the functioning of the market, and those related to national policies, is readily apparent from a consideration of the events surrounding the 1972-75 world food "crisis".

This chapter will examine past, as well as current, policy action on the issue of wheat market stabilization in

relation to these two sets of factors. It is apparent that past International Wheat Agreements, for example, were negotiated primarily in response to the major wheat exporting countries' concerns about low prices and over supply on the wheat market, conditions considered to be largely the product of exporting country policies. Recent reserve proposals, on the other hand, represent an attempt to deal with primarily the first set of factors, while the Food Financial Facility, and the food import bill insurance proposals on which it is based, seek to ameliorate only the effects of wheat price instability.

These current efforts, however, do not approach what is considered to be a major factor in explaining the variability of wheat markets: the impact of policies adopted by wheat trading nations. The unwillingness of major wheat trading nations to open domestic policies to international negotiation is apparent from the failure of the most recent round of GATT Multilateral Trade Negotiations and the lack of progress in other fora to resolve outstanding agricultural trade issues and lessen the destabilizing impact of these policies on world markets. Given this failure, and the persistence of policies considered responsible in part for the variability of the world wheat market, it is argued that an international reserve such as that recently under discussion, can have very limited success

in achieving its price stabilization objective. This point serves to underscore the argument that a correct appreciation of the causes of instability is a key prerequisite to successful international action to increase wheat market stability. In this regard, an understanding of the nature and impact of trade destabilizing national policies is clearly essential.

Explaining Wheat Market Instability

The price instability characterizing the world wheat market, in common with commodity markets more generally, in part can be explained by the inflexible nature of wheat supply and demand. Wheat is consumed in only slightly processed form, for the most part, and such consumption is little influenced by price changes. Models of the wheat market, in fact, generally assume the price elasticity of demand to lie in the range of $-.1$ to $-.3$.¹

¹Cochrane and Danin, for example, use estimates of the price elasticity of demand of $-.1$ and $-.2$. Johnson and Sumner use estimates of $-.1$ and $-.3$. Reutlinger specifies a kinked demand function, with the price elasticity of demand estimated at $-.15$ at the mid-point of the segment corresponding to short supplies, and $-.24$ at the mid-point of the segment corresponding to ample supplies. See D. Gale Johnson and Daniel Sumner, "An Optimization Approach to Grain Reserves for Developing Countries," and Willard W. Cochrane and Yigal Danin, "Reserve Stock Grain Models and the World 1975-1985," in Analyses of Grain Reserves, A Proceedings, compiled by David J. Eaton and W. Scott Steele (Washington, D.C.: Economic Research Service, U.S. Department of Agriculture, 1976); Shlomo Reutlinger, Simulation of World-Wide Buffer Stocks of Wheat, Staff Working Paper No. 219 (Washington, D.C.: World Bank, 1975).

The supply of wheat is also relatively unresponsive to changes in price. Over the short term, of course, (i.e. during one crop year) and in the absence of carryover stocks, the world supply of wheat is reliant on the current year's production, and is completely inflexible. In the longer term, production is considered somewhat price elastic as the acreage planted to wheat is influenced in part by farmers' expectations of future prices. With a degree of stockholding activity, the price elasticity of total supply and demand may be somewhat greater. Due to these low elasticities of demand and supply, even small shifts in either supply or demand lead to substantial price changes, as shown in Figure 3.1.

The explanatory value of this simple model can be increased by dropping the implicit assumption of a unified world wheat market, and considering instead, a disaggregated model in which shifts in wheat supply and demand in importing and exporting countries, and the resultant impact on the price and quantity of traded wheat, are examined. The world market for wheat is residual in nature: importing countries fulfill their demand from domestic production first, and by importing wheat, second. Their import demand, thus, is a function of the level of internal demand and domestic production. As noted in the previous chapter, in a number of the principal wheat

Figure 3.1

The Consequences of Inelastic Supply and Demand Functions for Price Fluctuations

importing countries, production is particularly unstable, affected by climatic variation, insects and crop diseases. The level of price also has an undeniable impact, as estimates suggest the price elasticity of supply to be .8, .4 and .3 in the European Community, India and Japan respectively. (See Table 3.1) Demand in the developed wheat importing countries, meanwhile, is generally noted to be little affected by price changes, although there is

Table 3.1
Elasticities for Wheat

Country or Region	Own Price Elasticity of Demand	Income Elasticity	Own Price Elasticity of Supply
North America	-0.05	-0.25	2.5 ¹
European Community	-0.2	-0.1	0.8
Australia	-0.15	-0.25	0.5
Japan	-0.45	0.2	0.3
Other Developed Countries	-0.2	-0.1	0.5
Argentina	-0.1	-0.1	0.5
Other Latin America	-0.25	0.3	0.65
North Africa/Mid East: High Income	-0.25	0.25	0.15
North Africa/Mid East: Low Income	-0.35	0.05	0.15
Other Africa	-0.3	0.35	0.15
India	-0.4	0.7	0.4
Other South Asia	-0.4	0.4	0.15
Thailand	-0.05	0.2	0.0
Indonesia	-0.6	0.55	0.0
Other East Asia	-0.3	0.25	0.4

¹ This is an export supply elasticity.

Source: U.S. Department of Agriculture, Alternative Futures for World Food in 1985
(Washington, D.C.: U.S. Department of Agriculture, Economics, Statistics
and Cooperatives Service, 1978).

less uniformity evident in the response of demand to changes in income. In the European Community, for example, a rise in income leads to a drop in demand for wheat, while in Japan, the opposite relationship holds true. Demand in the developing wheat importing countries is somewhat more price elastic than in the case of the E.C., with estimates of the income elasticity of demand ranging from $-.25$ in the wheat importing Latin American countries to $-.6$ in Indonesia. Moreover, the developing country demand for wheat appears positively influenced by growth in incomes. In India and Indonesia, to cite two examples, the income elasticity of demand is estimated to be $.7$ and $.55$ respectively.

The supply of wheat in the world market is similarly affected by factors internal to the mostly developed wheat exporting countries. Internal demand is considered to be almost completely unaffected by changing prices, with the price elasticity of demand estimated to be $-.05$, $-.1$ and $-.15$ in North America, Argentina and Australia respectively. Similarly, the income elasticity of demand is estimated at $-.25$ in North America and Australia, and $-.1$ in Argentina, indicating that the demand for wheat in these markets falls as income rises. Wheat production in exporting countries, meanwhile, is affected by natural factors and responds to changes in price. As a source of export supply, it is

supplemented by carryover stocks, characteristically held in exporting rather than importing countries.

From this outline, it is possible to ascertain the potential sources of changes in the supply of and demand for traded wheat which provoke price changes on the world market. Import demand could be expected to vary, influenced by unstable domestic production in both developed and developing wheat importing countries. Changes in income in Japan and the developing countries, and changes in the price of wheat itself in developing countries could also affect import demand by influencing the level of consumption. Export supply on the other hand, is not greatly affected by the impact of changing prices and incomes on domestic consumption in exporting countries. A more important determinant of the supply of wheat on the world market would appear to be the volume of production in exporting countries, as influenced by natural factors and price changes, and changes in the level of carryover stocks, which may augment or offset production as a source of export supply.

While it is a straightforward task to note the possible origin of shifts in export supply and import demand and speculate as to their role in the determination of world wheat prices, the empirical assessment of the magnitude of such shifts, and their relative impact on

price fluctuations has proved more difficult. Early work within the United Nations attempted to determine the ~~source~~ of commodity price variability by examining the correlation between export price and volume fluctuations.² A positive correlation, indicating that the export price and volume moved in the same direction in a particular year, was interpreted as indicating that a shift in the demand curve was responsible for the price fluctuation. A negative correlation, though, was taken to indicate that a shift in the supply curve was responsible. Following this reasoning, it was noted in the United Nations' World Economic Survey 1963 that demand shifts were the principal cause of fluctuations in the world price of temperate zone farm products, including wheat, between 1950 and 1961.³

As pointed out by Porter, though, this analysis is oversimplified and frequently misleading.⁴ He notes that the relationship between price and volume movements suggested by the United Nations holds true "only if the

² U.N., Instability in Export Markets of Under-developed Countries (New York: U.N., 1952).

³ U.N., World Economic Survey 1963 (New York: UN, 1964), p. 147.

⁴ Richard C. Porter, "On Placing the Blame for Primary Product Instability," International Economic Review, Vol. 11, No. 1 (February 1970).

elasticities of demand and supply are close to equal and percentage deviations from trends (rather than previous year values) are used."⁵ Moreover, even if these restrictive conditions are fulfilled, the UN method can only provide a qualitative indication of the responsibility for price fluctuation.

The methodology which Porter develops to more accurately assess the relative importance of supply and demand shifts as causes of price instability is more complex, however, and yields no firm conclusions.⁶ Briefly, deviations of trade prices and volumes from trend levels are calculated for 46 commodities for the period 1947-63, using two methods of trend measurement (the three year moving average and least squares methods). Estimates of the deviations of actual from trend prices and volumes, together with assumed price elasticities of supply and demand, permit an estimate of the fluctuations of the supply and demand, curve intercepts, considered by Porter to be the appropriate measures of supply and demand curve shifts. A knowledge of their relative magnitude, however, is not thought sufficient to indicate the responsibility for

⁵Ibid., p. 178.

⁶Richard C. Porter, "Who Destabilized Primary Product Prices," Indian Economic Journal, Vol. XVI, No. 4 (April-June, 1969).

price variability. Porter argues, instead, that it is necessary to estimate the degree of price fluctuation in the absence of either supply or demand shifts and compare it with the actual price fluctuation in order to assess blame.

Following such a comparison, it is concluded that for a number of commodities, the removal of either supply or demand shifts would have reduced price fluctuation somewhat, although for relatively few commodities would this reduction have been as great as 50 percent.⁷ In addition, for a number of commodities, the elimination of supply or demand shifts would have increased price fluctuation, due to the negative correlation between supply and demand curve shifts. These conclusions are qualified, however, because of the impact of the assumed elasticities and the method of trend removal on the results of the study.

The results obtained with regard to the international wheat market certainly confirm the problems inherent in this analysis. As a consequence, no conclusions can be drawn concerning the origins of wheat price instability between 1947 and 1963. Utilizing the least squares method of trend removal, the eradication of either demand or supply fluctuations would have reduced the

⁷Ibid., p. 404.

observed price variation if the price elasticities of demand and supply were between .2 and .6, but would have increased price variation if the elasticities were found in a broader range -- between .2 and 1.0. If the three year moving average method of trend removal were employed, however, the elimination of supply fluctuations would increase price variation with elasticities in either range. The removal of demand fluctuations though, would increase price fluctuation if elasticities were in the .2 to .6 range, and decrease price fluctuation if elasticities were between .2 and 1.0.⁸

Further limitations to the analysis, moreover, have been recently suggested in a study by Harris, Salmon and Smith.⁹ The three authors follow Porter's methodology utilizing 1950-74 data, and consider the impact of three methods of trend removal, different assumptions concerning the range of supply and demand elasticities and the inclusion of a lagged supply response on the outcome of the analysis. Not surprisingly, their conclusions also prove sensitive to the form of trend removal used, and the assumptions concerning the range of price elasticities of

⁸Ibid. These conclusions are drawn from data contained in Table 3, pp. 405-407.

⁹Stuart Harris, Mark Salmon, Ben Smith, Analysis of Commodity Markets for Policy Purposes, Thames Essay No. 17 (London, Trade Policy Research Centre, 1978).

supply and demand. The additional consideration of a lagged response of output to price changes, in place of Porter's implicit assumption of an instantaneous adjustment, further illustrates the sensitivity of any conclusions to the range and specification of parameters included in such studies.

The correct estimation of the relevant elasticities, for example, presents a clear problem, as elasticities vary somewhat between countries and may change over the study period. This latter concern is particularly relevant to the Harris study, as it covers a period of considerable policy change in the major wheat importing and exporting countries, which affected the response of consumption, production and stockholding to changes in price. Given these problems, in addition to the shortcomings noted above, the Harris judgement that "... it is unlikely that such approaches can provide sufficiently accurate methods of determining the origins of price instability for policy purposes,"¹⁰ appears fully justified.

Given this conclusion, it may be more useful to assess the origins of wheat market instability utilizing a more descriptive, historical approach, outlining the contributing factors identified by international organizations and academic observers. Such an analysis is appropriate

¹⁰Ibid., p. 38.

also because it serves to illustrate the important role played by the second set of factors identified at the outset of this chapter: those related to policy in the major wheat trading nations. Following this approach, the contribution of both policy changes and natural events to the rapid wheat price increases which characterized the "world food crisis" of 1972-75 is apparent.

An account of the world food crisis properly begins in the late 1960s with the disruption of what has been termed the 'global food security regime'.¹¹ The notable wheat price stability of the 1950s and 1960s is widely considered to have been the product of Canadian and American policies which encouraged production, supported stockholding and subsidized export sales, particularly to developing countries as a method of reducing high carryover stocks.¹² These two countries, under the largely passive umbrella of

¹¹Jon McLin, "Surrogate international organization and the case of world food security, 1949-1969," International Organization, Vol. 31, No. 1 (Winter, 1979).

¹²This point of view has been expressed by the World Food Council, and the FAO, as well as McLin and other academics. See: World Food Council, World Food Security for the 1980s, Report by the Executive Director (WFC/1979/5) April 26, 1979; FAO, The Stabilization of International Trade in Grains, An Assessment of Problems and Possible Solutions, Commodity Policy Studies No. 20 (Rome: FAO, 1970); Chris M. Alaouze, A.S. Watson, N.H. Sturgess, "Oligopoly Pricing in the World Wheat Market," American Journal of Agricultural Economics, Vol. 60, No. 2 (May, 1978); Jon McLin, "Surrogate international organization."

the International Wheat Agreements, cooperated to respect each other's share of the residual world market and held substantial carryover stocks which absorbed the impact of variable world import requirements. Those instances of price fluctuation which took place, such as the price increases of 1962 and the price drop of 1965, were considered the outcomes of widespread production shortfalls in the former case, and high world production, contracting commercial export markets and strong competition for sales to centrally planned countries in the latter.¹³

The price war of 1968-69, however, though brought about by similar factors, marked a significant restructuring of the wheat market. Australia, faced with large exportable surpluses which it was unable to sell at an acceptable price on the world market, constructed storage facilities and began holding substantial carryover stocks for the first time in 1966-67.¹⁴ Equally important, it chose to undercut the minimum prices agreed to under the 1968 International Grains Arrangement, thus sparking heightened price competition between major exporters. Out of this market

¹³ These events have been outlined in FAO, FAO Commodity Review 1962 (Rome: FAO, 1963); and FAO Commodity Review 1965 (Rome: FAO, 1966). See also FAO, The State of Food and Agriculture 1965 (Rome: FAO, 1966).

¹⁴ This discussion is based on Alaouze, et al. "Oligopoly Pricing."

disorder, it is suggested, emerged a "triopoly involving the United States, Canada and Australia,"¹⁵ which existed between 1968-69 and 1972-73, based again, on the holding of stocks and the limitation of competition with the tacit agreement of each exporter to respect the others' share of the residual world wheat market.

The high cost of government price support and wheat storage programs, and the uncertain market prospects for wheat exports, however, prompted exporting country governments to reorient farm programs. The sentiment behind these changes was evident in a 1974 statement of Clayton Yeutter, then U.S. Assistant Secretary of Agriculture for International Affairs and Commodity Programs:

The United States and Canada have held the world's food reserves for forty years. These reserves have cost our taxpayers billions of dollars to buy and store. They have cost our farmers billions of dollars in lost income. They have cost the nation billions of dollars on lost export earnings by depressing the value of our farm exports.¹⁶

The burden of price support and storage and the associated oligopoly control of the world wheat market, was thus unwillingly borne by the major exporters. Throughout

¹⁵Ibid., p. 173.

¹⁶Clayton Yeutter, "U.S. Farm Policy and Commodity Programs," Agriculture Abroad, Vol. XXIX, No. 4 (August, 1974), p. 33.

the 1960s, the focus of American farm programs shifted from the provision of high support prices as a means of raising farm incomes, to the provision of payments for acreage restriction.¹⁷ Canadian wheat farmers, on the recommendation of a Federal Task Force, were paid to divert wheat acreage to forage uses as a direct consequence of the record wheat carryover stocks at the close of the 1960s.¹⁸ In Australia, wheat delivery quotas were introduced by the Australian Wheat Board for the first time in 1969-1970.¹⁹ The impact of these measures, and poor weather conditions on the size of the carryover stocks held by the three exporters is shown in Figure 3.2.

At the same time, it has been suggested that wheat importing countries have increasingly implemented agricultural and trade policies which have destabilized trade flows and disrupted world markets. The pricing provision

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For a description of the changing focus of U.S. farm policy, see T.K. Warley, Agriculture in an Interdependent World: U.S. and Canadian Perspectives (Montreal: Canadian-American Committee, C.D. Howe Research Institute, 1977); and Willard W. Cochrane and Mary E. Ryan, American Farm Policy, 1948-1973 (Minneapolis: University of Minnesota Press, 1976), pp. 80-85.

¹⁸ See Canada, Federal Task Force on Agriculture, Canadian Agriculture in the Seventies (Ottawa: Queen's Printer, 1969), p. 131; and OECD, La Politique Agricole au Canada (Paris: OECD, 1973), p. 36.

¹⁹ Tom Connors, The Australian Wheat Industry: Its Economics and Politics (Armidale: Gill Publications, 1972).

Figure 3.2

Wheat Production, Prices and Carryover Stocks, 1960-1979

Sources: FAO, *The State of Food and Agriculture*, various years;
 IWC, *World Wheat Statistics*, various years.

of the E.E.C.'s Common Agricultural Policy, first made effective in 1967, is generally cited as the most important example of such a policy.²⁰ This system of price support is built around three sets of administered prices: the target price, the threshold price and the intervention price. The target price is established to guide the production decisions of farmers, and is maintained by the setting of a threshold price, slightly below it. A variable import levy, determined by the difference between the threshold and the prevailing world price of the commodity, is applied to ensure that the target price is not undercut by lower cost imports. If the country concerned is an exporter of the commodity however, it may become necessary to increase exports in order to prevent the accumulation of surplus stocks and the lowering of internal prices below the target level. This goal is accomplished by the setting of an intervention price. If the domestic price falls below this level, government agencies intervene by purchasing all available supply at the intervention price, and reselling it to firms which export it to offshore markets with the assistance

²⁰ This outline of the pricing provisions of the Common Agricultural Policy is drawn from Theodor Heidhues, T.E. Josling, Christopher Ritson and Stefan Tangermann, Common Prices and Europe's Farm Policy, Thames Essay No. 14 (London: Trade Policy Research Centre, 1978), Appendix A, pp. 50-63.

of an export subsidy.

The target prices set in the E.E.C. have been generally well above world price levels, and embody a substantial degree of protection. The intervention price for wheat in 1971-72 for example, was U.S. \$101/metric ton, more than fifty percent above the Canadian export price of U.S. \$65/metric ton,²¹ while the tariff equivalent of the variable levy on wheat in 1972 has been estimated at 109.5 percent.²² Similarly, Japan, the second largest wheat importer after the E.E.C., has supported both rice and wheat production by maintaining quotas on wheat imports which have led to domestic wheat prices more than double the world level in many years.²³ The U.S.S.R., in addition, has periodically and unexpectedly imported large quantities of wheat and other grains in order to maintain

²¹Colin Carter, Andrew Schmitz, "Import Tariffs and Price Formation in the World Wheat Market," American Journal of Agricultural Economics, Vol. 61, No. 3 (August, 1979), Table 1, p. 520.

²²William R. Cline, Nokoru Kawanabe, T.O.M. Kronsjo, Thomas Williams, Trade Negotiations in the Tokyo Round, A Quantitative Assessment (Washington: The Brookings Institution, 1978), Table 4-4, p. 157.

²³Malcolm D. Bale, Bruce L. Greenshields, "Japanese Agricultural Distortions and their Welfare Value," American Journal of Agricultural Economics, Vol. 60, No. 1 (February, 1968).

the projected growth of domestic consumption in years of serious production shortfalls.²⁴ A large number of other wheat importing nations both developed and developing, are also noted to have intervened to stabilize producer and/or consumer prices of agricultural commodities.²⁵

The disruptive impact of these policies on world markets has been illustrated by Johnson with the following hypothetical example.²⁶ Half the world's consumption of wheat is assumed to take place within countries pursuing stabilization policies such as these; carryover stocks, apart from working stocks, are assumed to be non-existent; and the short-run price elasticity of demand is estimated at -0.1 . In the event of a reduction in the supply of wheat by 4 percent in all countries, those countries using trade to stabilize internal prices and consumption would require

²⁴See D. Gale Johnson, The Soviet Impact on World Grain Trade (Montreal: British-North American Committee, C.C. Howe Research Institute, 1977).

²⁵Abdullah A. Saleh, "Disincentives to Agricultural Production in Developing Countries: A Policy Survey," Foreign Agriculture, March 1975 Supplement. Cited by Glenn C. Nelson, "International Food Policy Issues," Chapter V in The Lessons of Wage and Price Controls - The Food Sector, John T. Dunlop and Kenneth J. Fedor, eds. (Boston: Harvard University, Graduate School of Business Administration, 1977), p. 215.

²⁶D. Gale Johnson, "World Agriculture, Commodity Policy and Trade Variability," American Journal of Agricultural Economics, Vol. 57, No. 5 (December, 1975).

other nations to reduce their consumption by 8 percent. With the price elasticity of demand estimated at -1.1 , this reduction in consumption would result in a price increase of approximately 80 percent while in the absence of such trade measures, the increase in world price would have been 40 percent. Johnson attributes the greater instability of world wheat prices in the 1970s to the fact that "a much larger percentage of the world's grain production in the 1970s than in the 1960s occurred with the framework of policies to achieve internal price stability through the control of imports and/or exports."²⁷

The coincident impact of the "inherent" and policy-related sets of factors on the world market can be seen in a brief outline of the events surrounding the world food crisis, for each clearly played an important role. Policy changes in wheat exporting countries at the end of the 1960s led to the reduction of production and carryover stocks, so that the 1973-74 wheat carryover of 26.9 million metric tons was less than half that of 1969-70,²⁸ and was roughly equivalent to 11-12% of annual world consumption.²⁹ Total

²⁷ Ibid., p. 825.

²⁸ International Wheat Council, 1980 World Wheat Statistics (London: International Wheat Council, 1980), Table 10a, p. 44.

²⁹ U.N. World Food Conference, The World Food Problem: Proposals for National and International Action, (E/Conf 65/4) (Rome: FAO, 1974). Cited by McLin, "Surrogate international organization," p. 45.

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world wheat production, which had risen fairly consistently over the preceding decade, suffered small declines in 1972, 1974 and 1975. Shortfalls were most severe in the Soviet Union, which, following a 1971 policy change that, apparently passed unnoticed in exporting countries, chose to import large volumes of wheat and other feed grains in order to maintain domestic consumption and livestock production.³⁰ Simultaneous production shortfalls in other importing regions, and the failure of the anchovy fishery off the Peruvian coast, increasing feedgrain demand,³¹ all contributed to a sharply increased demand for wheat imports.

As carryover stocks were further reduced, to record low levels in 1973-74, the price elasticity of supply of wheat was lowered, and the susceptibility of the world market to price instability increased. The demand for imported wheat was also rendered more price inelastic in many countries as a result of domestic price stabilization programs, such as those outlined above. The shifts in import demand and export supply brought about by production shortfalls and the import policy changes in the Soviet Union led to a particularly sharp increase in the world

³⁰ D. Gale Johnson, The Soviet Impact on World Grain Trade, pp. 20-21.

³¹ UN, World Food Council, World Food Security for the 1980s, p. 12.

price of wheat, as a result, as shown in Figure 2.2. The terms on which many developing countries obtained food imports increased even more sharply as food aid shipments in 1973-74 fell to one-third of typical annual flow of the late 1960s.³²

The subsequent decline in wheat prices to levels comparable in real terms to those of the mid-1960s,³³ followed the increase of world wheat production and carry-over stocks. This recovery may be attributable to factors such as the favourable weather conditions in many regions, ensuring large harvests, and significant production increases in countries such as India, which previously imported large volumes of wheat. Policy changes in exporting countries may also have played a major role. In the United States, for example, under the Food and Agriculture Act of 1977, assistance to agricultural producers was increased and support provided for the holding

³²Ibid., p. 16. The volume of cereals shipped as food aid in 1973-74, 5,651,000 metric tons, was less than half the 1971-72 level of 12,563,000 metric tons.

³³The export price of Canadian exports of No. 1 Western Red Spring Wheat, in store in Thunder Bay, in 1977 dollars, was \$161.50/ton in 1976, as compared to \$165.50/ton in 1961. World Bank, Price Prospects for Major Primary Commodities, Report No. 814/80 (Washington: January 1980), Table 14, p. 157. Grennes, Johnson and Thursby note that the 1977 U.S. price of wheat was approximately equal in real terms to the 1932 level. Thomas Grennes, Paul R. Johnson, Marie Thursby, The Economics of World Grain Trade (New York: Praeger, 1978), p. v.

of carryover stocks,³⁴ while in Argentina the longstanding policy of taxing the farm sector to support industrial and urban development was partially reversed in 1976.³⁵ In Canada and Australia, established programs affecting wheat production and consumption, which may have reduced the supply of wheat available for export in the 1972-75 period of high world prices, reverted to their customary role of stimulating export supplies as world prices fell.³⁶ The changing impact of Canadian agricultural policy on the availability of wheat for export will be discussed in detail in Chapter 4.

International Approaches to Wheat Market Issues

International policy action related to the world wheat market can be considered on the one hand as a response to conditions in the world wheat market. The various International Wheat Agreements, for example, were negotiated

³⁴D. Gale Johnson, "The Food and Agriculture Act of 1977: Implications for Farmers, Consumers and Taxpayers," in Contemporary Economic Problems 1978, William Fellner, project director (Washington: American Enterprise Institute for Public Policy Research, 1978).

³⁵"Argentina: The Farming Sector," Bank of London and South America Review, Vol. 13 (August, 1979).

³⁶The argument that developed country policies restrained wheat production and encouraged consumption between 1973-74 and 1975-76 is developed by Timothy Josling in Developed Country Agricultural Policies and Developing Country Supplies: The Case of Wheat, Research Report No. 14 (Washington: International Food Policy Research Institute, 1980).

for the most part within a context of market surplus and reflected the interests and concerns of wheat exporting countries. More recent initiatives, such as proposals for the creation of an international reserve and a Food Financial Facility, have arisen out of concerns in the international community following the dislocations associated with the wheat price instability of 1972-75.

In a more fundamental sense, however, it is important to discuss recent policy initiatives in particular in terms of whether they attempt to deal with causes of world market instability, and which causes they may be responding to, or whether they attempt to deal with the effects. Hence, reserve proposals are one approach to dealing with instability inherent in the market, resulting from supply and demand functions that are inelastic with respect to price. Such proposals may also reflect a perception that the level of stockholding determined by commercial considerations may be less than that considered socially desirable. Negotiations to lower barriers to agricultural trade, meanwhile, have reflected a second view: that national agricultural and trade policies, in particular those pursued by developed importing countries constitute a serious distortion of the world market, and accentuate the instability of international markets for agricultural products. The Food Financial Facility, in contrast, can be

considered an attempt to mitigate the effects of wheat market instability without attacking the causes.

The International Wheat Agreements

The Pre-War Agreement

The negotiation of the first International Wheat Agreement in several ways set the pattern for those that followed.³⁷ Concluded in 1933 following six years of intermittent negotiation, the agreement sought indirectly to raise prices and to restore order to a wheat market disrupted by large surplus stocks, low prices, and rising wheat exports from Eastern European countries. The four major wheat exporters, Canada, Australia, Argentina and the United States, initially meeting alone, agreed to accept export quotas, based on the expected world demand for wheat imports, and further agreed to reduce wheat acreage by fifteen percent the following year. At subsequent meetings, the four pressed for, and obtained, concessions from other exporters and European importers, including tariff reductions and a general undertaking not to increase production to take advantage of the export quota system. Despite this initial achievement, though,

³⁷ This summary is derived from C.F. Wilson, A Century of Canadian Grain, Government Policy to 1951 (Saskatoon: Western Producer Prairie Books, 1978), chapters 18 and 19.

the agreement collapsed within a year. A change in the stance of Argentina regarding the I.W.A., its large harvest of 1934, and a lack of storage capacity, all contributed to the overshipment of its agreed quota by three million metric tons, and the failure of the agreement.³⁸

American enthusiasm for an international agreement continued unabated, though, consistent with the Roosevelt administration's policy of government intervention to raise farm prices and incomes. At a series of meetings held between 1938 and 1942, the United States lobbied for an agreement to stabilize, if not raise wheat prices.³⁹ The secretariat of the International Wheat Council, created in 1942, itself pressed for a comprehensive agreement, along the lines proposed by the United States. Building on the pre-war experience, their proposal included among its provisions, the setting of minimum and maximum prices, export quota and production control measures, the creation of reserve stocks, and the reduction of tariffs applied to wheat imports.⁴⁰

³⁸Ibid., p. 399.

³⁹A draft wheat agreement, prepared in 1939 prior to the onset of the Second World War, contained provision for a minimum price for internationally traded wheat which was to be tied to movements in the British wholesale price index. See Wilson, A Century of Canadian Grain, p. 619.

⁴⁰Ibid., pp. 893-94.

The Post-War Agreements

The post-war uncertainty in the world wheat market, characterized by current shortages due to the disruption of agricultural production in Europe, and the fear of imminent surplus as Europe reconstructed, formed the setting for wheat agreement negotiations in the late 1940s. The agreement, finally concluded in 1949 after three full negotiating conferences, differed from earlier comprehensive proposals though, and in fact served as the basic model for wheat agreements up to 1967. Based on a British proposal, the 1949 I.W.A. took the form of a four-year multilateral contract between thirty-eight buyers and sellers, responsible for the major part of the world wheat trade.⁴¹ When the world price fell within the agreed price range, the terms of the agreement were not to become operational. If the world price dropped below the set minimum, however, exporters were given the right to sell, and importers were obliged to purchase agreed quantities at the minimum price. Essentially, the agreement sought to limit the price fluctuations of the core of the world wheat trade, thus providing some assurance of a minimum level of export revenue to member exporting countries, and a maximum level

⁴¹This summary is derived from C.D. Harbury, "An Experiment in International Commodity Control -- The International Wheat Agreement," Oxford Economic Papers, Vol. 6, No. 1 (February, 1954).

of import expenditure to member importing countries. Subsequent agreements, signed in 1953 and 1956, were similar in form, although the minimum and maximum prices were revised somewhat.⁴²

This first post-war wheat agreement is considered to have had some impact on the stability of world wheat prices.⁴³ Over much of the agreement's four year term, the free market price of wheat exceeded the maximum specified in the agreement, due to large American military and economic aid expenditures, the uncertainty in commodity markets brought about by the Korean War, and the price inflation in Europe.⁴⁴ As the purchase obligations of member importers accounted for 59 percent of world wheat trade during this period,⁴⁵ the maximum price provision of the agreement acted to limit the impact of rising prices on importers. It is also considered likely, however, that the

⁴²See David L. MacFarlane, "The International Wheat Agreement of 1956, A Canadian View," International Affairs, Vol. 32, No. 4 (October, 1956), pp. 431-32.

⁴³This judgement has been expressed by Harbury, MacFarlane and the FAO. See Harbury, "An Experiment in International Commodity Control," p. ; MacFarlane, "The International Wheat Agreement of 1956," p. 431; and FAO, The Stabilization of International Trade in Grains, p. 20.

⁴⁴David L. MacFarlane, "The International Wheat Agreement of 1956," p. 431.

⁴⁵FAO, The Stabilization of International Trade in Grains, p. 24.

agreement contributed to the price instability of wheat traded outside its provisions.⁴⁶ The 1953 and 1956 wheat agreements had little, if any, impact on the stability of the wheat trade conducted under their terms, or in the remainder of the world market. With the decision of Great Britain not to accede to the agreements, and the increased participation on the wheat trade of countries not belonging to the I.W.A., the proportion of world wheat trade covered by purchase obligations fell to 41 percent under the 1953 I.W.A., and to 23 percent under the 1956 I.W.A.⁴⁷ In addition, free market wheat prices fell within the specified ranges during this period with the result that, "neither importers nor exporters were called upon to make good their contingent commitments laid down in the Agreement."⁴⁸

Any stabilizing impact of the agreements, when considered alone, was further compromised with the adoption of a revised form of multilateral contract as the basis of the 1959 and 1962 I.W.A.'s. In place of the system of

⁴⁶C.D. Harbury, "An Experiment in International Commodity Control."

⁴⁷FAO, The Stabilization of International Trade in Grains, p. 24.

⁴⁸David L. MacFarlane, "The International Wheat Agreement of 1956," p. 431.

rights and obligations to trade, importers signing the convention agreed to purchase a certain proportion of their import requirements from member exporters. A price range was also established within which this obligation was to be effective.⁴⁹

The 1967 Agreement

The terms of the 1962 agreement were extended unchanged in 1965 and 1966, pending the completion of the Kennedy-round Multilateral Trade Negotiations. The protracted discussions within the GATT Cereals Group led to the adoption at the 1967 International Wheat Conference, held in Rome, of the International Grains Arrangement, with provisions similar in most respects to those of prior agreements. As part of the Wheat Trade Convention, price ranges were established for a variety of grades of wheat, substantially above those of the 1962 agreement.⁵⁰ Within the range, member importers were committed to import a minimum percentage of their total wheat imports from exporters signing the agreement. As well, for the first

⁴⁹"The Wheat Conference, Negotiations Go On," The Economist, February 28, 1959.

⁵⁰See International Wheat Council, International Grains Arrangement 1967 (London: International Wheat Council, 1967).

time, a Food Aid Convention was created, specifying a minimum annual food aid commitment of 4.47 million metric tons of wheat and other grains, to be fulfilled by both wheat importers and exporters.⁵¹

The provisions of the 1967 International Grains Arrangement, reflected a modest achievement of the goals set by wheat exporting countries at the outset of negotiations. Increased minimum prices were sought to compensate for "... increased costs of production of efficient producers and the general trend of world prices."⁵² The importance of a strengthened pricing system was also evident in the exporting country desire to define more precisely the minimum prices for different grades of wheat and to regularize programs of food aid in order to reduce surplus stocks and stabilize commercial markets. In addition, the full participation of the developed wheat importing nations in the Food Aid Convention was sought to more equitably spread the cost of such surplus

⁵¹Ibid., p. 37.

⁵²This quotation is taken from comments by Maurice Schwartzmann, assistant deputy minister (trade policy) of the Department of Trade and Commerce. Maurice Schwartzmann, "Discussion: Kennedy Round Negotiations and the World Grains Agreement," Journal of Farm Economics, Vol. 49, No. 5 (December, 1967), p. 1343.

disposal programs.⁵³

As in 1933, however, the agreement broke down within one year. Faced with a world-wide bumper crop in 1967, contracting export markets and mounting carryover stocks, wheat exporters, led by Australia, embarked on a price war, undercutting and rendering inoperative the minimum prices set under the I.G.A. The failure of the agreement to prevent this market deterioration reflected its weakness, for although minimum prices were increased over the levels in the 1962 agreement, importers and exporters were unable to agree on measures to increase the openness of importing country markets.⁵⁴ The minimum volume of food aid set under the FAC was not substantially above pre-existing levels, moreover, and did little to eliminate the surplus disposal problem.⁵⁵

It was not surprising as a result that during the negotiations leading to the 1971 I.W.A., exporters refused to discuss price measures, and all reference to price levels was deleted from the agreement. The International

⁵³These points have been outlined by Irwin R. Hedges, "Kennedy Round Agricultural Negotiations and the World Grains Agreement," Journal of Farm Economics, Vol. 49, No. 5 (December, 1967).

⁵⁴Ibid. This point will also be discussed in the subsequent section on multilateral trade negotiations.

⁵⁵Ursula Wasserman, "International Wheat Agreement 1971," Journal of World Trade Law, Vol. 5, No. 3 (May-June 1971), p. 361.

Wheat Council was maintained as a forum for consultation and the exchange of information, and the F.A.C. was renewed, with annual food aid commitments reduced to four million metric tons.⁵⁶ This agreement has been periodically renewed in its existing form, most recently in June 1979 for a two year period. Agreement was also reached in 1979 to negotiate the Food Aid Convention separately from the I.W.A., and under the subsequent accord, subject to annual renewal, the guaranteed minimum level of food aid shipments was increased to 7.6 million metric tons.⁵⁷

From this history, past International Wheat Agreements based on multilateral contracts between importing and exporting nations cannot be considered successful instruments of wheat market stabilization. Their increasingly innocuous and passive character in the post-war era paralleled the implementation of production, stocking and trade policies by the major wheat exporters, noted earlier, to which the notable stability of the wheat market in this period has been correctly attributed. In the same way as the roots of the supposed success of the early post-war agreements can be found in the evolution of national

⁵⁶ Ibid.

⁵⁷ "Welcoming Food Aid Convention, FAO Director-General Calls Total Amount Short of Desirable Figure," FAO News, 14/80 (March 12, 1980).

policies, the bases of the failure of the 1968 agreement can be detected in policy developments. The contraction of export markets, in particular following the introduction of the E.E.C.'s Common Agricultural Policy, and the dissatisfaction of exporting countries with the level of world prices, leading to their insistence on increased minimum prices despite the objections of importing countries, can be cited as two factors that contributed to the failure of the agreement. Such factors illustrate both the inadequacy of past agreements themselves as market stabilizing mechanisms, and the basis on which market stability is rested.

International Wheat Reserves

The proposal to create an internationally controlled wheat reserve, the focus of recent discussions to increase the stability of the world wheat market, not unexpectedly, has a long history. A wheat reserve with price stabilization objectives was proposed as part of an International Wheat Agreement throughout the late 1930s and early 1940s.⁵⁸ A wheat reserve also formed prominent part of extensive post-war discussions conducted within the United Nations Food and Agriculture Organization. These proposals -- such

⁵⁸See C.F. Wilson, A Century of Canadian Grain, Chapters 28 and 31.

as a World Food Board, suggested in 1946 and intended to stabilize world market prices of agricultural commodities by including among its provisions the establishment of "a food reserve adequate for any emergency that might arise through failure of crops in any part of the world;"⁵⁹ a famine reserve, suggested by the Bruce Commission in 1947,⁶⁰ and an International Commodity Clearing House, incorporating a reserve as part of a program for stabilizing commodity transfers⁶¹ -- were given impetus by the same post-war turbulence in international commodity markets which gave rise to the 1949 International Wheat Agreement. Unlike the wheat agreements, however, agreement to implement the proposals was not reached before the waning of interest which accompanied the return of surplus conditions to world markets in the 1950s.

The most recent round of reserve negotiations also arose out of the disruption of world markets -- that which

⁵⁹ FAO, Proposals for a World Food Board, prepared for submission to the Second Session of the FAO Conference, Copenhagen, September 1946. (Washington, D.C.: FAO, 1946), cited in FAO, FAO Commodity Review and Outlook 1974-1975 (Rome: FAO, 1975), p. 40.

⁶⁰ FAO, Report of the FAO Preparatory Commission on World Food Proposals (Washington: FAO, 1947), cited in FAO, FAO Commodity Review and Outlook 1974-1975.

⁶¹ FAO, Report on World Commodity Problems (C49/10) (Washington: FAO, 1949), cited in FAO, FAO Commodity Review and Outlook 1974-1975.

took place in the early 1970s. The 1974 World Food Conference highlighted the role of a reserve in creating wheat price stability and averting food shortages and starvation in developing countries.⁶² One such international stock, the 500,000 metric ton International Emergency Food reserve, has been established under the auspices of the UN/FAO World Food Programme. Its effectiveness in responding to emergency situations has been hampered, however, by its small size, its reliance on voluntary contributions, and the inadequate level of support.⁶³

The creation of a larger reserve as part of a renewed International Wheat Agreement was also envisaged in the International Undertaking on World Food Security, endorsed at the 1974 conference.⁶⁴ Despite its stated support in 1974 for the creation of a reserve, it was not until the United States government in 1977 demonstrated renewed enthusiasm for international commodity agreements though, that movement toward the negotiation of a new wheat

⁶²FAO, International Undertaking on World Food Security, reproduced by the International Wheat Council, TD/Wheat 6/1, Annex III.

⁶³World Food Council, World Food Security for the 1980s, pp. 27-28.

⁶⁴FAO, International Undertaking on World Food Security.

agreement was evident.⁶⁵ Initial meetings between representatives of the four major exporting nations in early 1977, and the development of a joint exporter proposal led to the preparation of a draft convention by the International Wheat Council, and the calling of a world wheat conference in February 1978 under the auspices of UNCTAD.⁶⁶

In place of the longstanding system of agreed maximum and minimum prices within which trade was to take place, a system was to be established with internationally coordinated action tied to a set of indicator prices surrounded by three price bands. If the world price of wheat passed the innermost band, international consultations between importers and exporters would take place; if the world price continued to move past the second set of trigger points, an internationally coordinated reserve stock would be accumulated or released; and beyond the third set,

⁶⁵The changing stance of the United States is attributed to the 1976 change of Administration in the United States, and the introduction of the 1977 Food and Agriculture Act, which included provision for the holding of government supported reserves. See Anthony P. Elison, The Canadian Interest in an International Wheat Agreement, Discussion Paper No. 167 (Ottawa: Economic Council of Canada, 1980), p. 90.

⁶⁶"New international pact held likely for wheat," Globe and Mail (Toronto), March 18, 1977. "IWC asks UN to convene grain pact talks," Globe and Mail (Toronto), January 12, 1978.

exporters and importers would consult on appropriate modifications to agricultural and trade policies.⁶⁷

Discussion at the February 1978 conference, and the two subsequent negotiating sessions, focussed on resolving the differences between the major exporters and the E.E.C. on the two key issues of the price levels at which stocks were to be accumulated and released, and the size of the proposed reserve. While the European Community sought low price levels, a narrow range between floor and ceiling prices, and a reserve of approximately 20 million metric tons, the United States proposed both a higher floor and ceiling price and a wider price band, and a reserve stock of 30 million metric tons.⁶⁸ The two were able to agree on a compromise price range of U.S. \$140/200 per metric ton in February 1979, a year after negotiations first opened, only to encounter the opposition of the developing importing countries, led by Iraq and Tunisia, unwilling to accept an upper price trigger above U.S. \$160 per metric ton.⁶⁹ Their intransigence on this and several other points

⁶⁷ This description was taken from the testimony of W.M. Miner, head of the Grains Group of Industry, Trade and Commerce, before the Standing Senate Committee on Agriculture. Canada, Senate, Proceedings of the Standing Senate Committee on Agriculture, Fourth Session, Thirtieth Parliament, Issue No. 2 (February 28, 1979).

⁶⁸ "Wheat - Price Conference Deadlocked in Geneva," The New York Times, February 6, 1979.

⁶⁹ "Efforts fail to set up a new wheat treaty," Globe and Mail (Toronto), February 15, 1979.

led to the break up of the conference, and the decision to extend the skeletal 1971 I.W.A. until June 1981.

Subsequent discussion, conducted within a special committee of the International Wheat Council, has focussed on the development of an approach to market stabilization considered "more flexible" than the previously considered reserve stock and price bands.⁷⁰ Among the tentative elements of this proposal are the operation of a reserve much smaller than that earlier envisaged, the allowance for preferential access to reserves by developing countries, and the provision for flexible responses to market instability with action determined by consultation amongst members of the Council. The role envisaged for an international reserve is restricted to a response to "problems of insufficient or excessive supplies of wheat caused mainly by weather fluctuations in a particular crop year."⁷¹ Greater emphasis is placed on the importance of vaguely defined "additional measures" such as the coordination of national policies, as an appropriate response to

⁷⁰International Wheat Council, Second Meeting of the Special Committee, Draft Agenda item 2: Report by the Executive Secretary on alternative proposals for the preparation of a new Wheat Trade Convention (SC(79/80)2/2) (London: International Wheat Council, March 5, 1980).

⁷¹Ibid., p. 8.

longer term market problems.⁷²

Since the breakdown of the February 1979 negotiating conference, two additional proposals incorporating reserve measures have been advanced for discussion. The first, the F.A.O. Plan of Action on World Food Security was put forward at the Fifth Ministerial Session of the U.N. World Food Council in September 1979.⁷³ The plan consists of five sets of measures to guarantee world food security pending the successful conclusion of "negotiations on a new international grains arrangement with adequate stock, price and food aid provisions, and special provisions for developing countries, which is essential for an effective world food security system."⁷⁴ Among its provisions is the adoption of national food grain stock policies by all countries, with stocks managed to stabilize prices, avoid acute shortages and ensure that developing countries are able to meet their import requirements "on reasonable terms and without adversely affecting their economic development."⁷⁵

⁷²Ibid., p. 12.

⁷³World Food Council, World Food Security for the 1980s, Addendum, Plan of Action on World Food Security (WFC/1979/5/Add.1) (Rome: World Food Council, June 20, 1979).

⁷⁴Ibid., p. 1.

⁷⁵Ibid., p. 2.

The subsequent call by the Executive Director of the World Food Council for the creation of a 12 million metric ton international contingency reserve as part of a broader food crisis contingency plan shares these objectives.⁷⁶ The reserve, to serve as the nucleus of a renewed international wheat agreement, would have some price stabilizing impact as well as ensuring the physical availability of supplies in years of severe production shortfalls.

The shortcomings of international reserve schemes, as discussed to date, are several. In theoretical terms, it has been questioned whether the creation of an internationally controlled reserve will add to world stockholding activity, or merely replace the stocks formerly held by private traders and other participants in the market.⁷⁷ The assumption that by establishing an international reserve, the ratio of stocks to total supply will be increased and prices stabilized within a socially acceptable range may be

⁷⁶World Food Council, Food Crisis Contingency Planning, Report by the Executive Director (WFC/1980/4) (Rome: World Food Council, February 20, 1980).

⁷⁷This argument has been developed in Anne E. Peck, "Implications of private storage of grains for buffer stock schemes to stabilize prices," Food Research Institute Studies, Vol. 16, No. 3, (1977/78); and Anne E. Peck and Roger W. Gray, "Grain reserves -- unresolved issues," Food Policy, Vol. 5, No. 1 (February, 1980).

unjustified as a consequence.⁷⁸ A second concern raised in the theoretical literature relates to the impact of price stabilization on the level of output.⁷⁹ If the price of wheat is effectively stabilized, particularly in relation to the price movements of other temperate zone farm products, and if farmers respond to this reduced risk by increasing their output of wheat, downward pressure would be exerted on wheat prices. As a result, "buffer stocks could accumulate indefinitely at stabilized prices that would otherwise be reasonable."⁸⁰

The price stabilizing capability of a reserve must itself be questioned, however, given the factors which lead to price fluctuation in the world wheat market, noted earlier. Of the two sets of factors, those inherent in the market, and those related to national policies, recent

⁷⁸ Morrow notes that a public buffer stock will increase the total level of stockholding only if the acquisition and release prices of the stock are centred on the long-run average price and the price band is wide, or if the acquisition and release prices are centred above the long-run average price. See Daniel T. Morrow, The Economics of the International Stockholding of Wheat, Research Report No. 18 (Washington, D.C.: International Food Policy Research Institute, September, 1980), pp. 12-13.

⁷⁹ Richard E. Just, "Theoretical and Empirical Possibilities for Determining the Distribution of Welfare Gains from Stabilization," American Journal of Agricultural Economics, Vol. 59, No. 5 (December, 1977), p. 913.

⁸⁰ Ibid.

reserve proposals clearly represent a response to the former. By adding to supply when prices are high, and adding to demand when these are low, a reserve essentially increases the price elasticity of supply and demand. Consequently, the impact of changes in export supply and import demand, such as those related to climatic conditions, on the level of world price is reduced. The recent discussion of reserves within the International Wheat Council and the World Food Council gives explicit recognition to this focus. While the importance of national policy as a source of price instability has been noted in recent reserve proposals, the discussion of appropriate remedial action is invariably couched in vague terms.⁸¹

It may be concluded therefore that the importance attached to the creation of a reserve for the stabilization of world wheat prices is somewhat misplaced. It is not clear, for example, that such a reserve would greatly add to world-wide stockholding activity. Equally important, the proposals discussed to date have sought to deal with only

⁸¹ Although the most recent proposal under discussion in the International Wheat Council emphasizes the importance of "additional measures" (i.e. measures other than reserve stock actions) for the correction of serious market imbalances, such measures are not outlined in detail. See International Wheat Council, Second Meeting of the Special Committee, pp. 12-13.

one of the apparent causes of wheat price instability, that related to the inflexible nature of wheat supply and demand. To the extent that unstable prices are an outcome of policies pursued by the principal wheat trading nations, however, an international reserve alone will have only a limited impact on the reduction of price fluctuation.

The Multilateral Trade Negotiations

Ideally, the trade distorting impact of national policies affecting agricultural production, consumption and trade could have been reduced if not eliminated in the successive rounds of the G.A.T.T. Multilateral Trade Negotiations. Although from the outset, agricultural and industrial products were intended to be equally subject to trade liberalization efforts, however, the reduction of trade barriers has been largely confined to the industrial sector.

The relative failure to resolve agricultural trade issues may seem surprising in light of the stated commitment of major trading nations in both the Kennedy and Tokyo Rounds to the achievement of a satisfactory outcome. The statement of Christian Herter, chief U.S. negotiator at the Kennedy Round negotiations, "My Government will not be prepared to conclude negotiations until equitable tariff and trade arrangements have been developed for agricultural

products,"⁸² is remarkably similar to the more recent statement of Edward Schuh, Deputy Under Secretary for International Affairs and Commodity Programs, U.S. Department of Agriculture, commenting on the American position in the Tokyo Round: "... the U.S. Government repeatedly stated, 'No progress in agricultural matters, no MTN.'"⁸³ Yet in both rounds, concessions were limited to the reduction of tariffs applied to a number of agricultural products, a modest achievement given the more ambitious goals stated at the outset.

The willingness of the major industrial nations to negotiate national agricultural policy-related issues was perhaps most evident in the Kennedy Round.⁸⁴ Trade discussions conducted in conjunction with the renegotiation of the International Wheat Agreement brought out the differing objectives of the E.E.C. and the principal wheat

⁸²Press Release, U.S. Office of Special Representative for Trade Negotiations, May 17, 1963. Cited in MTN Studies 1, Results for U.S. Agriculture, A Report Prepared at the request of the Subcommittee on International Trade (Washington, D.C.: Government Printing Office, June 1979), p. 8.

⁸³G. Edward Schuh, "Agriculture and the MTN," Foreign Agriculture (July 1979), p. 7.

⁸⁴This discussion of agriculture in the Kennedy Round is drawn from Irwin R. Hedges, "Kennedy Round Agricultural Negotiations."

exporters. The E.E.C., in the midst of formulating its Common Agricultural Policy at the time, advanced the "montant de soutien" proposal as a basis for negotiation. For each commodity, a reference price was to be established, and the difference between this price and the support price in each country bound. The reference price would also serve as a minimum import price, and a levy would be imposed equivalent to the difference between the reference and the national support price. If import prices fall below the reference, an additional levy would be imposed to maintain the support level, in a manner similar to the E.E.C.'s variable import levy. In countering this proposal as it pertained to grains, wheat exporters proposed that importers establish a self-sufficiency index, set at about current levels, in order to assure exporters of access to markets. Both proposals would have imposed some constraint on the formulation of national agricultural policies. It became apparent over the course of negotiations, however, that an acceptable compromise could not be reached on either proposal. As a consequence, the only substantive Kennedy Round agreement affecting agricultural trade, apart from the 1967 International Grains Arrangement, dealt with the reduction of tariffs applied to a limited

range of agricultural products.⁸⁵

In a similar manner, the Tokyo Round Multilateral Trade Negotiations opened in 1973 with a particular commitment to deal with both agricultural trade issues and non-tariff barriers to trade.⁸⁶ The divergent objectives of the E.E.C. and the United States stymied progress in the negotiations until 1977, however. The U.S., consistent with its goal of opening markets for its agricultural exports, sought to negotiate together agricultural and manufactured trade issues. The E.E.C., on the other hand, in keeping with its Common Agricultural Policy, sought exceptional treatment for agriculture in the negotiations, expressing a preference for "managed market" solutions to agricultural trade issues.⁸⁷ The

⁸⁵In the Kennedy Round, the U.S. gave tariff concessions affecting US \$860 million in imports, and received concessions affecting US \$866 million in exports. See MTN Studies 1, Results for U.S. Agriculture, p. 10.

⁸⁶The declaration issued at the September 1973 GATT Ministerial Meeting (the Tokyo Declaration) emphasized the elimination or reduction of non-tariff barriers to trade, and the discussion of agricultural trade issues in line with the general objectives of the negotiations. See GATT Ministerial Meeting, Tokyo, 12-14 September 1973, Declaration, paragraphs 3(b) and 3(e), reproduced in Canada, Office of the Coordinator for Multilateral Trade Negotiations, Multilateral Trade Negotiations 1973-1979, Canadian Participation (Ottawa: Supply and Services Canada, 1979), pp. 128-131.

⁸⁷GATT, The Tokyo Round of Multilateral Trade Negotiations (Geneva: GATT, 1979), p. 19-20.

stalemate was only broken by the 1977 U.S.-E.E.C. compromise, by which it was agreed to conduct agricultural trade discussions separate from, but parallel to, other trade negotiations.⁸⁸

As in the Kennedy Round, though, final agreement was comprised primarily of tariff concessions, although limited and potentially significant progress was achieved on non-tariff issues. The volume of trade affected by tariff reductions, to be phased in over eight years, is large. The United States has estimated the 1976 value of agricultural exports affected by tariff changes to be \$U.S. 4.0 billion, equivalent to 23 percent of total U.S. agricultural exports in that year,⁸⁹ while the 1978 value of Canadian exports of agricultural products subject to tariff changes has been estimated at \$C 1.034 billion.⁹⁰ Of the several codes on non-tariff barriers to trade on which agreement was achieved, in particular that pertaining to subsidies and countervailing duties, as it affects the use of export subsidies, is judged to be of potentially

⁸⁸Ibid., p. 23.

⁸⁹G. Edward Schuh, "Agriculture and the MTN," p. 7.

⁹⁰J.S. Lahoar, "The Multilateral Trade Negotiations and Canadian Agriculture," Canadian Farm Economics, Vol. 14, No. 5 (October, 1979), Table 1, p. 2.

significant impact.⁹¹

National agricultural policies which constitute a major barrier to trade and which have contributed to the instability of world wheat prices, have emerged essentially unscathed from the two most recent rounds of GATT Multilateral Trade Negotiations. Despite statements of support for the negotiation within GATT of agricultural trade issues, it is apparent that the achievement of national farm support objectives is given high priority in most nations, and that there exists a general reluctance to open national economic policy, particularly as it affects agriculture, to international negotiation.⁹²

Conclusion

In this chapter, it has been argued that any assessment of international policies to increase the stability of world wheat prices must be based on an appreciation of the origins of price fluctuations. Two principal causes of wheat price instability have been identified: the relatively inflexible nature of wheat supply and demand and the susceptibility of the world

⁹¹Ibid., p. 8.

⁹²These points are made by T.K. Warley, "What Chance had Agriculture in the Tokyo Round?" The World Economy, Vol. 1, No. 2 (January, 1978), p. 178.

market to shifts in export supply and import demand due to natural causes; and the changing external impact of national agricultural policies adopted by the principal wheat trading nations. Understandably, each requires a different international policy response. Moreover, it is apparent that any attempt to stabilize the world wheat market by dealing with the first cause while ignoring the second will have little, if any, success. Thus, the creation of an international reserve, intended to mitigate the world price effect of production instability in exporting and importing regions, will not achieve its objective without the simultaneous elimination of the trade distorting impact of national agricultural policies. Given the intransigence evident in the negotiation of agricultural trade issues, it can be concluded that little can be gained, in terms of the reduction of wheat price fluctuations, by creating an internationally controlled reserve.

The current interest in the creation of a Food Financial Facility stands in marked contrast to this pessimistic outlook for the stabilization of wheat prices. Based on food import bill insurance proposals developed

by economists,⁹³ it has been the subject of recent discussion within the World Food Council⁹⁴ and the International Monetary Fund.⁹⁵ Such a facility could ensure that food importing countries have the financial capacity to purchase food imports when their import bill rises above trend levels due to either domestic production shortfalls or rising world prices. The proposal approaches the problems associated with price instability by dealing with the effects, rather than the causes. As a result, it may be readily implemented as it does not touch the entrenched political interests in importing and exporting nations which are affected by price questions.

⁹³Proposals have included those put forward by D. Gale Johnson and Daniel Sumner, "An Optimization Approach to Grain Reserves for Developing Countries"; Shlomo Reutlinger, "Food Insecurity: Magnitude and Remedies," World Development, Vol. 6, No. 6 (June, 1978); and P. Konandreas, B. Huddleston and V. Ramangkura, Food Security: An Insurance Approach, Research Report 4 (Washington, D.C.: International Food Policy Research Institute, 1978).

⁹⁴World Food Council, World Food Security for the 1980s, p. 28.

⁹⁵The discussion within the International Monetary Fund has been summarized in "Group of 24 Communiqué ... Larger Quota Share, Direct Link of SDR to Development Finance Among Goals," IMF Survey, Vol. 9, No. 19 (October 13, 1980); and "Is the IMF growing a softer heart, or just a softer head?" The Economist, October 4, 1980.

This effort notwithstanding, it can be argued that the fluctuation of world wheat prices will not be reduced by international policy action in the near future. An understanding of the effect of developed wheat exporting country policies on wheat price instability is thus important, particularly as wheat price fluctuations have a harmful impact on developing wheat importing countries, as noted in the previous chapter. A theoretical outline of the impact of the policies of wheat exporters on the level and variability of world wheat prices, and a detailed examination of Canadian policies will be presented in the two subsequent chapters.

CHAPTER 4

IMPACT OF WHEAT EXPORTING COUNTRY POLICIES ON WORLD MARKETS: THE THEORY

Introduction

Exporting country policies affecting wheat production, consumption, stockholding and trade can have a major impact on the level and variability of world wheat prices. In this chapter, these interrelationships will be analyzed using microeconomic theory. It is important to examine such linkages, for although both natural and policy related factors have been noted to be responsible for wheat price fluctuations, the latter have proved particularly difficult to resolve through international market management approaches. Consequently, from the Canadian perspective as both a wheat exporter and a country with a longstanding commitment to dealing with food-related issues as they affect Third World nations, it is vital to understand fully the impact of the principal exporting country wheat related policies on world markets.

Wheat and associated government policies have long played an important role in the agricultural development of Canada, Australia, Argentina and the United States, currently the four principal wheat exporting nations.¹

¹The European Economic Community is not included as a wheat exporter in this discussion.

Not surprisingly, the form of government involvement, and the characteristics of the wheat production and marketing system vary considerably across the four countries. The American system, for example, has been characterized by the private control of marketing and a complex and long-established system of price supports, deficiency payments, acreage controls and consumer subsidies.² Australian and Canadian government involvement has tended to be the opposite: government intervention affecting wheat production is more limited, and emphasis is placed instead on the provision of government sponsored marketing arrangements.³ In Argentina, meanwhile, government wheat policies, though marked by frequent changes, tended to depress producer prices, subsidize consumption and tax exports.⁴ Apart from Argentina, a general goal of agricultural policy common to wheat exporting countries has been the amelioration of the pace of rural adjustment and the stabilization or increase of farm prices and incomes.

²For a thorough description of American farm programs, see Willard W. Cochrane and Mary E. Ryan, American Farm Policy, 1948-1973 (Minneapolis: University of Minnesota Press, 1976).

³For a description of Canadian and Australian farm programmes, see T.K. Warley, Agriculture in an Interdependent World: U.S. and Canadian Perspectives (Montreal: Canadian-American Committee, C.D. Howe Research Institute, 1977); and T. Connors, The Australian Wheat Industry: Its Economics and Politics (Armidale, Austr.: Gill Publications, 1972).

Policies Affecting Production

A number of government programs act in a seemingly straightforward fashion to encourage or discourage wheat production. The provision of support prices by the Canadian Wheat Board and the United States government, for example, raises the returns to farmers when world wheat prices are low, resulting in an increase in production and the exportable surplus, and a downward adjustment in world price. Similarly, the provision of production subsidies will lead to a rightward shift in the supply function of the exporting country, while a production tax will have an opposite effect.

In a more indirect sense as well, the general structure of government assistance to economic activity has an impact on the level of wheat production. Government programs not only tax and assist the output of an industry; they act in a similar way to tax and assist the inputs the industry uses. Therefore, to obtain a more accurate indication of the net assistance provided to an economic activity, it is useful to examine the effective rate of protec-

⁴For an outline of Argentinian farm programs, see "Argentina: economic policy since April 1976," Bank of London and South America Review, Vol. 13 (May, 1978); and Lucio Rea, Argentina--Country Case Study of Agricultural Prices, Taxes and Subsidies, Staff Working Paper No. 386 (Washington, D.C.: World Bank, 1980).

tion. As outlined by Corden,⁵ the effective rate of protection serves as a measure of the protection (or assistance)⁶ provided to the value added activity in an industry. Thus, the level of the effective rate of assistance will affect the "price" of the value added activity, and consequently the level of activity and output in the industry.⁷ (For the calculation of the effective rate of assistance to wheat growing in Canada, see Appendix 5.1.)

In addition, the structure of government assistance programs, that is, the relative levels of effective assistance afforded different economic activities, will indicate the degree to which government programs assist any one activity. In the case of agriculture, at the most disaggregated level, it is important to note variations in the levels of effective assistance provided to activities which are close substitutes. Such an examination could indicate

⁵W.M. Corden, The Theory of Protection (Oxford: Oxford University Press, 1971), pp. 30-35.

⁶The Australian Industries Assistance Commission refers to this concept as the effective rate of assistance. As tariff protection is relatively insignificant for most grains, and other measures of assistance relatively more important, the term "effective rate of assistance" will be utilized throughout the remainder of the paper. See, Industries Assistance Commission, Assistance to Manufacturing in Australia 1968-69 to 1973-74 (Canberra: Australian Government Publishing Service, 1976).

⁷Corden, The Theory of Protection, p. 31.

whether government programs have encouraged farmers to shift into the production of one commodity which receives substantial assistance, and out of that of another which receives less assistance. More generally, a study of the relative levels of assistance available to different sectors of the economy would indicate whether one sector receives, in general, less assistance than others, and thus faces a disincentive to production. Furthermore, Johnson suggests an international comparison of levels of effective assistance is necessary to determine whether government programs encourage or discourage the location of productive activity within a particular country.⁸

Each of these three points is clearly pertinent to the world wheat industry. Anderson, for example, has shown that the effective rate of assistance received by different rural industries in Australia varies considerably,⁹ and Campbell has shown that the provision of assistance to the wheat industry during the 1950s at a time when the wool industry was suffering from low prices and was receiving little assistance, encouraged farmers to greatly

⁸ H.G. Johnson, "The Theory of Effective Protection and Preferences," Econometrica Vol XXXVI, No. 142 (May, 1969). Also included in H.G. Johnson, Aspects of the Theory of Tariffs (London: George Allen and Unwin, 1971), p. 333..

⁹ Kym Anderson, "On Why Rates of Assistance Differ Between Australia's Rural Industries," Australian Journal of Agricultural Economics Vol. 22, No. 2 (August 1978).

expand wheat production.¹⁰ Similarly, in Canada, the production of wheat rather than other grains has been encouraged by the provision of wheat storage subsidies,¹¹ and the maintenance of low freight rates applied to the shipment by rail of export wheat to port elevators.¹²

At a more general level, studies undertaken in Canada, Australia and the United States using input-output tables have shown that the effective rate of protection for agriculture is much lower than for most manufacturing activities.¹³ The importance of the international structure of assistance to production has also been demonstrated by the Canadian and American concern about the impact of the formulation of the E.E.C.'s Common Agricultural Policy, as expressed at

¹⁰Keith O. Campbell, "National Commodity Stabilization Schemes: Some Reflections Based on Australian Experience," International Explorations in Agricultural Economics, Roger N. Dixey, ed. (Ames: Iowa State University Press, 1964).

¹¹OECD, La Politique Agricole au Canada (Paris: OECS, 1973), pp. 42-43.

¹²Joseph G. Nagy, W. Hartley Furtan, Surendra N. Kulshreshtha, "The Implications of Change in the Crowsnest Pass Freight Rate on the Canadian Prairie Wheat Economy," Logistics and Transportation Review, Vol. 15, No. 5 (1979).

¹³To cite one example, Wilkinson and Norrie have calculated that, in the case of Canada, the effective rate of protection for agriculture (taken as the percentage decline in value-added following the elimination of protection) was .52 percent in 1970. This can be compared to the effective protection afforded the textile and clothing industries (generally in excess of 20 percent), and the weighted mean effective protection provided to manufacturing industry (12.71 percent). B.W. Wilkinson, K. Norrie, Effective Protection and the Return to Capital (Ottawa: Economic Council of Canada, 1975), Table 3.7, p. 49,

both the Kennedy and Tokyo Round Multilateral Trade Negotiations.

The form, as well as the relative level of government assistance is an important additional factor contributing to shifts in the exporting country's supply function. The decision to establish support prices, in Canada and the United States in the case of wheat, not only raises farmer returns when world prices are low, thus increasing production, but also reduces the risk of farmers receiving low and inadequate returns for their output. It has been suggested that the response of farmers to this reduced uncertainty is significant.¹⁴ The provision of a guaranteed return will increase the efficiency of resource use within the farm, encourage farmers to adopt yield-increasing technology and make greater use of purchased inputs (such as fertilizer, pesticides and irrigation), and promote the specialization between farms as farmers drop strategies of risk aversion (such as the decision to diversify their product mix). Also, to the extent that the prices of all commodities are not supported, farmers will be encouraged to shift into the production of those products

and Appendix Table A-1, p. 76. For American and Australian data, see L.J. Wipf, "Tariffs, Nontariff Distortions and Effective Protection in US Agriculture," American Journal of Economics, Vol. 53 (1971), and G. Motha, H. Plunkett, "The Effective Rate of Protection - An Investigation into the Application of the Concept to the Australian Rural Sector," Quarterly Review of Agricultural Economics Vol. XXVII, No. 3 (July 1974).

¹⁴D. Gale Johnson, Forward Prices for Agriculture. (Chicago: University of Chicago Press, 1947). Richard

covered by price support programs. The overall impact of a price support scheme (or, using the same reasoning, a price stabilization scheme), is a shift to the right of the exporting country's supply function, and an increase in the exportable surplus. Because these schemes are themselves subject to uncertainty, however, (witness the changes over the past decade in American price support programs) their supply increasing effect may be reduced.¹⁵

It is apparent from this discussion that a number of policy-related factors, in addition to straightforward production subsidies and taxes can lead to a shift in an exporting country's wheat supply function. Changes in the risk associated with the production of wheat and other commodities, as well as changes in the assistance provided to the production of inputs used by wheat producers, and to the production of commodities which compete for the use of the same resources, and changes in the broader national and international structures of assistance to economic activity will change the production incentives of farmers, and lead to a change in the quantity of output farmers in aggregate are willing to produce at a given price.

Policies Affecting Consumption

Exporting country governments also affect the stability of world markets through policies which tax or

E. Just, "Risk Response Models and Their Use in Agricultural Policy Evaluation," American Journal of Agricultural Economics, Vol. 57 (1975).

subsidize domestic wheat consumption. The United States, for example, has promoted the consumption of wheat with subsidies provided to poor consumers under the provisions of the Food Stamp Plan. The impact of this scheme, which increases the effective demand for wheat of poor consumers, has been to shift the United States' demand curve to the right and to decrease the country's exportable surplus, thus pushing up world prices.

No exporting country, however, taxes consumption in exactly the manner suggested by Corden (i.e. a proportional tax levied on wheat consumption).¹⁶ Both Canada and Australia, though, have established a government regulated home consumption price (HCP) which maintains the price paid for wheat by domestic consumers separate from the world price level. The Australian program, first implemented as part of the 1948-53 Wheat Industry Stabilization Plan, ties the domestic price of wheat to a measure of production costs. In a similar fashion, the Canadian program at its outset in 1969 sought to ensure that farmers received a price reflecting their production costs on that part of their wheat output destined for human consumption in Canada. The character of the program subsequently changed with the rapid wheat price increases of 1973-74, and it now has as its objective the protection of producers

¹⁵ Richard E. Just, "Risk Response Models," pp. 841-42.

¹⁶ W.M. Corden, The Theory of Protection, pp. 11-12.

and consumers respectively from excessively low and high world prices.

While a consumption subsidy affects the level of world prices, the establishment of a fixed HCP affects both the level and variability of world prices. The first assertion is illustrated in Figure 4.1 below. The exporting country government, in setting the price to be paid by domestic consumers at P_h , somewhat above the world price, P_w , reduces domestic demand from Q_1 to Q'_1 . As a result, the quantity of wheat available for sale in the international market at P_w increases from $Q_1 - Q_2$ to $Q'_1 - Q_2$. Because of the HCP scheme, at each level of world price below P_h , the quantity of wheat available for the export market will be greater, and at each level of world price above P_h , the export quantity will be less than would otherwise be the case. The consequent world equilibrium price, P'_w , established after the implementation of the HCP scheme and the associated shift of the export supply function (from E_s to E'_s), will be lower than the initial world price, P_w . In addition, to the extent that the scheme provides a guaranteed return to wheat producers and is not applied equally to the production of all agricultural commodities, the exporting country's wheat supply function will shift to the right.

Figure 4.1

The Impact of a Home Consumption Price Scheme on the Level of World Price

4.1a Importing Country

4.1b Exporting Country

4.1c World Market

The impact of a home consumption price, whether set above or below the current world price, on the variability of the world price is illustrated in Figure 4.2. An examination of the price fluctuation arising from a shift in the exporting country's excess supply curve (Figure 4.2b), and the importing country's excess demand curve (Figure 4.2a), indicates that the price variation associated with the excess supply function E'_s arising from the imposition of a home consumption price ($P'_1 - P'_2$ in both Figure 4.2a and 4.2b), is greater than the variation associated with the pre-existing excess supply function E_s ($P_1 - P_2$ in both figures).

Figure 4.2

The Impact of a Home Consumption Price Scheme
on the Variability of World Price

4.2a Shift in the
Excess Demand Function 4.2b Shift in the
Excess Supply Function

Policies Affecting Stockholding

The impact of exporting country policies on the level of stockholding activity will be discussed within the framework of the theory of optimal stockholding behaviour, as outlined by Gustafson,¹⁷ and more recently by Gardner¹⁸ and Morrow.¹⁹ In a single-country model of the wheat economy, with a given set of market parameters, a storage policy would be considered optimal if the difference between the expected sale price of a unit of wheat entering storage and the current price equalled the marginal cost of storage.

An example of an optimal storage rule in a one country model has been provided by Morrow and is illustrated in Figures 4.3a and 4.3b. As total supply (the current year's production plus carryover stocks from the previous year) increases above mean production, the optimal size of the carryover stock will also increase, although at a slower rate. Based on Gardner's calculations, Morrow concludes that for the world wheat economy as a whole, optimal carryovers

¹⁷ Robert L. Gustafson, Carryover Stocks for Grains, Technical Bulletin No. 1178 (Washington, D.C.: U.S. Department of Agriculture, 1958).

¹⁸ Bruce M. Gardner, Optimal Stockpiling of Grain (Lexington, Mass.: D.C. Heath and Company, 1979).

¹⁹ Daniel T. Morrow, The Economics of the International Stockholding of Wheat, Research Report No. 18 (Washington, D.C.: International Food Policy Research Institute, 1980).

increase in an approximately linear relationship with total supply, and that for a one unit change in total supply, the optimal carryover will change by .6 to .8 units.²⁰

Furthermore, the optimal storage rule affects the determination of price as well as storage activity. As shown in Figure 4.3b, total demand for wheat is comprised of demand for current consumption and demand for carryover stocks. Given the total supply of wheat in a given year, S_1 , the equilibrium price will be established at P_2 , and the available supply allocated between current consumption (quantity $0-Q_2$) and carryover stocks (quantity Q_1-Q_2).

Figure 4.3
Optimal Carryover Stocks of Wheat

Source: Daniel T. Morrow, The Economics of the International Stockholding of Wheat, Figures 1 and 2, p. 10.

With an optimal storage policy in place, the price fluctuation associated with a shift in supply (from S_1 to S_2) will be less than in the absence of a carryover stock ($p_1 - p_2$ as opposed to $P_1 - P_2$), although price fluctuations will not be completely eliminated.

A number of factors have been noted by Gardner to affect the specification of the optimal storage rule.²¹ They include the expected instability of future world wheat production, the price elasticity of demand for wheat, the marginal cost of storage, and the discount rate applied when calculating the present value of future benefits. For example, the greater the variability of production and the lower the price elasticity of demand, the cost of storing additional quantities of wheat, and the discount rate, the greater will be the size of the optimal carryover of wheat. In a multi-country model of the world wheat economy, additional factors influence the level of stockholding in a particular country, including the cost of storing wheat and the level of stockholding in other countries, and the relative degree of production instability in the various wheat producing areas. As noted by Morrow, "the efficient distribution of carryover stocks among countries is a continuously shifting, complex pattern...."²²

²⁰Morrow, International Stockholding, p. 9.

²¹Gardner, Optimal Stockpiling, p. 17.

²²Morrow, International Stockholding, p. 11.

As the cost of stockholding is considered to be lower in wheat exporting than importing countries (due to the lower cost of wheat and hence lower interest charges in wheat exporting countries), it could be expected that wheat exporters would store a disproportionate share of the world's carryover stocks. This tendency would be accentuated if, as suggested in the previous chapter, importing countries are increasingly choosing to rely on the manipulation of trade flows as a means of stabilizing internal prices. World Food Council data confirm this conclusion concerning the distribution of carryover stocks.²³ As shown in Table 4.1, the percentage of the world's stocks held by exporters in 1978-79 (69.0 %), has varied little since 1971-72. As a consequence, however, factors which affect exporting country stockholding activity will have a significant impact on the level of aggregate world stocks. While a number of such factors are closely linked to external forces, others may be influenced by exporting country government policy, among them the cost of stockholding and the degree of fluctuation of domestic wheat prices.

As suggested, government policy in Canada, the United States and Australia has influenced stockholding both directly, by subsidizing storage costs, and indirectly, by stabili-

²³World Food Council, Current World Food Situation, Note by the Executive Director (WFC/1979/2) (Rome: World Food Council, April 15, 1979), pp. 13-14.

zing the price of wheat consumed domestically. In 1969 Australia sponsored a program of storage facility construction as a means of dealing with an unusually large exportable surplus,²⁴ while Canada between 1956 and 1973 paid the carrying charges of Canadian Wheat Board stocks in excess of 180 million bushels.²⁵ The United States, under the provisions of the 1977 Food and Agriculture Act, currently supports the holding of carryover stocks on farms

Table 4.1

The Distribution of Wheat Stocks, 1971-72 to 1978-79

	<u>Main Exporters</u>		<u>Main Importers</u>		<u>Others</u>		<u>Total</u>
	million metric tons	% of total	million metric tons	% of total	million metric tons	% of total	million metric tons
1971-72	52	74.3	10	14.3	8	11.4	70
1972-73	33	70.2	7	14.9	7	14.9	47
1973-74	30	68.2	7	15.9	7	15.9	44
1974-75	33	68.8	8	16.7	7	14.5	48
1975-76	38	64.4	14	23.7	7	11.7	59
1976-77	55	64.7	22	25.9	8	9.4	85
1977-78	53	66.2	19	23.8	8	10.0	80
1978-79	58	69.0	18	21.4	8	9.5	84

Source: World Food Council, Current World Food Situation, Note by the Executive Director (WFC/1979/2) (Rome: World Food Council, April 15, 1979), table 7, p. 14.

²⁴Chris M. Alaouze, A.S. Watson, N.H. Sturgess, "Oligopoly Pricing and the World Wheat Market," American Journal of Agricultural Economics, Vol. 60, No. 2 (May 1978), pp. 175-76.

²⁵The Canadian government wheat storage subsidy under the terms of the Temporary Wheat Reserves Act will be discussed in the following chapter.

with interest-free loans.²⁶ The United States government has also held stocks directly, particularly during the 1950s and 1960s, as a by product of the price support program, although as noted by Peck, this was offset by a decline in private stockholding activity.²⁷ In a less direct sense, Canada and Australia have also reduced the level of stockholding by maintaining a stable home consumption price. With no price fluctuation permitted on the domestic market, there is no financial incentive for market participants to hold stocks for domestic use.

Marketing Policies

An additional facet of exporting country wheat policy to be considered for its impact on world market stability is that pertaining to marketing. While governments of all countries have become increasingly involved in the marketing of wheat and other food commodities since the end of the Second World War, two exporting country programs are of key interest: the provision of export subsidies (or the imposition of export taxes), and the longstanding efforts of exporting country governments to jointly control world wheat prices.

²⁶ See D. Gale Johnson, "The Food and Agriculture Act" of 1977: Implications for Farmers, Consumers and Taxpayers," in Contemporary Economic Problems 1978, William Fellner, project director (Washington: American Enterprise Institute for Public Policy Research, 1978).

²⁷ Anne E. Peck, "Implications of private storage of grains for buffer stock schemes to stabilize prices," Food Research Institute Studies, Vol. 16, No. 3 (1977/78).

Export subsidy programs are common to most wheat exporting countries, although perhaps they have been most characteristic of the United States' policy. Subsidies were provided on a regular basis during the 1950s and 1960s to promote the sale of large government-owned stocks of agricultural commodities accumulated as the result of price support programs. Canada and Australia, meanwhile, have not provided subsidies as such, but have encouraged the foreign sale of wheat and other commodities with credit provided on favourable terms. All three countries, in addition, have encouraged the concessional sale of wheat to developing countries as part of food aid programs. Argentina, on the other hand, has until recently imposed a tax on wheat exports.

A set of circumstances leading to the decision to offer an export subsidy, and the resulting impact, are illustrated in Figure 4.4. An exporting country may be faced with an especially large exportable surplus in a given year, a result of favourable weather conditions or government programs (such as the provision of a high support price, illustrated below), which subsidize production. An export subsidy, in effect subsidizing foreign consumption, serves as one alternative to storing the output which cannot be sold at an acceptable price.

Figure 4.4

The Impact of an Export Subsidy on Import Demand

4.4a Importing Country

4.4b Exporting Country

4.4c World Market

In Figure 4.4a exporting country farmers produce Q_1 with the encouragement of the government-maintained support price, P_s . At this price, however, the exporting

country's exportable surplus (Q_3 in Figure 4.4c) far exceeds the importing country's excess demand (Q_2). The provision of an export subsidy at the rate of $P'_w P_d / P_w$ will reduce the price of imports to P'_w , and increase the quantity of imports demanded. The import demand function will shift to the right as a consequence (from E_d to E'_d), as the quantity of imports demanded at any given level of world price will be greater with than without an export subsidy. As shown in Figure 4.4b, the benefits to the exporting country farmers are clear. The provision of a support price and an export subsidy leads to an increase in their production, from Q_0 to Q_1 , and an increase in export sales, from Q_4 to Q_3 . For the exporting country government, a balance is presumably struck between the program's benefits (increased producer returns, increased export returns,²⁸ reduced storage costs), and its costs (the export subsidy itself).

Related to this issue is the question of the market control exerted by the major wheat exporting nations. It has been suggested that the predominant market position of Canada, the United States, and more recently, Australia, their wheat storage capacity, the nature of their agricultural

²⁸ Whether export revenue will increase depends on the price elasticity of the importing country's demand for imports. If the elasticity were greater than one, export revenue would increase, and if it were less than one, export revenue would fall. See W.M. Corden, The Theory of Protection, p. 20.

policies, and, most importantly, their willingness to cooperate on price questions, has given rise to an oligopolistic market structure.²⁹ McCalla has noted the existence of a "cooperative duopoly" involving the United States and Canada between 1956 and 1964,³⁰ and Alaouze et al. have examined the restructuring of this arrangement to include Australia between 1969 and 1972.³¹

In the duopoly model outlined in Figure 4.5, it is suggested that Canada acts as a monopolist, setting price in order to maximize revenue, while the United States follows the Canadian pricing lead. This assumption is consistent with the importance of wheat export revenues to Canada, and the centralized control of the marketing of Canadian wheat output. The indirect control exerted by the American government over the pricing of wheat and its more flexible export policy, attributed to the American role as a world power have also been cited to justify this assumption.³²

²⁹For the development of this approach to the structure of the world wheat market, see Chaim Mendelsohn, "Approaches to International Trade Under Nonpure Competition, A Theoretical Framework for Analysis of Some Contemporary Problems of International Trade in Agricultural Products," Journal of Farm Economics, Vol. 39, No. 5 (1957); A.F. McCalla, "A Duopoly Model of World Wheat Pricing," Journal of Farm Economics, Vol. 48, No. 3, Part 1 (August 1966); J.H. Taplin, Demand in the World Wheat Market and the Export Policies of the United States, Canada and Australia, PhD. Thesis (Cornell University, 1969); and Alaouze et al., "Oligopoly Pricing." This discussion of market structure is drawn primarily from the last source.

³⁰McCalla, "A Duopoly Market."

Figure 4.5

A Duopoly Model of World Wheat Pricing

Source: Alaouze, et al, "Oligopoly Pricing," Figure 1, p. 175.

The export demand facing the two exporters, D' , is equivalent to the world demand for wheat exports, D , less that part supplied by competing exporters, S. Canada, holding the market to the left of the market share curve, D' , and acting as a monopolist, sets the price of wheat (P_1) at or near the point of unitary elasticity on the residual demand curve, where revenue is maximized (C), and the United States follows. However, as each country seeks to preserve a stable market share and is aware of how the

³¹Alaouze, et al, "Oligopoly Pricing".

³²Ibid., p. 174.

other will react to its pricing decisions, a range of export prices exists within which exports will be considered. Beyond P_1 , it is suggested, the United States will not follow the Canadian lead, and below a certain minimum, P_2 , Canada will prefer to hold stocks rather than sell. Price stability, at or about P' , should be the outcome of such a cooperative duopoly. That price fluctuation which takes place can be explained by changes in the residual demand curve which follow shifts in the supply curve of competing exporters who set their export prices so as not to be left with carryover stocks.

The duopoly's demise in 1965 and its eventual replacement in 1969 with a triopoly involving Canada, the United States and Australia, has been attributed to the actions of Australia.³³ By constructing storage facilities and choosing to hold stocks rather than market its entire surplus at whatever price was necessary, Australia joined the other two exporters in collusive action to stabilize the world wheat market. The termination of the arrangement in 1972-73 followed the unexpected large purchases of the USSR, which reduced exporter wheat stocks to minimal levels and eliminated a key element on which the exporter triopoly had been based.

Exporter cooperation such as that described above clearly can lead to the greater stability of wheat prices,

³³Alaouze, et al., "Oligopoly Pricing," pp. 176-77.

and as noted in the previous chapter, it has been considered the basic factor underlying the notable stability of wheat prices on the world market during the 1950s and 1960s.

Such cooperation is also vulnerable to disruption, however, emanating from a number of sources. Changes in the exportable surplus of countries not part of the cooperative arrangement, and sharp increases in the purchases of importing countries, leading to the rapid depletion of exporting countries' carryover stocks, can destabilize the system of oligopoly pricing and cause sharp fluctuations in the level of world wheat prices.

Conclusion

From this discussion, it is apparent that the policies of developed wheat exporting countries can have an impact on the level and variability of world wheat prices, the effects of which in turn are experienced by wheat importing developing countries. The assistance to wheat growing by exporting country governments, in terms of both the level of effective assistance and the impact of policy on the risk associated with wheat production, as well as exporting country policies affecting wheat marketing, stocking and domestic consumption, can influence the size of the exportable surplus, and hence, the level of world price. As well, year to year variations in these policies, as well as changes in the form of the excess

supply function associated with exporting country policy, can influence the variability of world wheat prices. In this light, the implications of Canadian policies for the stability of world wheat prices will be discussed in the following chapter.

CHAPTER 5

THE IMPACT OF CANADIAN POLICY ON WORLD WHEAT MARKET INSTABILITY

Introduction

Canadian agricultural policy over the period to be examined in this chapter, 1968 to 1978, has been marked by relatively few changes at the general level of goals and objectives. In more specific terms, however, the effect of policy has varied significantly during this time, due to the discontinuation of long-established programs, the introduction of new ones, and the changing impact of existing measures. The fluctuating impact of Canadian government policy on the production, consumption, storage and trade of wheat forms the subject of this chapter. From an examination of government wheat related programs and an assessment of the Canadian position in the world wheat market, it will be argued that Canadian policy has contributed to the instability of world wheat prices between 1968 and 1978. For Canada, this world price destabilizing impact of domestic policy is seemingly at odds with the stated Canadian commitment to the stabilization of world wheat markets, a point which will be discussed in the conclusion to this chapter.

Canada in the World Wheat Market

The share of the world wheat market held by Canadian exports at the end of the 1960s and the end of the 1970s is shown in Table 5.1. In this table, three-year average export volumes have been calculated in order to establish the general trend of export market shares. The data in Table 5.1 illustrate not only the predominant role of the United States in the world wheat market, but also the important position of Canada, which accounted for 21.0 percent of all wheat exports in the most recent three year period, a share which has increased over the 18.2 percent of the world market it held at the end of the 1960s.

Table 5.1

Wheat Exporters in the World Market,
1967/8 - 1969/70 and 1976/7 - 1978/9

Country	Average 1967/8 - 1969/70		Average 1976/7 - 1978/9	
	thousand metric tons	% of total	thousand metric tons	% of total
Argentina	2,088	4.3	3,854	5.7
Australia	6,543	13.4	8,916	13.3
Canada	8,867	18.2	14,091	21.0
E.E.C.	5,512	11.3	5,247	7.8
U.S.A.	17,124	35.2	30,113	45.0
U.S.S.R.	5,456	6.4	1,767	2.6
Others	3,102	6.4	3,080	4.6

Source: calculated from International Wheat Council, World Wheat Statistics, various.

Taken together, Canada, Australia and the United States, the three principal wheat exporters, accounted for 79.3 percent of the world wheat market between 1976/7 and 1978/8, a share somewhat above the 66.8 percent of the market they held ten years earlier.

As noted in Chapter 2, the increase of developing country imports of wheat has outpaced the growth of the world market in recent years. This trend has been reflected in the rising volume of export shipments from the three major exporters to developing countries, and in the case of Canada and Australia, the increasing share of total exports accounted for by developing countries as well, as shown in Table 5.2. Again, using three-year average data, developing country wheat purchases from the United States increased by 50 percent between 1967/8 - 1969/70 and 1976/7 - 1978/9, while their purchases from Canada and Australia more than doubled. Large increases in Soviet and Japanese purchases were also recorded, although European purchases from two of the three exporters declined.

In both absolute and relative ~~terms~~, Canada has not been as active as Australia and the United States in exporting wheat to the developing countries. In part, this may be explained by the greater proximity of Australia and the United States to major export markets in Asia and South America, respectively. Canadian wheat exports to developing countries have risen sharply, however, and the importance

Table 5.2

The Markets for the Wheat Exports of the U.S.A., Canada and Australia, 1967/8 - 1969/70 and 1976/7 - 1978/9

Destination:	U.S.A.			Canada			Australia		
	1967/8 - 1969/70			1967/8 - 1969/70			1976/7 - 1978/9		
	thousand metric tons	% of total	% of total	thousand metric tons	% of total	% of total	thousand metric tons	% of total	% of total
Developed	4,774	27.8	6,467	4,236	47.7	4,140	2,057	31.5	1,213
Western Europe	2,260	13.2	2,756	3,030	34.1	2,821	1,121	17.2	70
Japan	2,149	12.5	3,216	1,138	12.8	1,303	913	14.0	1,132
Others	365	2.1	495	68	.8	16	23	.4	11
Developing	12,316	71.9	18,434	1,732	19.5	4,679	2,470	37.7	5,005
Central and South America	3,017	17.6	5,486	709	8.0	2,267	323	4.9	98
Asia	8,208	47.9	8,311	773	8.7	1,259	1,798	27.5	3,466
Africa	1,088	6.4	4,637	249	2.8	1,153	258	3.9	1,340
Other	3	-	-	1	-	-	91	1.4	108
Eastern Europe & U.S.S.R.	22	.1	4,175	1,152	12.9	2,434	-	-	253
P.R. China	-	-	945	1,775	19.9	2,810	2,015	30.8	2,245
Total	17,124		30,113	8,867		14,091	6,543		8,916

Source: calculated from data contained in International Wheat Council, World Wheat Statistics, various.

of these markets has been reflected in the market development objective of the Canadian food aid program,¹ the recent agricultural trade mission activity in developing countries,² and the development of export credit programs, designed in part to facilitate developing country purchases of Canadian wheat.³

Canada, thus, has sought an increasingly important role in meeting the food needs of wheat importing developing countries. In a less direct sense as well, Canada will have a significant impact on these nations by virtue of the Canadian position in the world wheat market and the potential impact of Canadian wheat programs on the level and stability of world wheat prices.

Canadian Wheat Policies and Programs

The general objective of both Canadian and American agricultural policy have changed little in the period following the Second World War, according to Warley.⁴ They

¹For an outline of the objectives of the Canadian food aid program, see Theodore Cohn, Canadian Food Aid: Domestic and Foreign Policy Implications (Denver: University of Denver, Graduate School of International Studies, 1980).

²Reports of a wide range of agricultural trade missions to developing countries have been carried in the newsletter of the Department of Industry, Trade and Commerce. See Canada Commerce, Newsletter, Vol. 2, No. 1 (January 1979), Vol. 2, No. 3 (July 1979) and Vol. 3, No. 1 (May 1980).

³For an outline of the development of the export credit program related to wheat, see Canadian Wheat Board, Annual Report 1972/73, p. 28..

have included, at the domestic level, the redistribution of incomes to producers, the enhancement of market stability, and the amelioration of the pace of rural and farm adjustment.⁵ Due to the small domestic market, Canadian policy has also long recognized the importance of international markets, and the impact of world market instability on agricultural producers. This concern has been reflected in the Canadian participation in international efforts to stabilize the world wheat market, as well as in the evolution of domestic policies.

Canadian government policy related to wheat has been distinguished from American policy, however, by the limited use of support prices, a reliance on commercial export markets, and the pervasive public involvement in all aspects of wheat marketing.⁶ The central government-sponsored institution active in wheat marketing has been the Canadian Wheat Board (C.W.B.). Created in 1935 and given a monopoly on the marketing of Prairie-grown wheat in 1943,

...the Canadian Wheat Board, through its power to fix a minimum price, through its power to receive Dominion financing, and through its

⁴T.K. Warley, Agriculture in an Interdependent World: U.S. and Canadian Perspectives (Montreal: Canadian-American Committee, C.D. Howe Research Institute, 1977).

⁵Ibid., p. 11.

⁶Alex F. McCalla, Andrew Schmitz, "Grain Marketing Systems: the Case of the United States versus Canada," American Journal of Agricultural Economics, Vol. 61, No. 2 (May 1979).

power to transfer deficits to the Dominion government, really acted as a buffer between chaotic conditions in the international wheat market [during the late 1930s]⁷ and the farmers on the land in Western Canada.

The C.W.B. controls the marketing of wheat grown in Western Canada by allocating each producer a delivery quota based on the producer's cultivated acreage.⁸ The aggregate delivery quota for all producers is based on C.W.B. estimates of export and domestic sales and working reserve requirements. Upon delivery, the producer is paid the "initial price", an amount generally below the final price realized by the Board, but guaranteed by the federal government should the realized price be lower. When the sale is completed, the producer receives a final payment, equivalent to the difference between the realized price and the initial price, less C.W.B. expenses. Export sales are conducted by the Board either directly, through negotiations with central purchasing agencies in importing countries, or through such intermediaries as the privately owned grain trading companies.

This long established government involvement in the wheat economy did not, however, prevent the emergence of problems affecting the wheat sector during the 1960s.⁹ Rising input costs and low world wheat prices reduced producer

⁷T.W. Grindley, et al., The Canadian Wheat Board 1935-46 (Ottawa: King's Printer, 1947) pp. 7-8, cited in Vernon C. Fowke, The National Policy and the Wheat Economy (Toronto: University of Toronto Press, 1957, paperback edition, 1978), p. 266.

⁸This description is derived from Andrew Schmitz, Alex F. McCalla, "The Canadian Wheat Board", in Agricultural Marketing Boards - An International Perspective, Sidney Hoos, ed. (Cambridge, Mass.: Ballinger, 1979), pp. 84-89.

returns, and led to large advance payments under the terms of the Prairie Grain Advance Payments Act. Despite tight C.W.B. delivery quotas, wheat carryover stocks mounted, and federal payments under the Temporary Wheat Reserves Act to reimburse the C.W.B. for the costs of storing wheat stocks in excess of 180 million bushels rose to record levels.

The response to these developments, advocated by the Federal Task Force on Agriculture in its 1969 report Canadian Agriculture in the Seventies, was that the federal government should discontinue the wheat storage subsidy and advance payment programs, institute a program of wheat acreage reduction, and implement a program to stabilize the price of Prairie-grown grains.¹⁰ The implementation of the L.I.F.T. (Lower Inventories for Tomorrow) program in 1970, the discontinuation of the Temporary Wheat Reserves Act in 1973, and the passage of the Western Grain Stabilization Act in 1976, under which the net income of Prairie grain producers was to be stabilized, reflected the intent of these recommendations.¹¹

Other agricultural program changes between 1968 and 1978 also reflected the increasing government concern with the stabilization of the farm sector. Amendments passed in 1973 to the Crop Insurance Act increased government contributions to farmers' premium payments, leading to a rapid expansion of program coverage¹², and 1975

⁹ J. Clayton Gilson, "The Agricultural Task Force Report - The Ben fit of Hindsight", Canadian Journal of Agricultural Economics, Vol. 28, No. 2 (July, 1980).

¹⁰ Canada, Federal Task Force on Agriculture, Canadian Agriculture in the Seventies (Ottawa: Queens

amendments to the Agricultural Stabilization Act increased the level at which prices for a number of agricultural commodities would be supported.¹³ Although not affecting the wheat sector, the passage of the Farm Products Marketing Agencies Act in 1971, and the ensuing establishment of national egg, turkey and chicken marketing agencies in 1973, 1974 and 1979 respectively,¹⁴ is also evidence of rising government involvement in farm sector stabilization.

To assess the impact of government policy on the world wheat market, three programs in addition to those outlined above will be examined. The two-price wheat program, since its inception in 1969, has limited the impact of world price movements on the Canadian consumption of wheat, and on the production of wheat in Canada for domestic consumption. The evolution of this program is outlined in Appendix 5.1. The Crow's Nest Pass system of freight rates will also be included in this survey. The rates charged for the movement by rail of wheat to export positions have remained unchanged since 1927, although the cost of providing the service has increased considerably.

Printer, 1969), pp. 130-133.

¹¹Gilson, "The Agricultural Task Force Report", pp. 6-7.

¹²See Canada, Agriculture Canada, Annual Report of the Minister under the Crop Insurance Act, various.

¹³See Canada, Agriculture Canada, Agricultural Stabilization Board Annual Report 1975/76.

¹⁴Gilson, "The Agricultural Task Force Report", p. 7.

As a consequence, the rate structure embodies a substantial subsidy element. Finally, government assistance to the export of wheat will be considered for its effect on world markets.

The impact of Canadian policy on the level and variability of world wheat prices is considered on outcome of policy-related changes in Canadian wheat production, consumption, storage and trade, and thus in the supply of wheat available for the export market. It is also considered an outcome of policy-related shifts in the shape of the Canadian wheat export supply function associated with a home consumption price scheme, as outlined in the previous chapter, and changes in the incentives provided for stockholding activity. It will be argued below that Canadian government policy between 1968 and 1978, a period of considerable wheat market turbulence, acted to exacerbate price instability in the world wheat market.

The Impact of Policy on Wheat Production

Over the study period, Canadian policy has increasingly served to insulate wheat producers from risks associated with crop failure and low prices, thus increasing the output farmers in aggregate are willing to produce at any given price level. Coverage under the federal-provincial crop insurance program has expanded rapidly, particularly following 1973, and wheat has accounted for a large share of total program coverage.¹⁵ As well, under the Western Grain Stabilization Act, participating Prairie grain producers

receive some assurance of a steady level of income, although wheat and other grain prices may fall.¹⁶

The federal government, through the Canadian Wheat Board (in western Canada) and the Agricultural Stabilization Board (in other parts of the country) has also provided a low level of wheat price support, as shown in Table 5.3. In the case of wheat, though, on only two occasions

Table 5.3

Support Prices for Canadian Wheat Production,
1967-68 to 1978-79

<u>Year</u>	<u>Prairie Grown Wheat¹ \$/metric ton</u>	<u>Wheat Grown Outside the Prairies² \$/metric ton</u>
1967-68	62.46	50.28
1968-69	62.46	51.75
1969-70	55.12	52.85
1970-71	55.12	53.58
1971-72	53.65	54.68
1972-73	53.65	55.78
1973-74	82.67	56.52
1974-75	82.67	n.a.
1975-76	82.67	n.a.
1976-77	110.23	n.a.
1977-78	110.23	n.a.
1978-79	128.60	115.24

1. Prices are for No. 1 Northern or No. 1 C.W.R.S.

2. Prices are for Canadian Eastern, No. 2 or better.

Sources: Canadian Wheat Board, Annual Report 1978/79,
Table XXIV, p. 21.
Agricultural Stabilization Board, Annual Report,
various.

¹⁵Canada, Agriculture Canada, Annual Report of the Minister under the Crop Insurance Act, various.

¹⁶The provisions of the Western Grain Stabilization Act, and other programs affecting wheat production are outlined in Appendix 5.1.

have support payments been made. In the 1968-69 crop year, the initial payment to western wheat producers exceeded the price realized by the C.W.B., and the federal government provided a payment of \$39,787,979 to reimburse the C.W.B. for the resulting deficit;¹⁷ and in 1979, the Minister of Agriculture announced that the 1977 eastern wheat crop had been "designated" to receive price support at the level of \$3.14/bushel, leading to the payment of \$16,843,736 to producers in the 1978-79 fiscal year.¹⁸

The federal government has also more directly affected the level of wheat output by providing assistance to production in the form of subsidies (or taxes) on inputs and output. From estimates of the value added in the wheat growing sector with and without assistance, the effective rate of assistance (ERA) has been calculated, serving as a measure of the impact of government assistance programs on the value added activity in the wheat growing sector. The E.R.A. for each of the study years is presented in Table 5.4, and the data and calculations on which it is based are outlined in Appendix 5.1. The first estimate, E.R.A.₁ is a measure of the rise in value added which can be attributed to government assistance policies, while the second E.R.A.₂, indicates the fall in value added that would accompany the discontinuation of assistance.

¹⁷Schmitz and McCalla, "The Canadian Wheat Board," p. 85.

¹⁸Canada, Agriculture Canada, Agriculture Stabilization Board, Annual Report 1978/79.

Table 5.4

The Effective Rate of Assistance (E.R.A.)
for Wheat Growing, 1968-1978

<u>Year</u>	<u>E.R.A.₁</u>	<u>E.R.A.₂</u>
1968	17.91%	12.61%
1969	11.87%	10.61%
1970	29.04%	22.51%
1971	25.76%	20.48%
1972	32.03%	24.26%
1973	7.61%	7.08%
1974	2.85%	2.77%
1975	5.44%	5.16%
1976	6.88%	6.44%
1977	16.37%	14.07%
1978	15.54%	13.45%

E.R.A.₁ = $\frac{\text{value added with assistance} - \text{value added without assistance}}{\text{value added without assistance}}$

E.R.A.₂ = $\frac{\text{value added with assistance} - \text{value added without assistance}}{\text{value added with assistance}}$

Over the eleven year period, the effective rate of assistance to wheat growing has varied considerably. At its peak in 1972, a year of low world wheat prices and substantially increased subsidies on output, government assistance comprised over 24 percent of the value added in the wheat growing sector. The drop in the E.R.A. over the following two years in turn was a product of rising world wheat prices and a sharp decline in the dollar value of government output subsidies. The more recent increase in the E.R.A reflects the increased provision of both input and output subsidies.

Data outlined in Table 5.5 indicate that the structure, as well as the level, of assistance to wheat production has shifted over the eleven years. Prior to 1973,

Table 5.5

Wheat Input and Output Subsidies, 1968-1978 (million Canadian dollars)

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
<u>Output Subsidies:</u>											
Crow's Nest Pass Freight Rates	40.5	32.2	54.2	68.0	81.0	82.1	74.2	104.0	109.8	166.5	175.9
Two Price Wheat Program	4.6	3.4	10.9	12.4	69.8	(16.7)	(38.6)	(12.2)	.6	8.4	-
Temporary Wheat Reserves Act	44.5	62.0	34.3	67.9	37.1	11.3	-	-	-	-	-
Prairie Grain Advance Payments Act	1.8	7.2	7.6	3.4	1.1	.9	1.8	1.1	1.5	2.0	2.8
Agricultural Stabilization Act	-	-	-	-	-	-	-	-	-	-	12.6
C.W.B. Support Price Payment	39.8	-	-	-	-	-	-	-	-	-	-
TOTAL OUTPUT SUBSIDIES	131.2	104.8	107.0	151.8	189.0	77.6	37.3	92.9	111.9	126.9	191.3
<u>Input Subsidies:</u>											
Western Grain Stabilization Act	-	-	-	-	-	-	-	-	33.5	35.0	33.4
Crop Insurance Program	1.4	1.5	1.2	1.2	1.6	6.9	14.6	24.4	31.4	36.5	29.8
Oil Price Program	(1.8)	(2.0)	(1.2)	(2.0)	(1.6)	(2.4)	10.4	12.6	13.7	11.9	9.5
TOTAL INPUT SUBSIDIES	(.4)	(.5)	-	(.8)	-	4.5	25.0	37.0	78.6	83.4	72.7

Source: See Appendix Tables 5.1.5 and 5.1.8.

assistance was comprised largely of output subsidies associated with the Crow's Nest Pass Freight rates, and the Temporary Wheat Reserves Act. Smaller transfers to producers also took place under the provisions of the Prairie Grain Advance Payments Act and the two price wheat program, while the assistance provided to inputs was negligible.

Between 1973 and 1975, although government assistance to inputs rose, due to rising contributions under the crop insurance program and a change in the objectives and impact of the domestic oil price program, assistance to output fell. This decline was associated with the two price wheat program, which acted to reduce producer returns, and the discontinuation of storage subsidy payments under the Temporary Wheat Reserves Act. Following 1975, assistance to both inputs and output rose. Government assistance under the crop insurance and western grain stabilization programs increased, while the assistance to output, composed almost exclusively of the subsidy embodied in the Crow's Nest Pass freight rates, also rose.

From this analysis, it is apparent that changes in the level of assistance provided by government to value-added activity in the wheat sector have moved in the opposite direction to changes in the level of the world price of wheat over the eleven year study period. As wheat prices declined in the late 1960s and early 1970s, assistance levels rose, while between 1973 and 1975, a period of high world

prices, both the rate and absolute level of assistance fell sharply. The more recent decline of world wheat prices, in addition, has been accompanied by an increase in the level of assistance.

The impact of these trends on the stability of the world wheat market is two-fold, it is argued. Over the longer-term, the variation in assistance may have stabilized the level of Canadian wheat output. High levels of assistance in the late 1960s and early 1970s, increasing producer returns, encouraged the production of wheat at a volume greater than would have otherwise been the case, as world prices were at a low level. Falling levels of assistance between 1973 and 1975 may have somewhat reduced the production incentive provided by rising world wheat prices. Given the lag between price changes and the response of output levels--one year, possibly more--it may also be the case, however, that the impact of this decline in assistance on production incentives was not immediate. This argument suggests, therefore, that the assistance provided by government has tended to stabilize the level of Canadian wheat output, and thus, the size of Canada's exportable wheat surplus.

At the same time, however, it is also possible that such policies have destabilized world wheat prices. Policies that encouraged production during the 1960s and early 1970s in other wheat exporting countries in addition to Canada,

contributed to the relatively abundant supplies on the world market, and led to the further decline of world wheat prices. The abrupt change in 1972 from a position of abundant supplies to one of tight supplies in the world market, a situation which persisted until mid-1976, led to a smaller response of output levels in exporting countries than would have been the case in the absence of assistance programs. Wheat production, which had been highly assisted in the earlier period, was already at a relatively high level, and the increase in world prices brought about a smaller increase in producer returns because of the assistance program's stabilizing impact. Canadian assistance programs, it is argued, have increased world wheat price instability by the very act of stabilizing Canadian producers' returns and wheat output: the already low prices of the 1960s and early 1970s were pushed still lower, and the post-1972 rise in world prices was exacerbated.

Impact of Policy on Domestic Wheat Consumption

In a similar fashion, government policy has insulated Canadian consumers from the full impact of changing world wheat prices. Under the provisions of the two price wheat program, the price charged Canadian millers for purchases of wheat destined for human consumption in Canada was somewhat above the world price, between 1968 and 1972. From 1973 to mid-1977, however, the price charged Canadian millers was significantly below the world price. Estimates of the

subsidy (or tax) on consumption associated with the program are presented in Table 5.6 and the data and calculations on which the estimates are based are outlined in Appendix 5.2.

These data indicate that the taxing impact of the two price program was greatest in 1971, at which time the home consumption price was approximately 12 percent above the prevailing world price. By 1973, and for the following two years, the impact of the program was quite different, as the domestic price was held at a level more than 30 percent below the current world price at that time. It can be concluded that, as a result of the two price program, domestic consumption was lower between 1968 and 1972, and in 1977, years of low world prices, and higher between 1973 and 1976 and in the first months of 1978, years of high prices, than would have been otherwise. The actual quantity of wheat consumption affected by the program may be small, however, due to the low price elasticity of demand for wheat in Canada, estimated at $-.05$ by the U.S. Department of Agriculture.¹⁹

The Impact of Policy on Wheat Carryover Stocks

While the government has not directly engaged in stockholding activity, it is apparent that Canadian policy has influenced the level of carryover stocks held in Canada.

¹⁹ U.S. Department of Agriculture, Alternative Futures for World Food in 1985 (U.S. Department of Agriculture, Economics, Statistics and Cooperatives Service, 1978), cited in World Bank, Price Prospects for Major Primary Commodities, Report No. 814/80 (Washington: World Bank, January 1980), Table 16, p. 159.

Table 5.6
The Consumption Subsidy (Tax) Impact of the Two Price Wheat Program

Year	Domestic Consumption Valued at Export Prices (million dollars)	Domestic Consumption Valued at the Home Consumption Price (million dollars)	Total Subsidy (Tax) (million dollars)	Subsidy (Tax) as a % of Domestic Consumption Valued at Export Prices
1968	116.9	117.5	(.6)	(.47%)
1969	119.5	122.9	(3.4)	(2.82%)
1970	113.4	124.3	(10.9)	(9.60%)
1971	106.3	118.7	(12.4)	(11.68%)
1972	122.2	125.1	(2.9)	(2.41%)
1973	259.4	175.2	84.2	32.46%
1974	372.0	217.2	154.8	41.60%
1975	358.8	234.5	124.3	34.64%
1976	284.5	231.0	53.5	18.80%
1977 ¹	230.3 ¹	232.7 ¹	(2.4)	(1.03%)
1978 ¹	168.8	150.6	18.2	10.77%

¹ January to July only.

Source: See Appendix 5.2.

Two programs have been specifically directed at stockholding activity. The federal payment of carrying charges for C.W.B. stocks in excess of 180 million bushels (4.90 million metric tons) between 1954 and 1973 was one of several factors contributing to the build-up of carryover stocks during the 1960s. The 1970 L.I.F.T. program, on the other hand, was implemented to reduce carryover stocks which at the end of July, 1970 were equivalent to 150 percent of the previous year's wheat production. It has been estimated that in the absence of the L.I.F.T. program of wheat acreage diversion payments, wheat carryover stocks in Canada would have increased by 240 million bushels (6.54 million metric tons) in 1971.²⁰

In addition, from the analysis of optimal stockpiling behaviour presented in Chapter 4, it is evident that the magnitude of wheat price fluctuations is an important factor influencing stockholding activity. Thus, by reducing the fluctuation of wheat prices in the domestic market, the government has limited the opportunities for profitable stockholding, and so tended to discourage stockholding activity.

Between 1968 and 1978, it can be concluded that the Canadian government shifted from a policy of encouraging stockholding, to one of limiting stockholding incentives. Wheat storage subsidies were discontinued in 1973; a program

²⁰R.K. Sahi, W.J. Craddock, "Estimating the Effects of Operation LIFT on 1970 Prairie Land Utilization," Canadian Farm Economics, Vol. 6, No. 5 (December 1971), p. 6.

of production control was instituted in 1970 to reduce stocks; and, following 1969, the fluctuation of domestic wheat prices was limited. While other factors are undoubtedly linked to the fluctuation of Canadian wheat carryover stocks, shown in Table 5.7, it is also likely that the changing impact of Canadian policy was partly responsible.

Changing stockholding incentives provided by government between 1968 and 1978 may also have had some impact on the size of the exportable surplus of wheat. Government storage policies in the late 1960s somewhat reduced Canada's exportable surplus by permitting the government subsidized accumulation of carryover stocks. Operation L.I.F.T. in 1970, while reducing carryover stocks, also reduced wheat production, and had no net impact on the level of the exportable wheat surplus. The 1973 discontinuation of government storage payments for C.W.B. stocks in excess of 4.90 million metric tons also had little effect on the size of the exportable surplus. Carryover stocks at that time fell largely in response to the strengthening of prices on the world wheat market, and it was this decline that led to the discontinuation of payments under the Temporary Wheat Reserves Act. Since that time, however, the relative lack of stockholding incentives may have discouraged any build-up of stocks, and so increased the exportable surplus.

Table 5.7Canadian Wheat Carryover Stocks, 1968-1978

<u>Year</u>	<u>Wheat Carryover</u> <u>July 31</u> (thousand metric tons)
1968	11,689
1969	13,053
1970	12,682
1971	9,235
1972	7,410
1973	6,815
1974	7,884
1975	6,405
1976	6,401
1977	6,160
1978	7,108

Source: Canadian Wheat Board, Annual Report 1978/79,
Table X, p. 7.

The Impact of Export Assistance Policies

The Canadian government, through the Canadian Wheat Board and the Export Development Corporation (E.D.C.), has sought to facilitate export sales of Canadian wheat with the provision of medium and long term credit. Similarly, the Canadian food aid program from its inception in 1950 has had, as part of its objective, the disposal of surplus commodities and the development of Third World markets for Canadian agricultural exports.²¹

These objectives notwithstanding, the volume of wheat exports covered by the food aid and export credit programs has not been large, as illustrated in Table 5.8.

²¹Cohn, Canadian Food Aid: Domestic and Foreign Policy Implications.

Table 5.8

Government Assisted Wheat Exports, 1967-68 to 1978-79
(million metric tons)

Crop Year	Food Aid	Medium term credit		Long term credit		Total Assisted Exports	Total Wheat Exports
		E.D.C.	C.W.B.	C.W.B.	C.W.B.		
1967-68	.6	.2	1.5	--	2.3	2.3	9.145
1968-69	.7	.2	2.3	--	3.2	3.2	8.323
1969-70	.8	.5	1.8	--	3.1	3.1	9.430
1970-71	1.2	1.0	2.6	.4	5.2	5.2	11.846
1971-72	1.2	.3	3.7	.4	5.6	5.6	13.710
1972-73	.9	.05	5.1	.3	6.4	6.4	15.692
1973-74	.6	.05	2.8	.3	3.8	3.8	11.414
1974-75	.6	--	3.1	.4	4.1	4.1	10.739
1975-76	1.1	--	2.0	.1	3.2	3.2	12.285
1976-77	.8	.7	3.7	.3	5.5	5.5	13.409
1977-78	.8	.3	5.3	.1	6.5	6.5	15.998
1978-79	.7	--	3.7	--	4.4	4.4	13.064

Source: Canadian Wheat Board, Annual Report, various.

It also appears insignificant when compared to the comparable American programs of export assistance.²² The notable drop in the volume of government-assisted Canadian wheat exports between 1972-73 and 1973-74 does suggest, though, a hardening of the terms on which developing countries purchased wheat from Canada. From data in Table 5.9, it is apparent that total developing country purchases of Canadian agricultural commodities has included a large and rising share purchased under the export credit and food aid programs. It is unlikely, however, that the Canadian program of government assisted wheat exports has had a significant impact on the level of prices in the world wheat market.

Table 5.9

Government Assisted Exports of Agricultural Commodities to Developing Countries

	<u>1969-71 average</u> (thousand dollars)	<u>1976-78 average</u> (thousand dollars)
Total Canadian Agricultural Exports to Developing Countries (excluding P.R. China)	297,537	684,246
- under credit programs	35,990 (12.1%)	156,668 (22.9%)
- under the food aid program	64,114 (21.5%)	121,476 (17.8%)
-total under government assistance programs	100,104 (33.6%)	278,144 (40.7%)

Source: calculated from Diana Wisner, "Canada's Agricultural Trade with Developing Countries: An Analysis of the Past Level of Exports," Canadian Farm Economics, Vol. 15, No. 1 (February 1980), Table 4.

²²Willard W. Cochrane, Mary E. Ryan, American Farm Policy, 1948-1973 (Minneapolis: University of Minnesota Press, 1976), pp. 274-279.

Conclusion

It can be argued, based on the data presented in this chapter, that Canadian wheat policy contributed to price instability in the already turbulent world market between 1968 and 1978. In part, this impact is the result of the implementation of the two price wheat program which, in stabilizing the price paid for wheat by Canadian consumers, has increased the variability of Canadian wheat exports, as discussed in theoretical terms in Chapter 4. In part, as well, world wheat price variability has been increased by changes in Canadian policies which have tended to discourage stockholding.

Perhaps the most important, and most direct, impact of Canadian policy on the world wheat market, though, has been that related to the varying levels of assistance to production and domestic consumption. Prior to 1972, government policy both provided substantial encouragement to wheat growing activity, and discouraged Canadian consumption. To some extent, the impact of these policies on increasing the size of the exportable surplus may have been nullified by the accumulation of carryover stocks at government expense. On balance, however, it is probable that government policy at this time increased the exportable surplus of Canadian wheat, further reducing already low world wheat prices.

After 1973, though, the orientation of Canadian policy changed, and government programs between 1973 and 1976 reduced the incentive to increase production afforded by

rising world prices, and encouraged consumption. The impact of reduced production incentives on the level of output was not immediate, as pointed out earlier. It can be concluded, however, that the changed orientation of Canadian policy at this time reduced the exportable surplus, thus exacerbating and prolonging the existing situation of tight world market supplies and high prices. More recently, the impact of Canadian policy has again changed, so that as world prices fell after 1976, government incentives to production increased, and consumption was discouraged. These policies, together with the possible reduction of storage incentives associated with Canadian government policy, suggest that the export supply of wheat has been increased. These trends suggest that Canadian policy over the eleven year period has increased the 'peaks' and deepened the 'valleys' of world wheat price movements.

Canadian policy, clearly, cannot be cited as the primary cause of price instability in the world wheat market. As pointed out in a previous chapter, the wheat market is inherently unstable, due to the low price elasticity of wheat supply and demand, and the variability of wheat production in many regions of the world. In addition, many countries, of which Canada is only one, have adopted domestic policies which increase the variation of world wheat prices. Nevertheless, because of the Canadian position as a major wheat producing and exporting nation, the Canadian policies

examined in this chapter have had a significant impact on the instability of prices in the world wheat market.

This finding stands in contrast to official statements of Canadian policy respecting the desirability of stabilizing world wheat prices. Canada has long been active in attempting to secure an International Wheat Agreement with strong pricing provisions. In the most recent negotiations, for example, Canada sought an internationally controlled reserve "of at least 25 million tonnes (metric tons),"²³ capable of successfully defending a minimum price of \$4.00/bushel (\$146.80/metric ton) which was considered to reflect the Canadian cost of production.²⁴ Of this stock, Canada was prepared to hold ten percent, of 2.5 million metric tons, to be stored in the Canadian Wheat Board marketing system, and released only under the terms of the I.W.A.²⁵

It is evident that different aspects of Canadian wheat policy have been at cross-purposes. While advocating measures to reduce world wheat price fluctuations at international negotiations, Canada has at the same time adopted domestic policies which have destabilized world prices. It has been suggested that in part, the causation of world

²³ Testimony of W.M. Miner before the Standing Senate Committee on Agriculture. Canada, Senate, Proceedings of the Standing Senate Committee on Agriculture, Fourth Session, Thirteenth Parliament, Issue No. 2 (February 28, 1979), p. 2:9.

²⁴ Ibid., p. 2:7.

²⁵ Ibid., pp. 2:9-2:10.

wheat price instability is circular: unstable world wheat prices may induce nations to adopt policies which, while increasing the stability of internal markets, further disrupt world markets.²⁶ The self-reinforcing nature of such policies is apparent. Thus, there is a clear need for a reorientation of Canadian domestic policies in order that they may be consistent with the Canadian objectives of ensuring the increased stability of world wheat prices. As long as domestic policy continues to isolate the Canadian market from world market developments, however, the pursuit in international negotiations of the market stabilization objective of Canada will be futile.

²⁶ See D. Gale Johnson, "Food Reserves and International Trade Policy," in International Trade and Agriculture: Theory and Policy, Jimmye S. Hillman, Andrew Schmitz, eds. (Boulder: Westview Press, 1979).

Appendix 5.1

The Calculation of the Effective Rate of Assistance for Wheat Growing in Canada

The effective rate of assistance for wheat growing in Canada for the eleven year period 1968-1978 has been calculated following the methodology outlined by Soe Lin,¹ which in turn is based on that of Wilkinson and Norrie.² It also parallels the procedure followed by the Industries Assistance Commission of Australia in its report Wheat Stabilization.³ Estimates are developed of the cost of production and the value of output, both at free trade prices, and the rate of assistance provided to output and to the use of inputs, for each of the eleven years. The value added with and without assistance is then calculated⁴ using the following formulae:

$$VA_j = P_j (1 - \sum a_{ij})$$

$$VA'_j = P_j [(1 + t_j) - \sum a_{ij} (1 + t_i)]$$

where: VA_j = the value added per unit of j without assistance
 VA'_j = the value added per unit of j with the structure of assistance to output and to the use of inputs
 P_j = the world price of a unit of output of j
 t_j = the rate of assistance provided to the output of j
 t_i = the rate of tax (assistance) provided to the use of input i
 a_{ij} = the cost of input i per dollar of output j

The estimates of the value added with and without the assistance structure are used to prepare two estimates of the effective rate of assistance. The first, following the example of the Industries Assistance Commission, is calculated using the equation:

$$ERA_1 = \frac{VA_j' - VA_j}{VA_j}$$

where ERA = the effective rate of assistance and is a measure of the proportional increase in value added over the free trade situation brought about by the assistance structure. The second estimate, following the reasoning of Wilkinson and Norrie, is calculated using the equation:

$$ERA_2 = \frac{VA_j' - VA_j}{VA_j'} \quad \text{C}$$

and is a measure of the decrease in value added that would be brought about by the elimination of all forms of assistance.

The Cost of Production and Input Subsidies

Estimates of the cost of production of wheat, with and without assistance for the period 1968-1978 are presented in Table 5.1.5.

The 1977 cost of production, in dollars per metric ton, has been calculated using data presented by L.M. Johnson.⁵ Estimates of production costs of wheat grown on fallow in six Prairie regions, expressed in dollars per

acre, were converted to dollars per metric ton using yield data.⁶ An aggregate estimate of the production cost of wheat was made by taking the simple average of the production costs in the six areas. The portion of the production cost attributable to crop insurance and western grain stabilization payments was adjusted to reflect data in Tables 5.1.2 and 5.1.3. The 1977 breakdown of production costs is summarized in Table 5.1.1, below.

Table 5.1.1
The 1977 Cost of Production for Wheat on Fallow
(dollars/metric ton)

Crop Services	
Seed	6.48
Weed Spray	3.56
Fertilizer	6.63
Seed Cleaning	.20
Federal/Provincial Crop Insurance	1.84
Other Insurance	.60
Western Grain Stabilization Payments	.78
Machinery	
Repairs, fuel oil and lubricants	5.52
Depreciation	5.82
Interest	4.19
Buildings	<u>7.62</u>
Total	<u><u>43.24</u></u>

Source: Calculated from L.M. Johnson, "Economic Analysis of Crop Rotations in Western Canada," Canadian Farm Economics, Vol. 13, No. 5 (October, 1978), Tables 2, 6 and 11. Western Grain Stabilization and crop insurance data are taken from Tables 5.1.2 and 5.1.3 respectively.

Data for other study years were obtained by adjusting the 1977 cost of production using the index of total farm input prices for Western Canada.⁷

Three items were considered for their impact as subsidies or taxes on the use of inputs. The Western Grain Stabilization Act was implemented in 1976 to stabilize the net cash flow of the western grain production sector.⁸

Payments to farmers are provided when the net cash flow of the sector (cash receipts for grain minus production costs) falls below the previous five-year average. Program payments are taken out of a fund accumulated from producer contributions, assessed at the rate of 2 percent of the gross eligible participating receipts of producers, and federal contributions, equivalent to twice this amount. The government contribution is considered an input subsidy. The proportion related to wheat is calculated as equal to the share of wheat in farm cash receipts for grain, while, in turn, the value of the subsidy per metric ton is calculated using annual wheat production data.

The second item, the federal-provincial crop insurance program, has undergone significant modifications since its inception in 1959.⁹ During the years under study, crop insurance coverage expanded rapidly, particularly following the 1973 amendments increasing federal financial contributions. Federal and provincial government contributions which can be

Table 5.1.2
Government Subsidies Under the Western Grain Stabilization Act

<u>Year</u>	<u>Total Producer Levy</u>	<u>The share of wheat in total farm cash receipts for grain</u>	<u>Producer levy related to wheat</u>	<u>Wheat Production (thousand metric tons)</u>	<u>Producer levy per metric ton</u>	<u>Government Contribution per metric ton</u>
1976	\$24,348,493	.6903	\$16,807,765	23.587	.71	1.42
1977	\$28,007,401	.6274	\$17,571,843	19.861	.88	1.76
1978	\$28,415,470	.5867	\$16,671,356	21.145	.79	1.58

Sources: Western Grain Stabilization Act levies: Western Grain Stabilization Annual Report, 1978.
the share of wheat on farm cash receipts for grain: Canada, Statistics Canada,
Grains and Oilseeds Review (22-007).
wheat production data: Canadian Wheat Board, Annual Report 1978/79, Table VII, p. A6.

Table 5.1.3
Government Subsidies Under the Crop Insurance Program, 1968-1978

Year	Farmers' Premiums	Federal and Provincial Government Premiums	The Share of Wheat in Total Program Coverage	Government Premiums Attributable to Wheat	Wheat Production (thousand metric tons)	Government Premiums per Metric Ton
1968						.08 ¹
1969	\$ 8,563,818	\$ 3,607,618	.426 ¹	\$ 1,536,845	18,267	.08
1970	\$ 6,079,508	\$ 2,668,077	.426 ¹	\$ 1,136,601	9,024	.13
1971	\$ 6,681,193	\$ 2,687,751	.426 ¹	\$ 1,144,982	14,412	.08
1972	\$ 8,056,195	\$ 3,733,473	.426	\$ 1,590,460	14,514	.11
1973	\$ 16,187,029	\$ 16,187,029	.428	\$ 6,928,048	16,159	.43
1974	\$ 30,843,080	\$ 30,843,080	.474	\$ 14,619,620	13,295	1.10
1975	\$ 48,424,152	\$ 48,424,152	.503	\$ 24,357,348	17,078	1.43
1976	\$ 56,730,431	\$ 56,730,431	.553	\$ 31,371,928	23,587	1.33
1977	\$ 73,216,295	\$ 73,216,295	.500 ¹	\$ 36,608,148	19,861	1.84
1978	\$ 73,563,751	\$ 73,563,751	.404	\$ 29,719,755	21,145	1.41

¹ In the absence of detailed information, these values have been assumed.

Sources: premium data: Canada, Department of Agriculture, Annual Report of the Minister Under the Crop Insurance Act; the share of wheat in total program coverage: calculated from data on the share of cereals in total program coverage, contained in the Annual Report of the Minister Under the Crop Insurance Act, and data on the share of wheat in farm cash receipts for grain, contained in Canada, Statistics Canada, Grains and Oilseeds Review (22-007); wheat production data: Canadian Wheat Board, Annual Report 1978/79, Table VII, p. A6.

attributed to wheat are determined by taking the share of cereals in program coverage multiplied by the share of wheat in total farm cash receipts for grains. The federal and provincial payment per metric ton is then calculated by dividing the contribution attributable to wheat by the annual production of wheat. These data are outlined in Table 5.1.3. In several instances, noted with a (1), in Table 5.1.3, figures were assumed, due to lack of detailed information.

The third input subsidy considered here is the federal program affecting the domestic price of oil products. Prior to 1974, domestic oil prices west of the Ottawa Valley were maintained at a level above the world price as part of a government program to assist the western Canadian oil industry, while since 1974, domestic oil prices have been kept below world price levels. The 1968-1973 domestic price series (average well-head prices) has been adjusted upward by ten percent to make it consistent with the 1974-1978 price series (average well-head prices, Toronto citygate). The 1978 cost of oil products used in the production of a metric ton of wheat was \$2.29, according to Soe Lin, equivalent to .173 barrels of oil at 1978 domestic prices. This figure is used to calculate an estimate of the subsidy (or tax) per metric ton of wheat associated with government programs affecting the price of oil. These data are outlined in Table 5.1.4.

Table 5.1.4
The (Tax) Subsidy Effect of the Federal Government Domestic Oil
Price Program, 1968-1978

Year	Domestic Oil Price (well head, Toronto city- gate) \$/barrel	World Oil Price (Imported oil price) \$/barrel	World Price Minus Domestic Price \$/barrel	Assistance (tax) Associated with the Oil Price Program \$/metric ton on wheat
1968	2.70	2.10	(.60)	(.10)
1969	2.65	2.04	(.61)	(.11)
1970	2.73	2.00	(.73)	(.13)
1971	3.01	2.21	(.80)	(.14)
1972	3.05	2.42	(.63)	(.11)
1973	3.75	2.87	(.88)	(.15)
1974	6.54	11.07	4.53	.78
1975	8.04	12.32	4.28	.74
1976	9.33	12.67	3.34	.58
1977	11.10	14.54	3.44	.60
1978	13.24	15.81	2.57	.45

¹ Calculated to reflect the use of .173 barrel of oil in the production of a metric ton of wheat.

Sources: Domestic oil price data: 1968-1973 - Canadian Petroleum Association, Statistical Handbook; 1974-1978 - provided by the Department of Energy, Mines and Resources.
World oil price data: 1968-1973 - Canada, Statistics Canada, Imports by Commodity (65-007); 1974-1978 - provided by the Department of Energy, Mines and Resources.

Some caution should be exercised in drawing conclusions from the 1968-1973 data. Import prices for 1968 to 1973, calculated from Statistics Canada external trade data, are considered to be inflated, as significant undercutting of posted OPEC prices was taking place which was not reflected in the data collected at the customs port of entry. Therefore, the difference between the prices of domestic and imported oil between 1968 and 1973 may be understated.

Finally, the free trade price of wheat was calculated using data on the volume and value of Canadian wheat exports obtained from Canada, Statistics Canada, Exports by Commodity (65-004). This data, together with data on the cost of production and input subsidies, outlined previously, was used to calculate the cost of production without assistance, the production cost per dollar of output (both valued at free trade prices), and the subsidy (tax) rate on input use, as shown in Table 5.1.5.

Assistance to Output

Six programs are considered here for their impact as subsidies or taxes on output: the Crow's Nest Pass system of freight rates, the two price wheat program, the Temporary Wheat Reserves Act, the Prairie Grain Advance Payments Act, and the price stabilization programs under the Agricultural

Table 5.1.5
Summary Table: Production Costs and Input Subsidies (Taxes), 1968-1978

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Cost of Production with Assistance (\$/metric ton)	22.27	23.09	23.22	24.08	25.77	30.10	34.98	39.26	42.12	43.24	48.90
Input Subsidies:											
Western Grain Stabilization											
government payments (\$/metric ton)									1.42	1.76	1.58
Drop Insurance, government payments (\$/metric ton)											
oil price subsidy (tax) (\$/metric ton)	.08	.08	.13	.08	.11	.43	1.10	1.43	1.33	1.84	1.41
	(.10)	(.11)	(.13)	(.14)	(.11)	(.15)	.78	.74	.58	.60	.45
Cost of Production without Assistance (\$/metric ton)	22.25	23.06	23.22	24.02	25.77	30.38	36.86	41.43	45.45	47.44	52.34
Free Trade Price (\$/metric ton)	73.76	70.60	64.00	64.66	66.42	98.93	201.64	180.86	161.82	127.99	132.49
Production Cost per Dollar of Input	.302	.326	.363	.372	.388	.307	.183	.229	.281	.371	.395
Subsidy (tax) rate on Input Use	(.001)	(.002)	-	(.003)	-	.009	.051	.052	.073	.089	.066

Sources: See Tables 1, 2, 3, and 4
Free trade prices: Canada, Statistics Canada, Exports by Commodity (65-004).

Stabilization Act, and Canadian Wheat Board Act.

Under the Crow's Nest Pass system of freight rates, applied to the movement by rail of all grain to export positions, users of the system (the grain producers) are charged a rate which has remained unchanged since 1927.¹¹ Due to the increasing cost of transporting grain, however, these charges have come to cover only a fraction of the total cost of the service. The difference between the cost of carrying grain and the rate charged producers is considered a production subsidy. The implicit subsidy for each of the eleven study years has been estimated by adjusting the "total variable cost" per metric ton, by the annual rate of inflation and subtracting the statutory charge per metric ton paid by producers. This figure is multiplied by the annual volume of bulk wheat exports to obtain an estimate of the total subsidy to the production of wheat embodied in the statutory rate structure. These data are contained in Table 5.1.6.

The two price wheat program was first introduced as such in 1969, following on from a pre-existing program designed to raise returns to producers following a delay in the implementation of the 1967 International Grains Arrangement. The two price program attempted to raise producer returns on that part of their output sold to Canadian milling companies for consumption in Canada. From

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Table 5.1.6
The Assistance Effect on Producers of the Crow's
Nest Pass System of Freight Rates, 1968-1978

Year	Total Variable Cost \$/metric ton	Statutory Revenue \$/metric ton	Total Cost Minus Revenue \$/metric ton	Exports of Bulk Wheat metric tons	Total Assist- ance \$
1968	9.11	4.71	4.40	9,205,352	40,503,549
1969	9.46	4.71	4.75	6,783,182	32,220,115
1970	9.74	4.71	5.03	10,775,841	54,202,480
1971	10.01	4.71	5.30	12,837,648	68,039,534
1972	10.49	4.71	5.78	13,987,019	80,844,970
1973	11.29	4.71	6.58	12,469,724	82,050,784
1974	12.52	4.71	7.81	9,500,692	74,200,405
1975	13.87	4.71	9.16	11,355,509	104,016,470
1976	14.92	4.71	10.21	10,756,836	109,827,340
1977	15.52	4.71	10.81	15,402,439	166,500,380
1978	16.91	4.71	12.20	14,416,870	175,885,581

Sources: Total variable cost: calculated from the 1974 "Total Variable Cost" estimate contained in the Commission on the Costs of Transporting Grain by Rail, Report, Volume 1 (Ottawa: Supply and Services Canada, October 1976). Table 10, p. 207, and adjusted for changes in the "All Items" price index, Canada, Statistics Canada, Consumer Prices and Price Indexes (62-010).
Statutory Revenue: Commission on the Costs of Transporting Grain by Rail, Report, Volume 1, Table 10, p. 207.
Exports of Bulk Wheat: Canada, Statistics Canada, Grain Trade of Canada (22-201).

its inception, it has undergone the following changes:¹²

- August 1, 1967-June 30, 1968 - The federal government guaranteed the returns to producers at the levels specified in the 1967 International Grains Arrangement, although export prices were lower. The guaranteed return for No. 1 Northern wheat, in store, Thunder Bay was \$1.95¹/₂/bushel (\$71.75/metric ton).
- August 1, 1969-December 31, 1971 - The two price wheat program was introduced guaranteeing producers a return of \$1.95¹/₂/bushel (\$71.75/metric ton) (No. 1 Northern, in store, Thunder Bay) for their sales of wheat to Canadian millers for consumption in Canada.
- January 1, 1972-July 18, 1973 - The federal government raised the return of producers on their sales to Canadian millers to \$3.00/bushel (No. 1 Northern, in store, Thunder Bay), while millers continued to pay \$1.95¹/₂/bushel (\$71.75/metric ton). The difference of \$1.04¹/₂/bushel (\$38.35/metric ton) was paid by the federal government.
- July 19, 1973 - September 11, 1973 - The price paid by Canadian millers was set at \$1.00/bushel (\$36.70/metric ton) less than the export price.
- September 12, 1973-November 30, 1978 - The federal government established \$3.25/bushel (\$119.28/metric ton) (No. 1 Canadian Western Red Spring, in store, Thunder Bay) as the price paid by millers. Producers received a minimum return on their sales to millers of \$3.25/bushel (\$119.28/metric ton) and a maximum of \$5.00/bushel (\$183.50/metric ton). The difference between the price paid by millers and the return to producers was made up by a federal payment, to a maximum of \$1.75/bushel (\$64.23/metric ton). A similar system was established for the sale of durum wheat to millers. Millers paid \$3.25/bushel (\$119.28/metric ton) (No. 1 Amber Durum, in store, Thunder Bay), producers received a return of between \$3.25/bushel and \$5.75/bushel (\$119.28-\$211.03/metric ton), and the federal government paid a subsidy, to a maximum of \$2.50/bushel (\$91.75/metric ton).

August 1, 1977-July 30, 1978 - The program was modified by raising the price paid by millers and the minimum price received by producers to \$3.55/bushel (\$130.29/metric ton) (No. 1 CWRS, in store, Thunder Bay).

- December 1, 1978-July 31, 1980 - The federal government established a price range within which sales of wheat to millers for consumption in Canada were to take place of \$4.00/bushel to \$9.00/bushel (\$146.80-\$183.50/metric ton) (No. 1 CWRS, in store, Thunder Bay), and \$4.00/bushel to \$7.50/bushel (\$146.80-\$275.25/metric ton) (No. 1 Amber Durum, in store, Thunder Bay). Federal payments were discontinued.

- August 1, 1980-present - The price ranges were modified, to \$5.00/bushel to \$7.00/bushel (\$183.50-\$256.90/metric ton) (No. 1 CWRS, in store, Thunder Bay), and for No. 1 Amber Durum, a minimum of \$5.00/bushel (\$83.50/metric ton) with no maximum.

The dollar value of transfers to and from producers has been calculated as the difference between the monthly average export price of No. 1 Northern (or No. 1 CWRS), in store, Thunder Bay, quoted by the Canadian Wheat Board, and the price specified under the two price wheat program, applied to the monthly volume of wheat purchased by millers, less the volume of flour exports (in wheat equivalent). Summary data from which transfer estimates have been calculated are included in Table 5.1.7.

It should be noted that these calculations are based on the assumption that sales to millers consist exclusively of No. 1 CWRS wheat. Of the wheat milled in Canada between 1968/69 and 1977/78, approximately 81 percent was Canadian Western Red Spring, and 5 percent was durum. No data are

Table 5.1.7
The Assistance (Tax) Effect on Producers of the Two Price
Wheat Program, 1968-1978

Year	Wheat Purchased by millers million metric tons	Flour Exports (wheat equiv) million metric tons	Wheat Purchased by Millers for Domestic Consumption million metric tons	Canadian Wheat Board Export Price Range (No. 1 Northern CWRS) \$/metric ton	Two Price Wheat Program- Producer Price Range (No. 1 Northern CWRS) \$/metric ton	The Producer Assistance (Tax) Effect of the Two Price Wheat Program \$
1968 ¹	n.a.	n.a.	n.a.	70.28-73.68	71.75	4,590,941
1969	2.37	.64	1.73	66.84-72.07	71.75	3,368,598
1970	2.47	.74	1.73	63.40-66.89	71.75	10,884,897
1971	2.38	.72	1.66	60.56-67.02	71.75	12,419,713
1972	2.37	.63	1.74	61.11-95.14	110.10	69,822,079
1973	2.35	.60	1.75	98.22-206.44	95.70-183.50	(16,695,446)
1974	2.28	.49	1.79	178.00-223.00	178.00-183.50	(38,648,213)
1975	2.48	.53	1.95	160.61-195.38	160.61-183.50	(12,188,071)
1976	2.68	.72	1.96	118.95-168.59	119.28-168.59	616,095
1977	2.51	.64	1.87	110.93-134.69	119.28-130.29	8,389,010
1978	1.50 ²	.34 ²	1.16 ²	134.69-153.41 ²	134.69-133.41 ²	-2

¹In 1968, the federal government guaranteed a minimum price on both export and domestic shipments of wheat.

²Data for 1978 cover only January to July.

Source: Wheat purchased by millers, flour exports and Canadian Wheat Board monthly prices: Canada, Statistics Canada, Grain Trade of Canada (22-201).
Two price wheat program price ranges: see footnote 12.

available on the grade distribution of sales to millers however. Although the calculations may not be entirely accurate, they do provide a reasonable indication of the magnitude and year-to-year changes of the transfers to and from producers associated with the two price wheat program.

Producers have also benefitted from transfers under the provisions of the Temporary Wheat Reserves Act. First implemented in 1956 and discontinued in 1973, the program provided for the federal payment of the carrying charges of Canadian Wheat Board carryover stocks of wheat in excess of 178 million bushels (4,850,136 metric tons). As the program applied to wheat stocks, and not to stocks of other grains produced in western Canada, it can be considered an incentive to the production of wheat and is included as a production subsidy. Data on program expenditures, obtained from the Public Accounts of Canada, were converted from fiscal to calendar years and are outlined in Table 5.1.8.

Assistance to producers under the Prairie Grain Advance Payments Act is considered a production subsidy as well. Interest-free advance payments to Prairie grain producers are determined according to the anticipated deliveries during the crop year. The federal payment of interest charges, recorded in the Public Accounts of Canada, are converted from fiscal to calendar years and multiplied by the share of wheat in total farm cash receipts for grains

in order to determine the assistance to wheat production provided by this program. This figure for each of the eleven study years is recorded in Table 5.1.8.

Finally, although wheat grown outside the Prairie region has been covered under the terms of the Agricultural Stabilization Act from its inception in 1959, only in the 1978-79 fiscal year were price support payments made.¹³

The guaranteed producer return for the 1977 eastern wheat crop, announced in January 1979 was \$3.14/bushel (\$115.24/metric ton), equivalent to 90 percent of the previous five year average price, adjusted for changes in the estimated cash costs of production. The deficiency payment to producers for the 1978 calendar year has been estimated at \$12,632,802.

Similarly, the Canadian Wheat Board supports the price of Prairie grown wheat at the level of the "initial payment" to producers. Generally, the final price obtained by the Board has been greater. In the 1968-69 crop year however, the realized price was lower, and the support payment to producers totalled \$39,787,979.¹⁴

Data on production subsidies, outlined above, the annual volume of wheat production in Canada, and the free trade price of wheat are recorded in Table 5.1.8. They are used to calculate the total assistance to production, the assistance per metric ton of wheat produced, and the rate

Table 5.1.8
Summary Table: Wheat Production Subsidies (Taxes) 1968-1978

	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Production Subsidies (Taxes)											
Crow's Nest Pass Freight Rates (dollars)	40,503,549	32,220,115	54,202,480	68,039,534	80,984,840	82,050,784	74,200,405	104,016,470	109,827,340	166,500,380	175,885,581
Two Price Wheat Program (dollars)	4,590,941	3,368,598	10,884,897	12,419,713	69,822,079	(16,695,446)	(38,648,213)	(12,188,071)	616,095	8,389,010	-
Temporary Wheat Reserves Act (dollars)	44,538,720	61,957,796	34,313,955	67,878,658	37,094,432	11,312,517	-	-	-	-	-
Prairie Grain Advance Payments Act (dollars)	1,750,822	7,228,796	7,647,960	3,429,512	1,102,817	914,212	1,771,981	1,076,303	1,497,118	2,036,416	2,795,124
Agricultural Stabilization Act (dollars)	-	-	-	-	-	-	-	-	-	-	12,632,802
C.W.B. Support Price Payment	39,787,979	-	-	-	-	-	-	-	-	-	-
Total Subsidies	131,172,011	104,775,305	107,049,392	151,767,417	189,004,168	77,582,067	37,324,173	92,904,702	111,940,553	176,926,826	191,313,507
Wheat Production (thousand metric tons)	17,689	18,267	9,024	14,412	14,514	16,156	13,295	17,078	23,587	19,861	21,145
Subsidies per metric ton (\$/metric ton)	7.42	5.74	11.86	10.53	13.02	4.80	2.81	5.44	4.75	8.91	9.05
Free Trade Price (\$/metric ton)	73.76	70.60	64.00	64.66	66.42	98.93	201.64	180.86	161.82	127.99	132.49
Subsidy Rate on Production (subsidy per dollar of output at free trade prices)	.101	.081	.185	.163	.196	.049	.014	.030	.029	.070	.068

Sources: See Tables 6 and 7

Free trade prices: calculated from Canada, Statistics Canada, Exports by Commodity (65-004)

Wheat production data: Canadian Wheat Board, Annual Report 1978/79, Table VI, p. A6.

of assistance per dollar of wheat output valued at free trade prices.

The Calculation of the Effective Rate of Assistance for Wheat Growing

Using the formulae outlined in the first paragraphs of this Appendix, and the summary data contained in Tables 5.1.5 and 5.1.8, two estimates of the effective rate of assistance for wheat growing have been calculated. The first, ERA_1 , measures the proportional increase in value added by the wheat growing sector which can be attributed to the assistance structure, while the second, ERA_2 , measures the proportional decrease in value added which would take place if all assistance were discontinued. Estimates of the effective rate of assistance are contained in Table 5.1.9 while the calculations are outlined in Table 5.1.10.

Table 5.1.9
The Effective Rate of Assistance (ERA) for Wheat Growing, 1968-1978

<u>Year</u>	<u>ERA₁</u>	<u>ERA₂</u>
1968	17.91%	12.61%
1969	11.87%	10.61%
1970	29.04%	22.51%
1971	25.76%	20.48%
1972	32.03%	24.26%
1973	7.61%	7.08%
1974	2.85%	2.77%
1975	5.44%	5.16%
1976	6.88%	6.44%
1977	16.37%	14.07%
1978	15.54%	13.45%

$$ERA_1 = \frac{\text{value added with assistance} - \text{value added without assistance}}{\text{value added without assistance}}$$

$$ERA_2 = \frac{\text{value added with assistance} - \text{value added without assistance}}{\text{value added with assistance}}$$

Table 5.1.10
The Calculation of the Effective Rate of Assistance for
Wheat Growing, 1968-1978

Year	
1968	$VA' = 73.76 [(1 + .101) - .302 (1 + .001)] = 58.91$ $VA = 73.76 (1 - .302) = 51.48$ $ERA_1 = (58.91 - 51.48) \div 51.48 = 17.91\%$ $ERA_2 = (58.91 - 51.48) \div 58.91 = 12.61\%$
1969	$VA' = 70.60 [(1 + .081) - .326 (1 + .002)] = 53.23$ $VA = 70.60 (1 - .326) = 47.58$ $ERA_1 = (53.23 - 47.58) \div 47.58 = 11.87\%$ $ERA_2 = (53.23 - 47.58) \div 53.23 = 10.61\%$
1970	$VA' = 64.00 [(1 + .185) - .363 (1 + .00)] = 52.61$ $VA = 64.00 (1 - .363) = 40.77$ $ERA_1 = (52.61 - 40.77) \div 40.77 = 29.04\%$ $ERA_2 = (52.61 - 40.77) \div 52.61 = 22.51\%$
1971	$VA' = 64.66 [(1 + .163) - .372 (1 + .003)] = 51.07$ $VA = 64.66 (1 - .372) = 40.61$ $ERA_1 = (51.07 - 40.61) \div 40.61 = 25.76\%$ $ERA_2 = (51.07 - 40.61) \div 51.07 = 20.48\%$
1972	$VA' = 66.42 [(1 + .196) - .388 (1 + .00)] = 53.67$ $VA = 66.42 (1 - .388) = 40.65$ $ERA_1 = (53.67 - 40.65) \div 40.65 = 32.03\%$ $ERA_2 = (53.67 - 40.65) \div 53.67 = 24.26\%$
1973	$VA' = 98.93 [(1 + .049) - .307 (1 - .009)] = 73.78$ $VA = 98.93 (1 - .307) = 68.56$ $ERA_1 = (73.78 - 68.56) \div 68.56 = 7.61\%$ $ERA_2 = (73.78 - 68.56) \div 73.78 = 7.08\%$
1974	$VA' = 201.64 [(1 + .014) - .183 (1 - .051)] = 169.44$ $VA = 201.64 (1 - .183) = 164.74$ $ERA_1 = (169.44 - 164.74) \div 164.74 = 2.85\%$ $ERA_2 = (169.44 - 164.74) \div 169.44 = 2.77\%$
1975	$VA' = 180.86 [(1 + .030) - .229 (1 - .052)] = 147.02$ $VA = 180.86 (1 - .229) = 139.44$ $ERA_1 = (147.02 - 139.44) \div 139.44 = 5.44\%$ $ERA_2 = (147.02 - 139.44) \div 147.02 = 5.16\%$

CHAPTER 6

CONCLUSION

In this paper it has been argued that price instability in the world wheat market adversely affects developing countries, and that Canadian policy is one factor that has contributed to the fluctuation of wheat prices. The first part of this proposition has been assessed in Chapter 2. Surplus analysis, commonly used to assess the distribution of the benefits of price stabilization (or, conversely, price fluctuation), may prove inappropriate in this case, due to the nature of the assumptions on which it is based. Consequently, the impact of changing world wheat prices on the stability of wheat import expenditures has been taken as a measure of the impact of world wheat market instability on the developing countries.

Theoretically, it has been noted that price instability, when generated by other participants in the world wheat market, will destabilize the import expenditures of a particular country. Data have been presented which confirm that developing country wheat import expenditures have been more unstable than those of developed countries. In addition, it has been established that wheat price fluctuations have accentuated the instability of developing country import expenditures since 1972, while the reverse has been true

Footnotes

1. Soe Lin, "Effective Protection Rates for Selected Canadian Agricultural Commodities," April, 1980 (mimeographed).
2. B.W. Wilkinson, K. Norrie, Effective Protection and the Return to Capital (Ottawa: Economic Council of Canada, 1975).
3. Australia, Industries Assistance Commission, Wheat Stabilization, Report No. 175 (Canberra: Australian Government Publishing Service, 1978).
4. Soe Lin, "Effective Protection Rates," Appendix B.
5. L.M. Johnson, "Economic Analysis of Crop Rotations in Western Canada," Canadian Farm Economics, Vol. 13, No. 5 (October, 1978).
6. Ibid., Tables 2 and 6.
7. See Canada, Statistics Canada, Farm Input Price Indexes (62-004) and Farm Input Price Indexes 1961-1971 (62-534).
8. Information on the operations of the Western Grain Stabilization Act has been obtained from Canada, Agriculture Canada, Western Grain Stabilization Annual Report 1978 (Ottawa: Agriculture Canada, 1979).
9. Information on the crop insurance program has been obtained from Canada, Agriculture Canada, Annual Report of the Minister Under the Crop Insurance Act (Ottawa: Agriculture Canada), various.
10. The relationship between domestic and world oil price levels has been graphically outlined in Canada, Department of Energy, Mines and Resources, Background to a New Energy Strategy (Ottawa: Department of Energy, Mines and Resources, 1980), Figure 1, p. 12.
11. For an outline of the historical background to the current controversy surrounding the Crow's Nest Pass freight rates, see Canada, Grain Handling and Transportation Commission, Grain and Rail in Western Canada, Volume 1 (Ottawa: Supply and Services Canada, 1977), pp. 32-39.

12. Information on changes to the two price wheat program have been obtained from Canadian Wheat Board Annual Report (various), and Harold Headley of the Grain Marketing Office of the Department of Industry, Trade and Commerce.
13. Information on the Agricultural Stabilization Act has been obtained from Canada, Agriculture Canada, Annual Report of the Agricultural Stabilization Board (various).
14. This information has been obtained from Andrew Schmitz, Alex McCalla, "The Canadian Wheat Board," in Agricultural Marketing Boards - An International Perspective, Sidney Hoos, ed. (Cambridge, Mass.: Ballinger, 1979), Table 4.1, p. 85.

Appendix 5.2

The Subsidy (Tax) Effect on Consumption of the Two Price Wheat Program

The origin and development of the two price wheat program has been outlined in Appendix 5.1. The subsidy (tax) impact on consumption has been estimated as the difference between the monthly average export price of No. 1 Northern (or No. 1 CWRS), in store, Thunder Bay, and the price paid by Canadian millers under the program, applied to the monthly volume of wheat purchased by millers, less the volume of flour exports (in wheat equivalent). Summary data from which the subsidy (tax) rate has been calculated are presented in Table 5.2.1.

As noted in Appendix 5.1, these estimates may not be completely accurate, as it has been assumed that sales to millers consist exclusively of No. 1 CWRS wheat. However, they do provide a reasonable indication of the year to year changes in the consumer impact of the program.

Table 5.2.1

The Consumption Subsidy (Tax) Effect of the Two Price Wheat Program

Year	Wheat Purchased by Millers for Domestic Con- sumption million metric tons	C.W.B. Export Price Range (No. 1 Northern, CWSR) \$/metric ton	Two Price Wheat Program- Domestic Price Range (No. 1 Northern, CWSR) \$/metric ton	Domestic Consumption Valued at Export Prices \$/million	Domestic Consumption Valued at Home Consump- tion Price \$/million	Subsidy (Tax) Rate %
1968	1.64	70.28-73.68	71.75	116.9	117.5	(.47%)
1969	1.73	66.84-72.07	71.75	119.5	122.9	(2.82%)
1970	1.73	63.40-66.89	71.75	113.4	124.3	(9.60%)
1971	1.66	60.56-67.02	71.75	106.3	118.7	(11.68%)
1972	1.74	61.11-95-14	71.75	122.2	125.1	(2.41%)
1973	1.75	98.22-206.44	71.75-169.74	259.4	175.2	32.46%
1974	1.79	178.00-206.44	119.28	372.0	217.2	41.60%
1975	1.95	160.61-195.38	119.28	358.8	234.5	34.64%
1976	1.96	118.95-168.59	119.28	284.5	231.0	18.80%
1977	1.87	110.93-134.69	119.28-130.39	230.3	232.7	(1.03%)
1978 ¹	1.16 ¹	134.69-153.41 ¹	130.29 ¹	168.8 ¹	150.6 ¹	10.77% ¹

¹ January to July only

Source: Wheat consumption and C.W.B. monthly prices: Canada, Statistics Canada, Grain Trade of Canada (22-201)

Two price wheat program price ranges: see footnote 12, Appendix 5.1.

CHAPTER 6

CONCLUSION

In this paper it has been argued that price instability in the world wheat market adversely affects developing countries, and that Canadian policy is one factor that has contributed to the fluctuation of wheat prices. The first part of this proposition has been assessed in Chapter 2. Surplus analysis, commonly used to assess the distribution of the benefits of price stabilization (or, conversely, price fluctuation), may prove inappropriate in this case, due to the nature of the assumptions on which it is based. Consequently, the impact of changing world wheat prices on the stability of wheat import expenditures has been taken as a measure of the impact of world wheat market instability on the developing countries.

Theoretically, it has been noted that price instability, when generated by other participants in the world wheat market, will destabilize the import expenditures of a particular country. Data have been presented which confirm that developing country wheat import expenditures have been more unstable than those of developed countries. In addition, it has been established that wheat price fluctuations have accentuated the instability of developing country import expenditures since 1972, while the reverse has been true

in the case of developed nations. These findings confirm that developing countries have been especially vulnerable to price instability in the world wheat market.

The impact of variable wheat import expenditures on developing countries, it has been suggested, parallels the impact of unstable export revenues. Although no rigorous statistical techniques have been employed, data indicate that the total food import expenditures of non-OPEC developing countries more than doubled between 1972 and 1974, and accounted for an increased share of non-oil merchandise imports. This increase may have served to disrupt the ability of developing countries to purchase other necessary imports, hampered investment activity, and thus, deterred economic growth. The impact of wheat price instability on individual well-being may also be significant, due to the large and increasing share of wheat imports in aggregate developing country wheat consumption. Furthermore, it has been also suggested that world wheat price fluctuations may play a role in the formation of a national food policy, encouraging developing countries to isolate their domestic market from instability emanating from the world market.

The causes of, and international approaches to the reduction of, wheat price instability have been assessed in Chapter 3. In part, the wheat market is inherently unstable, due to the large response of price to changes in quantity of wheat supplied or demanded. This, and the susceptibility

of wheat output to sharp year-to-year changes in many regions of the world, suggests that world wheat prices will vary significantly. In addition, wheat related policies adopted by the major wheat trading nations have been noted to contribute to price instability in the world market. It has not proved possible, however, to apportion the 'blame' for price instability between these factors, or even, for that matter, to accurately determine whether import demand or export supply shifts are more responsible for wheat price fluctuations. From a description of the events surrounding the world food 'crisis,' though, the contribution of both the inherent nature of the market, and the policies followed by the major wheat trading nations to the sharp rise in wheat prices is apparent.

Recent international approaches to the stabilization of the wheat market appear to have reflected only the first of these two sets of factors. An internationally controlled wheat reserve, such as that currently under discussion, will only increase the elasticity of wheat supply and demand, thus reducing price fluctuations, and will provide a modest buffer against production shortfalls. National agricultural production and trade policies have proved difficult to negotiate in international fora, however, and the negotiation of agricultural trade issues within GATT has been characterized by a notable lack of success.

Consequently, a full understanding of the world market impact of national agricultural policies is imperative.

A theoretical outline of the way in which the wheat production, consumption, storage and export policies of exporting countries affect the world market has been presented in Chapter 4, and indicates that these policies may affect both the level and the variability of world wheat prices. It is concluded that Canadian policies, outlined in detail in Chapter 5 for the period 1968 to 1978, have contributed to world wheat price instability. Measures which have established a home consumption price isolated from world price changes, and have reduced storage incentives, increased the susceptibility of the world wheat market to price fluctuations. More directly, Canadian policies have affected the size of Canada's exportable surplus. In particular, based on the calculation of the effective rate of assistance to wheat growing, outlined in Appendix 5.1, and rate of subsidy (or tax) on domestic wheat consumption, outlined in Appendix 5.2, it is found that Canadian policy has somewhat increased the exportable surplus in years of low prices, and reduced the increase in the surplus as prices rise. This characteristic of Canadian policy, it is concluded, has increased the fluctuation of world wheat prices between 1968 and 1978, a time of already severe market turbulence.

This finding raises a difficult issue for Canadian policy-makers. While expressing a commitment to the stabilization of the world wheat market and the negotiation of an effective International Wheat Agreement with strong pricing

provisions, policies adopted by Canada have exacerbated the fluctuation of world wheat prices, inflicting hardship on the wheat importing developing countries, as noted in Chapter

2. The achievement of Canada's world wheat market stabilization objective will necessarily involve more than the establishment of an international wheat reserve. On the part of Canada and other wheat trading nations, it must also encompass the reorientation of national wheat related policies to more fully reflect an awareness of their external impact, and a renewed commitment to the international negotiation of agricultural policy related issues.. It is apparent that the goal of world wheat market stability, and the attendant benefits for wheat importing developing nations will prove elusive if the world market destabilizing impact of national policies is not resolved.

SELECTED BIBLIOGRAPHY

I Official Government Sources

Australia, Industries Assistance Commission, Wheat Stabilization Report, No. 175. Canberra: Australian Government Publishing Service, 1978.

Australian Wheat Board, Annual Report, 1976/77

Canada, Agriculture Canada. A Food Strategy for Canada. Ottawa: Agriculture Canada and Consumer and Corporate Affairs, June 1977.

Canada, Agriculture Canada. Annual Report of the Minister under the Crop Insurance Act.

Canada, Agriculture Canada, Agricultural Stabilization Board. Annual Report

Canada, Commission Into the Cost of Moving Grain by Rail. Report. Ottawa: Queen's Printer, 1977.

Canada, Federal Task Force on Agriculture. Canadian Agriculture in the Seventies. Ottawa: Queen's Printer, 1969.

Canada, Grain Handling and Transportation Commission. Report of the Grain Handling and Transportation Commission. Volume 1, Grain and Rail in Western Canada. Ottawa: Queen's Printer, 1977.

Canada, Senate, Proceedings of the Standing Senate Committee on Agriculture, Wednesday, February 28, 1979, Issue No. 2. Fourth Session, Thirtieth Parliament, 1978/79.

The Canadian Wheat Board. Annual Report.

Commonwealth Secretariat. Developments in International Food Policy. Commonwealth Economic Papers: No. 9. London: Economic Affairs Division, Commonwealth Secretariat, September, 1978.

FAO. Agricultural Protection and Stabilization Policies. C 75/LIM/2. Rome: FAO, 1975.

FAO. Agricultural Protection: Domestic Policy and International Trade. C73/LIM/9. Rome: FAO, 1973.

- FAO. Commodity Review and Outlook, 1974-75. Rome: FAO, 1975.
- FAO. Commodity Review and Outlook, 1979-80. Rome: FAO, 1980.
- FAO. The Fourth World Food Survey. Rome: FAO, 1977.
- FAO. Production Yearbook. Rome: FAO, annual.
- FAO. "A Reconsideration of the Economics of the International Wheat Agreement". Commodity Policy Series #1. Rome: FAO, 1962.
- FAO. The Stabilization of International Trade in Grains. Commodity Policy Studies, No. 20. Rome: FAO, 1970.
- FAO. "The Stabilization of World Trade in Wheat, A Consideration of the Underlying Issues". Commodity Policy Series #14. Rome: FAO, 1963.
- FAO. The State of Food and Agriculture, 1975. Rome: FAO, 1976.
- GATT. The Tokyo Round of Multilateral Trade Negotiations. Report by the Director General of GATT. Geneva: GATT, April, 1979.
- Hutchison, John E.; Naive, James J.; and Tsu, Sheldon K. World Demand Prospects for Wheat in 1980 With Emphasis on Trade by the Less Developed Countries. Foreign Agriculture Economic Report 62. Washington: U.S. Department of Agriculture, Economic Research Service, 1970.
- International Monetary Fund, International Bank for Reconstruction and Development. The Problem of Stabilization of Prices of Primary Products. Washington: IMF/IBRD, 1969.
- International Wheat Council. World Wheat Statistics. London: International Wheat Council, annual.
- International Wheat Council. Problems in Grain Handling and Transportation. Secretariat Paper No.11. London: International Wheat Council, February 1980.
- International Wheat Council. Second Meeting of the Special Committee, Draft Agenda Item 2: Report by the Executive Secretary on alternative proposals for the preparation of a new Wheat Trade Convention. March 5, 1980.
- OECD. Agricultural Policy in Australia. Paris: OECD, 1973.

- OECD. Food Consumption Statistics 1970-1975. Paris: OECD, 1978.
- OECD. The Instability of Agricultural Commodity Markets. Paris: OECD, 1980.
- OECD. La Politique agricole au Canada. Paris: OECD, 1973.
- OECD. La Politique agricole des États-Unis. Paris: OECD, 1974.
- OECD. Prospects for Soviet Agricultural Production in 1980 and 1985 with Special Reference to Meat and Grain. Paris: OECD, 1979.
- OECD. Recent Developments in Canadian Agricultural Policy. Paris: OECD, 1978.
- OECD. Recent Developments in United States Agricultural Policies. Paris: OECD, 1976.
- OECD. Review of Agricultural Policies in OECD Member Countries 1974-76. Paris: OECD, 1977.
- OECD. Review of Agricultural Policies in OECD Member Countries 1977. Paris: OECD, 1978.
- OECD. Review of Agricultural Policies in OECD Member Countries 1978. Paris: OECD, October, 1979.
- OECD. Supply Control in Agriculture. Paris: OECD, 1973.
- United Nations, World Food Council. Current World Food Situation, Note by the Executive Director (WFC/1979/2) Rome: World Food Council, April 15, 1979.
- United Nations, World Food Council. Food Crisis Contingency Planning, Report by the Executive Director. (WFC/1980/4) Rome: World Food Council, February 20, 1980.
- United Nations, World Food Council. World Food Security for the 1980s, Report by the Executive Director. (WFC/1979/5) Rome: World Food Council, April 26, 1979.
- United Nations, World Food Council. World Food Security for the 1980s, Addendum, Plan of Action on World Food Security. (WFC/1979/5/Add.1) Rome: World Food Council, June 20, 1979.
- U.S. Department of Agriculture, Economics, Statistics and Cooperatives Service, International Food Policy Issues, Proceedings. Foreign Agricultural Economic Report No. 143. Washington: USDA, 1978.

U.S. General Accounting Office. Grain Marketing Systems in Argentina, Australia, Canada and the European Community; Soybean Marketing System in Brazil. Washington: US GAO, May 28, 1976.

U.S. Senate, Committee on Finance. MTN Studies, 1, Results for U.S. Agriculture. A Report prepared at the request of the Subcommittee on International Trade, June, 1979.

World Bank. Commodity Trade and Price Trends, Report No. EC 166/79. Washington: World Bank, 1979.

World Bank. Price Forecasts for Major Primary Commodities. Report No. 844. Washington: World Bank, 1975.

World Food Council. Report of the World Food Council on the Work of its Fifth Session, 3-7 September, 1979. New York: United Nations, 1979.

World Food Programme, Committee on Food Aid Policies and Programmes. Food Aid Policies and Programmes: A Survey of Studies of Food Aid. (study carried out by Hans Singer, IDS, Sussex). WFP/CFA: 5/5-C, March, 1978.

II Books and Pamphlets

Adams, Gerhard F. and Klein, Sonia A. Stabilizing World Commodity Markets. Lexington, Mass: D.C. Heath, 1978.

Bale, Malcolm D. and Lutz, Ernst. Price Distortions in Agriculture and Their Effects: An International Comparison. World Bank Staff Working Paper No. 359. Washington: World Bank, October 1979.

Blakesless, L.; Meady, E.O.; and Framingham, C.F. World Food Production, Demand and Trade. Ames: Iowa State University Press, 1973.

Brook, E.M.; Grilli, E.R.; and Waelbroeck, Jean. Commodity Price Stabilization and Developing Countries: the Problem of Choice. Staff Working Paper No. 262. Washington: World Bank, July 1977.

Campbell, Keith O. Food for the Future, How Agriculture Can Meet the Challenge. Lincoln and London: University of Nebraska Press, 1979.

Cochrane, Willard W. and Ryan, Mary E. American Farm Policy, 1948 - 1973 Minneapolis: University of Minnesota Press, 1976.

- Connors, T. The Australian Wheat Industry: Its Economics and Politics. Armidale, Australia: Gill Publications, 1972.
- Cohn, Theodore. Canadian Food Aid: Domestic and Foreign Policy Implications. Denver: University of Denver, Graduate School of International Studies, 1980.
- Coppock, Joseph D. International Economic Instability, The Experience After World War II. New York: McGraw-Hill, 1962.
- Gorden, W.M. The Theory of Protection. Oxford: Oxford University Press, 1971.
- Crown, Robert W. and Heady, Earl O. Policy Integration in Canadian Agriculture. Ames: Iowa State University Press, 1972.
- D'Amico, S. and Evans, J.W. The International Effects of National Grain Policies. Commodity Policy Series #8. Rome: FAO, September 1955.
- Eaton, David J. and Steele, W. Scott, eds. Analyses of Grain Reserves Proceedings. Washington: USDA in Cooperation with the National Science Foundation, ERS Report No. 634, August 1975.
- Ellison, Anthony P. The Canadian Interest in an International Wheat Agreement. Discussion Paper No. 167. Ottawa: Economic Council of Canada, 1980.
- Fischer, Lewis A. Canadian Agriculture and the World Food Problem. Montréal: C.D. Howe Research Institute, 1976.
- Fowke, V.C. Canadian Agricultural Policy, The Historical Pattern. Toronto: University of Toronto Press, 1946.
- _____. The National Policy and the Wheat Economy. Toronto: University of Toronto Press, 1957.
- Gardner, Bruce M. Optimal Stockpiling of Grain. Lexington, Mass: D.C. Heath and Company, 1979.
- George, Susan. How the Other Half Dies, The Real Reasons for World Hunger. Harmondsworth: Penguin Books, 1976.
- Gittinger, J. Price. North American Agriculture in a New World. Montreal: Canadian American Committee, 1970.
- Green, H.A. John. Consumer Theory. (Revised Edition) London: The MacMillan Press, 1976.
- Grennes, Thomas; Johnson, Paul R.; and Thursby, Marie. The Economics of World Grain Trade. New York: Praeger, 1978.

- Harris, Stuart; Salmon, Mark; and Smith, Ben. Analysis of Commodity Markets for Policy Purposes. Thames Essay No. 17. London: Trade Policy Research Centre, 1978.
- Heidhues, Theodor. World Food, Interdependence of Farm and Trade Policies. International Issues, No.3. London: Trade Policy Research Centre, 1977.
- Heidhues, Theodor; Josling, T.E.; Bitson, Christopher; and Tangermann, Stefan. Common Prices and Europe's Farm Policy. Thames Essay No. 14. London: Trade Policy Research Centre, 1978.
- Hillman, J.S. Nontariff Agricultural Trade Barriers. Lincoln: University of Nebraska Press, 1978.
- Hillman, J.S.; Johnson, D.G.; and Gray, R. Food Reserve Policies for World Food Security: A Consultant Study of Alternative Approaches. Rome: FAO, January 1975.
- Hillman, J.S. and Schmitz, Andrew, eds. International Trade and Agriculture: Theory and Policy. Boulder, Colorado: Westview Press, 1979.
- Hoos, Sidney, ed. Agricultural Marketing Boards - An International Perspective. Cambridge, Mass.: Ballenger, 1979.
- Johnson, D. Gale. Forward Prices for Agriculture. Chicago: University of Chicago Press, 1947.
- _____. The Soviet Impact on World Grain Trade. Montreal: British North American Committee, 1977.
- _____. World Agriculture in Disarray. New York: St. Martin's Press, 1973.
- _____. World Food Problems and Prospects. Washington: American Enterprise Institute for Public Policy Research, 1975.
- Johnson, D. Gale, and Schnittker, John A., eds. U.S. Agriculture in a World Context, Policies and Approaches for the Next Decade. New York: Praeger Publishers, 1974.
- Jones, David. Food and Interdependence: The Food and Agricultural Policies of Developed Countries and the Food Problems of Developing Countries. London: Overseas Development Institute, 1976.
- Josling, T.E. Agriculture in the Tokyo Round Negotiations. London: Trade Policy Research Centre, 1977.

. Developed-Country Agricultural Policies and Developing-Country Supplies: the Case of Wheat.
Research Report 14. Washington: International Food Policy Research Institute, March 1980.

. An International Grain Reserve Policy.
British-North American Committee, 1973.

Knudsen, Odin, and Parnes, Andrew. Trade Instability and Economic Development, An Empirical Study.
Lexington, Mass: D.C. Heath, 1975.

Konandreas, P.; Huddleston, B.; and Ramangkura, V. Food Security: An Insurance Approach. Research Report No.4. Washington: International Food Policy Research Institute, 1978.

MacBean, Alasdair I. Export Instability and Economic Development. Cambridge, Mass: Harvard University Press, 1966.

Moore Lappé, Frances and Collins, Joseph. Food First, Beyond the Myth of Scarcity. Boston: Houghton Mifflin Company, 1977.

Morrow, Daniel T. The Economics of the International Stockholding of Wheat. Research Report No. 18. Washington: International Food Policy Research Institute, September, 1980.

Nappi, Carmine. Commodity Market Controls, A Historical Review. Lexington, Mass.: Lexington Books, 1979.

The North-South Institute. World Food and the Canadian "Breadbasket" Canada North-South 1977-1978. Ottawa: The North-South Institute, 1978.

Reutlinger, Shlomo. Simulation of World-Wide Buffer Stocks of Wheat. International Bank for Reconstruction and Development, Bank Staff Working Paper No. 219. Washington: World Bank, November, 1975.

O'Rourke, A. Desmond. The Changing Dimensions of U.S. Agricultural Policy; Englewood Cliffs: Prentice Hall Inc., 1978.

Reca, Lucio. Argentina - Country Case Study of Agricultural Prices, Taxes and Subsidies. World Bank Staff Working Paper No. 386. Washington: World Bank, 1980.

Rochos, Georges. Le commerce international du blé et les politiques et pratiques d'exportation du Canada pour ce produit. Montreal: Université de Montreal, CÉTAI, 1976.

Rojko, Anthony S.; Urban, F.S.; and Naive, J.S. World Demand Prospects for Grain in 1980 with Emphasis on Trade by the Less Developed Countries. Foreign Agriculture Economic Report No. 75. Washington: U.S. Department of Agriculture, Economic Research Service, December, 1971.

Samuelson, P.A. Foundations of Economic Analysis. Cambridge, Mass.: Harvard University Press, 1947.

Sanderson, Fred H. Japan's Food Prospects and Policies. Washington: The Brookings Institution, 1978.

Scandizzo, Pasquale L. and Bruce, Colin. Methodologies for Measuring Agricultural Price Intervention Effects. World Bank Staff Working Paper No. 394. Washington: World Bank, June, 1980.

Schultz, T.W., ed. Distortions of Agricultural Incentives. Bloomington, Indiana: University Press, 1978.

Shefrin, Frank. The World Food Problem, Surpluses or Shortages. Ottawa: Canadian Hunger Foundation, 1970.

Stern, Robert; Francis, Jonathan; and Schumacher, Bruce. Price Elasticities in International Trade. London: MacMillan for the Trade Policy Research Centre, 1976.

Talbot, Ross B. The World Food Problem and U.S. Food Politics and Policies, 1972-76. Ames: Iowa State University Press, 1977.

Taplin, J.H. Demand in the World Wheat Market and the Export Policies of the United States, Canada, and Australia. Ph.D Thesis. Cornell University, 1969.

Taylor, Lance; Sarris, Alexander H.; and Abbott, Philip C. Grain Reserves, Emergency Relief and Food Aid. Washington: Overseas Development Council, 1977.

Toward the Integration of World Agriculture. A tripartite report by fourteen experts from North America, the European Community and Japan. Washington: The Brookings Institution, 1973.

Trezise, Philip H. Rebuilding Grain Reserves - Toward an International System. Washington: The Brookings Institution, 1976.

Valdes, Alberto, ed. Food Security for Developing Countries. Boulder, Colorado: Westview Press, 1980.

Warley, T.K. Agriculture in an Interdependent World: U.S. and Canadian Perspectives. Montreal: Canadian American Committee, C.D. Howe Research Institute, 1977.

Wilkinson, B.W. and Norrie, K. Effective Protection and the Return to Capital. Ottawa: Economic Council of Canada, 1975.

Wilson, C.F. A Century of Canadian Grain, Government Policy to 1951. Saskatoon: Western Producer Prairie Books, 1978.

Grain Marketing in Canada. Winnipeg: Canadian International Grains Institute, 1980.

Zwart, A.C., and K.D. Meilke. Economic Implications of International Wheat Reserves. Discussion Paper No. 1, School of Agricultural Economics and Extension Education, University of Guelph, June, 1976.

III Articles and Speeches

Alaouze, Chris M.; Watson, A.S.; and Sturgess, N.H. "Oligopoly Pricing in the World Wheat Market." American Journal of Agricultural Economics, Vol. 60, No. 2, (May 1978).

Anderson, Kym. "On Why Rates of Assistance Differ Between Australia's Rural Industries." Australian Journal of Agricultural Economics, Vol. 22, No. 2, (August 1978), pp. 99-114.

Apedaile, L.P. "Compensating for the Crow Gap." in Meat-Grain Interface Project, Vol. 1, D.G. Devine and R. Sparling (eds.), Saskatoon: Department of Agricultural Economics, University of Saskatchewan, 1976-77.

Arcus, P.L. "The Impact of the Crow's Nest Pass Freight Rates on the Meat-Grain Interface in Western Canada." in Meat-Grain Interface Project, Vol. 1, D.G. Devine and R. Sparling (eds.), Saskatoon: Department of Agricultural Economics, University of Saskatchewan, 1976-77.

"Argentina: the Farming Sector." Bank of London and South America Review, Vol. 13 (August, 1979).

"Argentina: Economic Policy Since April 1976." Bank of London and South American Review, Vol. 13, (May, 1979) pp. 278-84.

Askari, H. and Cummings, J.T. "Estimating Agricultural Supply Response with the Nerlove Model: A Survey." International Economic Review, Vol. 18, No. 2, (June, 1977), pp. 257-292.

Bale, Malcolm D. "Distributional Impacts of Price Intervention." American Journal of Agricultural Economics, Vol. 61, No. 2, (1979), pp. 348-50.

Bale, Malcolm D. and Greenshields, Bruce L. "Japanese Agricultural Distortions and Their Welfare Value." American Journal of Agricultural Economics, Vol. 60, No. 1, (February, 1978).

Behrman, J.R. "International Commodity Agreements: An Evaluation of the Integrated Commodity Programme," in William R. Cline (ed), Policy Alternatives for a New International Economic Order. New York: Praeger, 1979.

Belder, Joe. "Food Strategy for Canada, Inching Towards a National Plan." Food Policy, Vol. 3, No. 2, (May, 1978) pp. 82-82.

Bigman, David and Reutlinger, Shlomo. "Food Price and Supply Stabilization: National Buffer Stocks and Trade Policies." American Journal of Agricultural Economics, Vol. 61, No. 4, (November 1979), pp. 657-667.

. "National and International policies Toward Food Security and Price Stabilization." American Economic Review, Vol. 69, No. 2, (May 1979).

Bjarnason, H.F. "World Grain Production and Consumption Trends." Address to the Thirteenth International Grain Industry Course. Canadian International Grains Institute, Winnipeg, May 14, 1980. (mimeographed)

Blandford, D. and Currie, J.M. "Price Uncertainty - the Case for Government Intervention." Journal of Agricultural Economics, Vol. 26, No. 1, (January 1975).

Blandford, D. and Lee, S. "Quantitative Evaluation of Stabilization Policies in International Commodity Markets." American Journal of Agricultural Economics, Vol. 6, No. 1, (February, 1979).

- Bredahl, Maury E; Meyers, William H; and Collins, Keith J. "The Elasticity of Foreign Demand for U.S. Agricultural Products: The Importance of the Price Transmission Elasticity." American Journal of Agricultural Economics, Vol. 61, No. 1, (February, 1979).
- Brook, E; Grilli, E.; and Waelbroeck, J. "Commodity Price Stabilization and the Developing Countries." Banca Nazionale del Lavoro Quarterly Review, Vol. 31, No. 124, (1978).
- Caldwell, Dan. "Food Crisis and World Politics." International Studies Series, Vpl. 5, Beverley Hills: Sage Publications, 1977.
- Campbell, Keith O. "National Commodity Stabilization Schemes: Some Reflections Based on Australian Experience." in Roger N. Dixey (ed.) International Explorations of Agricultural Economics. Ames: Iowa State University Press, 1964.
- Carter, Colin and Schmitz, Andrew. "Import Tariffs and Price Formation in the World Wheat Market." American Journal of Agricultural Economics, Vol. 61, No. 3, (August 1979).
- Caves, Richard E. "Organization, Scale and Performance of the Grain Trade." Food Research Institute Studies (Stanford), Vol. 61, No. 3, (1977-78), pp. 107-23.
- Cochrane, Willard W. "Some Non-Conformist Thoughts on Welfare Economics and Commodity Stabilization Policy." American Journal of Agricultural Economics, Vol. 62, No. 3, (August 1980), pp. 508-511.
- Cohn, Theodore. "The 1978-9 Negotiations for an International Wheat Agreement: An Opportunity Lost?" International Journal, Vol. 35, No. 1, (Winter 1979-80).
- Curry, J.M.; Murphy, J.A.; and Schmitz, A. "The Concept of Economic Surplus and its Use in Economic Analysis." Economic Journal, Vol. 81, No. 324, (December 1978), pp. 741-749.
- Dobson, G.J. and Gifford, M.N. "International Trade, the GATT and Canadian Agriculture." Canadian Farm Economics, Vol. 6, No. 6, (February, 1972).
- Farnsworth, H.C. "Imbalance in the World Wheat Economy." Journal of Political Economy, Vol. 66, No. 1, (February, 1958).

- . "International Wheat Agreements and Problems - 1949-56." Quarterly Journal of Economics, Vol. 70, (May, 1956).
- Gilson, J. Clayton. "The Agricultural Task Force Report - The Benefit of Hindsight." Canadian Journal of Agricultural Economics, Vol. 28, No. 2, (July, 1980), pp. 1-10.
- Glezakos, Constantine. "Export Instability and Economic Growth: A Statistical Verification." Economic Development and Cultural Change, Vol. 21, No. 4, Part 1, (July, 1973), pp. 670.
- Harbury, C.D. "An Experiment in Commodity Control - The International Wheat Agreement." Oxford Economic Papers, Vol. 6, No. 1, (February, 1954).
- Hazell, P.B.R. and Scodizzo, P.L. "Farmers Expectations, Risk Aversion and Market Equilibrium under Risk." American Journal Of Agricultural Economics, Vol. 59, No. 1, (February 1977), pp. 204-209.
- Hedges, Jrwin. "Kennedy Round Agricultural Negotiation and the World Grains Agreement." Journal of Farm Economics, Vol. 49, No. 9, (December, 1967).
- Hillman, J.S. "Negotiations on Trade Disruptions." in Trade Negotiations and World Food Problems, Papers for a Conference in London on 5 December, 1974. London: Trade Policy Research Centre.
- Hovck, James P. "U.S. Agricultural Trade and the Tokyo Rould." Law and Policy in International Business, Vol. 12, No. 1, (1980).
- Hueth, Darrell and Schmitz, Andrew. "International Trade in Intermediate and Final Goods: Some Welfare Implications of Destabilized Prices." Quarterly Journal of Economics, Vol. 76, No. 3, (August, 1972).
- Hussey, D.D. and Dickie, I.C. "Australian Government Intervention Measures in the Rural Sector." Quarterly Review of Agricultural Economics, Vol. 27, No. 3, (July 1974).
- "Instability of Agricultural Markets." OECD Observer, No. 102, (January, 1980).
- Johnson, D. Gale. "The Food and Agriculture Act of 1977: Implications for Farmers, Consumers, and Taxpayers." in William Fellner, project director, Contemporary Economic Problems 1978. Washington: American Enterprise Institute for Public Policy Research, 1978.

- _____. "Food Reserves and International Trade Policy." in J.S. Hillman and Andrew Schmitz (eds.). International Trade and Agriculture: Theory and Policy. Boulder, Colorado: Westview Press, 1979.
- _____. "Limitations of Grain Reserves in the Quest for Stable Prices." The World Economy, Vol. 1, No. 3, (June 1978), pp. 289-300.
- _____. "Negotiations on Levels of Farm Support." in Trade Negotiations and World Food Problems, Papers for a Conference in London on 5 December 1974. London: Trade Policy Research Centre.
- _____. "World Agriculture, Commodity Policy and Trade Variability." American Journal of Agricultural Economics, Vol. 57, No. 5, (December, 1975).
- Johnson, H.G. "The Theory of Effective Protection." Chapter 13 in Aspects of the Theory of Tariffs. Cambridge, Mass.: Harvard University Press, 1972.
- Johnson, L.M. "Economic Analysis of Crop Rotations in Western Canada." Canadian Farm Economics, Vol. 13, No. 5, (October, 1978).
- Johnson, P.R.; Grennes, Thomas; and Thursby, Marie. "Devaluation, Foreign Trade Controls and Domestic Wheat Prices." American Journal of Agricultural Economics, Vol. 59, No. 4, (November, 1977).
- Josling, T.E. "Agricultural Policy in the Developed Countries." Journal of Agricultural Economics, Vol. 25, (1974).
- _____. "Agricultural Trade Policies - Vital Link Between Developed and Developing Countries." Round Table, Vol. 1977, No. 267, pp. 277-284.
- _____. "Agriculture's Place in General Economic Policy." The World Economy, Vol. 1, No. 1, (October, 1977).
- _____. "The European Community Agricultural Policies and the Interest of Developing Countries." ODI Review, No. 1, (1979).
- _____. "Expansion of Commercial Trade in Agricultural Products." in Frank McFodzean, et.al., Towards and Open World Economy. London: Macmillan for the Trade Policy Research Centre, 1972.
- _____. "Government Price Policies and the Structure of International Agricultural Trade." Journal of Agricultural Economics, Vol. 28, (1977), pp. 261-277.

- _____. "Grain Reserves and Government Agricultural Policies." World Development, Vol. 5, No. 5-7, (May-July, 1977).
- _____. "An International System of Grain Reserves." in Trade Negotiations and World Food Problems, Papers for a Conference in London on 5 December 1974. London: Trade Policy Research Centre.
- _____. "World Trade in Basic Foodstuffs." International Journal, Vol. 34, No. 1, (Winter, 1978-9), pp. 39-52.
- Just, Richard E. "Risk Response Models and Their Use in Agricultural Policy Evaluation." American Journal of Agricultural Economics, Vol. 57, No. 5, (December, 1975), pp. 836-43.
- _____. "Theoretical and Empirical Possibilities for Determining the Distribution of Welfare Gains from Stabilization." American Journal of Agricultural Economics, Vol. 59, No. 5, (December, 1977), pp. 912-917.
- Just, Richard; Lutz, Ernst; Schmitz, Andrew; and Turnovsky, Stephen. "The Distribution of Welfare Gains from International Price Stabilization under Distortions." American Journal of Agricultural Economics, Vol. 59, No. 4, (November, 1977), pp. 652-61.
- _____. "The Distribution of Welfare Gains from Price Stabilization: An International Perspective." Journal of International Economics, Vol. 8, (1978), pp. 551-563.
- Kenen, P.B. and Voivodas, C.S. "Export Instability and Economic Growth." Kyklos, Vol. 25, (1972), pp. 791-804.
- Konandreas, P.A. and Schmitz, Andrew. "Welfare Implications of Grain Price Stabilization: Some Empirical Evidence from the United States." American Journal of Agricultural Economics, Vol. 60, No. 1, (February, 1978).
- Kristjanson, R.L. The World Grain Situation, Address to Southam Business Editors, Vancouver, September 24, 1974.
- Kulshreshtha, S.N. and Devine, D.G. "Historical Perspectives and Propositions on the Crowsnest Pass Freight Rate Agreement." Canadian Journal of Agricultural Economics, Vol. 26, No. 2, (July, 1978), pp. 72-83.
- Labys, W.C. "World Grain Markets: A Functional Analysis." World Development, Vol. 5, No. 5-7, (May, July, 1977).

Lahoar, J.S. "The Multilateral Trade Negotiations and Canadian Agriculture." Canadian Farm Economics, Vol. 14, No. 5, (October, 1979).

Lancieri, Elio. "Export Instability and Economic Development: a Reappraisal." Banca Nazionale del Lavoro Quarterly Review, Vol. 31, No. 125, (June 1978).

_____. "Instability of Agricultural Exports: World Markets, Developing and Developed Countries." Banca Nazionale del Lavoro Quarterly Review, Vol. 32, No. 130, (September, 1979), pp. 281-330.

Lattimore, Ralph. Some Aspects of World Grain Market Instability. Paper presented at the First International Working Group on Food Security Issues in Asia and the Pacific, East-West Centre, Honolulu, June 18-30, 1979.

Lueng, D.T.W. "The Concept of Effective Subsidy and its Application to the Canadian Flour Milling Industry." Canadian Journal of Agricultural Economics, Vol. 21, No. 1, (February, 1973).

Lin, Soe. "Effective Protection Rates for Selected Agricultural Commodities." April, 1980. (mimeographed).

Lord, Montague J. "The Impact of International Price Stabilization Schemes on Primary Commodities." March 21, 1980. (mimeograph).

MacFarlane, David L. "The International Wheat Agreement of 1956. A Canadian View." International Affairs, Vol. 32, No. 4, (October, 1956), pp. 427-35.

Marzels, A. Book Review of Export Instability and Economic Development by Alisdair J. MacBean. American Economic Review, Vol. 58, No. 3, (June 1968), p.11.

Malmgren, H.B. and D.L. Schelchty. "Rationalizing World Agricultural Trade." Journal of World Trade Law, Vol. 4, No. 4, (July-August, 1970), pp. 515-537.

Marsh, John. "Europe's Agriculture: Reform of the CAP." International Affairs, Vol. 53, No. 4, (October, 1977), pp. 604-614.

Mason, Greg. "The Grain Handling and Transportation Commission." Canadian Public Policy, Vol. 4, No. 2, (Spring, 1978), pp. 235-245.

Massell, Benton F. "Export Instability and Economic Structure." American Economic Review, Vol. 50, No. 4, (September, 1970).

_____. "Price Stabilization and Welfare." Quarterly Journal Of Economics, Vol. 83, No. 2, (May 1969).

McCalla, A.F. "A Duopoly Market of World Wheat Pricing." Journal of Farm Economics, Vol. 48, No. 3, Part 1, (August, 1966).

_____. "Implications for Canada of United States Farm Policies." Journal of Farm Economics, Vol. 49, No. 5, (December, 1967).

McCalla, A.F. and Schmitz, Andrew, "Grain Marketing Systems: The Case of the United States versus Canada." American Journal of Agricultural Economics, Vol. 61, No. 2, (May 1979).

McLaughlin, M. "The World Food Situation and the U.S. Role." in R.D. Hansen, ed., The U.S. and World Development: Agenda for Action 1976. New York: Praeger, 1976.

McLin, Jon. "Surrogate International Organization and the Case of World Food Security." International Organization, Vol. 31, No. 1, (Winter, 1979).

Mendelsohn, Chaim. "Approaches to International Trade Under Nonpure Competition, A Theoretical Framework for Analysis of Some Contemporary Problems of International Trade in Agricultural Products." Journal of Farm Economics, Vol. 39, No. 5 (1957).

Menzie, E.L. "Developments in Canadian Agricultural Policy, 1929-79." Canadian Farm Economics, Vol. 15, No.2 (April, 1980).

Motha, G. and Plunkett, H. "The Effective Rate of Protection - An Investigation into the Application of the Concept to the Australian Rural Sector." Quarterly Review of Agricultural Economics, Vol. XXVII, No. 3 (July, 1974).

Nagy, J.G.; Furtan, W.H.; Kulshreshtha, S.N. The Canadian Wheat Economy: Economic Implications of Changes in the Crowsnest Pass Freight Rates. Technical Bulletin BL:79-1. Saskatoon: Department of Agricultural Economics, University of Saskatchewan, January, 1979.

- _____. "The Implications of a Change in the Crowsnest Pass Freight Rate on the Canadian Prairie Wheat Economy." The Logistics and Transportation Review, Vol. 15, No. 4.
- Nelson, Glenn C. "International Food Policy Issues." Chapter V in The Lessons of Wage and Price Controls-The Food Sector, John T. Dunlop and Kenneth J. Fedor, eds. Boston: Harvard University, Graduate School of Business Administration, 1977.
- Oi, Walter. "The Desirability of Price Instability Under Perfect Competition." Econometrica, Vol. 29, No. 1 (January, 1961).
- Papson, T.C., Stuckhart, C.F., Burger, S.R., Goldberg, C.K. and Hoegle, R.L. "United States and International Commodity Accords: Cocoa, Coffee, Tin, Sugar and Grain." Law and Policy in International Business, Vol. 9, No. 2 (1977).
- Pasour, E.C. Jr. "Cost of Production: A Defensible Basis for Agricultural Price Supports?" American Journal of Agricultural Economics, Vol. 62, No. 2 (May, 1980).
- Peck, Anne E. "Implications of Private Storage of Grains for Buffer Stock Schemes to Stabilize Prices." Food Research Institute Studies, Vol. 16, No. 3 (1977/78), pp. 125-40.
- Peck, Anne E. and Gray, Roger W. "Grain Reserves--Unresolved Issues." Food Policy, Vol. 5, No. 1 (February, 1980).
- Peterson, Willis L. "International Farm Prices and the Social Cost of Cheap Food Policies." American Journal of Agricultural Economics, Vol. 61 (February, 1979), pp. 12-20.
- Poirier, Rolland P. "La Nature et l'etendue de la contribution canadienne pour aider à solutionner le probleme alimentaire mondial." Proceedings, Symposium on Canada and World Food. The Royal Society of Canada and the Agricultural Institute of Canada, (August 22-24, 1977).
- Porter, Richard C. "On Placing the Blame for Primary Product Instability." International Economic Review, Vol. 11, No. 1 (February, 1970), pp. 175-78.
- _____. "Who Destabilizes Primary Product Prices?" Indian Economic Journal, Vol. XVI, No. 4 (April-June, 1969), pp. 389-413.

- Reutlinger, Shlomo. "Food Insecurity: Magnitude and Remedies." World Development, Vol. 6, No. 6 (June, 1978), pp. 797-811.
- Rojko, Anthony S. "The Economics of Possible Food Reserve Systems and their Relation to Commercial Markets." American Journal of Agricultural Economics, Vol. 57, No. 5 (December, 1975), pp. 866-72.
- Rosenfeld, S.S. "The Politics of Food." Foreign Policy, Vol. 14 (Spring, 1974), pp. 17-29.
- Rothschild, Emma. "Short Term, Long Term." New Yorker, (May 27, 1975).
- Sahi, R.K. and Craddock, W.J. "Establishing the Effects of Operation LIFT on 1970 Prairie Land Utilization." Canadian Farm Economics, Vol. 6, No. 5 (December, 1971).
- Savary, R. "Towards World Food Security: International Approaches to Food Stocks." Commodity Review and Outlook, 1974-75. Rome: FAO, 1975.
- Schertz, Lyle P. "World Food: Prices and the Poor." Foreign Affairs, Vol. 52, No. 3, pp. 511-37.
- Schmitz, Andrew and McCalla, Alex F. "The Canadian Wheat Boards." Agricultural Marketing Boards--An International Perspective, Sidney Hoos, ed. Cambridge, Mass.: Ballinger, 1979.
- Schuh, G. Edward. "Agriculture and the MTN." Foreign Agriculture (July, 1979).
- Schwarzmann, Maurice. "Discussion: Kennedy Round Agricultural Negotiations and the World Grains Agreement." Journal of Farm Economics, Vol. 49, No. 5 (December 1967), pp. 1341-44.
- Shefrin, Frank. "The Agricultural Agencies: Objectives and Performance." International Journal, Vol. XXXV, No. 2 (Spring, 1980).
- Shei, Shun-Shei and Thompson, Robert L. "The Impact of Trade Restrictions on Price Stability in the World Wheat Market." American Journal of Agricultural Economics, Vol. 59, No. 4 (November, 1977).
- Stam, Jerome M. "The Effects of Public Law 480 on Canadian Wheat Exports." Journal of Farm Economics, Vol. 46, No. 4 (November 1964).

Stein, Leslie. "Export Instability and Development: A Review of some Recent Findings." Banca Nazionale del Lavoro Quarterly Quarterly Review, Vol. XXX, No. 122 (September 1977), pp. 279-90.

Trezise, Philip H. "Rebuilding Grain Reserves." Development Digest, Vol. 15, No. 2 (April 1977).

Turnovsky, Stephen J. "The Distribution of Welfare Gains from Price Stabilization: A Survey of Some Theoretical Issues." Stabilizing World Commodity Markets, F. Gerard Adams and Sonia Klein (eds.). Lexington, Mass.: Lexington Books, 1978.

_____. "The Distribution of Welfare Gains from Price Stabilization: The Case of Multiplicative Disturbances." International Economic Review, No. 17 (1976), pp. 133-48.

_____. "Price Expectations and the Welfare Gains from Price Stabilization." American Journal of Agricultural Economics, Vol. 56, No. 4 (November, 1974), pp. 7-6-16.

Turnovsky, Stephen J., Shalit, Haim, and Schmitz, Andrew. "Consumer's Surplus, Price Instability, and Consumer Welfare." Econometrica, Vol. 48, No. 1 (January, 1980).

Warley, T.K. "Canada, Australia and New Zealand in International Agricultural Trade." U.S. Agriculture in a World Context: Policies and Approaches for the Next Decade, D.G. Johnson and J.A. Schnittker, eds. New York: Praeger, 1974.

_____. "Domestic Implications of the International Food Policy Agenda." Trade and Aid, R.M.A. Loyns and N.J. Beaton, eds. Proceedings of the Agricultural and Food Marketing Forum. Occasional Series No. 10. Winnipeg: Department of Agricultural Economics and Farm Management, University of Manitoba, January 1978.

_____. "Trade, Aid and Food Reserves." Proceedings, Symposium on Canada and World Food. The Royal Society of Canada and the Agricultural Institute of Canada, August 22-24, 1977, Ottawa, Canada.

_____. "What Chance has Agriculture in the Tokyo Round?" The World Economy, Vol. 1, No. 2 (January, 1978), pp. 177-94.

- Wallensteen, P. "Scarce Goods as Political Weapons: the Case of Food." Journal of Peace Research, Vol. 13, No. 4, pp. 277-98.
- Wallerstein, Mitchel B. and Austin, James E. "The World Food Council at Three Years: Global Food System Manager?" Food Policy, Vol. 3, No. 3 (August, 1978), pp. 191-201.
- Wasserman, Ursula. "International Grains Arrangement 1967." Journal of World Trade Law, Vol. 2, No. 2 (March-April, 1968), pp. 233-39.
- _____. "International Wheat Agreement 1971." Journal of World Trade Law, Vol. 5, No. 3 (May-June, 1971), pp. 360-62.
- Waugh, Frederick V. "Does the Consumer Benefit from Price Instability?" Quarterly Journal of Economics, Vol. 58 (August, 1944).
- Weiss, Thomas G. and Jordan, Robert G. "Bureaucratic Politics and the World Food Conference: The International Policy Process." World Politics, Vol. 28, No. 3 (April, 1976).
- Wheeler, L.A. "Government Intervention in World Trade in Wheat." Journal of World Trade Law, Vol. 1, No. 4 (July-August, 1967).
- White, Garry and Bosworth, Malcolm. Measuring Assistance to Rural Industries: Some Methodological Issues. Contributed Paper: 24th Annual Conference of the Australian Agricultural Economics Society, Adelaide, 12-14 February, 1980. Industries Assistance Staff Paper 80/1. February, 1980.
- Willig, R.D. "Consumer's Surplus Without Apology." American Economic Review, Vol. 66, No. 4 (September, 1976), pp. 589-97.
- Wipf, Larry J. "Tariffs, Nontariff Distortions and Effective Protection of U.S. Agriculture." American Journal of Agricultural Economics, Vol. 53, No. 3 (August, 1971).
- Wisner, Diana. "Canada's Agricultural Trade with Developing Countries: An Analysis of the Past Level of Exports." Canadian Farm Economics, Vol. 15, No. 1 (February, 1980).
- Yeutter, Clayton. "U.S. Farm Policy and Commodity Programs." Agriculture Abroad, Vol. 29, No. 4 (August 1974).

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