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RISK AND UNCERTAINTY IN WORLD GRAIN MARKETS*

by Lowell Hill, Sheryl Lazarus
and Aree Wiboonspongse

Although risk and uncertainty are often used interchangeably we would like to revert back to the more traditional distinction and define risk as a situation or event for which the probability of occurrence is known or can be calculated from historical data. Uncertainty will define as relating to situations or events where information on probability distributions is not available (Van Horn, 1977).

Both of these concepts are important in international grain markets. There have been many examples of uncertainty in recent years, most of them related to political decisions. Grain embargoes in response to political decisions, opening of new trade channels, and labor strikes are difficult to predict and it is impossible to establish probability distributions of their occurrence. On the other hand, weather cycles, demand and supply shifts, and price response are explainable by variables whose distributions are known and the probability of occurrence and magnitude can be captured within a confidence interval. The importance of the distinction between risk and uncertainty is that risk can be insured against, can be shifted to other participants in the market, can be redistributed from individuals to groups and can be incorporated into market prices. We intend to focus the rest of this paper primarily on risk with only incidental references to uncertainty.

The institutions and economic instruments for dealing with risk can be formal or informal. The natural development of the market system nearly always results in the emergence of informal arrangements; formal institutions are generally the result of explicit decisions by governments or public bodies. These formal instruments and institutions are a part of the continuing process of the search for improving the performance of markets.

The topic of agricultural market performance has received increased attention in recent years from farmers, researchers and policy makers in state and federal agencies. Much of the attention has been directed toward changing the way the market is organized; introducing new marketing

institutions; or increasing the public regulation of marketing firms and institutions. All of these efforts have been for the purpose of improving the market's performance.

Disagreement on the means for improving market performance results from the diverse and often inconsistent measures of performance used by different individuals and groups. For example, consumers may think of improved market performance as meaning lower prices for agricultural products, while producer groups may measure it by the rate of increase in agricultural prices. Some producer groups rank price stability as the most important measure of performance while others are willing to sacrifice stability in exchange for higher average prices or access to world markets.

Because of the diverse criteria by which people measure market performance, marketing research must be developed within a framework of what the market can be expected to do. Alternative choices can be evaluated as to their positive or negative contributions to specified performance criteria. Seldom can a researcher determine that one policy action is preferable to another on all possible criteria. One approach to the dilemma of conflicting welfare goals is to specify the functions that a market performs and evaluate alternative choices (public or private) on the basis of the functions and the performance criteria identified as relevant by the market participants or public agencies that are considering the alternatives.

In this paper we will first select the function of risk from among the total set of marketing functions and describe and evaluate cause and effect of risk in international grain markets. Secondly we will evaluate some suggested solutions to the problems of risk.

A FUNCTIONAL APPROACH TO EVALUATING MARKET PERFORMANCE

Every market must perform a basic set of functions whether it is a primitive barter type of exchange or a highly regulated market with sophisticated rules and technology. Not all functions are performed equally well by all markets, nor do they all receive the same relative emphasis. Different markets also give responsibility for performing the functions to different participants in the market.

In the simplest form of a market, there are only two participants exchanging goods, with each

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benefiting by giving up one product in exchange for another. All market functions are performed by either the buyer or the seller. As this market develops, money becomes a medium of exchange permitting a wider range of participants. With increasing market sophistication, individuals start specializing in one or more marketing functions. As a result we have middlemen, information agencies, regulatory bodies, and a wide variety of market institutions.

In all stages of market development, the functions performed can be classified into three categories: (1) physical functions, (2) exchange functions, and (3) facilitating functions. As discussed at length by Shepherd (1976) there is not unanimous agreement on this classification or on the functions included. However, every market must provide most of the functions that are described below. Primitive markets differ from sophisticated markets primarily in the degree to which the functions are performed by specialized firms.

Physical Functions - The physical functions identified by most marketing textbooks are storage, processing, assembly and distribution. Unless products are consumed as soon as they are produced, they must be stored. This is especially true for agricultural products because production is seasonal and consumption continuous.

Most agricultural products must be processed before they can be consumed. In addition to the obvious types of food processing, this category of market functions includes such diverse activities as grain drying, packaging of cereals, and cooking by the consumer.

Unless consumer and producer are the same person, transportation of the goods from the production point to the consumer is also an essential function. Agricultural products must be assembled from many producers located over a wide geographical area, and then distributed to an even larger number of consumers often scattered over an even greater geographical area.

Exchange Functions - In most textbooks the exchange function is divided into buying and selling. However, this division implies that buying and selling are separate activities when in fact they merely identify the two parties involved in a single transaction. A more useful categorization is the transactions function - exchange of title, consummation of the contract, etc. - and the pricing function. Regardless of the simplicity or complexity of the market system, title to the goods must change hands and social and legal rules governing the rights associated with title and contract inevitably must be developed.

The pricing function differs among marketing systems but is always present. In a barter economy it is the process of setting the value of one good in terms of another. This is often a process of negotiation between buyer and seller. In a system of administered prices such as those found in the European Community or in centrally planned economies, prices are established by commissions

or government agencies, who try to equate forces of demand and supply within the context of other social and economic goals. In a market economy the price is established through a series of bids and offers interacting within a market. This may involve several middlemen, government agencies, and private entrepreneurs operating within a set of rules and regulations and using arbitrage through time and space.

Facilitating Functions - The list of facilitating functions differs from one textbook to another but the list that I prefer includes information, risk shifting, standardization and financing.

The importance of the facilitating functions increases with the complexity of the market system, although they are present to a limited extent even in the simplest market. For example, the function of financing is highly developed in sophisticated markets. But even in a two-person market one party may arrange for partial advance payment before delivery or the buyer may find it necessary to accumulate funds prior to a purchase. In the grain industry forward contracts, delayed pricing schemes, and the futures markets all depend heavily upon the market (i.e., the middlemen and their institutions) to provide financing while the grain is moved from the place of production to the final consumer.

RISK AS FACILITATING FUNCTION

Risk is the facilitating function on which I would like to concentrate the rest of this paper. Unless the consumption of a product is simultaneous with production there is risk to the owner of the product. This risk can be of two forms - risk of price changes or risk of loss in quality and quantity. The price risk obviously depends on the degree of price variability over time. This risk is often shifted among participants in the market by means of various market devices and institutions. Hedging a commodity on the futures market shifts most of the risk to market speculators who are willing to accept risk for a lower premium than the firm that is hedging. In this way total costs of marketing may be reduced. Forward contracts are also used to shift risk from seller to buyer. If the producer retains ownership of a product while he waits to market it, then he bears the price risk.

Risk is primarily the result of fluctuations in price and quantity. This instability can be analyzed at the micro or macro level. At the micro level the producer seeks to reduce risk of fluctuation in quantity by insurance schemes, by diversification of crops and by increased use of inputs over which he can exert control - fertilizer, pesticides and irrigation. Individual producers seek relief from price risks through forward sales, contract production and use of formalized futures markets. To the extent that these efforts are successful, risk is shifted from the producer to other individuals or groups in society. If these individuals or groups can absorb risk at a lower social cost than individual

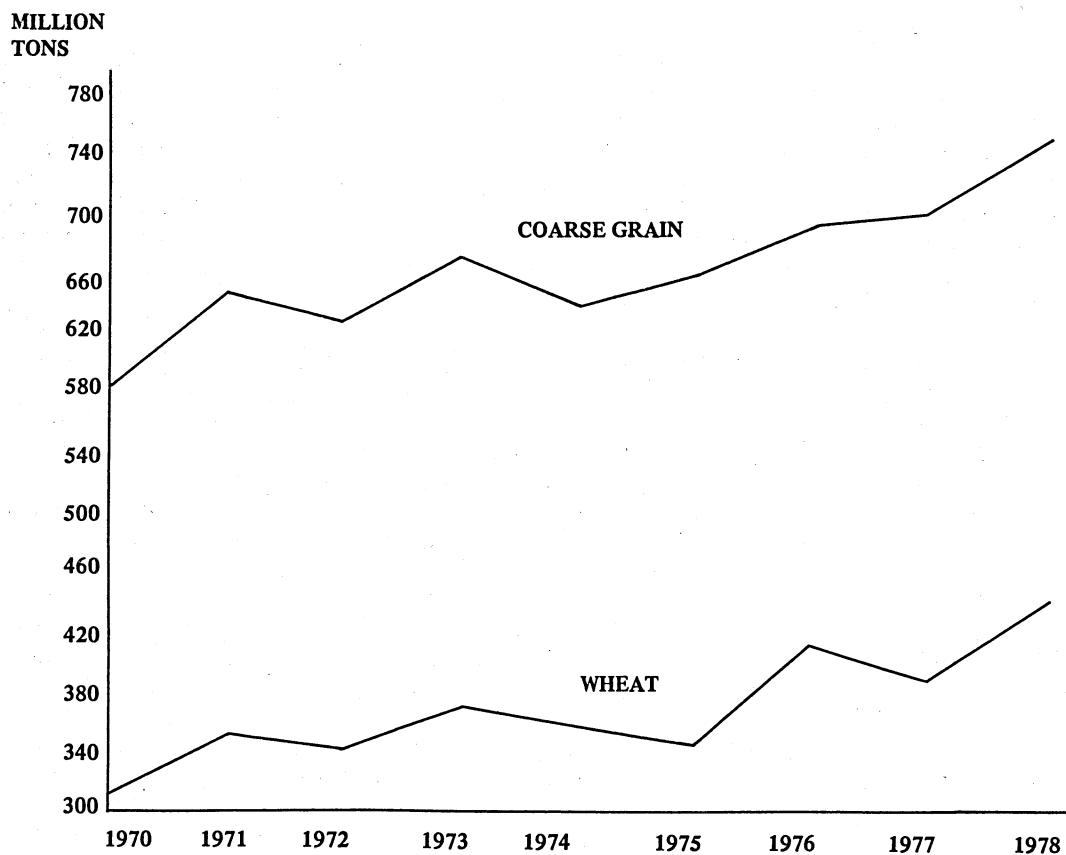


FIG. 1 WHEAT AND COARSE GRAIN PRODUCTION

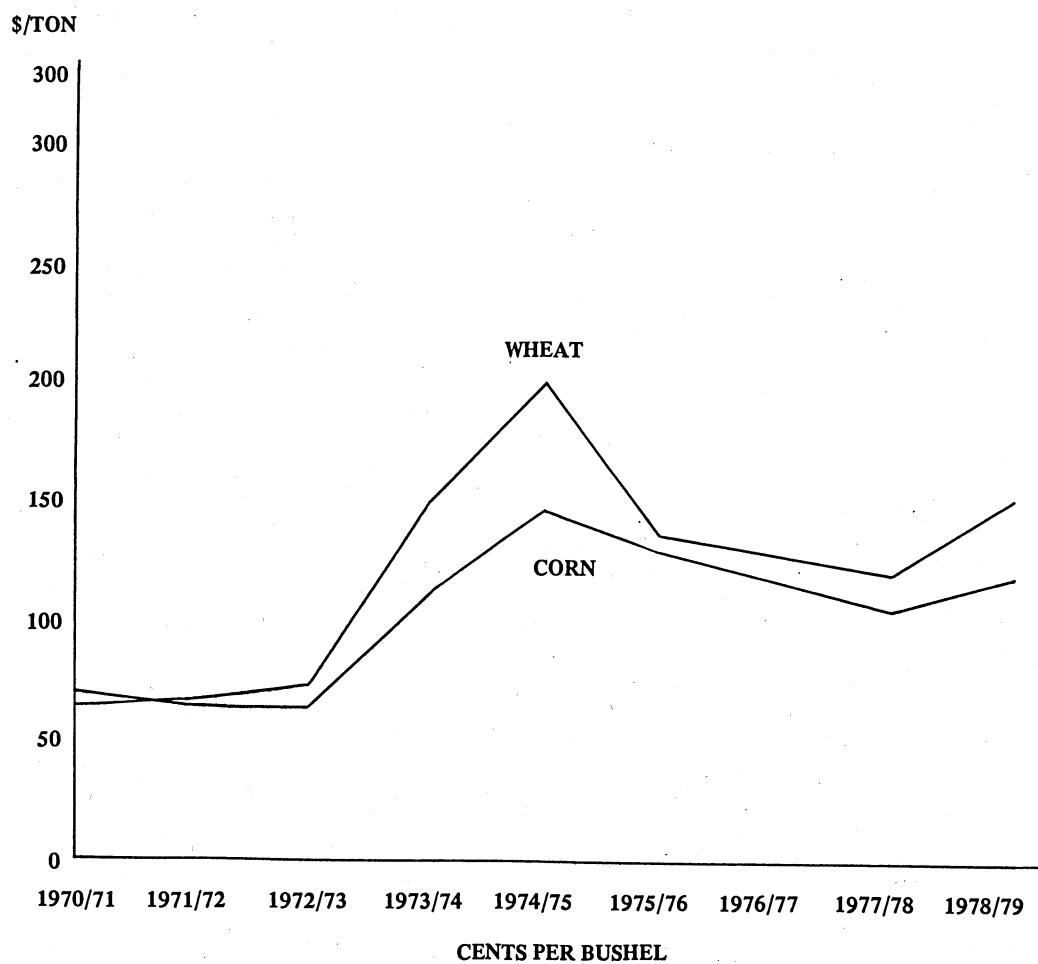


FIG. 2 WHEAT AND CORN PRICES (C.I.F. NORTH SEA PORTS)

farmers, then total welfare is improved. But the development of risk shifting or risk distributing institutions requires action by governments or public groups. Market performance can be improved through policies that facilitate the development of institutions for dealing with risk.

Aggregate concerns about instability also can be divided into supply instability and price instability. I would now like to turn to a description of these sources of instability, their causes, their effects, and an evaluation of some alternative techniques for reducing them.

INSTABILITY IN WORLD SUPPLIES

Many developed nations are frequently faced with supplies of grain that exceed their domestic demand at what is considered to be market clearing prices. There is frequently excess grain production capacity as a result of domestic agricultural policies. Because of the difficulty in shifting resources and the social costs involved in adjustments, many countries have found it necessary to subsidize domestic agricultural production. The excess supplies then enter the world markets. Over time the total volume of grain and proportion of world grain production that enters world markets has increased. Much of this volume traded is a result of agricultural trade policies in the industrial nations. Supply fluctuations have been large during the past decade (Figure 1) and are the result of price response by producers, weather and government policies.

Most of the developing countries are net importers of grain and are frequently dependent upon these imports to support their people even at a subsistence level. However, most of them lack both the economic and the political power of the industrialized countries to control the supplies. Most of the world grain trade occurs between industrialized nations on a commercial basis where hard currency is available for payment. As supplies fluctuate and prices make dramatic shifts the countries least able to accommodate these changes suffer most from the diminishing supply of grains. Developing countries frequently lack storage facilities and stocks to tide them over and they lack the exchange currency or credit to purchase the needed grain at inflated prices.

INSTABILITY IN WORLD PRICES

Relatively small changes in world grain production can cause major gyrations in prices. Grain prices in the world market have fluctuated wildly in recent years as shown in Figure 2. As an example, between 1972 and 1974 the U.S. wheat export price more than doubled. This price instability was caused by several factors. Weather influenced the amount of grain produced throughout the world. In 1972 world wheat production decreased by 3.5 percent in the world production trend (Hillman, 1978). This relatively small change resulted in price increases of

considerable magnitude partly as a result of the trade barriers throughout the world.

Governments throughout the world attempt to make decisions that will be domestically, socially and economically advantageous to their own people. In the process of protecting domestic prices and supplies they effectively insulate their consumers and to some extent their producers from price fluctuations. As a result the remaining grain moving in the free market is required to bear the entire adjustment implied by the world price change so that a few countries are reflecting change in demand for the entire world. Various agricultural programs have been enacted by country after country to stabilize and/or increase domestic farm prices and income. In order for these programs to be effective trade barriers between countries were established. These barriers change over time but not in response to supplies and demands. Many of the changes that do occur are politically motivated and determined by world situations unrelated to grain production and consumption. Uncertainty of this type is difficult to predict and produces serious social and economic disruptions in countries who depend upon this grain for food and subsistence.

The European Economic Community provides an example of the stabilizing policies that are present in many countries. The variable levy is the major policy instrument used by the EC to stabilize internal price relationships. This levy sets a threshold price which is the minimum price at which grain can enter the Common Market. If the world price is below threshold price a levy is imposed equal to the difference. This policy of variable levies effectively exports internal changes in demand and supply to those countries where prices are determined in the international markets.

The USSR and other centrally planned economies also introduce major fluctuations in world grain prices. The USSR is a major consumer of grain but its domestic production is highly variable depending on the weather. The USSR also purchases grain in the world markets as a single buyer, thus effectively representing a monopsony position when it buys grain. It is a sufficiently large buyer to have a major impact on world prices and available supplies. Since internal policies in Russia are difficult to predict, the Russian purchases provide one more source of uncertainty. At the same time Russian crop production does have a historical base on which to predict yields with some degree of probability associated with different yield levels in any one year. To the extent this prediction is possible there are market mechanisms which can be used to reduce this predictable risk.

The developing countries and the U.S. are left to face the major impacts of political decisions by those countries, such as the EC with major tariffs, and centrally planned economies such as the USSR who come into the market often without any advance warning. The ability of governments to cushion their economies from the world shortage in 1972 was in direct proportion to their existing levels of protection and their ability to transfer

producer protective policies to consumers. Obviously the developed countries were in the best position to accomplish this protection. In countries that consume well over half of the world's grain, prices are not allowed to reflect the supply and demand situation. These countries include the EC, China and the USSR. Consumers in these countries have no incentive to reduce grain consumption and producers have no incentive to expand production as prices rise in the world market.

The U.S. is better able to deal with price instability than the developing countries. However, fluctuations still cause problems. Since the U.S. is the largest grain exporter in the world it is frequently forced to play a de facto buffer role in price stabilization. The U.S. consumer rather than the English, the Japanese, or the Russian consumer must often bear the brunt of adjustments when there are fluctuations in prices and supplies. The U.S. also provides much of the storage function for the world, often in response to expected price changes in future time periods. Insofar as future changes in price can be predicted with some set of confidence limits around the predicted value, entrepreneurs in the U.S. grain industry will try to use a storage policy that in effect tends to stabilize prices and supplies throughout the world.

Government programs in the United States have also used grain storage as a way of subsidizing farmers when grain prices are low. Following World War II large stocks of grain began to be accumulated in the U.S. The stocks became an important part of domestic U.S. grain policy during the early 1960's. In the late 1960's the government decided to liquidate these stocks. This increased supply on the world markets resulted in a lowering of prices to farmers since U.S. farmers were not insulated from world conditions. The elimination of the large government stocks in the U.S. during the late sixties resulted in destabilizing world prices and supplies. A period of almost a decade of very small price fluctuations in the U.S. and world markets was followed in the seventies by wildly fluctuating prices primarily because there was no longer a major buffer stock held by the U.S. government. The decrease in world production in 1972 was immediately followed by a large increase in prices partly because there was no longer a supply of wheat in the United States that could move into commercial markets when prices rose above the release level.

ALTERNATIVES FOR REDUCING INSTABILITY

Changes in Trade Policy - There are several changes in trade policies and agricultural policies that would minimize grain price fluctuations in world markets. First, trade liberalization would make all countries more responsive to surpluses or deficits of grain in world production and would also make them more responsive to changes in prices. Since all countries would be participating in adjustments to price changes the total effect would

be less than when the world market adjustment must be made by relatively few freely operating markets. Currently major grain users such as the countries in the EC are unaffected by world conditions. Due to the variable levy their flat supply curve and essentially vertical demand curve with respect to world price changes increases the instability of grain prices for the rest of the world. A change from a variable levy to an ad valorem (fixed percentage) tariff would result in a more responsive domestic market while continuing to protect domestic producers.

Changes in storage policies of many of the importing countries would also serve to dampen the effects of changes in supply. This would increase the cost for the consumers in those countries because they would have to bear the cost of storage. This cost is currently being borne indirectly by all consumers since the cost of all market services must be covered by someone in the buying sector of the world economy. The storage function must be performed by someone and the question is whether it can be done more efficiently by the consuming nations or by the producing nations and whether increased storage capacity could reduce price fluctuations.

Increase in Grain Stocks - Larger grain reserves throughout the world can also help decrease price fluctuations. More research needs to be done to determine the optimal level of these stocks in various countries but several attempts have been made (Johnson, 1978). Some of these studies (Burt, Koo and Dudley, 1980) suggest that relatively small grain stocks are needed because price instability may be preferred to price stability, if prices are expected to fluctuate in such a way that total expenditure is less with instability. However the concept of consumer surplus is not always appropriate as a measure of the level of utility for very low income consumers. Some developing countries are faced with the prospect of starvation. Even though theoretically, utility may be greatest with widely fluctuating grain prices, responsible governments need to develop strategies to avert food shortages that can be devastating to even minor segments of their population.

In the case of a nonlinear demand curve for grain the gain from price stability depends on whether the total revenue curve is concave or convex. The greatest gains from price instability are to the producers in exporting countries even though certain individual countries may gain from price instability. When all countries are taken together, price stability is preferred (Schmitz, 1977; Just, Lutz, *et. al.*, 1977). Massel (1969 and 1970) used a linear model to examine the effects of price stabilization on both producers and consumers. He concluded that when both groups are simultaneously considered price stabilization will improve total welfare even though one group may be adversely affected. Oi determined that if price fluctuation is caused by random shifts in demand, producers will be better off from price fluctuations rather than a price stabilization at the average level

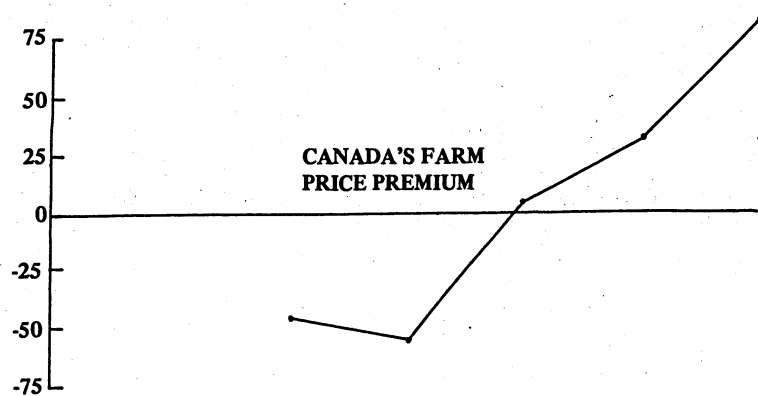
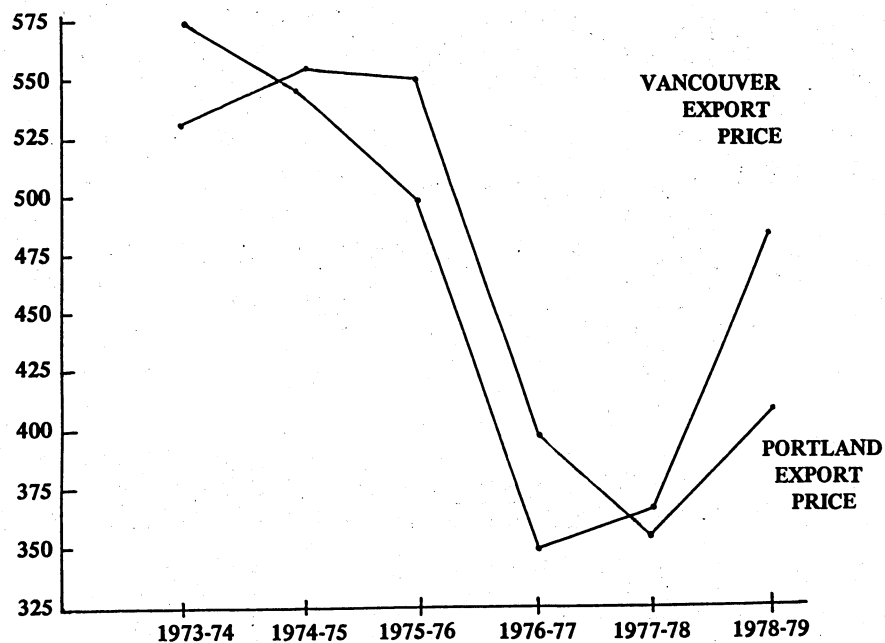
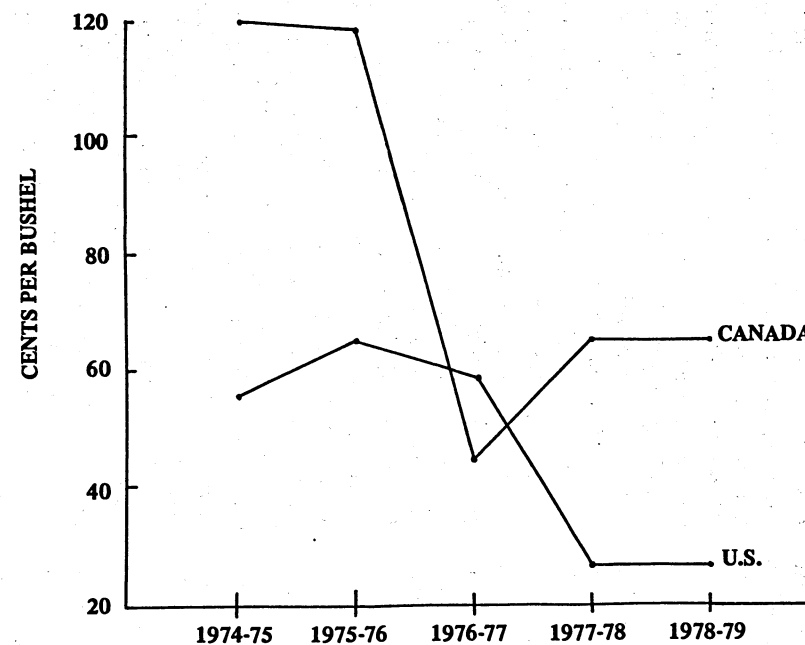


FIG. 3 COMPARISON OF U.S. AND CANADIAN PRICES



TRANSPORTATION COSTS, FARM TO PORT: U.S. = 43c PER BU.
 CANADA = 13c PER BU.

FIG. 4 COMPARISON OF U.S. AND CANADIAN MARKETING MARGINS

of prices. Oi (1966, 1944) assumed that demand was downward sloping and facing a random price because of stochastic supply fluctuations. He concluded that consumers were better off when prices were stabilized at the main level.

Turnovsky extended the work done by Massel, Oi and Waugh by using price expectations rather than actual prices. He concluded that Oi's result will continue to hold if rationale expectation is used, provided the demand fluctuations are autocorrelated (either positively or negatively). If the price expectations are independently distributed, producers' welfare will be unaffected by price stability. Oi's conclusions will not be true if expectations are adaptively formed. Unless the stochastic demand fluctuations are very highly positively autocorrelated Waugh's conclusion will hold under either rational or adaptive price expectations. Massel's conclusion that price stabilization provides a net gain when producers and consumers are considered together still holds.

The developing countries also need to be encouraged to increase their stocks during the periods of low prices (grain surpluses). This would not only help bolster world prices but would provide these countries with a needed buffer in times of shortage. Communications between countries also needs to be increased. Improved estimates of crop yields and impending crop failures or major changes in demand would enable the grain industry to take proper steps to cushion and dampen fluctuations in prices and quantities.

Forward Pricing - The U.S. futures market provides incentives for storage. For example, when the world price for wheat is low, U.S. exports tend to be proportionately reduced more than other countries'. However, the U.S. wheat price tends to decrease proportionately less than the world price in this situation because of the willingness of the U.S. grain industry to hold stocks. This willingness may be a function of the futures market and the ability of producers and merchandizers to shift and redistribute the risk of holding stocks.

The U.S. futures market indirectly plays a large role in world grain prices, since the majority of all grain sold is based on the FOB Chicago price. This provides a certain level of competition in a world market containing the EEC, marketing boards, and the USSR's centrally planned economy since the Chicago futures price is based on the open sale of grain futures.

Additional use of the futures market or other forms of forward contracting can help increase price stability. The forward pricing allows grain traders to lock in a price and thus reduce the price uncertainty of a future grain sale or purchase. Forward prices and the more formalized institution of futures markets provide a mechanism for individual producers to shift risk from their individual firm either to other segments in the marketing channel or to redistribute this risk among a large number of people willing to take a position on the futures market. This institution effectively substitutes a very small risk by a large

number of people for a very large risk by a small number of people. Based on the assumption that risk aversion is a nonlinear function of the size of the risk, this provides for increased total welfare in a system of markets.

Marketing Boards - Grain marketing boards are another method used by countries to reduce price instability. Aside from the political considerations, there are probably three important economic objectives that have been used to justify the existence of marketing boards. The first objective is to increase farm prices. The idea of better farm prices with a grain marketing board implies that government employees would do a better job of marketing than the private trade. The second objective is to provide price stability. Since prices would be administered by an agency and not controlled by the forces of demand and supply, daily or monthly price fluctuations would be unnecessary. The third objective of marketing boards is to increase access to foreign markets. Since many of the major grain importing countries have centrally planned economies, marketing boards would presumably ease trade negotiations.

You are probably more familiar with marketing boards than I am since South Africa uses them to handle grain exports. However, let me examine the effect of government involvement on each of the three criteria which I have just identified by comparing the U.S. system with existing boards.

Price Level and Marketing Boards - Despite the frequent argument that marketing boards increase farm prices, there is little evidence to support it, if we look at countries who have traditionally used marketing boards. The argument implies that the Boards do a better job of marketing. Argentina has fluctuated between an open market system and a marketing board system according to the whims of their political ideology. In a recent report on the performance of different grain systems around the world, the U.S. General Accounting Office identified some of the problems that the marketing board in Argentina has had in securing higher prices (1976). The report stated that in 1975 the board negotiated with Mexico to substitute 300 000 tons of sorghum for 200 000 tons of corn because they thought they were out of corn. The year ended with a surplus of 100 000 tons of corn but insufficient grain sorghum to fill the Mexican order. The six month postponement of deliveries and logistics of substitution resulted in considerable losses to both buyer and seller. In 1976 there was evidence that the board restricted export sales of wheat because they thought that the downward price trend would have an upturn later in the year. They guessed wrong. The continued price decline resulted in considerable losses and a large carryover into the next year.

Canada has a long history of marketing board operations and is frequently used as an example of how effective a U.S. board could be. A report from their own government illustrates some of their problems. The Canadian wheat board had decided

that because of depressed world grain prices they should increase exports in 1977/78. When the year was over they were still 2 million metric tons below their goal. Their inability to increase exports depressed the off-board prices by as much as \$5.00 per metric ton. The result was lower farm prices, increased feed use in Canada, lower livestock prices, increased stocks on farm held at the farmers expense and a decrease in production in the following year when export prices were higher.

A comparison of actual price data for a period of several years provides no evidence that Canada has been able to sell their grain at higher prices or that they have paid any consistent premium to their producers. Canada's export price after adjustment for quality and moisture follows close to that of the U.S. Both countries are selling to the same buyers who are trying to buy at the lowest price. Over the past 6 years Canada's export price has been above the U.S. price for 3 years and below for 3 years (Figure 3). Farm prices have shown a similar pattern. Over the past 5 years U.S. farm prices were above Canada for 2 years; below Canada for 2 years and equal to Canada in 1976-77 (Figure 4). It is important to understand Canada's rail system before we can evaluate the producer prices, because farm prices are determined by subtracting transportation and marketing costs from the export price. For wheat moving from producers in Western Canada to Vancouver, the rail rate was 13 cents per bushel. The comparable cost for U.S. wheat moving equal distances to Portland was 43 cents per bushel. The Canadian taxpayer (including farmers) provide the rest of the Canadian transport cost - 20 to 30 cents per bushel. If the Canadian grain industry paid the full cost of transportation the prices to their farmers would be significantly lower. Their marketing system is much less efficient, their handling costs are much higher than in the U.S. Their farmers receive comparable prices for wheat only because the government pays most of the cost of transportation. Without the transport subsidy, there is strong evidence that the marketing boards would result in lower farm prices.

Marketing Boards and Price Stability

Since a board establishes prices to producers at whatever level it chooses, there is no question but what day to day, week to week or month to month price variability is less under a marketing board system than under a free market system. The Chicago Board of Trade prices are varying every minute. Wide swings in prices with the accompanying profits and losses are not a possibility under a board system such as Canada's where the producers are all paid the same base price averaged out over the entire year's sales. However, on a year to year basis the data show that Canada's producers experience just as wide a swing in annual average price as do U.S. producers so the stability question hinges on what is meant by, and the time frame involved in, stable prices.

Marketing Boards and Access to World Markets

A review of the last ten years of data shows some interesting insights into Canada's share of the world markets (Figure 5). Whenever world demand is increasing and total world imports take an upward swing, Canada's share of the world market declines and the U.S. share of the world markets shows an increase. Another way of saying this is that in those years when world prices increased, Canada's share has fallen. When prices decreased Canada's share increases. This does not speak well for the ability of a marketing board to respond to the fluctuating demand and the new opportunities as markets grow and increase.

Similarly, history does not show that the Canadian Board has gained a larger share of the market in the centrally planned economies. The relative proportion of grain imports provided by Canada and the United States does not show any preference of the centrally planned economies for the Canada marketing board system. The determination of who takes the larger share of the market is primarily a function of the ability of the exporting system and the producers of the country to respond to changes in demand.

Grain Cartels

There have been proposals in recent years to establish international grain cartels. These ideas are basically extensions of the marketing board concept to an international level. The success of OPEC has generated additional enthusiasm for an international grain cartel. Proposals for organising the international grain markets have taken many forms and have ranged from a very loose coordination-information system to an international cartel controlling all exports of all grains from every producing country.

Wheat is the grain that has received most of the attention in the proposals for an international cartel. However, it is important to recognize that much of the demand for wheat could be met with other grains. Because of the substitutability among grains in production and consumption, a cartel for one grain only would be unlikely to have long run success. This brings us against the next problem which is the question of the countries to be included.

Ideally the cartel to be effective must include all of the major producers of grain. If we are going to set up a cartel to control the price of wheat, barley and corn, which are good substitutes for each other, we need to involve all major producers. But many countries who are producers of one grain are consumers of another. For example, western European countries are already producing surpluses of feed quality wheat. We would find limited support from them for an international cartel restricting world supplies when they are major importers of many of the grains that we would want to include.

There has also been considerable pressure from time to time concerning a differential price

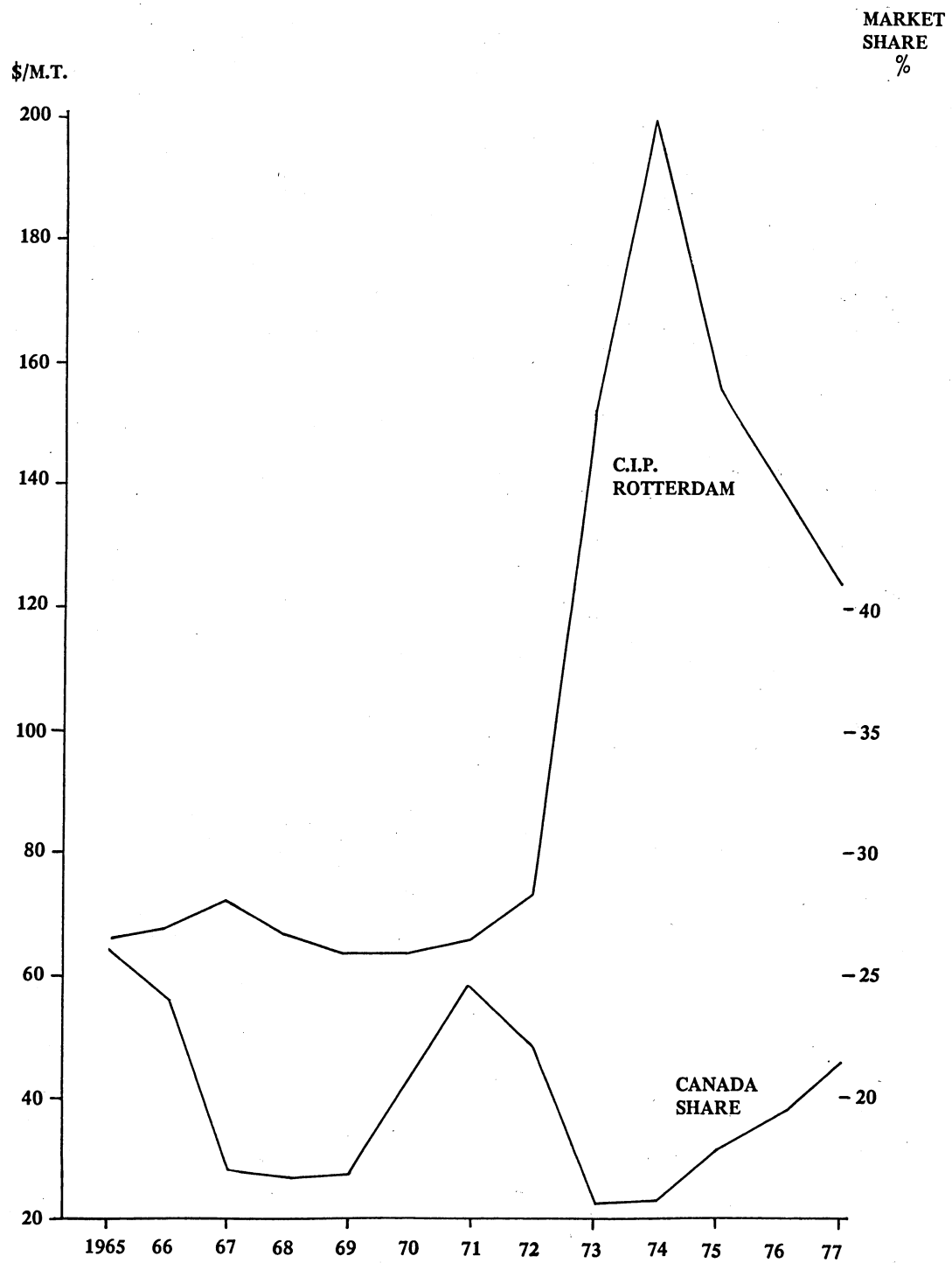


FIG. 5 RELATIONSHIP BETWEEN WORLD PRICES AND CANADA'S SHARE OF WORLD WHEAT EXPORTS

between those countries who are already too poor to afford the grain they need and those countries with sufficient income to buy the grain even at higher prices. The cartel scheme would have to at least recognize this problem. If we set up a two price plan, one for the low income countries and one for the high income countries, we would immediately be faced with a transshipment problem. Procedures would also have to be developed to allocate the share of each market that would be given to each producing country which brings me to the third point - the issue of supply control.

The allocation process by which each country would be given its share of the market so as not to flood the market with more grain than would be sold at the price the cartel establishes would become a major problem of negotiations. The allocation of shares among countries would not likely be based on economic efficiency. Strict supply controls in every country would have to be enforced and some arrangements provided so that in years of large production the excess above domestic needs would not be fed into the world markets. By the same token a country would not want to lose its market share in years of low yields when the domestic market would be competing with exports.

Effect on Consumption

In those countries where import levys already have prices at an artificially high level the cartel price would have limited effect upon the consumption within their own country. However, there are many parts of the world where the world price does have an influence on the prices paid by consumers. In these cases surely the quantity consumed would decline, people would eat smaller quantities or feed smaller quantities of grain to the livestock. Those countries who purchase through a central planning agency try to establish limits as to how much food of what kind their population will be allowed to consume.

Multilateral Trade Issues

Most of the people who have evaluated the potential gains from cartels and higher export prices have implicitly assumed that the consuming nations would accept this with no response or reaction.

This is a very unlikely assumption.

Grain trade does not operate in a vacuum but must be treated as a total package of trade and international politics. Whether we wish to see it or not food and specifically grain is being used for political purposes and will be increasingly used for political purposes in the years that lie ahead.

Conclusions

Trade restrictions in importing countries do not reduce price and quantity fluctuations in total but only alter the distribution of effects. Exporting

nations that enact policies to restrict exports or to dispose of surplus grain in international markets also shift their risk on to others who are often less capable of absorbing it. Trade barriers may be able to solve domestic grain price fluctuations, but frequently these barriers cause a drain on government resources. By insulating the domestic grain market from world conditions, imbalances of supply and demand are likely to occur. Regardless of the ability of trade barriers to solve domestic producers and/or consumer problems they will not result in long-term world grain price stability.

Risk and uncertainty in international markets for grain creates a cost as well as an opportunity to the grain industry. The costs are in terms of the fluctuations in supplies to those countries who depend upon grain as a major source of food. The opportunity arises from the ability of the market to transfer the risks among individuals and among groups in such a way as to increase total utility. At the micro level this opportunity takes the form of increased returns to those merchants who are able to provide the marketing function of storage and allocation over space at a price differential that exceeds their cost. Individual producers and merchandisers who are not in the position to withstand losses associated with risk and uncertainty must find ways to shift or distribute this risk or they must dramatically increase the prices they receive for services in order to cover potential losses due to price variability.

The most important mechanism in the world for accommodating the desire to shift and redistribute risk is some form of a forward contract which has been formalized into a futures trading institution. The value of this institution is evident from the number of countries and firms that rely on the Chicago Board of Trade to tell them what the "true value" of a lot of grain should be. Even centrally planned economies who feel that government officials can do a better job of establishing price than the market, still rely heavily on the Chicago Board of Trade as a means of protecting them from risk and as a means for establishing the price at which they will buy and sell. If no formalized board of trade or futures market exists, it is not unusual to find a country and the traders within a country establishing their own market for forward contracts. These may not be formalized into a futures market as such but they are serving the same function of permitting one individual to lock in a price at a future point in time while still giving other individuals the option of purchasing that contract and shifting ownership and the time relationships.

I want to re-emphasize that risk and uncertainty provides both a cost and an opportunity. A riskless world would in general also be a profitless world. A profitless world is one where there is no incentive for improving efficiency, quality of service, and the quantity of food available to a hungry world.

REFERENCES

- BURT, OSCAR L. WON. W. KOO and NORMAN J. DUDLEY. "Optimal Stochastic Control of U.S. Wheat Stocks and Exports." *American Journal of Agricultural Economics*. May 1980.
- FOOD AND AGRICULTURE ORGANIZATION. *Commodity Review and Outlook*. Various Issues.
- GENERAL ACCOUNTING OFFICE. *Grain Marketing Systems in Argentina, Australia, Canada, and the European Community; Soybean Marketing System in Brazil*. May 1976.
- HILLMAN, JIMMYE S. *Nontariff Agricultural Trade Barriers*. Lincoln: University of Nebraska Press, 1978.
- JABARA, CATHY L. "Trade Restrictions in International Grain and Oilseed Markets." *Foreign Agricultural Economic Report 162*, USDA, ECCS, January 1981.
- JOHNSON, D. GALE. "International Food Security Issues and Alternatives." *International Food Policy Issues: A Proceedings*, Foreign Agricultural Economics Report 143, USDA, ESCS, January 1978.
- JUST, R.E., E. LUTZ, A. SCHMITZ, and S. TURNOVSKY. "The Distribution of Welfare Gains from International Price Stabilization Under Distortions." *American Journal of Agricultural Economics*. November 1977.
- MASSEL, B.F. "Price Stabilization and Welfare." *Quantitative Journal of Economics*. May 1969.
- MASSEL, B.F. "Some Welfare Implications of International Price Stabilization." *Journal of Political Economy*. March/April 1970.
- Oi, W. Y. "On Desirability of Price Instability Under Perfect Competition," *Econometrica*, January 1961.
- SCHMITZ, ANDREW. "Research on International Trade: Methods and Techniques with Emphasis on Agricultural Trade." Paper presented at Symposium on International Trade and Agriculture, Tucson, Arizona, April 17-20, 1977.
- SHEPHERD, GEOFFREY S., and GENE A. FUTRELL. "Marketing Farm Products." Iowa State University Press, Ames, Iowa. 1976, pp. 25-27.
- TURNOVSKY, STEPHEN J. "Price Expectation and Welfare Gains from Price Stabilization." *American Journal of Agricultural Economics*. November 1974.
- VAN HORN, JAMES C. *Financial Management and Policy*. 4th Edition. Englewood Cliffs, New Jersey.: Prentice-Hall, 1977.
- WAUGH, F.V. "Consumer Aspects of Price Instability." *Econometrica*. April 1966.
- WAUGH, F.V. "Does the Consumer Benefit from Price Instability?" *Quantitative Journal of Economics*. August 1944.