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EXPORT MARKETING PERFORMANCE OF MAJOR GRAIN TRADING NATIONS

Edited
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Preface

In recent years there has been pressure to change the United States system for exporting grain to one with more government involvement. Most of the functions in that system are presently performed in the private sector. As grain exports have expanded in the 1970's, the ability of the present system to serve many diverse interests has been questioned. Suggestions have been made to change the present organization to one similar to that in Canada or, in general, to a system with more government involvement.

Ironically, the advantage of the marketing board operations in the other grain exporting countries has also been questioned. The marketing mechanism in Canada comes under attack periodically and in 1974 a referendum to put rapeseed under the direct control of the Canadian Wheat Board was rejected.

In the case of Argentina, the role of government in the grain marketing system has changed on several occasions since 1945. Most recently, they adopted a market-oriented system.

It is likely that the performance of the U.S. grain marketing system will continue to be questioned. For that reason, it is incumbent upon the agricultural economics profession to develop objective economic criteria for marketing systems. The papers contained herein are a discussion of conceptual and empirical problems in evaluating the performance of grain marketing systems. Performance issues are discussed with respect to the U.S., Canadian, Australian, and Argentinean grain marketing systems. In each case the system and conceptual problems are discussed briefly and some preliminary results are presented. The overall purpose of the papers is not necessarily to be conclusive, but to present conceptual and empirical problems associated with evaluating the performance of grain marketing systems.

The papers were presented at a Symposium at the American Agricultural Economics Association on July 28, 1980, Urbana, Illinois. Each of the papers is prepared under Regional Research Project NC-139, "Economic Analysis of the United States Grain Exporting System."

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THE ECONOMIC PERFORMANCE OF THE U.S. GRAIN EXPORT SYSTEM*

by

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The U.S. grain export industry has come under increased public scrutiny as grain exports have expanded in the 1970's. After the large grain sales to the Soviet Union in 1972-73, questions were raised concerning the ability of private U.S. grain exporting firms to deal with state trading organizations in many importing countries.

Also, many of the structural characteristics of the U.S. grain export industry--such as the small number of large, multinational firms that handle a sizable share of the grain exports--resemble those of an oligopoly. This leads many to conclude that the industry's performance is below the standards expected of a perfectly competitive industry. The evidence to support such conclusions, however, is little more than tenuous connection between market structure and performance. Nevertheless, bills have been introduced in the U.S. Congress calling for a more direct role of the government in grain exporting.

In an attempt to fill the void of empirical research on the economic performance of the U.S. grain export industry, a study was made by the Department of Agricultural and Applied Economics of the University of Minnesota to analyze its economic performance using performance criteria of pricing and productive efficiency. These are the two principle dimensions of the economic efficiency of marketing systems as described by Bressler and King.[1]

Pricing Efficiency of the System

The pricing efficiency of the U.S. grain export system was measured by studying weekly corn prices between 1975 and 1977 at five different locations in the exporting market channel--a country elevator, a terminal market, two port locations, and a foreign destination. These prices are plotted in Figure 1.

In a competitive market, the price of a commodity at different locations should differ, at most, by the minimum cost of transfer between markets. Arbitrage, a function of competitive markets, keeps prices at different locations in line with these specifications. Therefore, by testing whether corn prices at these five different locations in the export marketing channel differ only by transfer costs between locations, an evaluation of the spatial dimension of the industry's pricing performance is possible.

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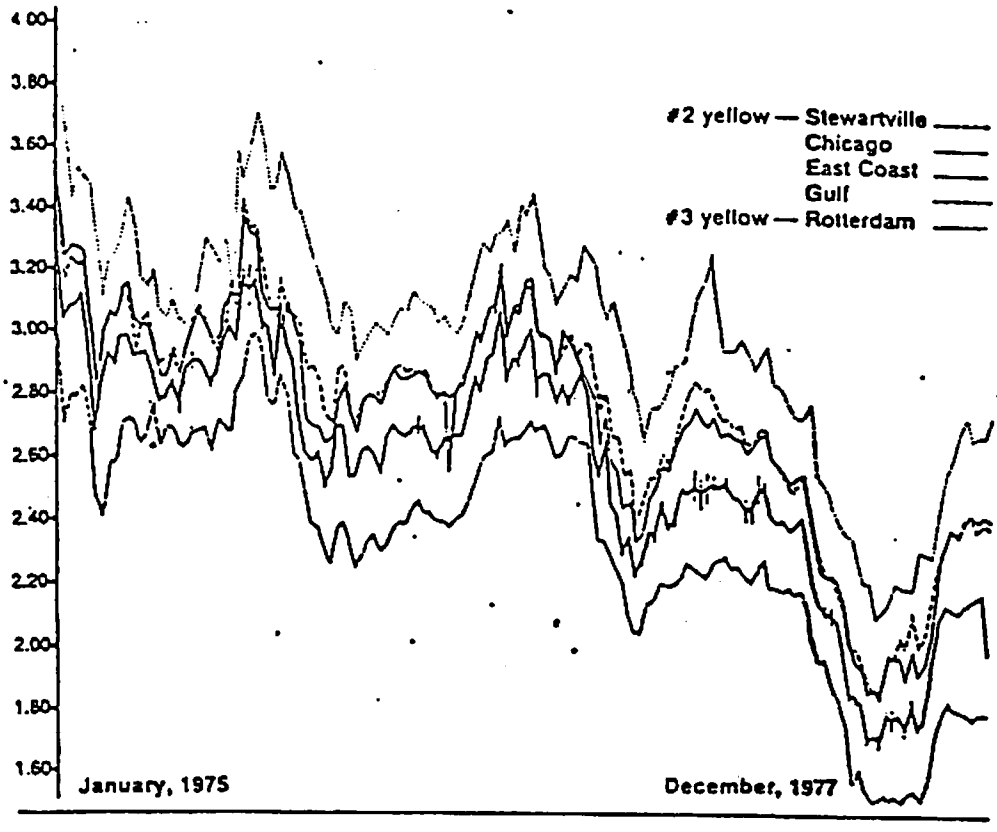
*The complete study from which this paper is drawn is contained in Thompson, Sarahelen R., and Reynold P. Dahl, The Economic Performance of the U.S. Grain Export Industry, Technical Bulletin 325, Agricultural Experiment Station, University of Minnesota, St. Paul, 1979.

[1]Bressler, Raymond G., and Richard A. King, Markets, Prices, and Interregional Trade, (New York: John Wiley and Sons, 1970).



Destination prices for corn were adjusted for transportation costs, the largest single item making up total transfer costs between markets. The origin prices for corn at each stage of the marketing channel were then subtracted from the adjusted destination prices. These differences were then examined to determine whether they approximate transfer costs other than transportation costs, such as elevation costs, interest, and insurance. The distribution characteristics of these differences were also tested to determine whether deviations from the average adjusted differences represent exogenous or random shocks to corn markets.

The tests for efficient pricing showed that movements in corn prices at one location are usually reflected in corresponding movements in prices at other market locations in the export marketing channel. This can be seen by visual inspections of the weekly corn prices as plotted in Figure 1. The degree of association between the prices was also measured statistically through regression analysis of both the unadjusted prices and the destination prices adjusted for transportation costs between markets. The results are shown in Table 1. All regressions were statistically signficant at the .01 level, and all of the coefficients of determination (r^2) were above .90. It was also found that adjusting destination prices for transportation cost improves the regression fit, as indicated by the slightly higher coefficients of determination. For example, the (r^2) between corn prices at Stewartville, Minnesota, and unadjusted corn prices at the Gulf was .93; but when the Gulf corn price was adjusted for transportation cost the (r^2) was .97. The regressions using adjusted destination prices also yielded slope coefficients that were not significantly different from one at the .01 level. This suggests that there is nearly a one-to-one relationship between prices exclusive of transportation costs between markets. Thus, movements in prices at one location are usually reflected in corresponding movements at every other market location. Prices for corn at various stages in the export marketing channel differ largely by transportation costs between markets.

Table 1. Results of regressions of adjusted and unadjusted destination prices on original prices.

Variables	Fitted regression line	Standard error of slope	Slope significantly different than 1, $\alpha = .01$	Significance of slope	Significance of intercept	Coefficient of determination (r^2)
x = Stewartville (STEW)						
y = Gulf (GULF)	GULF = .6551 + .8962 (STEW)	.02256	Yes	α=.00001	α=.00001	.93489
x = Stewartville (STEW)						
y = Adjusted Gulf (STGULF)*	STGULF = .2242 + .959 (STEW)	.01611	No	α=.00001	α=.00001	.96899
x = Chicago (CHIC)						
y = Gulf (GULF)	GULF = .3612 + .9269 (CHIC)	.01343	Yes	α=.00001	α=.00001	.97124
x = Chicago (CHIC)						
y = Adjusted Gulf (AGULF)	AGULF = .1491 + .9612 (CHIC)	.02120	No	α=.00001	α=.00001	.97809
x = Chicago (CHIC)						
y = East Coast (BALT)	BALT = .2665 + .955 (CHIC)	.01332	Yes	α=.00001	α=.00001	.97328
x = Chicago (CHIC)						
y = Adjusted East Coast (ABALT)	ABALT = −.0268 + .9837 (CHIC)	.01265	No	α=.00001	α=.41798	.97721
x = Gulf (GULF)						
y = East Coast (BALT)	BALT = −.0713 + 1.0178 (GULF)	.01287	No	α=.00001	α=.04785	.97794
x = Adjusted Gulf (AGULF)						
y = Adjusted East Coast (ABALT)	ABALT = −.1541 + 1.0137 (AGULF)	.01206	No	α=.00001	α=.00001	.98043
x = Gulf (GULF)						
y = Rotterdam (ROTT)	ROTT = .2298 + 1.009 (GULF)	.02256	No	α=.00001	α=.00001	.93193
x = Gulf (GULF)						
y = Adjusted Rotterdam (AROTT)	AROTT = .1579 + .9851 (GULF)	.02375	No	α=.00001	α=.00897	.93330
x = East Coast (BALT)						
y = Rotterdam (ROTT)*	ROTT = .3646 + .9676 (BALT)	.02565	No	α=.00001	α=.00001	.90983

*This regression was run only on data from the months when the Mississippi River was open.
*Because of the small and irregular number of ocean freight cost observations between the East Coast and Rotterdam, no regression was made of adjusted Rotterdam prices on East Coast prices.

Most of the remaining differences between the adjusted prices were within the range of what may be transfer costs other than transportation costs associated with moving corn from one market to another. However, these remaining differences did not appear to be randomly distributed around a constant transfer cost in most cases.

It is not possible to say conclusively that these apparent nonrandom differences in corn prices are not a reflection of market imperfections. However, the correlations in both unadjusted and adjusted prices among various points in the marketing channel were very high. Consequently, the unexplained variation, even if nonrandom, was very small. Furthermore, there are good reasons to support the conclusion that this apparent nonrandom behavior is largely attributable to other market factors, such as institutional rigidities in rail rates, seasonality in elevation costs, and external shocks to the marketing system.

The results lead to the conclusion that the U.S. grain export system's pricing performance is efficient. The differences between prices in spatially separated markets and competitive arbitrage efficiently allocate grain flows through the export marketing channel. The pricing efficiency in the grain export industry meets the efficiency criteria characteristic of competitive markets. Hence there is little statistical evidence of oligopolistic behavior by the firms that make up this industry.

Productive Efficiency of the System

The second dimension of performance, productive efficiency, rests mostly upon the system's load and scale factors. The load factor indicates the extent to which firms in the industry make reasonably full use of their available facilities and reflects short-run productive efficiency. The scale factor indicates the extent to which firms are organized to take advantage of these scale economies and reflects industry's productive efficiency in the long run.

It was not possible in our study to analyze the productive efficiency of the U.S. grain export industry in terms of specific efficiency standards. Nevertheless, certain characteristics of the industry's market organization and operations were examined which are indicative of productive efficiency.

The Industry's Load Factor

An indication of the industry's load factor can be obtained by comparing the overall turnover rates for export elevators at each port location. Table 2 shows that more grain was put through Gulf elevators than at any other port. In addition, the average ratio of inspections to capacity, or turnover rate, is much greater at the Gulf than at other ports. The South Atlantic ports also have a high turnover rate. This indicates that the most important ports are also the most efficient in terms of elevator use. Great Lakes elevators have a low turnover because they are often used for longer-term storage. This occurs because the Lake area ports are closed between December and March each year.

The Industry's Scale Factor

Grain export firms are organized to take advantage of sizable economies to scale in grain exporting. Grain exports are made in large units (typically a million bushels or more) so exports must be large to handle such sales. Scale economies are found in at least four principle areas: 1) operation of port and inland terminal elevators, 2) grain transportation, 3) market information systems, and 4) financial risk management.

Operation of Port and Inland Elevators. Grain export firms may buy grain at U.S. ports which is shipped there for sale by other merchants. For example, there is a market for barge grain CIF (cost, insurance, and freight paid) New Orleans. Exporters are heavy users of this market. But exporters also buy and move their own grain from inland locations and transport it to ports for export.

There are advantages in operating storage space and other facilities along marketing channels from the producing areas to the ports. Indications are that sizable returns to scale exist in the operations of both port and inland terminal elevators.

A USDA Farmers' Cooperative Service study reported that the five largest grain export firms (Cargill, Inc.; Continental Grain Co.; Cook Industries, Inc.; Bunge, Inc.; and Louis Dreyfus, Inc.) handled 85 percent of all U.S. grain exports in 1976.[2] Our study showed that the same five firms own a smaller percentage of the total port elevator capacity. As of January 1, 1977, these five firms owned 167 million bushels or 52 percent of the total port elevator capacity of 322 million bushels (Table 3).

Cooperatives owned the second largest share of the port elevator capacity, 35 million bushels or 11 percent of the total. Flour milling companies owned 10 percent of the port elevator capacity, all located on the Great Lakes. Public elevator companies owned 7 percent of port elevator capacity and are very important at the Gulf where they own one-fourth of the elevator capacity. The remaining 20 percent is divided among a variety of firms.

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[2] U.S. Department of Agriculture, Farmers' Cooperative Service, Improving the Export Capability of Grain Cooperatives, FCS Research Report 34, June 1976.

Table 2. Port grain elevator capacities, grain inspections for export, and ratio of inspections to capacities, calendar year 1976.

Port	Elevators No.	Elevators Capacity	Inspections for export	Ratio of inspections for export to capacity
		(million bushels)		
LAKES				
Chicago	7	50.6	77.8	1.5
Duluth-Superior	10	59.5	95.7	1.6
Toledo	2	18.5	129.6	7.0
Saginaw	0	0	[5.9][a]	
Subtotal		128.6	303.1	2.4
ATLANTIC				
North	1	14.0	110.6	7.9
South	4	18.8	423.9	22.5
Subtotal		32.8	534.5	16.3
GULF				
Mississippi	7	43.9	1,514.7	34.5
East Gulf	1	3.0	146.5	48.8
North Texas Gulf	6	30.4	528.6	17.4
South Texas Gulf	3	15.7	139.0	8.8
Subtotal		93.0	2,329.0	25.0
PACIFIC				
Columbia River	8	28.4	256.6	9.0
Puget Sound	3	12.8	82.3	6.4
California	4	13.0	49.0	3.8
Subtotal		54.2	387.9	7.2
TOTAL	56	308.6	3,554.5	11.5

[a]According to the Approved Warehouse Lists, there is no longer any elevator with export capability in this area. The amount of grain inspected for export in the Saginaw area during 1976 is not significant for purposes of this table.

Sources: USDA, ASCS, Approved Warehouse Lists, Jan. 1, 1977.
USDA, Grain Market News, Consumer and Marketing Service, Grain Division, Vol. 25, No. 2, Jan. 14, 1977.

Table 3. United States port elevator ownership, capacity, and shares of capacity, by port area, 1976.

	Number of elevators	Total capacity (million bu.)	Percent	Lake capacity (million bu.)	Percent	Atlantic capacity (million bu.)	Percent	Gulf capacity (million bu.)	Percent	Pacific capacity (million bu.)	Percent
BIG FIVE											
Cargill	12	90.4	28	39.9	28	20.0	61	16.3	18	14.3	26
Continental	9	44.6	14	24.6	17	3.5	11	7.8	8	8.6	16
Bunge	4	18.0	6					15.9	17	2.1	4
Louis Dreyfus	3	9.7	3			4.9	15	3.0	3	1.9	3
Cook	1	4.4	1[a]					4.4	5		
Subtotal	29	167.1	52	64.5	45	28.4	87	47.4	51	26.8	49
FLOUR MILLERS											
General Mills	2	5.5	2	5.5	4						
Pillsbury	1	4.8	1	4.8	3						
Peavey	1	5.0	2	5.0	4						
International Multifoods	1	4.8	1	4.8	3						
ADM	1	13.5	4	13.5	10						
Subtotal	6	33.6	10	33.6	24						
COOPERATIVES											
FUGTA	1	19.0	6	19.0	13						
Producer's Grain Coop.	1	6.4	2					6.4	7		
North Pacific Grain Growers Inc.	1	4.2	1							4.2	8
Farmer's Export Co.	1	5.4	2					5.4	6		
Subtotal	4	35.0	11[b]	19.0	13			11.8	13	4.2	8
PUBLIC ELEVATORS											
Public Grain Elevator of New Orleans	1	7.4	2					7.4	8		
Port Brownsville Public Elevator	1	3.8	1					3.8	4		
Nueces County	1	5.6	2					5.6	6		
Port of Houston Authority	1	6.7	2					6.7	7		
Subtotal	4	23.5	7					23.3	25		
OTHERS	11	63.2	20	24.9	18	4.4	13	10.6	11	13.2	43
TOTAL	54	322.4	100	142.0	100	32.8	100	93.1	100	54.2	100

Source: USDA, ASCA, Approved Warehouse Lists, Jan. 1, 1977.

[a]This elevator is now owned by Farmer's Export Co.

[b]Adding the Cook Industries Elevator at Galveston, Texas, increases the total cooperative port capacity to 39.4 million bushels, 12 percent of the industry's total capacity.

Port elevator ownership and capacity have changed considerably in the past three years. Cook Industries, Inc. is no longer a major grain exporter and has sold its port elevators. Farmers Export Company, an interregional cooperative, purchased the Cook Industries elevator at Galveston, Texas. New export elevators have also been constructed in response to the increased demand for grain exports and, hence, a greater need for port elevator facilities. One of the advantages of a privately owned and operated grain export marketing system is its ability to attract capital to expand both the quantity and quality of marketing facilities when and where they are needed in response to market incentives.

Grain exporters also own and operate inland terminal elevators. As of January 1, 1977, inland terminal elevator capacity totaled 1.3 billion bushels. The five largest grain exporters owned 261 million bushels or 21 percent of the total. This, together with 52 percent of the port elevators owned by the same five firms, indicates only a moderate degree of concentration in the ownership of grain export marketing facilities. The authors of this study concur with Richard Caves who argues that this moderate concentration of physical facilities is only of limited economic relevance because of substitutability between channels of distribution from a production or accumulation point to a consumption point.[3] Furthermore, as Caves correctly observes, storage facilities at different points along a distribution channel compete with one another.

Scale Economies in Grain Transportation. Sizable scale economies also exist in grain transportation. Costs per bushel are reduced by transporting grain in large quantities by rail, barge, or ocean vessel. The advent of multicar rail rates and unit train rates has allowed exporters to take advantage of these lower rates through large shipments. Numerous examples can be cited of how exporters have reduced transportation costs through implementing multicar and unit train rail rates.

Scale Economies in Market Information Systems. Scale economies also arise from market information systems. Caves argues that scale economies in information systems are in part responsible for the small number of large firms that make up the grain export industry.[4] The information network required to maintain a successful exporting firm keeps the exporter current with the subtle changes in grain and transportation markets throughout the world. Maintaining such a network involves a large fixed cost because it is only achieved by being present in these markets continuously. So volume must be large to support these information systems.

Scale economies of this sort are empirically difficult to substantiate. But the fact that a number of regional grain cooperatives have joined together to form the Farmers Export Company demonstrates that cooperatives recognize scale economies in exporting. The Farmers' Cooperative Service study also urges cooperatives to emulate the market information systems of the large grain export companies to improve their export capabilities.

Scale Economies in Financial Risk Management. Finally, scale economies are found in the management of the financial risks of large grain export sales. Each sale typically involves large sums of money. So grain export firms must have a

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[3] Caves, Richard E., "Organization, Scale, and Performance in the Grain Trade," Food Research Institute Studies, Vol. 16, No. 3 (1977-1978).

[4] Ibid.

large financial base that can absorb losses in the event of default by the importer. This is well illustrated by the large loss recently absorbed by a grain export firm as a result of default by a foreign government on an import contract. Grain exporters must also be skillful in the management of substantial price risks on export sales which are typically made on forward cash contracts. Such price risks can be minimized through hedging on futures markets. But recent events have shown that such markets can be used to compound risks as well as to reduce risks. The recent failure of a large grain export firm indicates how a firm can fail through improper risk management. Being large is no guarantee of success.

The market organization of the U.S. grain export industry reflects these sizable returns to scale in grain exporting. Scale economies associated with elevator operations, grain transportation, market information systems, and financial. risk management are the primary reasons for the small number of large firms in the grain export industry.

Further research is underway at the University of Minnesota to measure empirically the productive efficiency of the U.S. grain export system. the structure of the industry, which has changed significantly in recent years, is also being studied. Indications are that cooperatives have increased their share of the market and Japanese firms now have a substantial grain export capability in the U.S. These and other changes point in the direction of reduced market concentration in the U.S. grain export industry.

References

Bressler, Raymond G., and Richard A. King, Markets, Prices, and Interregional Trade, New York: John Wiley & Sons, 1970.

Caves, Richard E., "Organization, Scale, and Performance in the Grain Trade", Food Research Institute Studies, Vol. 16, No. 3, 1977-78.

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The Canadian Grain Marketing System

by
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World grain marketing systems have historically faced considerable stress due to the vagaries of proudction and shifting demand patterns. The resulting price and income variability has stimulated the formulation of government policies designed to stabilize producer prices and incomes. Since the turn of the century, Governments of both Canada and the U.S. have intervened in their marketing systems. Early programs in each country followed parallel policies with direct government intervention in grain markets. However, political and economic forces since World War I have led Canadian policy toward a centralized grain board system. Generally, a board marketing mechanism implies one exporter, intrayear price stability and, because of the latter, alternative procedures (other than the price system) for directing the movement of grain into and within the system. Price and income policies in the U.S. have used supply control, price supports, and the purchase of grain by government when supplies were excessive. Because of the divergent nature of the two systems, policy makers are tempted to evaluate each others' systems (or parts thereof).[1] For this reason, it is incumbent on the economic profession to develop empirical measures of performance is we are to make a meaningful contribution to the policy debate regarding alternative grain marketing systems.

The purpose of this paper is to describe the Canadian grain marketing system and discuss various performance measures. The emphasis is on the Board aspect of the system. The grain marketing system in Canada is described first. Conceptual problems associated with measuring performance are then discussed. Thirdly, results of the measurement of two performance indicators are reviewed and, finally, conclusions and policy implications are drawn.

Description of the System

The dominant institution in the Canadian grain marketing "system" is the Canadian Wheat Board.[2] Other agencies and policies are of lesser importance for purposes here and are discussed only briefly.

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[1]This is true not only in the U.S. but also in Canada. In late 1973, shortly after rapeseed production became an important cash crop in Canada, producers were given the option, via a referendum, and rejected marketing of that crop through the Canadian Wheat Board. Also, at the recent annual meeting of the Canadian Grain Commission, the Secretary General of that group suggested various attributes of the U.S. system which could be incorporated in that of Canada to improve its performance. See D. Dever, "Features of the U.S. Grain System," Proceedings of Annual Meeting, Canadian Grains Council, Winnipeg, April 8 and 9, 1980, pp. 20-25.

[2]Marketing systems, as defined by other authors, are much broader in perspective and the Canadian Wheat Board is only considered as part of the system. See McCalla, A. and A. Schmitz, "Grain Marketing Systems: The Case of the United States versus Canada," American Journal of Agricultural Economics, Vol. 61, No. 2 (May, 1979), pp. 199-212.

Canadian Wheat Board. Generally the Canadian Wheat Board evolved because of pressure from producers for higher and more stable prices.[3] The present Canadian Wheat Board is solely responsible for the marketing of export wheat, oats, barley, and domestic food grains. In 1974 producers were given the option of marketing feed grains through the open market system. The general objective of the Canadian Wheat Board is that "The Board shall sell and dispose of grain acquired by it. . . at such prices as it considers reasonable with the object of promoting the sale of grain produced in Canada in world markets."[4] This policy is normally interpreted to include the following specific objectives:

1) Market as much grain as possible at the best prices;
2) provide price stability for Prairie grain-producers; and
3) ensure each producer a fair share of the available grain market.[5]

These objectives are implemented through various procedures which are administered by the Canadian Wheat Board.

The Sales and Market Development division sponsors promotion activities, arranges for sales, and conducts research on Canadian grains and their markets. Sales can be classified into one of two general categories: 1) indirect sales utilizing the private trade as agents; or 2) direct government-to-government sales. The latter fosters longer-term contractual agreements and has been considered an advantage of the Board. However, it is usually difficult to differentiate between these two methods of sale.

An important feature of the Canadian Wheat Board is its price pooling mechanism which provides producers with intrayear price stability. An initial payment is announced for each type of grain in March for grain delivered during the following crop year. At the time of delivery, producers are paid the initial payment net of transportation and handling charges. Revenue from the sales of grain are pooled in separate accounts from which the costs of operating the Board and initial payments are deducted. The remainder, called the final payment, is paid producers in proportion to the amount of grain they sold.[6]

A producer delivery quota system is used to regulate the movement of grain into the marketing system and is the mechanism used to achieve the third objective of the Canadian Wheat Board. Producers allocate parts of their total acreage to different crops, and delivery quotas are announced

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[3]Specifically, producers experienced low and unstable prices prior to and after World War I when grain was marketed through the open market. Grain was marketed through a government agency during World War I and producers experienced higher and relatively stable prices. Even though these price movements were due to fundamental factors, producers associated high and stable prices with a board marketing system. See Fowke, V. C., The National Policy and the Wheat Economy (Toronto: University of Toronto Press, 1973), pp. 87-256.

[4]Government of Canada, Canadian Wheat Board Act (Ottawa: Queen's Printer, 1972), p. 5.

[5]Canadian International Grains Institute, Grains and Oilseeds: Handling Marketing, Processing (Winnipeg, 1975), pp. 26-34.

[6]Periodically interim payments may be distributed depending on the Board's expected revenues.

during the marketing year to attract grain into the system as needed. Separate quotas are announced for each type of grain (including grains which are not marketed directly by the Board) and are allocated on an acreage basis. Changes in delivery quotas throughout the year are the signals used to attract grain into the system. The quota system has been criticized because, as presently applied, it does not encourage productivity at the farm-level.[7] Further, during periods when the quotas are restrictive, production and marketing decisions are distorted as well as price relationships between Board and nonboard sales of grain.

The allocation of transportation equipment for all grain movements was formerly controlled by the Board through its Block Shipping System. At present, the overall allocation is done by the Grain Transportation Authority--the Board allocating the equipment assigned to it weekly by the Authority.

Other Institutions and Policies

There are many other institutions and policies in the Canadian grain marketing system, some of which are mentioned below. The Canadian Grain Commission is largely a regulatory agency which regulates tariffs in the handling system, prevents the release of undesirable grain varieties, enforces grade standards, and performs other functions. The Canadian International Grains Institute is a promotional agency providing educational programs related to the Canadian grain industry.

Another important policy is the differential system for export wheat and that consumed domestically as food grain. Prices in the latter are stabilized within a range in an effort to insulate Canadian consumers from volatility in the export market.

A major policy issue affecting grain marketing in Canada is that related to transportation. The rate structure for grain and grain products has not increased since 1925 and provides insufficient revenue to adequately remunerate the railways. Another transportation policy is the Domestic Feed Grains Policy which is intended to provide buyers across Canada with access to feed grains at the same price. The economics of these policies have been discussed elsewhere.[8] In general, these policies have resulted in nonoptimal locations of economic activity favoring eastern livestock feeding and processing and discouraging those activities in Western Canada. Also, the rapeseed processing industry has been discouraged from fully developing in Western Canada.[9] Farm-level and railway firm-level decisions are also distorted by

[7] Submission by the Secretariat of the Canada Grain Council to the Quota Review Committee, "A Review of the Delivery Quota System for Western Canadian Grains," (Winnipeg, 1979).

[8] An extensive review of these studies is contained in Wilson, W. and E. W. Tyrchniewicz, "The Role of Transportation in the Development of Western Canadian Agriculture," paper prepared for the Canada West Foundation, Calgary, January, 1980.

[9] Perkins, P., An Economic Review of Canada's Rapeseed Processing Industry. A study in cooperation with the Provincial Governments of Alberta, Saskatchewan and Manitoba and the Management of CSD Foods Ltd., Cambra Foods Ltd., United Oil Seeds Products Ltd., N.A.P.D. Co-op Ltd., and Alberta Food Products, Edmonton, November, 1976.

these policies. In the latter case, there has been a lack of incentive for the railways to provide service beyond that required to meet their common carrier obligations. Farm-level decisions have favored grain production and exports and discouraged livestock production in Western Canada.

Conceptual Approach to Measuring Performance

Economic theory provides predictive links between structure and/or conduct and performance. The latter is usually defined to include progressiveness, efficiency in resource allocation, full employment, and an equitable distribution of income. More specific indicators may be applicable for specific industries.[10] Exogenous variables, such as policy, may be introduced into the paradigm as one of the "basic conditions."[11] These linkages provide a means of hypothesis formulation which can be tested in empirical analysis. However, specific hypotheses regarding the performance of a Board marketing system are difficult to identify. Measures of performance may be specified and derived, but, a priori, it is difficult to discern the results of the indicator.

The general methodology used in analyzing the performance of marketing systems is to calculate various indicators under alternative organizations, make comparisons, and draw conclusions therefrom. Examples include comparisons of the same industry before and after implementation of a policy or institution changing its organization, or, comparisons of the same industry under alternative organizations. Performance of the Canadian and United States marketing systems have been compared using this methodology.[12] This should not be implied that either one is, or should be, a norm for the other.

An important methodological problem in comparative studies is that of causality. If differences in the performance of two systems are detected, they may not necessarily be attributed to the operation of a particular organization. The inherent problem is that the ceteris paribus assumption necessary in the deductive process cannot be maintained. For example, the analysis of prices received under different marketing systems is rendered difficult because the effects of explicit and implicit transfer payments, themselves being societal value judgments, are difficult to isolate.

Measures of Market Performance

There are many possible attributes of performance which may be desirable in a marketing system, all of which require more specific indicators in order to be measured. Of particular interest in the analysis of the Canadian Wheat Board marketing mechanism if its performance in the market. This

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[10] In the literature on workable competition, the performance criteria has been expanded to include other and more specific measures. See Scherer, F., Industrial Market Structure and Economic Performance (Chicago: Rand McNally, 1971), pp. 36-37.

[11] Ibid, pp. 3-7.

[12] Martin, L. J. and T. K. Warley, "The Role of Marketing Boards," American Journal of Agricultural Economics, Vol. 60, No. 5 (December, 1978), pp. 878-884; A. McCalla and A. Schmitz, op cit.

involves the level and stability of prices received by producers and its ability to capture and maintain foreign markets. Indicators of these performance measures are presented in the remainder of this paper. However, it is recognized that concentration on any subset of performance indicators implies a value judgment regarding their importance. Other performance criteria exist, some of which appear to be of lesser importance and/or may not be directly attributable to the Board mechanism which is presently under review. further, the results are presented with no intentions of being conclusive, but to stimulate interest and discussion in the problems associated with measuring performance.

Price Level

One performance indicator of the Canadian Wheat Board system is whether it is capable of charging a higher price and passing it back to producers relative to a nonboard system such as in the U.S. The specific hypothesis which should be tested is unclear (i.e., whether prices received under the Board system should be greater than or less than those received under a nonboard system), because the Canadian Wheat Board is a monopsonist in its domestic procurement activities but must be competitive with other countries and export firms in the international market.

Prices received be producers in Manitoba were compared to those in North Dakota between 1963-1964 and 1978-1979. The advantage of this comparison is that the classes of wheat and locations are relatively similar. The data are presented in Table A.1 after adjustments were made for exchange rate differentials. The hypothesis that the mean price received by the two groups of producers were equal was tested using the entire series as well as that period since 1973-1974. Despite periodic anomolies where prices in one system were greater than the other, in both cases the evidence suggests that these differences were not statistically significant.[13]

Arguments have been made that since the grain produced in these two areas is similar and sold in the same world market, it follows that prices received by the two groups of producers should approximate the transportation rate differential.[14] In other words, Canadian producers should receive approximately that much more due to their lower transportation rates. The argument assumes ceteris paribus. It follows from the analysis discussed above that this is not the case.

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[13]Other studies have made price comparisons and all have been criticized. The purpose here is not to resolve these issues. See A. McCalla and A. Schmitz, op cit.; K. Peltier and D. Anderson, "The Canadian Grain Marketing System" Agricultural Economics Report No. 130, Department of Agricultural Economics, North Dakota State University, Fargo, December, 1978; Foodwest Resource Consultants, "U.S. Grain Handling and Transportation with Selected Comparison to the Canadian System," report prepared for the Alberta Department of Economic Development, June, 1979; and response to the above report by the Canadian Wheat Board, November 2, 1979. The latter report demonstrated the results of protein including quality differentials in the analysis.

[14]Peltier, K. and D. Anderson, op cit., pp. 47-49; D. Dever, op cit., p. 21.

Price Stability

Another measure of market performance is the stability of prices received by producers. Intrayear prices for grain sold through the Board are constant because of its price pooling mechanism--as opposed to an open market system where prices vary throughout the year. In the latter case, producers have the option of forward marketing their grain and/or operating their own pooling mechanism by marketing at alternative times. Resource allocation may or may not be efficient under the price pooling mechanism depending on the accuracy of the initial payment as a price signal and the sensitivity of production shifts to the level of payment.

Interyear price stability is expected to be the same in each country given that both systems operate in the same world market. This hypothesis was tested using a procedure used previously by Martin for testing intertemporal price stability.[15] The results are presented in Table A.2. The tests indicate that the difference in the rate of change in prices was not statistically different and the variances were equal. The conclusion is that the level of interyear price stability was not statistically different between the two countries over the period studied.

Market Access

A major issue in the evaluation of a Board system is whether it has an advantage in the export market because of its ability to make state-to-state trades and long term contractual agreements. A related issue is whether a Board system is able to respond to changes in market conditions. Several performance indicators of each are discussed in this section.[16] A conceptual problem, however, is whether any conclusion reached is attributable to the Canadian Wheat Board or to policies exogenous to the Board.

The first indicator is the growth in sales to various destinations or regions and was estimated using a simple linear trend. The direction of each trend is presented in Table 1 and the results of the regressions are shown in Table A.3. The analysis indicates that in several cases sales of All Wheat by the U.S. are increasing while that from Canada is not.

A related indicator is the trend in market share by destination. The nature of the trends are presented in Table 2, and the regression results are presented in Table A.4. In several cases, the U.S. market share is increasing while that from Canada is not. However, in the recent two years, the Canadian market share of total trade exceeded its trend by 1 percent and 3 percent respectively.

The ability of a marketing system to respond to changes in market conditions may be considered an important indicator of performance. One measure of this is the portion of world trade by the exporting country when

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[15] L. Martin, op cit.

[16] The measures of performance discussed in this section were originally developed by L. Martin, "Some Thoughts on the Comparison of Grain Market Performance Under Alternative Market Systems," draft of a paper presented for discussion at the annual meeting of NC-139 in Moscow, Idaho, 1979.

world trade exceeds its trend. These results are presented in Table 3. Statistical tests indicated that the difference between the Canadian market shares under the two situations was not statistically different while that of the U.S. was. It appears that when world trade exceeds the trend in trade, the U.S. responds by increasing her exports while Canadian exports appear relatively constant.

TABLE 1. DIRECTION AND STATISTICAL SIGNIFICANCE OF TRENDS IN ALL WHEAT TRADE FROM CANADA AND THE U.S. TO VARIOUS DESTINATIONS (1963/1964-1977/1978)*

Destination/Origin	Canada	United States	Total
West Europe	not significant	not significant*	not significant
East Europe	not significant	not significant	not significant
USSR	not significant	+	not significant
China	not significant	not significant	not significant
Japan	not significant	+	+
North & Central America	+	+	+
South America	+	+	+
Total Trade	not significant	+	+

*Trends are indicated if significant at the 10 percent level. A + indicates the trend is positive and significant. A - indicates the trend is negative and significant. See Table A.3 for regression results and data source.

TABLE 2. DIRECTION AND STATISTICAL SIGNIFICANCE OF TRENDS IN THE MARKET SHARE OF ALL WHEAT TRADE BY DESTINATION (1963/1964-1977/1978)

	Average Market Share		Trend*	
	Canada	U.S.	Canada	U.S.
West Europe	34%	34%	not significant	+
East Europe	13	17	not significant	not significant
USSR	60	22	-	+
China	48	6	not significant	not significant
Japan	29	54	-	not significant
North & Central America	42	40	not significant	+
South America	10	56	+	+
Total	22	40	-	+

*Trends are indicated if significant at the 10 percent level. A + indicates the trend is positive and significant. A - indicates the trend is negative and significant. See Table A.4 for regression results and data source.

TABLE 3. CANADIAN AND U.S. MARKET SHARES OF ALL WHEAT TRADE WHEN WORLD TRADE IS GREATER THAN AND LESS THAN THE TREND IN TRADE

Periods When Trade was Greater Than the Trend in World Trade	Market Share Canada	U.S.	Periods When Trade was Less Than The Trend in World Trade	Market Share Canada	U.S.
1963/1964	27%	41%			
			1964/1965	23%	38%
1965/1966	24	37			
1966/1967	26	36			
			1967/1968	18	40
			1968/1969	19	33
			1969/1970	18	33
			1970/1971	22	37
			1971/1972	26	32
1972/1973	23	47			
1973/1974	19	49			
1974/1975	18	45			
1975/1976	18	47			
			1976/1977	21	43
1977/1978	22	44			
Mean*	22	43		21	37

*T values were calculated to test the equivalence of the market shares for each country when trade was greater than and less than the trend in trade. The calculated t value for Canada was 0.67 and that for the U.S. was 2.90 (the former insignificant and the latter significant at the 10 percent level of significance).

A similar indicator is the response in exports to price changes. A system is responsive if when price exceeds its trend in a particular year, trade exceeds its trend and vice versa. These results are presented in Table 4. The results indicate that the U.S. system responds to price changes by increasing or decreasing her exports accordingly. However, changes in Canadian exports have not corresponded with deviations of prices from the trend.

In the foregoing analysis, all wheat was used in the derivation of export performance indicators. A relevant point, however, is that hard red spring wheat is the dominant class in Canada, whereas in the U.S. it is hard red winter wheat. Trends were examined in spring wheat trade from the two countries and the results presented in Table A.5. The results indicate that 1) exports of all wheat from the U.S. are increasing at a faster rate than in Canada, and 2) the trend in the exports of hard red spring wheat from both Canada and the U.S. is statistically insignificant.

As discussed previously, performance indicators may or may not be attributable to the organization of the industry. Of particular importance is the productive capacity and flexibility in each country. Production figures indicate that, for whatever reason, the U.S. system has had the flexibility or capacity to increase its production which has not been the case in Canada.

TABLE 4. RELATIONSHIPS BETWEEN TREND IN TRADE AND TREND IN PRICES

Periods When Price Was Greater Than the Trend in Prices[a]	Trade Relative To The Trend in Trade[b] Canada	U.S.	Periods When Price Was Less Than The Trend in Prices	Trade Relative To Trend in Trade Canada	U.S.
1963/1964	+	+			
1964/1965	-	+			
1965/1966	+	+			
1966/1967	+	-			
			1967/1968	-	-
			1968/1969	-	-
			1969/1970	-	-
			1970/1971	-	-
			1971/1972	+	-
			1972/1973	+	+
1973/1974	-	+			
1974/1975	-	+			
1975/1976	-	+			
			1976/1977	+	-
			1977/1978	+	+

[a]Price trends were calculated for both hard red spring and hard red winter wheat and in both cases, the deviations from trend had the same sign in the same years.

[b]A + indicates that trade was greater than the trend in trade in that particular year. A - indicates that trade was less than the trend in trade in that particular year.

The trend in wheat production in the U.S. has been increasing at a significant rate while that in Canada is not significant (Table A.6). The reason for pointing this out is that performance differences may not be attributable to the Canadian Wheat Board marketing mechanism. Production is an alternative explanatory variable. Others include the logistics and flexibility in the transportation system and the climate.

Conclusions and Research Issues

An important component of the Canadian grain marketing system is its Wheat Board. Other institutions and policies also exist and influence grain marketing in Canada. Attributes of the Canadian Wheat Board are its sales arrangements, intrayear price stability, and the quota system for directing grain into the system on an equitable basis. The latter tool is a requisite in the absence of intrayear price variability.

Several performance indicators were compared to that of the U.S. system. With all due qualifications, prices received by producers under the two systems are different, but the differences are not statistically significant and may be due to chance. They differ, however, if transportation rate differentials are incorporated.

Several indicators of export performance were measured, and it appears that the Canadian system is lacking. However, these differences are not necessarily attributable to the operation of the Canadian Wheat Board.

There are other indicators which could be or have been discussed and measured.[17] An important concern in general is the effect of the Canadian Wheat Board method of marketing on resource allocation. Resource allocation at the farm level is affected by the initial payment and expectations of interim and final payments. Whether resources are allocated efficiently at the farm level depends on the accuracy of these price signals in directing production decisions. Equally important is the effect of the quota system on production and marketing decisions. Resource allocation in the marketing. system is also affected by the Canadian Wheat Board through its quota mechanism and block shipping plan. However, the effect of the Canadian Wheat Board on specific parts of the marketing system is difficult to ascertain.[18]

Policy decisions are being considered in both Canada and the U.S. regarding their systems and agricultural economists may be called on to analyze the performance of each. In general, derivation of hypotheses from the existing body of economic theory regarding the links between the Canadian Wheat Board marketing mechanism and the performance of the system is not well defined. Secondly, in the absence of logically derived hypotheses, differences in observed performance between systems are difficult to attribute to the organization of marketing in each (i.e., causal-effect cannot be implied because of observed differences). Finally, the problem inherent in comparing systems is that ceteris are not paribus, and differences may be caused by nonboard activities or policies exogenous to the Board.

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[17] The performance measures discussed by McCalla and Schmitz were a) product quality and grading, b) producer prices and returns, c) marketing margins, market efficiency and information flows, d) physical efficiency and progressiveness, e) export performance, and f) equity issues. See A. McCalla and A. Schmitz, op cit.

[18] A recent study indicated that Canadian elevators had a smaller average capacity, handled a smaller volume, and had a smaller turnover rate than did North Dakota elevators. Indications were also made that capital has not been attracted to improve their system. K. Peltier, "Comparison of the Marketing Systems of the U.S. and Canada," unpublished M.S. Thesis, Department of Agricultural Economics, North Dakota State University, Fargo, 1977.

TABLE A.1 AVERAGE WHEAT PRICES RECEIVED BY NORTH DAKOTA AND MANITOBA PRODUCERS

Year	North Dakota ($/bushel[a] U.S.)	Manitoba ($/bushel U.S.)[b]
1964	1.44	1.52
1965	1.45	1.53
1966	1.67	1.64
1967	1.44	1.52
1968	1.33	1.27
1969	1.39	1.35
1970	1.48	1.43
1971	1.30	1.37
1972	1.88	1.87
1973	4.28	4.32
1974	4.45	4.04
1975	4.05	3.47
1976	2.67	2.84
1977	2.40	2.78[c]
1978	2.80	3.23[c]
1979	3.55	3.84[c]
Mean 1964-1979[d]	2.35	2.38
Mean 1973-1979[d]	3.46	3.50

[a]Prices for Other Spring Wheat. Source: North Dakota Crop and Livestock Statistics, Department of Agricultural Economics, Agricultural Experiment Station, North Dakota State University. Ag. Statistics Nos. 29, 35, 38, 40, 42, and 44. Fargo.

[b]Manitoba Agriculture, 1978 Yearbook, Manitoba Department of Agriculture, Winnipeg. Canadian dollar figures were stated in U.S. dollars using exchange rates in various issues of the Federal Reserve Bulletin.

[c]These figures are revised estimates and were obtained from Mr. M. Daciw, Agricultural Statistician, Statistics Section, Manitoba Department of Agriculture.

[d]The t statistic for the 1964-1979 period was 0.0692 and that for the 1973-1979 period was 0.1180, and both were insignificant at the 10 percent level of significance.

A.2 STATISTICAL TESTS FOR DIFFERENCES IN INTERYEAR PRICE STABILITY[a]

	Mean	Standard Deviation
1964-1979		
Manitoba	19.4	32.18
North Dakota	22.2	31.5
	(-0.2392)[b]	(1.04)[b]
1973-1979		
Manitoba	29.6	45.2
North Dakota	32.6	43.2
	(-0.1287)[b]	(1.09)[b]

[a]Means and standard deviations were calculated on the year-to-year percentage changes in prices received by North Dakota and Manitoba producers as listed in Table A.1. The calculated t and f values are shown in parentheses beneath the means and standard deviations respectively.
[b]Insignificant at the 10 percent level.

TABLE A.3 REGRESSION RESULTS INDICATING THE TREND IN TRADE FROM CANADA AND THE UNITED STATES AND TOTAL TRADE TO VARIOUS DESTINATIONS

Dependent Variable: Imports of all wheat by destination measured in 1,000 metric tons[a]
Independent Variable: Trend From 1963/1964-1977/1978, t = 1, 2, 3,.....15[b]

Importing Region	Constant	Trend Coefficient	R^2
Western Europe			
Canada	4108.05	-114.01	.56
	(16.09)*	(-4.06)*	
United States	3336.81	- 26.87	.02
	(6.62)*	(-0.48)	
Total Imports	13,122.36	-450.70	.82
	(24.32)*	(-7.59)*	
Eastern Europe			
Canada	821.84	-29.07	.06
	(2.88)*	(-0.93)	
United States	594.81	13.98	.01
	(1.16)	(0.25)	
Total Imports	4696.75	-23.49	.01
	(9.40)*	(-0.43)	
USSR			
Canada	3177.79	-127.58	.11
	(3.41)*	(-1.24)	
United States	-577.95	280.96	.24
	(-0.45)	(2.00)*	
Total Imports	3859.23	137.25	.02
	(1.55)	(0.50)	
China			
Canada	1644.47	65.10	.11
	(3.50)*	(1.26)	
United States	-156.37	65.40	.11
	(0.33)	(1.27)	
Total Imports	4775.21	0.11	.00
	(5.45)*	(0.00)	
Japan			
Canada	1281.32	6.61	.02
	(11.61)*	(0.55)	
United States	1614.91	120.26	.76
	(9.90)*	(6.70)*	
Total Imports	3361.48	173.33	.91
	(24.14)*	(11.32)*	
North & Central America			
Canada	566.96	27.75	.45
	(7.34)*	(3.27)*	
United States	225.82	72.89	.63
	(1.62)	(4.74)*	
Total Imports	1126.51	100.53	.75
	(7.63)*	(6.19)*	
South America			
Canada	-30.35	69.69	.69
	(0.26)	(5.33)*	
United States	1610.96	174.50	.56
	(4.14)*	(4.08)*	
Total Imports	3729.11	187.91	.64
	(10.45)*	(4.79)*	
World			
Canada	12,232.10	37.93	.01
	(8.88)*	(0.25)	
United States	16,775.40	861.22	.41
	(6.39)*	(2.98)*	
Total Imports	49,399.23	1106.93	.41
	(14.49)*	(2.95)*	

[a]Source: International Wheat Council, World Wheat Statistics, London, 1974-1979.
[b]t values are listed in parenthesis beneath the regression coefficient.
* indicates significance at the 10 percent level.

TABLE A.4 REGRESSION RESULTS INDICATING THE TREND IN CANADIAN AND UNITED STATES MARKET SHARES BY DESTINATION

Dependent Variable: Market Share of Exporter[a]
Independent Variable: Trend from 1963/1964 - 1977/1978, t = 1, 2, 3,.....15[b]

Importing Region	Constant	Trend Coefficient	R^2
Western Europe			
Canada	0.30	0.01	.18
	(10.29)*	(1.71)	
United States	0.23	0.01	.39
	(5.25)*	(2.88)*	
Eastern Europe			
Canada	0.18	-0.01	.01
	(3.05)*	(-0.96)	
United States	0.15	0.01	.01
	(1.20)	(0.20)	
USSR			
Canada	0.91	-0.04	.30
	(5.92)*	(-2.36)*	
United States	-0.14	0.04	.56
	(-1.38)	(4.10)*	
China			
Canada	0.36	0.02	.11
	(3.05)*	(1.24)	
United States	-0.03	0.01	.11
	(-0.32)	(1.26)	
Japan			
Canada	0.36	-0.01	.53
	(15.76)*	(-3.80)*	
United States	0.49	0.01	.19
	(16.77)*	(1.74)	
North & Central America			
Canada	0.49	-0.01	.17
	(10.51)*	(-1.62)	
Unites States	0.26	0.02	.56
	(7.18)*	(4.09)*	
South America			
Canada	0.02	0.01	.45
	(0.72)	(3.25)*	
United States	0.48	0.01	.25
	(10.11)*	(2.10)*	
World Market			
Canada	0.24	-0.01	.20
	(14.53)*	(-1.79)*	
United States	0.35	0.01	.29
	(13.09)*	(2.29)*	

[a] Source: International Wheat Council, World Wheat Statistics, London, 1974-1979.
[b] t values are listed in parenthesis beneath the regression coefficient.
* indicates significance at the 10 percent level.

TABLE A.5 REGRESSION RESULTS INDICATING THE TREND IN CANADIAN AND UNITED STATES EXPORTS OF ALL WHEAT AND HARD RED SPRING WHEAT[a]

Dependent Variable: Exports measured in millions of tonnes
Independent Variable: Trend from 1970/1971 - 1978/1979. t = 1, 2. 3,.....9[b]

All Wheat Exports	Constant	Trend Coefficient	R^2
Canada	12.42 (8.97)*	0.14 (0.57)	.04
United States	21.04 (5.98)*	1.33 (2.13)*	.39
Hard Red Spring Wheat Exports			
Canada	10.39 (7.75)*	-0.10 (-0.39)	.02
United States	3.53 (3.43)*	0.18 (0.97)	.12

[a]Source: Statistics were obtained from Dr. Art Wilson, Canada Grains Council, Winnipeg.
[b]t values are listed in parenthesis beneath the regression coeffient.
* indicates significance at the 10 percent level.

TABLE A.6 REGRESSION RESULTS INDICATING TRENDS IN CANADIAN AND UNITED STATES PRODUCTION OF ALL WHEAT[a]

Dependent Variable: Production measured in 1,000 metric tons.
Independent Variable: Trend from 1963/1964 - 1977/1978, t = 1, 2, 3,.....15[b]

	Constant	Regression Coefficient	R^2
Canada	17259.8 (8.44)*	-16.77 (-0.07)	.01
United States	29401.52 (15.49)*	1747.32 (8.37)*	.84

[a]Source: International Wheat Council, World Wheat Statistics, London, 1974-1979.
[b]t values are listed in parenthesis beneath the regression coefficient,
* indicate significant at the 10 percent level.

THE AUSTRALIAN WHEAT EXPORT MARKETING SYSTEM: A DESCRIPTION AND CONCEPTUAL FRAMEWORK FOR PERFORMANCE ANALYSIS

by
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and
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In recent years, U.S. public policymakers have attempted to redirect the grain exporting network from a quasi market-oriented system toward a more market-managed system.[1] The economic implications of these proposed actions are unclear. Several studies have commenced examination of this very complex issue.[2] The purpose of this paper is to improve our understanding of the subject by describing another major grain export marketing system and to investigate a number of methodological issues with respect to measuring the performance of the Australian export marketing system. This paper is the framework for a proposed study to be completed at Texas A&M University; therefore, it does not present research results or policy conclusions.

Description of the Australian Grain Marketing System

The grain marketing system can be defined as the "total system" including all elements that influence movement, transformation, and the price of grain after it leaves the farm.[3] Marketing institutions such as the Australian Wheat Board (AWB), the Bulk Handling Authority (BHA), and various state grain and elevator boards are included in the "total system" concept. This total system is encompassed and influenced by the policy environment. The prevailing policy environment in Australia is the market-managed system with the Wheat Board as the coordinating body.

The AWB is producer controlled and oriented as ten of its fourteen members are grower representatives from each of the five wheat producing states. The other four members include the chairperson, an employee representative, a finance member, and a representative of the flour mill owners. The AWB derives its current authority from the Wheat Marketing Act of 1979. This Act will be reviewed for renewal after five years, as has been done with previous wheat plans since 1948.

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[1]Specifically, see Weaver Bill; 96th Congress, H.R. 4237; Roth Stevenson Bill, and 96th Congress, S. 2773.

[2]Peltier, K., and D. Anderson, "The Canadian Grain Marketing System," Agricultural Economics Report No. 130, Department of Agricultural Economics, North Dakota State University, Fargo, December 1978; McCalla, A., and A. Schmitz, "Grain Marketing Systems: The Case of the United States versus Canada," American Journal of Agricultural Economics, Vol. 61, No. 2, (May 1979), pp. 199-212; Martin, Larry, Comparing Performance of Alternative Market Systems, Working Paper, University of Guelph; and Thompson, S.R., and Reynold P. Dahl, "The Economic Performance of the U.S. Grain Export Industry," Agricultural Experiment Station, T.B. 325, University of Minnesota, 1979.

[3]McCalla and Schmitz, op. cit.

Operating within this market-managed policy environment, three levels of the grain marketing system are discussed: a) production, b) first handler (country elevator), and c) end use (transformation and port terminals) (Figure 1). Physical and exchange linkages including transport and pricing are also described.

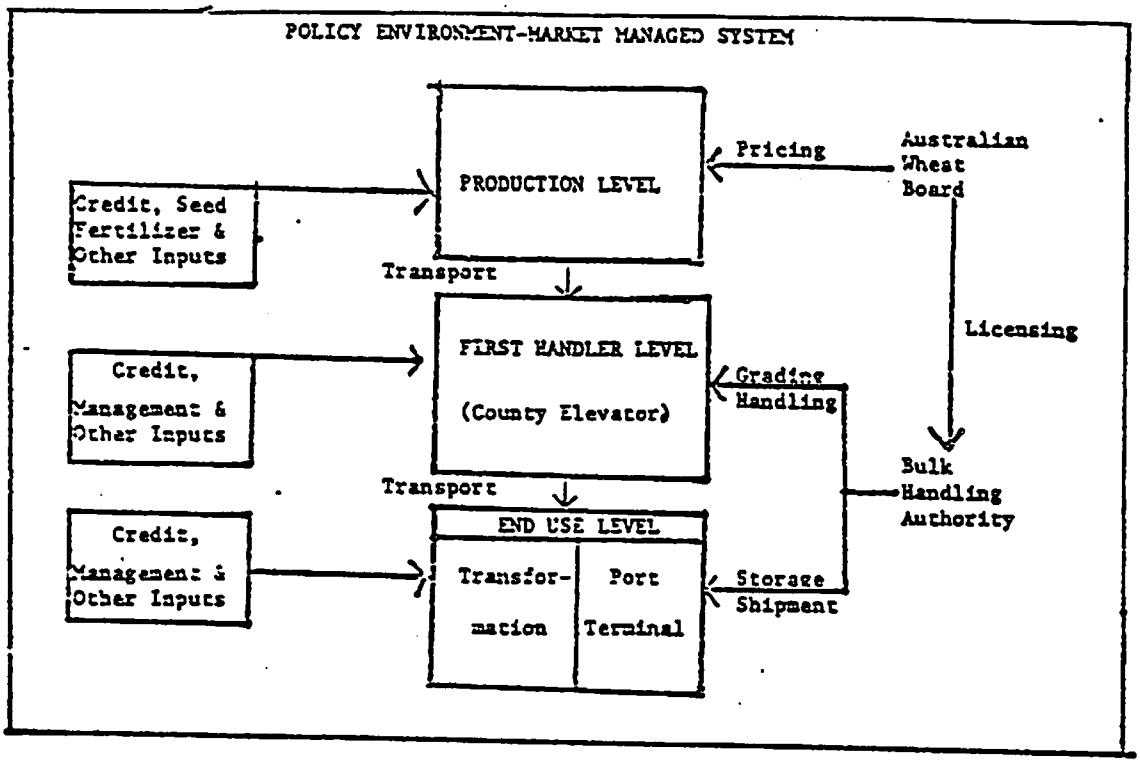

Figure 1. A Schematic Diagram of the Policy Environment and Levels of the Australian Wheat Subsector, 1939-80

Production Level

Australia's agricultural sector generated 11 percent of gross national product in 1978, but accounted for one-half of the country's total export value. Australia harvested 4 percent of the world's wheat production in 1978-1979 and will account for nearly that much in 1979-1980 if current estimates prove accurate. Usually between two-thirds and three-fourths of the wheat crop is exported. Australia has exported about 13 percent of the world's wheat since 1971 (FAS). Wheat sold domestically is used mainly for flour (65 percent) and stockfeed (32 percent).[4]

Wheat is the country's most important cereal crop, accounting for 79 percent of total cereal crop value in 1978-1979 (Table 1). Wheat value was one-half of total crop value and 24 percent of total agricultural output in that same year.

Five of Australia's six states grow wheat, with New South Wales and Western Australia being the two largest producers, harvesting 6.4 MMT and 4.4 MMT, respectively, in 1978-1979 (Figure 2).[5] Together they accounted for over half of total wheat production. Victoria, South Australia, and Queensland produced 3.4 MMT, 2.1 MMT, and 2.0 MMT, respectively, in the same year.

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[4]Australian Wheat Board, Annual Report, (Melbourne, 1970/71 - 1977/78).

[5]Bureau of Agricultural Economics, BAE Trends in Australian Agricultural Commodities, (Canberra, December 1977).

Table 1. Australia: Gross Value of Wheat Production, Cereals, Crops, and Agricultural Output, 1976/77 - 1978/79

	1976/77	1977/78 b/	1978/79 c/
		$ A million	
Wheat	1030	920	2420
Total Cereals a/	1551	1362	3053
Total Crops	3192	2956	4980
Agricultural Output	6312	6384	10010

a/ Wheat, barley, oats, maize, sorghum, rice.

b/ BAE estimate.

c/ Preliminary.

Source: Industries Assistance Commission Report. Wheat Stabilization, No. 175, June 30, 1978; and Bureau of Agricultural Economics. Quarterly Review of the Rural Economy, Canberra, Nov. 1979.

Australia's average farm had 1,274 hectares (3,147 acres) in 1975-1976.[6] Of this total, 251 hectares (620) acres, or 20 percent, were planted to wheat, 108 hectares (267 acres) planted to other field crops, 791 hectares (1,954 acres) under pasture, and the rest fallow or unused. There appears to be a trend of increasing farm size, as the 1,274 hectares was a 10 percent increase over average farm size in 1970-1971.

Average value of farms growing wheat was $A 245,000 in 1975-1976, with land value being the largest component, averaging $A 145,000 per farm.[7] Average farm total revenue was $A 55,000 in 1975-1976. Increased wheat value was a major contributing factor as wheat receipts increased from 34 percent of total farm receipts in 1973-1974 to 61 percent in 1975-1976. Total cash costs perfarm went from $A 16,000 in 1973-1974 to $A 23,500 in 1975-1976, or an increase of 47 percent.[8] Net farm income increased from $A 23,000 to $A 34,000, or 48 percent during the same period.

Farm Handler Level (Country Elevator)

In 1978 there were approximately 930 country elevators located in the Australian Wheat Belt (Green). That represent an increase of 40 percent over the 658 available in 1960 (Commonwealth Bureau of Statistics). The Bulk Handling Authority owns or leases most country facilities as the licensed representative of the AWB. The average country elevator, which serves as the first

[6] Ibid.

[7] Ibid.

[8] Ibid.

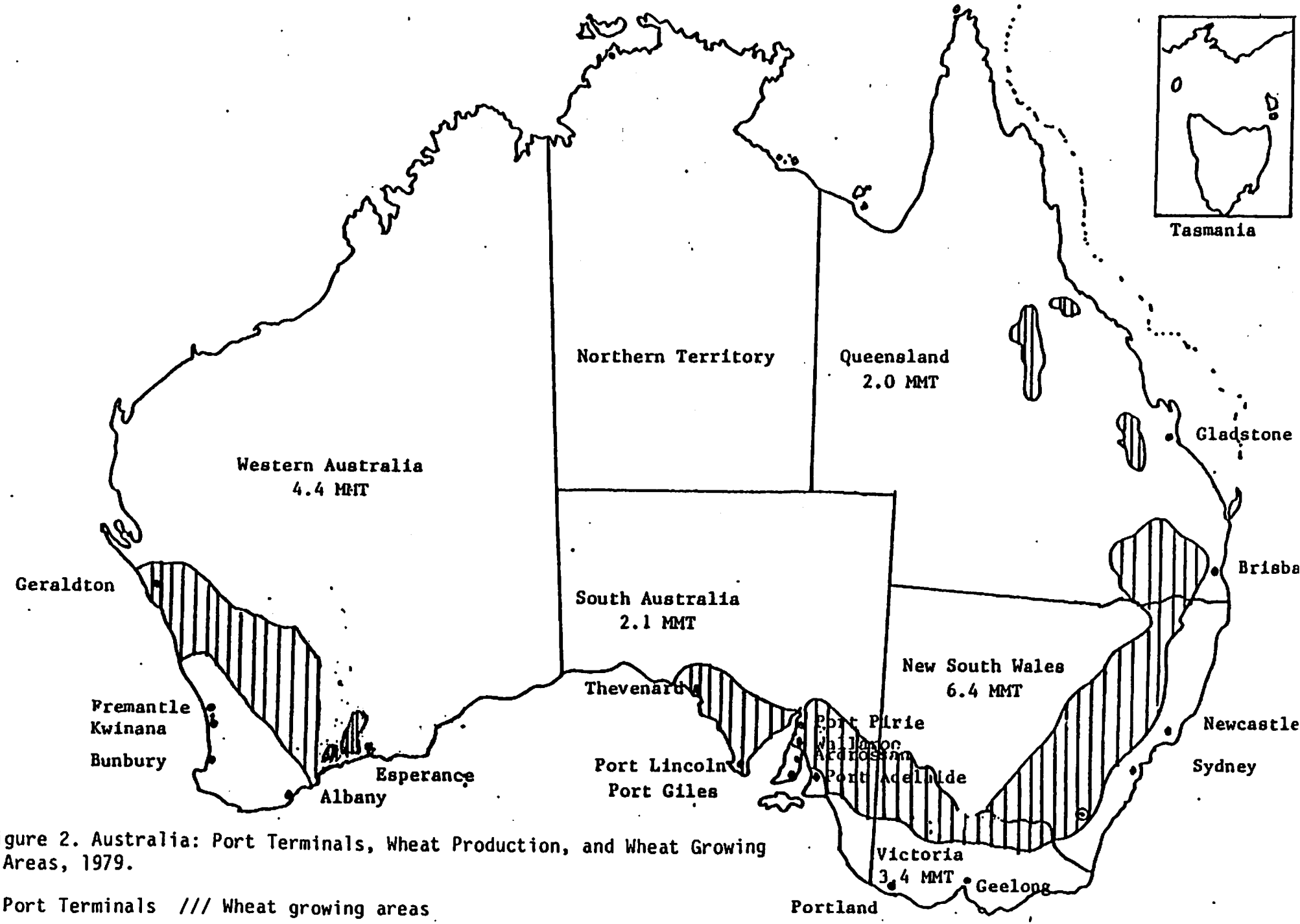

Figure 2. Australia: Port Terminals, Wheat Production, and Wheat Growing Areas, 1979.

• Port Terminals /// Wheat growing areas

receival point for wheat deliveries, has a storage capacity of 20,000 tons and is located on rail services thus facilitating grain movement to the port terminal.[9]

Country elevator storage capacities range from 6.024 million metric tons (MMT) in New South Wales to 1.263 MMT in Queensland, while the whole country system has a capacity of 17.620 MMT (Table 2) or three-fourths of total Australian grain storage capacity. Reports from N.S.W. indicate that inload rates vary from 75 MT per hour at Attunga, Breeza, and West Tamworth to 400 MT per hour at Narrabri. Outload rates vary from a minimum of 40 MT per hour at Baan Baa to a maximum of 240 MT per hour at Banaba, Croppa Creek, Burren Junction, and Moree.

Truck transport is normally used in moving wheat from farms to country elevators. Transport costs are the farmer's responsibility and are deducted from the initial payment for the farmer's wheat.

Wheat has to travel 40 miles on the average to reach a country facility.[10] Truck transport is also used to move wheat from country points to various end users within each state.

Table 2. Storage Capacity of Australian Bulk Handling Authorities and Mills by State and Type of Facitity, 1978

State	Country Elevator	Port Terminal	Mill	Total
	Million Metric Tons			
New South Wales	6.042	.375	.145	6.562
	(34)[a/]	(7)	(47)	(28)
Victoria	2.751	1.070	.075	3.896
	(15)	(20)	(25)	(17)
South Australia	2.104	1.471	.040	3.615
	(12)	(28)	(12)	(16)
Western Australia	5.460	2.157	.020	7.637
	(31)	(40)	(6)	(33)
Queensland	1.263	.107	.023	1.393
	(7)	(2)	(7)	(6)
Tasmania	-	.031	.003	.034
		(1)	(1)	(.1)
Australia	17.620	5.211	.306	23.137

[a/] Percent of storage among states by type of facility.
Source: 1977/78 AWB Annual Report.

[9] Network of subterminal facilities is limited as none are located in South Australia or Queensland due to proximity of farms to ports. Richards, Dean, Australian: Production and Marketing of Grain for Export, USDA, FASM-298, October, 1980.

[10] Ibid.

End Use Level (Port Terminal)

Australia has 19 major port terminals, 13 of which are located in South and Western Australia (Figure 2). The BHA in each state is the licensed representative of the AWB and receives wheat for storage and shipment domestically and overseas. In New South Wales, Victoria, and Tasmania, the Grain Elevators Board is designated as the BHA. In South and Western Australia, the BHA is the Co-operative Bulk Handling Ltd., while in Queensland it is the State Wheat Board.

The AWB is the sole marketing authority for Australian wheat. As such, the Board directs the sale of all wheat domestically and also is responsible for the sale of wheat and wheat products abroad. To this end, the AWB has four modes of operation in exporting: a) for sales to centrally planned countries, the AWB deals directly with governments or government agents; b) a foreign government may call tenders for wheat purchases; c) in some markets, private buyers deal directly with AWB; and d) wheat is sold by the AWB to traders who supply various markets. In all cases, the AWB is directly involved in the sale of wheat to both foreign and domestic customers, and is therefore a trading monopoly with authority over Australian wheat. In recent years, government-to-government sales have accounted for 60 percent of annual exports.[11] Wheat for export is normally sold on an f.o.b. basis at the Board's daily asking price.

Export credit plays an important role in AWB wheat sales to many foreign countries. The country's primary credit customers are Egypt, China, and Pakistan. All credit sales are backed by the Export Finance and Insurance Corporation (EFIC) which guarantees against commercial default, expropriation, and war. Normally, the coverage is extended to 90 percent of the value of outstanding credit and the purchase price. If the EFIC is unwilling to accept the risk, the federal government will usually guarantee the coverage if it is in the national interest.

Port terminal storage capacity ranges from 107,000 MT in Queensland to 2,157,000 MT in Western Australia (Table 2). Total port storage capacity is estimated at 5,211,000 MT or 23 percent of total capacity. Port storage in Western Australia represented 40 percent of port terminal capacity, while South Australia and Victoria had 28 percent and 20 percent of total port storage capacity, respectively in 1978. N.S.W., Queensland, and Tasmania together represented 10 percent of port terminal storage capacity in the same year.

Handling and storage facilities have been expanded at several ports in recent years to accommodate larger ships and greater grain volume. However, inload/outload rates vary from 120 tons per hour at Gladstone, Queensland, to 4,000 tons per hour at Kwinana, Western Australia, which became operational in 1977. Seven of the ports have outload rates of 400 tons per hour, while Kwinana can ship out 5,000 tons per hour. Western Australia has the largest export capability measured at 5.5 million metric tons annually, while N.S.W. and Victoria can each handle five million metric tons (MMT).[12] South Australia has an export capacity of 2.5 MMT, while Queensland can ship out 2.0 MMT. Australia's sustainable monthly export capacity is now placed at 1.5 MMT which implies an annual flow of 18 MMT.

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[11] Ibid.

[12] International Wheat Council (IWC), "Problems in Grain Handling and Transportation," Secretariat Paper No. 11, February, 1980.

Wheat is moved primarily by rail from the country elevator collection point to the port terminal. Australia's railway system developed on a state-by-state basis and had 26,000 miles of track in 1971. Of this, about 25,000 miles were state owned, while the remainder was privately owned.

While Australian railway mileage is extensive, three different gauges have developed. Wheat movement for export is not severely hampered by these breaks in gauge because they normally occur at state boundaries and export movement is usually contained within each state. However, Australia's inland transport system is considered a major constraint in the country's ability to expand exports.[13]

End Use Level (Transformation Industry)

The second largest use of Australian wheat is the flour industry. The number of Australian flour mills has declined 65 percent since 1948 (Table 3). N.S.W. has seen the greatest decline in mill numbers, going from 58 in 1948 to 23 in 1978 or a decrease of 60 percent, while in South Australia mill numbers fell by 64 percent (Table 3).

Table 3. Number of Flour Mills: Australia, Selected Years, 1948-78

State	1948	1956	1966	1976	1978
New South Wales	58	47	32	25	23
Victoria	38	34	20	9	7
South Australia	31	23	17	13	11
Western Australia	20	19	11	5	5
Queensland	10	11	11	11	7
Tasmania	3	3	5	3	3
Australia	160	137	96	66	56

Sources: Industries Assistance Commission Report, Wheat Stabilization, No. 175, June 30, 1978; AWB Annual Report, 1977/78.

This reduction in mill numbers occurred because of technical change, vertical integration of mills with local flour users, and the decrease in demand for exporter flour.[14] One-third of the mills and one-half of the gristling capacity is now controlled by three groups within the country. These groups also control 40 percent of the flour mill's bulk wheat storage capacity.[15]

[13] Ibid.

[14] Industries Assistance Commission Report (IACR), Wheat Stabilization, Report No. 175, Canberra, June 30, 1978.

[15] Ibid.

Most mills are vertically integrated and involved in activities such as baking, pastries, stockfeed processing, and livestock fattening and processing. Millers buy wheat from the AWB at the home consumption price. Freight rebates are given to flour mills in country areas to equate their purchase price with that of mills at seaboard terminals.[16]

In 1976 the flour milling and flour using sector employed 39,000 people. The largest employers were the bread, cake, and biscuit industries which employed 31,000 or 80 percent of total sector employment.[17] Flour milling employed only 2,663 persons or 7 percent of total sector employment in 1976.

Feed processing has become integrated with the chicken meat industry and flour milling according to the Australian Stock Feed Manufacturer's Federal Council. The AWB controls wheat deliveries to feed millers and processors to insure that regular deliveries and grade standards are met. In 1976 there were 153 prepared animal and bird feed plants employing 4,100 persons.[18]

Wheat Pricing and Payment Policy

Current wheat pricing policies in Australia are the direct result of the Wheat Marketing Act of 1979 and will extend through September 1984. Wheat delivered to the AWB in any season forms a "wheat pool" and growers receive a "pooled" or average price based on export and domestic sales. After wheat is delivered to the AWB, wheat growers receive an initial payment known as the Guaranteed Minimum Delivery Price (GMDP). The GMDP is set at 95 percent of the average of the pool return for the past two seasons and an estimate of the pool return for the current season. Any deficiency between the net pool return and the GMDP is guaranteed by the commonwealth government. The GMDP is limited to a 15 percent movement between seasons.

The former "home consumption price" has been replaced by a two-tier domestic wheat price to more adequately recognize the major components of the domestic market, namely wheat for flour for human consumption and wheat for stockfeed and industrial use.

Since 1979 the "human consumption price" has been determined by a formula which accounts for export price movements and grower production cost adjustments while giving farmers a margin above export prices. The formula price is limited to movements of 20 percent from one year to the next.

Under the 1979 Wheat Marketing Act, the Wheat Finance Fund (WFF) was established to replace the old Wheat Stabilization Fund. The primary purpose of the WFF is to hold funds which will be used to refinance the debt incurred from initial grower payments for wheat deliveries and to refinance AWB debts to the Rural Credits Department of the Reserve Bank of Australia.

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[16] Ibid.

[17] Ibid.

[18] Ibid.

Conceptual Framework for Examining Export Market Performance

In this section, five general performance criteria are proposed:[19] a) technical efficiency, b) price efficiency, c) export response, d) progressiveness, and e) equity. A number of conceptual measures are identified for each performance criteria. And for each conceptual measure, a number of operational methods are submitted.

A. Technical Efficiency

Technical efficiency is defined as the input/output ratio.[20] Ideally, there are a number of ways of conceptualizing technical efficiency as a performance criterion. Those identified here are a) level of supplies to all users, b) stability of supplies, and c) productivity.

Proposed operational methods of technical efficiency include a) trend in supplies, b) variation around trend in supplies, c) trend in crop yields, d) variation around trend in yields, e) response in grain production to changes in government payments, f) country elevator and port terminal throughput ratios, and g) mill output relative to milling capacity.

B. Price Efficiency

Price efficiency can be defined as the speed and accuracy with which price information flows throughout the pricing system.[21] Conceptually, there are many ways of measuring price efficiency: a) level and stability of producer prices, b) changes in marketing costs, c) market signals, d) response to structural changes in demand, e) grower returns, and f) producer market access.

C. Export Response

To maintain a viable export program, a country must gain access to foreign markets regardless of the market orientation of its policy environment. Therefore, it is necessary to examine a country's performance with respect to export response. This performance criterion can be evaluated by conceptual measures such as a) growth in sales to alternative countries, b) response to changes in export demand, c) foreign exchange earnings, d) foreign market development, and e) credit assistance to foreign customers.

Proposed measures to operationalize these conceptual variables include but are not limited to: a) export volume by destination, b) share of major import markets, c) share of world trade relative to annual grain prices, and d) trend in value of grain exports.

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[19] This is a proposed study to be completed at Texas A&M University over the next two years.

[20] Bressler, Raymond G., and Richard A. King, Markets, Prices, and Interregional Trade, (New York: John Wiley and Sons, 1970).

[21] Sporleder, T. L., and Jean-Paul Chavas, "Aspects of Pricing Efficiency and the Value of Information," Working Paper, Texas A&M University, May, 1979.

D. Progressiveness

Conceptually, progressiveness can be measured by a) rate of adoption of productivity increasing technology, b) resource conservation, c) effectiveness of commodity research, d) commodity product image overseas, and e) exploitation of opportunities for new crops.

Operationalization of these conceptual measures is achieved by examining a) fertilizer use relative to yield response, b) rate of development of marginal land, c) water and land conservation programs, d) research expenditures relative to yields, e) adoption of new crops, and f) investment in new technology at country elevator and port terminal facilities relative to total grain sales.

E. Equity

Many ways exist of conceptualizing equity; those submitted in this paper include a) level and stability of consumer prices, b) income distribution, c) market access, d) sales restrictions (barriers to entry), e) employment, and f) environmental externalities.

For each conceptual measure there exists a number of operational methods. These include a) percent change in food component of CPI relative to percent changes in CPI, b) coefficient of variation in percent change of food CPI, c) farm income relative to nonfarm income, d) wheat prices or grower returns by state or region, e) use of production or delivery quotas, f) unemployment level and coefficient of variation in employment level, g) level of employment in the grains sector, h) percentage of work force in labor or trade unions, i) relative strength of trade unions (seats held in legislature), j) number of elevator explosions per 1,000 tons throughput, and k) number of explosion deaths per 1,000 tons throughput.

Conclusions

The description of the Australian grain marketing system and the brief outline of selected performance criteria surface a number of disconcerting issues. These issues can be categorized into four general areas: a) the scope of economic policy environment, b) methodological issues, c) implications for clientele, and d) implications for the agricultural economics profession. Each is addressed in detail in "A Preliminary Overview of the Argentine Grain Export Marketing System," by Cook and Wilson.

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A PRELIMINARY OVERVIEW OF THE ARGENTINE GRAIN EXPORT MARKETING SYSTEM

by
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and
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The post World War II history of the Argentine grain marketing network offers the export performance system researcher a unique opportunity to observe differences between a market-managed and a market-oriented policy environment. Since 1945 the policy environment in Argentina has vacillated between a market-managed system and a market-oriented system.[1] A grain board was first created in Argentina in 1933 by government ministers and ratified by the legislature in 1935. At that time it was given control over foreign sales and the authority to fix minimum prices for wheat, corn, and flax. Grain handling facilities were still controlled by the private sector, but the government paid them for handling charges. The Board initially came into existence because of the pressures the world crisis put on grain producers.[2]

When Peron came to power in 1945, two of his economic objectives had a profound effect on the policy environment for Argentine agriculture. One objective was a plan for industrialization, and the other was a plan for massive income redistribution to transfer wealth from the agricultural sector to urban consumers and industrial workers. Peron created the Instituto Argentina de Promocion del Intercambio, IAPI, (Argentine Trade Promotion Institute) in 1946. It was developed partially for the purpose of creating a "single seller" to deal with a "single buyer", which is how the Argentines viewed the Allied purchasers after World War II. The Board was then put under supervision of the IAPI and reorganized to eliminate producer participation. The IAPI established official prices, monopolized the purchase and sale of principal grain crops, and established margins for processors.

In 1955 Peron was exiled, and a military provisional government took his place. For Argentina, this was just the beginning of a long succession of presidents and military leaders and a period of political instability. In 1956 the National Grain Board was reorganized again. Half of the directors on the Board came from the public sector, as opposed to one-third before the Peronist era. This reorganization was intent on maintaining a certain amount of government control over commodity marketing.

The official National Grain Board of the sixties and seventies was established in 1963. From that point until 1973, the Grain Board was organized

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[1]Initial examination of secondary data suggested that analyses of four periods were appropriate. But after further investigation, the first three periods appear to be less well-defined, leaving a mirage of a 30-year market-managed period from 1945 to 1975 and a well defined market-oriented period from 1976 to the present. Further comments on this observation will be highlighted in the performance section and conclusions.

[2]To date, specific historical documentation of the move toward a board has not been encountered.

to allow grain trading through private firms and cooperatives, but it still exerted influence in several ways. The Board was obligated to buy crops at the official support prices, but the only grain purchased in significant quantities was wheat. The Board could act as direct seller in large state trading sales and negotiated the bilateral sales agreements with agencies of foreign governments. The Grain Board also had the power to issue export licenses and establish embargoes in years of tight supply.

In 1974 the role of the National Grain Board was greatly expanded when Peron returned to power. It became the sole legal market for all Argentine sales and purchases of wheat, corn, and grain sorghum. All producers were obligated to deal with the Board; and any merchants, brokers, or cooperatives were considered agents of the Board and paid commissions. The Board was also responsible for establishing domestic and export grades and standards.

Peron died in July of 1974, and after spiraling inflation and government instability under his wife, a military coup took over leadership of the government in 1976. A major reorientation of agricultural policy immediately took place. The agricultural sector was returned to a market-oriented system, and the National Grain Board was relegated to minor administrative responsibilities and various information functions. A major change differentiates this period from the previous three. The export retention tax, which had been in effect since the first Peron era, was eliminated. Another significant difference between this period and the previous Board period was the unification of exchange rates that had previously discriminated against agriculture.

Operating within this complex and changing policy environment, four levels of the grain marketing sector have emerged: production, first-handler, second-handler, and end-use. The general purpose of this paper is to describe the role of these levels in the Argentine grain system. The description also includes an examination of the physical and exchange linkages between the four levels (Figure 1). A second objective of this paper is to surface a number of problems in measuring export marketing system performance. Further objectives of this paper include a) questioning the relevance of grain export marketing systems as a policy issue, and b) to stimulate interest and discussion regarding the welfare implications of changes in marketing systems.

Description of the Argentine Grain Marketing System

Production Level

The major producing area for Argentine agriculture is the Pampa Region (Figure 2). The characteristics of the Pampean topography, soil, and climate make it one of the richest agricultural regions in the world. It provides pastureland for 80 percent of Argentina's cattle production, and is the major wheat, coarse grains, and oilseeds growing area. Trends in Argentine grain production have been affected by three important price-related factors in the past fifty years. In general, there has been a trade-off between area devoted to grain crops and area devoted to pastureland, depending on market signals and/or government policies. Another significant influence on Argentine grain production patterns has been the introduction of grain sorghum. Wheat has historically accounted for the largest area planted to any single grain, corn

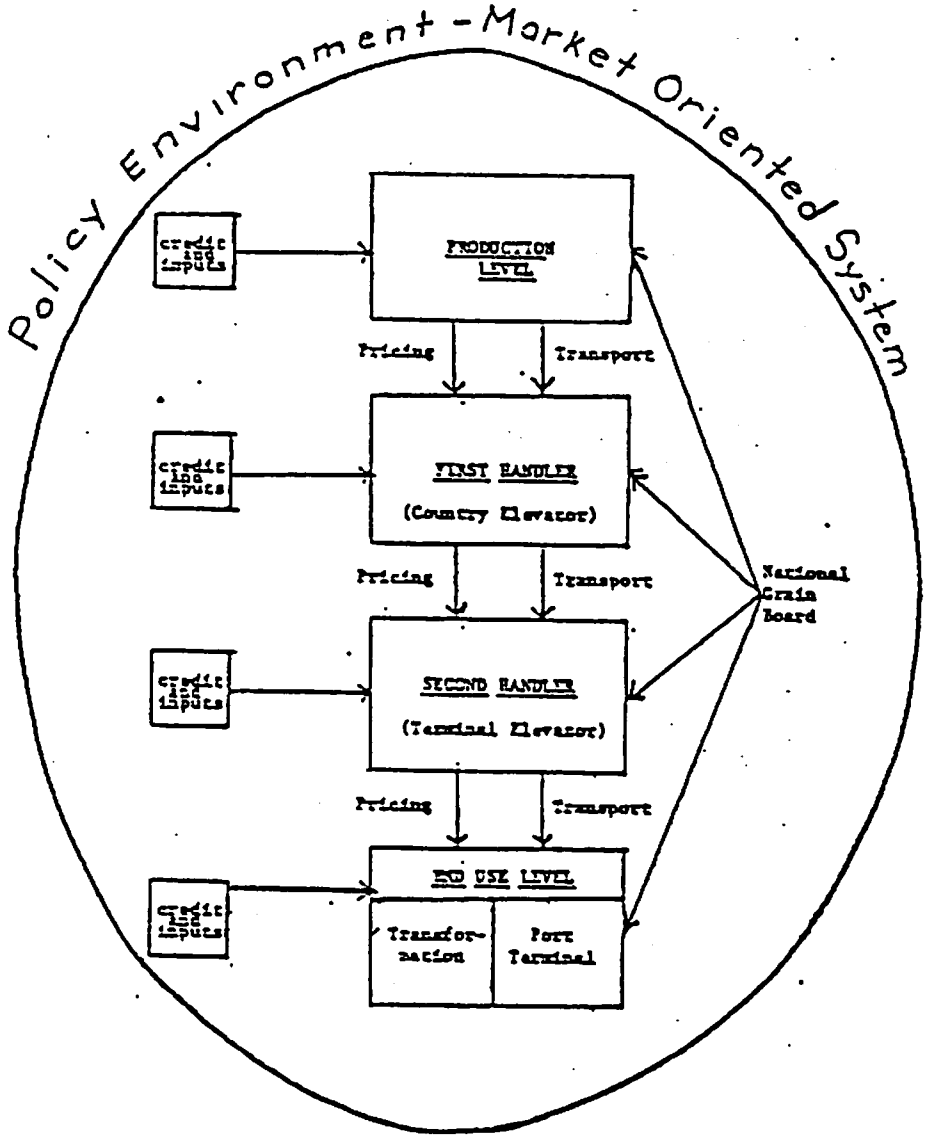

Figure 1. A Schematic Diagram of the Policy Environment Subsector Levels in Argentina, 1976-1980.

area has shown an overall decline since the 1940's, and grain sorghum hectarage has increased substantially since 1950. In the 1978-1979 marketing year, grain sorghum planted area accounted for 12 percent of total grain and oilseeds planted area, up from less than 1 percent in 1953-1954 marketing year. The third factor influencing production trends is the cultural practice of double-cropping wheat and soybeans.

Land ownership is still fairly concentrated due to Argentina's traditional land tenure pattern. In the 1960 census, 5 percent of the landowners held nearly three-fourths of all private agricultural land. In 1965 more than one-half of the land in the Pampa Region was concentrated in farms of 1012 hectares (2500 acres). In 1978 Rudbeck estimated the average farm size to be just under

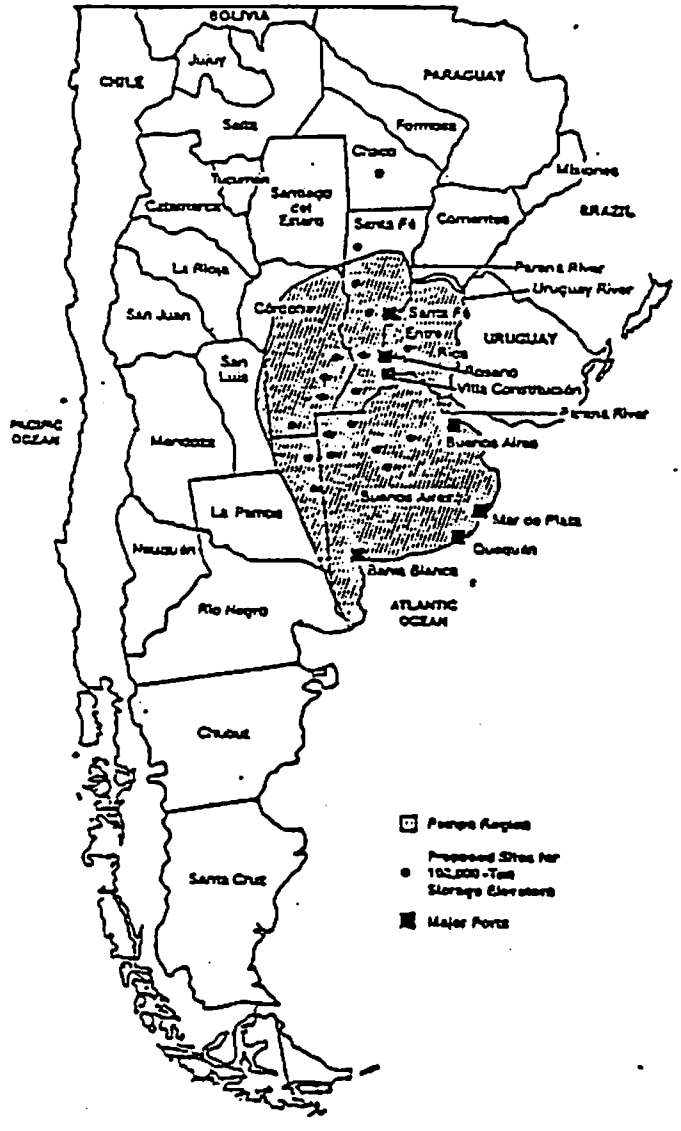

Figure 2. Argentina: Principal farm production region, ports, and proposed elevators.

Source: USDA, FAS, Foreign Agriculture, January 1978

400 hectares (988 acres), roughly two and one-half times the average size in the U.S. at that time.[3]

Input utilization by Argentina producers is largely a function of investment incentives and land tenure conditions. Policy to protect most of the domestic input industries has been a major factor in reducing the profitability of investing in modern input technology.

Due to the extensive method of farming, mechanization occurred early but continued at a low rate of investment in comparison to other sectors of the economy up until the mid-fifties. Since then mechanization has increased at a fairly high rate, although prices for machinery in Argentina were substantially higher than most other major agricultural producing countries due to policies protecting the domestic industry. However, in 1977 the high import duties affecting tractors were reduced leading to relatively lower prices.

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[3] Horsley, B., "Argentina: Rising South American Agricultural Exporter," USDA, FAS, Foreign Agriculture, April 1978.

The use of fertilizers in crop production is another aspect of modern technology that has been limited by protectionist policies. The use of fertilizers in grain production has historically been minimal, although recently there has been a small increase in the utilization of nitrogen based fertilizers. At present, fertilizer usage continues at its relatively low level due to three major factors. The small improvement in yields, especially in corn and grain sorghum production, from the use of fertilizers has not been able to offset their relatively high cost. Second, Argentina's susceptibility to weather variability could cause extensive burn damage to a crop in years of drought if fertilizer usage is increased without increases in irrigation practices. Third, Argentina's crop research has traditionally fostered new seed varieties which were developed to respond to the Pampean soil and climate rather than to fertilizer use.[4]

First-Handler Level - Country Elevators

The primary collection system is characterized by a lack of adequate storage facilities. There is limited on-farm storage, and the major storage facility at this level is the primary elevator which receives grain directly from producers. Recent estimates show 10.0 MMT in-country and 3.4 MMT on-farm storage capacity, of which 9.1 MMT is estimated to be commercially owned.[5]

There are currently two major programs being developed to alleviate the inadequate storage problem: The National Administration for the Building of Grain Elevators is developing a project to expand government-owned storage capacity by 340,000 MT. However, not all of the planned expansion will be at the primary collection level, as some of the increased capacity will be at inland terminal elevators.[6] The second major program, financed by the World Bank, plans for the construction of 20 in-country elevators with storage capacity of 100,000 MT each. The total projected increase in inland grain storage capacity from these two projects (to be completed by 1982) is 2,340,000 MT, an increase of 14 percent (see next section). Annual investment in government controlled grain elevators has been highly variable in the seventies. It has ranged from $7.1 million to $27.2 million (Table 1).

Investment in storage capacity by the private sector has traditionally been low, but the availability of credit through the Banco de la Nacion for the construction of private grain elevators may be changing that trend also. This credit extension supported by the Inter-American Development Bank is available for expanding storage capacity 1.5 MMT. Since February of 1977 when this credit line was established, the storage capacity of private grain elevators has been increased 528,000 tons. The number of primary elevators controlled by the private sector will soon increase when the National Grain Board completes its planned transfer of 82 primary elevators through a rental system.[7]

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[4] As of yet, no complete cost of production studies similar to the Brazilian, Australian, and U.S. series have been found. In-country data collection will concentrate on filling the gaps in available cost of production statistics.

[5] International Wheat Council (IWC), "Problems in Grain Handling and Transportation" Secretariat Paper No. 11, London, February 1980.

[6] In the proposed study and after in-country data collection, a separate section will not only expand upon the first-handler level, but will also describe a second-handler level.

[7] The Argentine Ministry of Economy, "Network of Grain Elevators to be Extended and Modernized", Economic Information on Argentina, No. 102, December 1979

Table 1. Annual Investment in Government Controlled Grain Elevators in Argentine, 1970-1978.

Year	US $
1970.	9,200,000
1971	9,200,000
1972	7,100,000
1973	7,700,000
1974	15,000,000
1975	9,000,000
1976	8,500,000
1977	19,100,000
1978	27,200,000

Source: Economic Information on Argentina, Dec. 1, 1979.

End-Use Level - Port Terminals

The same problem of inadequate storage also exists at the port terminal level. The storage capacity at the ports is estimated to be 2.6 MMT (IWC). Hence, total country, terminal, and port elevator storage capacity in Argentina sums to 16 MMT. This capacity is equivalent to about one-half of the annual grain and soybean production. Limited total storage capacity creates severe congestion at harvest time (December-January for wheat, April - May for corn and grain sorghum) when a rapid flow of grain into the ports occurs. Between 1975 and 1979, shipments of grains, soybeans, and meal averaged 1.8 MMT per month from April to July compared to only .6 MMT per month from October to December.

Ownership of all the port elevators has remained in the hands of the Grain Board since the first Peronist era. Current consideration is now being given to transfer control to the private sector. If this policy is adapted, port elevators will be rented on a monthly tonnage capacity per-month basis to the private sector for a ten-year period.

The major grain shipping ports are Bahia Blanca and Buenos Aires, which were the only two ports in 1978 with harbors that could accommodate ships with drafts of 30 or more feet. Bahia Blanca had a 4.1 MMT port throughput in 1977, and Buenos Aires' port throughput in 1977 was 3.9 MMT. The main upriver ports of the Parana River, Villa Constitucion, Rosario, and Santa Fe, have water depths of approximately 25 to 30 feet; and cargo topping off of ships then is completed at Buenos Aires. Improvements in handling facilities at Argentine ports since 1978 has allowed loading capacity to reach new records. The average from April to July in 1979 was 2.6 MMT per month, including almost 3 MMT in the month of June, a relatively large increase from the 1 MMT per month maximum in 1976.[8]

[8] Ibid.

Transportation Linkage

The two main modes of transportation of grains from farm to elevators are the rail and trucking industries. Rail rates for movement of grain in comparison to trucking rates have been low; but the inefficiencies of the system, which was nationalized in 1947, decreased its competitiveness as a mode of transportation for grain. Since 1970 the railway system has been improved through increased labor productivity, a reduced number of workers, more efficient use of capital, and improvements in the quality and quantity of rolling stock and in loading and unloading facilities. However, there still remains a number of major problems including a shortage of suitable grain cars, several different gauges, and routing.

Trucking has been the main mode of internal transportation for grain.[9] Although the rail system was improved in the seventies, trucking still dominates the internal movement of grain. In 1970 several long-distance and international trucking firms were in operation,[10] but the majority of trucking firms were short-haul single vehicle operations.

Pricing Linkage

The Buenos Aires cash market is the most important in determining price, and it generally sets the price levels for the other minor cash markets. The futures market in Argentina is not as important because of the high inflation rate. Pricing behavior is much more complex since the removal of price controls in 1976.[11]

Export Market System Performance

After describing the system and the policy environment, the question arises as to how the policy environment has influenced the performance of the export marketing system. In this section, four general performance criteria are proposed: a) technical efficiency, b) price efficiency, c) export response, and d) equity. A number of conceptual measures are identified for each performance criteria.[12] And for each conceptual measure, a number of operational methods can be utilized.

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[9] In 1970, 70 percent of the grain moving through the market was transported by truck.

[10] Secondary data availability in the U.S. on the Argentine transportation system is minimal; particularly with respect to the more recent developments in quantity and quality of rolling stock, rail and truck rate and route regulation, ease of substitutability, and other related transportation problems.

[11] Time series of prices at the farm level, country elevators, and terminal elevators have not yet been collected; but data on export prices and wholesale prices are available.

[12] In the proposed study, the operational method for analyzing each conceptual measure will be evaluated.

Technical Efficiency

Ideally, there are a number of ways of conceptualizing technical efficiency as a performance criterion including a) level and stability of supplies and b) productivity. Level and stability of supplies is an important conceptual performance measure to study, especially in the case of Argentina, due to its history of alternating market-managed and market-oriented policy environment surrounding the agricultural sector. A state objective of most grain boards is to introduce some stability into the market in an effort to increase producer welfare and a country's reliability as a supplier. Therefore, this measure could be approached (as will all measures used in the final analysis) with the intentions of separating the effects of the two market-managed periods from the two market-oriented periods since 1945.

Pricing Efficiency

Numerous conceptual performance measures for pricing efficiency will be examined in the study. These include the level of producer prices, the stability of consumer prices, income distribution, market access, sales restrictions, and employment levels. Income distribution is one of the traditional concepts of equity, and is particularly pertinent to Argentina's case.

Export Response

Five conceptual performance measures for export response including growth in sales response to export demand changes, growth in foreign exchange earnings, foreign market development, and credit assistance will be measured in the analysis of the Argentine grain export system.

Equity

The performance criteria, equity, may be conceptualized in many ways. Such conceptual measures include the level of consumer prices, the stability of consumer prices, income distribution, market access, sales restrictions, and employment levels. Income distribution is one of the traditional concepts of equity, and is particularly pertinent to Argentina's case.

CONCLUSIONS

Preliminary observations lead us to conclude that the Argentine grain export marketing system is considerably more complex than the Australian system. There are more levels within the subsector of the Argentine system leading to a greater variety of functions. The policy environment is also more complex. The history of political instability has in general lowered the economic performance at the macroeconomic level. A different policy environment exists in each of the four periods defined in this paper. The vast complexities of the Argentine grain export marketing system make a further in-depth study and analysis necessary to draw any rigorous conclusions.

The description of the Argentine system and the brief outline of selected performance criteria surface a number of other disconcerting issues. These issues can be categorized into four general areas: a) the scope of economic policy environment, b) methodological issues, c) implications for clientele, and d) implications for the agricultural economics profession.

The Scope of Policy Environment

Is the real issue board versus nonboard? We think not. The question is of greater magnitude - what is the economic policy environment, market-oriented or market-managed and what objective function is the economic policy environment and its related institutions attempting to optimize? Can it, therefore, be hypothesized that the adaptation of a board is predetermined by the choice of economic policy environment (Figure 4)?

The Argentine system up until 1976 is a prime example of differing degrees of regulation in a market-managed policy environment. The period since 1976 to the present is an excellent example of a market-oriented policy environment since the degree of regulation has been lowered considerably.

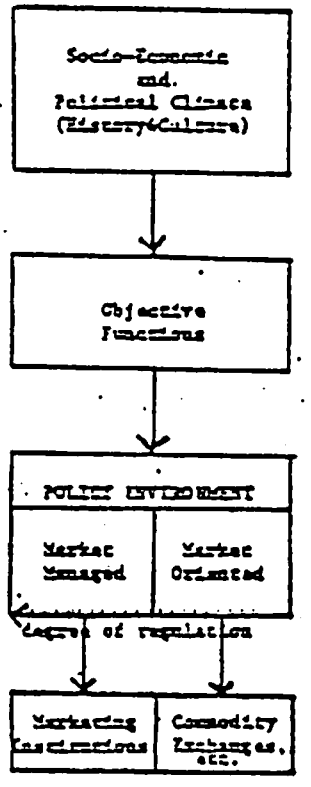

Figure 3. Conceptual Development of a Marketing System

Methodological Issues

1. No set of well-developed testable hypotheses has been found linking policy environment - grain boards - market performance to a commonly accepted body of economic theory. The simultaneity of relationships between performance and its determinants makes conceptualization difficult and empirical measurement even more formidable.

2. Selection of testable performance criteria can prove very difficult. A certain degree of subjectivity is involved in selecting any criterion. Our five criteria and 26 conceptual measures do not exhaust the list by any means, but we feel that superior results will emit from an initial selection of a broad spectrum of performance criteria. McCalla and Schmitz use eight performance indicators in comparing the performance of the U.S. and Canadian grain export marketing systems.[13] Martin suggests the use of 11 performance objectives and 25 performance indicators.[14] Therefore, we can conclude that attempts at an analysis of the entire spectrum of export market performance criteria, through initially superficial, will yield incremental gains to knowledge that may prove invaluable to future endeavors.

3. Marion and Handy point out that it is difficult to combine performance objectives into a comprehensive index.[15] Martin further emphasizes this point and adds that performance criteria may attempt to achieve conflicting goals.[16] Therefore, we recommend a three-step examination of export market performance. First, a disaggregated performance analysis is used to lay the groundwork for comparative studies and objective function measurement. This disaggregated analysis would examine each performance criterion in depth, similar to the Thompson and Dahl study.[17] Assuming society is attempting to optimize some objective function, then a norm can be specified and attempts made to achieve it. Finally, comparative studies can then be viewed as a tool or a benchmark in measuring how well a system is accomplishing its own objective functions.

4. Very few market-managed or market-oriented systems have developed exogenous to the policy environment and political and economic history. Therefore, we feel it extremely important to develop a thorough historical description of agriculture and food policy, general economic development, and evaluation of the grain marketing network. This description will aid in developing a concensus concerning the objective function of the grain marketing system and its encompassing policy environment.

5. From this brief exercise, we conclude that the ability to use rigorous descriptive techniques may prove as valuable as the use of sophisticated inferential statistics.[18]

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[13] McCalla, A., and A. Schmitz, "Grain Marketing Systems: The Case of the United States versus Canada," American Journal of Agricultural Economics, Vol. 61, No. 2, May 1979, pp. 199-212.

[14] Martin, Larry, Comparing Performance of Alternative Market Systems, Working Paper, University of Guelph.

[15] Marion, B. W., and C. R. Handy, Market Performance: Concepts and Measures, Agricultural Economic Report No. 244, ERS, September 1973.

[16] Martinm, L., op cit.

[17] Thompson, S. R., and Reynold P. Dahl, "The Economic Performance of the U.S. Grain Export Industry," Agricultural Experiment Station, T. B. 325, University of Minnesota, 1979.

[18] Preliminary analysis of the conceptual measures of a number of performance criteria has been made to test the quality of data and applicability of techniques. The result of these tests will be made available in the final study.

Implications for Clientele

1. With respect to its end use, export market performance research has implications at two levels: macro and micro. The implications on the macro level involve public policy decision making and the benefits of welfare analysis. When viewing contemporary policy issues such as the Weaver Bill and Roth-Stevenson Bill, welfare analysis takes on added importance.

2. On the micro level, the efficiency and quality of economic decisions within a firm may be improved by the disaggregated performance analysis described in this paper. The firm level decision maker could use this analysis in enhancing the competitive position of the firm through improved long-range planning and development of short-run marketing strategies. Investment decisions, inventory control, pricing, and marketing arrangements might also be enhanced through this type of analysis.

Implications for the Agricultural Economics Profession

Because of training in theoretical and welfare analysis and familarity with marketing institutions, agricultural economists are uniquely qualified to objectively explore and evaluate the advantages and disadvantages of such an important issue.

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LESSONS THE U.S. MIGHT LEARN FROM THESE COMPETITIVE GRAIN MARKETING SYSTEMS

by Leonard W. Schruben*

Two major purposes are served by a comparative analysis of grain marketing systems of different countries. One is to learn new techniques, the adoption of which would improve the efficiency of the system. The other is to identify issues so that an informed public can establish as public policy sound rules under which marketing activities will be conducted.

It is hoped that lessons learned from the experience of others will contribute to our reaching a wise decision as to whether or not to establish a national grain board empowered to be the sole buyer and seller of grain. Legislation repeatedly has been introduced in Congress by Representative Weaver (Oregon) to create a national grain board to be the only marketing agent for all export sales of U.S. wheat, rice, corn, grain sorghum, barley, oats, rye, and soybeans. The proposed board presumably would operate only in the export market. However, with monopoly control of exports a board with such powers could clearly dominate and control the domestic market also.

The Weaver Bill and the government's January grains sale agreement with Mexico display a propensity for direct government intervention. In a commercial sense (though not legal) they are not far removed from export subsidies, reserve management rules, exchange controls, and export licensing. These devices were created to give government a measure of control over exports without the necessity of assuming title to the grain.

Are we going to establish a grain board by adopting specific legislation similar to that proposed by Mr. Weaver, or are we unknowingly going to drift into a defacto grain board? Of the two, Mr. Weaver's frontal approach is to be preferred because it provides an opportunity for full discussion of the issues.

This objective is stated in the Weaver Bill (H.R. 4237, 96th Congress): to "provide the highest possible prices in foreign markets for American agricultural producers." No one, however, has carefully described how a grain board would operate to achieve this objective. A systematic analysis of the results that could reasonably be expected to be achieved by such a board includes a close look at the experiences of other countries.

Fortunately, the U.S. can draw on wheat board experience in Argentina, Australia, and Canada in projecting the results of a grain board operation. How do we draw upon that experience? What is the best way to arrive at an answer for the basic question put to the U.S. by proponents of a grain board?

Presentations at this conference make plain there is no general concensus as to the appropriate methodology to use in making a comparative analysis of different grain marketing systems. By the examples given by the presenters, however, one might rightly conclude that description and deduction yield the best results.

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The results from formal mathematical models of a complete grain marketing system are likely to prove as nonsensical as some of the more fanciful that have been designed for analyzing the effects of U.S. agricultural policies.

The general public recently was treated to a delightful trip into fantasy land by a study reporting results of using a model called POLYSIM (National Agricultural Policy Simulator) to evaluate the impact of making ethanol from grain.[1] This lapse into frivolity dutifully informed the public that market forces would adjust to an increase in corn oil production of 1 billion pounds and increases in distillers protein feeds of 9.5 million tons by increasing soybean prices. Also, the reader learns that high protein byproduct feeds could be priced at but 25 percent of the price of corn per pound rather than at the more normal 135 percent. Other projections are with no apparent connection or relationship to the real world.

It is tempting to limit issues to one index such as a comparison of prices between two countries--and implicitly attribute such differences in prices as may exist to the difference in systems. This exercise falls short of the mark. No two countries are sufficiently alike so that price differences result from the presence or absence of a marketing board because a wide range of differences unrelated to the type of marketing system are brought into play in determining relative price levels.

Some examples are rates of facility maintenance and replacement methods, costs of production, transport costs, social and economic habits and expectations, and role of government in business affairs other than grain. In 1975 North Dakota farmers received an average of $4.18 per bushel for wheat, Kansas farmers $3.40, and Ohio farmers $3.25. In 1976 farmers in Ohio averaged $2.90, North Dakota $2.77, and Kansas $2.70. Can it be determined from these price relationships in which state the marketing system performs best?

Even if one could fairly conclude prices were consistently higher in country A than country B, it does not necessarily follow that a change in the marketing system in B will result in higher prices in B. How can we say price differentials are the result of a particular marketing system? Might it not be the other way around?

The increasingly active role of government in grain marketing is the principal reason we are here today discussing different systems. Should the U.S. go all the way to a government operation? Does the U.S.-Mexican grain agreement of January 16 foretell the future? Or was it a convenient way for CCC to dispose of stocks of old rice?

Should the U.S. move toward centralized or toward a dispersed system of decision making and control? I suggest that concentrating on relative price levels is the wrong way to answer these questions.

The pertinent question is whether or not the U.S. would be better served by a grain board; not whether Canadians (for example) are better served by their system or the U.S. by its system. A unique quality of the U.S. situation is the quantity, multidirection of flow, and domestic utilization of grain

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[1] Hertzmark, D., D. Ray, and G. Parvin, "The Agricultural Sector Impacts of Making Ethanol from Grain," Solar Energy Research Institute, SERI/TR-352-554. March, 1980

from which arises a distinctly different set of circumstances affecting policy decisions than found in other exporter countries and which makes the U.S. system more difficult to centrally manage.

Comparative analysis of systems can help us describe how a grain board monopoly would operate, its problems, its decision making procedures, and some notion of its impact on the general economy. Some of the things we should learn from others' experiences include the following.

Pricing

How would a grain board establish the appropriate schedule of prices, such as among the classes and qualities of wheat? The quantity of a particular quality demanded at a given price is a function, in part, of the prices of other qualities. Clearing the market of each class doesn't prove pricing efficiency. Both substitutability and complementarity are at work in the market.

Consider, for example, the fact that price spreads between winter wheats having a different protein content are changing constantly. At any time, protein premiums for a completed sale in any market are equal to the price demanded by the most willing seller and offered by the most willing buyer. Also, at any given time, depending on his order book, each user has a schedule of priorities. When premiums are large, a buyer restricts his use of high protein to higher value in use. When premiums are small, he puts high protein to a lower value in use. Thus, a buyer is willing to pay a substantial premium for flour used to satisfy high priority needs and follows a downward premium scale for each successive step down his priority ladder.

In the absence of product discrimination, as is the case of wheat protein, a buyer will procure supplies sufficient for all his needs at one price. It will be that price at which supplies can be obtained to meet his lowest includable priority. Although willing to pay a higher price for higher priority uses, he need not and therefore will not do so.

Sellers also face a schedule of values corresponding to the ladder of priorities when flour is put to use. A relatively large supply of high protein wheat will reach further down on the value in use scale and, to clear the market, will be priced lower than under circumstances in which limited supplies will only satisfy needs of a higher order. All sellers must accept the same price if they are to make a sale because buyers need pay no higher price than that offered by the most willing seller.

Thus, in an open competitive market, wheat protein premiums are established by the lowest use value of any buyer and the retention or reservation price of the most willing seller. Buyers cannot purchase for a lower price and do not need to pay a higher price. Sellers cannot obtain a higher price than the lowest offered by any other seller and need not accept a lower price.

The process is complicated by the fact that the specifications in the order book change from day to day and even from one hour to the next. It is my working hypothesis that combined schedules of individuals are unknown and unknowable by any central agency. Of course, they can be frozen at one spot by a system of allocations, priority, or government order and indeed they are in some countries. No such freeze can hope to optimize the system over time.

Is such a system for the U.S. in the best interest of the people as a whole? Of farmers? Pricing is dynamic in that both demand and supply are constantly changing.

How do marketing boards anticipate the appropriate change in prices? Table 1 gives the largest and smallest premium at Kansas City for selected years. How would a pricing committee of a wheat board know that a premium of 2 cents would clear the market on June 10, 1960, and one month later, 14 cents would be required? Or that in June, 1975, users would pay 69 cents premium and the following August the premium should be only 18 cents to clear the market?

If one quality of wheat is consistently underpriced relative to its use value, supplies soon will be depleted, leaving surpluses of other qualities. Of course, a grain board could establish a system of allocations as a substitute for allocation by price, and it could establish a schedule of prices to which both buyers and sellers could respond. But how would it know when and what size of adjustment would allow individuals within the system to cater best to the demands and tastes of their customers by supplying a variety of products?

It is my belief that there would be traders who could consistently anticipate adjustments government should and eventually would make and would thus avail themselves of high speculative profits when government did actually change price schedules. To learn how monopoly wheat boards deal with this problem would be most instructive.

A similar pricing dilemma exists in pricing for export. The wheat-price spread between Houston and Kansas City changes from time to time. (See Figure 2.) For example, if an exporter with an insufficient supply of wheat is paying demurrage on a ship in harbor, he will bid a higher price than if he is paying charges on wheat in port storage and his ship has been delayed at sea. How will a board respond to such changed situations when it is the individual exporter that is feeling a hurt different from that of other exporters? What kind of decision mechanism could a grain board devise that would allocate wheat to the shipper most in need of a supply? Would licensing provide for survival of the most efficient marketing agencies?

Here is where we can make a fatal error if we aren't careful. Our ignorance on this point may trap us into believing that differences in the Houston-basis changes are some sort of willy-nilly accident and that, consequently, no one understands the reason. We may think the market is in chaos.

But the parties to the transaction understand why the basis changes from time to time. The buyer knows why he was willing to pay higher prices at one time than at another, and the seller knows why he offered at that price. Isn't this enough? As long as buyers and sellers have access to the market, who else needs to know?

Use of Physical Facilities

Measuring efficiency of physical facilities by annual throughput also has logic traps for the unwary. Does the fact that some Great Lakes elevators have a lower turnover in volume-to-capacity ratio than do gulf elevators mean

the Gulf elevators are either better managed or operated with greater efficiency? Does lower turnover at Lake ports suggest the marketing system would do a better job for the country if those elevators were closed?

Likewise, in comparing handling efficiency between countries with different systems, one might conclude that a higher turnover in country A indicated it had a more efficient marketing system than did country B. Does this mean if country B changed its marketing system it would increase rate of elevator turnover? Or could it be that a higher proportion of grain was farm-stored at harvest in country A and that elevators performed more of a handling and concentrating function and less of a longer-term storage function? Comparing Canadian and Australian experience in relation to on-farm storage as affects elevator turnover rates should be interesting in that both operate under a centralized decision system (at least for wheat).

Production Allocations

The U.S. produces five classes of wheat as well as other crops, which compete for the use of land--hard winter wheat vs. grain sorghum; grain sorghum vs. cotton; hard spring wheat vs. barley vs. durum vs. sunflowers; soft winter wheat vs. corn vs. soybeans; and so on.

The use of land and other resources is in response to price and cost signals as interpreted by individual farmers. If the price of one crop is such that it results in relatively higher profits for that crop than for its principal competitors, more resources will be used in its production. Rigidity of relative prices could result in major shifts in acreage to the favored crop, with that crop becoming surplus and other crops in short supply. Would acreage or bushel allotments or bushel marketing quotas be a permanent feature of grain board operations?

If the pricing mechanism is to be relied upon as a principal resource-allocation guide, would a centralized pricing decision by a board likely result in more efficient use of resources than would a dispersed system?

Cost of Operation

Grain producers in most countries receive considerable protection and price support from their governments. The U.S. offers a variety of subsidies including price supports, low-interest storage loans, market promotion, as well as indirect benefits paid from the general treasury.

An important decision will be who is to pay the cost of operating a board. Will farmers or will the general public share these costs? Will its cost be more or less than the marketing margins paying for similar services performed by the present system?

Will facility replacement and repairs be kept current? A board would face the temptation to delay unduly current expenditures in favor of higher immediate prices to producers "until after the election." The same temptation faces individuals in relation to immediate profits. In the latter situation, however, competition for business encourages updating of facilities, whereas a licensed elevator with a rigid market share has somewhat less incentive to modernize.

Executive Control

Some proponents of a grain board apparently assume it would price and market grain for the exclusive, or nearly exclusive, benefit of producers. That implies control by producers. Authorization of such economic power would break precedence. If control were vested in producers, which producers? Would a wheat board be dominated by growers of hard red winter? Would livestock feeders have a voice on a corn board?

A more likely prospect would be a government board appointed by the President, especially if crop loans, target prices, facility loans, etc. were paid from the general fund. Given the political balance of power, is it reasonable to assume "farm oriented" decisions from such a board? Many farmers accuse government of favoring consumer interests over farmer interests. Would those farmers peacefully more readily accept a grain board decision? Would not such a board make it easier for the government to favor consumers; or to use grain as an instrument of economic pressure applied selectively to foreign exports (grain embargoes have been applied by the last three presidents)?

Corruption and Deception

What about corruption? What about deception, coverup of errors, fraud, and favoritism? These questions may be considered indelicate by some and seldom if ever are raised by economists when legislation is considered. Yet, who can deny that centralized control of the marketing of U.S. grain would provide unique opportunities and powerful temptations for corruption?

One constantly is reminded that laws are enacted, policies are established, and bureaus of the government are operated by human beings. The integrity of these human beings who make government decisions is no better or worse than that of anyone else. They are not endowed with divine infallibility. We must banish any thoughts that these officials are motivated solely by public interest.

How are temptations to use economic power for narrow and selfish gains curbed under market and collective systems? Which system more likely will better serve the public good?

Consider that when private traders deal with each other, the system is to a considerable degree self-policing. When traders begin dealing with the government, there will be temptations--the resistance of which, as the record of recent years shows, won't be very promising.

For example, for the past dozen years there has been a noticeable trend toward suppression of USDA reports that do not support administrative positions. Federal policies more and more determine the published results of research rather than the other way around. The integrity of internal analysis of USDA programs has always been a battle between action agency officials and scientists.

Would censorship of reports by a grain board be exercised in reports to the public? Would favoritism, political payoff, bribery be covered up? Reflect for a moment on the New Orleans grain-grading scandals. On Watergate, Korea AID purchases, Abscam.

Pool or Buy/Sell

How would a wheat board distribute to each farmer the correct proportion of net receipts from sales? Would it distribute receipts from a pool (or pools) or conduct a buy/sell operation? For example, consider deductions for transportation charges. When, each season, all the grain from a given district consistently moves from farm to market in well-defined channels, as does wheat in Australia, deductions for transportation can be rather straightforward. If your local delivery point is 50 cents per bushel to port or mill, a charge of 50 cents can be deducted from the average sales price. If your farm is 25 cents from port, this sum can be deducted.

But how would calculations be made in the U.S. when wheat produced in a given locality (the Pacific Northwest excepted) usually moves in all directions sometime during a marketing season? Do you establish artificial zones and charge each zone the same each year, irrespective of the ultimate destination of wheat from each zone?

Suppose that within one freight zone in Kansas, wheat in a given community is of superior milling quality and is transported, say, 50 miles to a flour mill; whereas, wheat produced in an adjoining coummunity is of an inferior quality and is transported 800 miles to port of export. We can see that producers of superior wheat deserve to receive a premium for quality plus benefiting from a lower freight bill. Obviously a flat zone-rate deduction would not differentiate.

If a board conducted a buy/sell operation, would each producer be provided equal opportunity to sell? Suppose one influential board member favored proportionately larger sales of hard red winter wheat so that the carryover stocks of hard spring wheat became disproportionately large. Would spring wheat growers be left without a fair share of the market? (What is a fair share?) Would the buildup in supply later result in fire-sale price cuts of hard spring so as to clear the market? Would the hard spring producers complain? Would they attempt to cut prices in a black market?

A complete description of alternative operational procedures involved in centralized control of U.S. Grain Marketing would be highly instinctive. Architects develop blueprints to show what they are proposing. Inventors develop working models. The U.S. cannot wisely decide whether or not to centralize grain marketing without a good understanding of what this system would look like and how it would perform. Their job remains to be done.

Table 1.--Wheat: Difference between low price for ordinary and low price for 13.0 percent premium at Kansas City.

Calendar year	High for year	Dates(s)	Low for year	Date(s)
1960	+14	7/8-12	+ 2	6/10
1961	+20	7/12	+ 4	1/27-2/9, 3/10-3/29
1962	+18	8/3, 8/23-24	+ 8	12/27-31
1963	+13	2/4-20, 6/25	+ 3	12/10-31
1964	+ 6	7/8-10	0	3/18
1965	+17	7/2-8	+ 1	1/4-2/5, 3/18-23
1966	+10	6/1	+ 2	7/20-8/18, 12/8-22
1967	+ 5	5/10-6/12, 11/10-13	+ 2	3/2-6, 4/4-5/2, 8/22-9/8, 12/1-12/29
1968	+22	10/14-17	+ 1	2/17-29, 3/18-4/5
1969	+35	7/11-15	+16	2/25-3/3
1970	+24	1/5-22	+ 8	10/19-30
1971	+18	1/4	+ 4	8/24-9/9
1972	+15	6/28	0	12/14-15
1973	+23	8/15	0	1/10, 3/1, 8/30, 9/13, 11/2, 12/26
1974	+60	9/16	0	1/7, 1/30
1975	+69	6/23-27	+18	8/25
1976	+48	4/20	+18	8/16-17
1977	+31	6/7-10	+ 1	10/18
1978	+22	4/17-24	0	9/27-10/10, 10/25-12/11

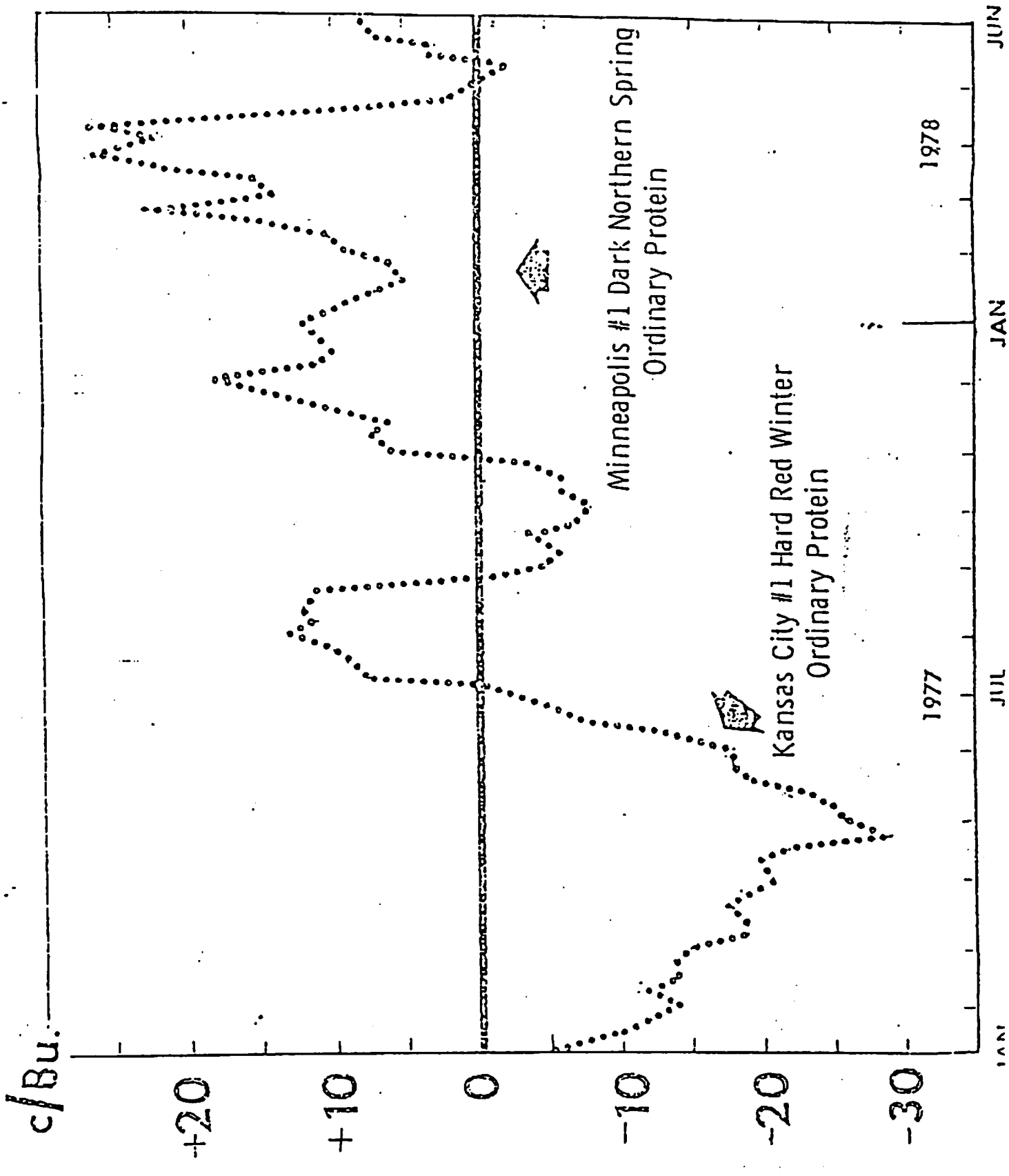
c/Bu.
+20
+10
0
-10
-20
-30
Minneapolis #1 Dark Northern Spring
Ordinary Protein
Kansas City #1 Hard Red Winter
Ordinary Protein
1977
1978
JUL
JAN
JUN

Figure 1.

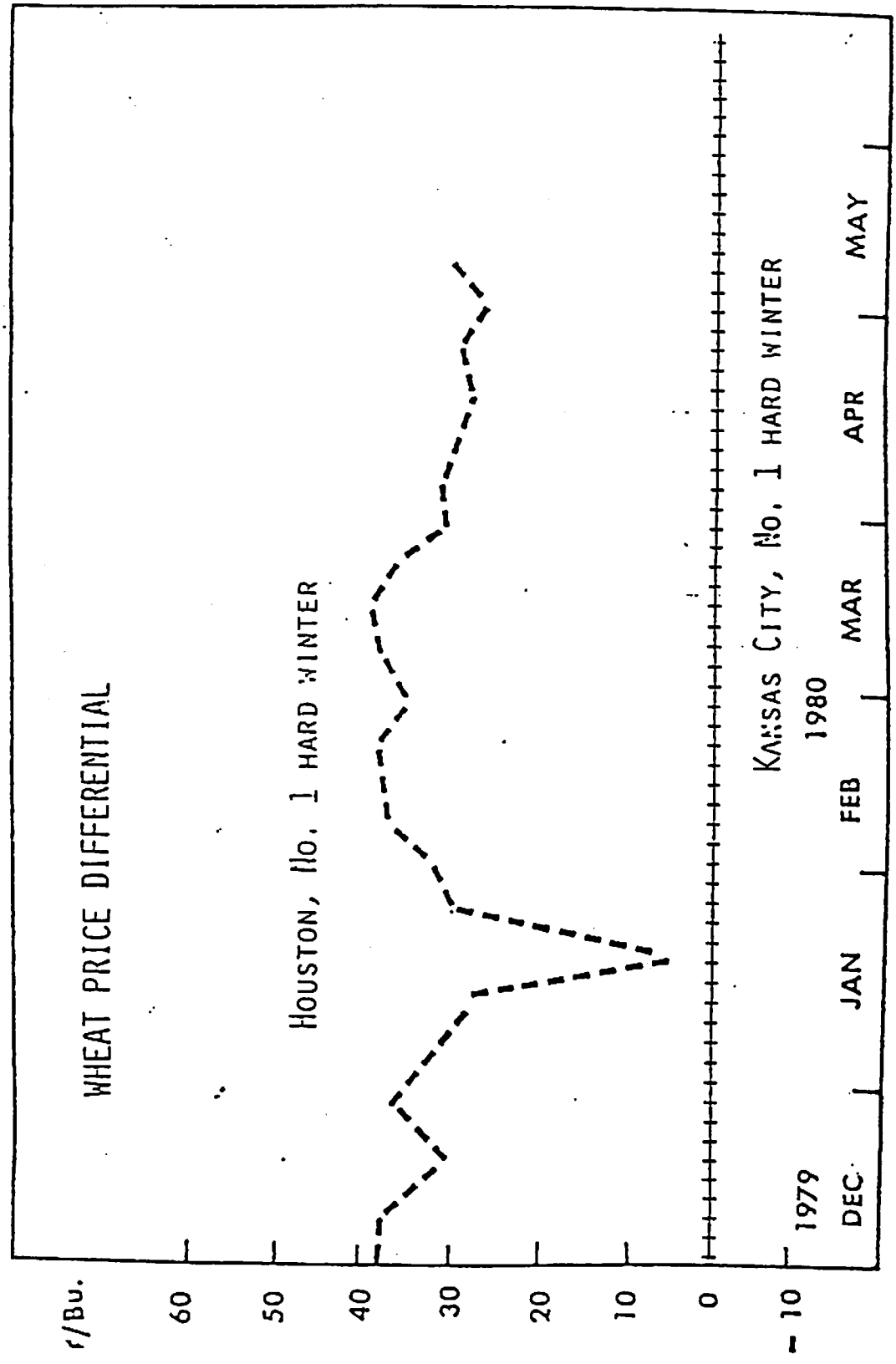
WHEAT PRICE DIFFERENTIAL
HOUSTON, NO. 1 HARD WINTER
KANSAS CITY, NO. 1 HARD WINTER
¢/Bu.
60
50
40
30
20
10
0
- 10
1979
DEC
JAN
FEB
MAR
APR
MAY
1980

Figure 2.

DISCUSSION

E. W. Tyrchniewicz*

The objective of this symposium is to focus on methodological problems in evaluating the performance of grain marketing systems. All five papers raised some methodological issues, either directly or illustratively through empirical analysis. To varying degrees, all of the papers tended to overemphasize the descriptive aspects of the various grain marketing systems. The following are a number of general observations which may be useful for agricultural economists who undertake the analysis of the performance of grain marketing systems.

In general, all of the authors appear to have a latent (perhaps even blatant!) fear of centralized or board marketing of grain. From an analytical standpoint one has to raise the question: to what extent might this underlying value judgement influence the evaluation criteria for export market performance? A related point raised by Wilson and Anderson needs to be stressed here--that concentration on any subset of performance indicators implies a value judgement regarding their importance.

Cook and Wilson make the point that the real issue in evaluating export market performance is not one of Board versus non-Board marketing of grain. Rather, it is the economic policy environment and the objective function which related institutions are attempting to optimize. They illustrate their point very well with the situation in Argentina, where different political regimes have brought about different institutional frameworks. Another example is the environment in which the Canadian Wheat Board operates. Any evaluation of the Canadian Wheat Board should take account not only of the current policy environment in Canadian agriculture but also of the socio-economic circumstances which gave rise to the establishment of the Canadian Wheat Board as well as the general economic policy environment within Canada.

Wilson and Anderson raise the issue of causality. If differences in the performance of two grain marketing systems are detected, they may not necessarily be attributable in the operation of a particular organization. For example, the efficient marketing of Canadian grain has been hampered by grain transportation bottlenecks. Many of these bottlenecks stem from the unremunerative statutory freight rates on grain--a policy over which neither the Canadian Wheat Board nor the grain merchandising firms have any control.

What is the "correct" approach to evaluating the export market performance for grain? Each of the papers presented in this symposium illustrates one or more performance indicators; however, each such indicator has its shortcomings, particularly when considered individually. Perhaps the approach suggested by Cook in the Australian case has the most potential. Starting with five performance criteria, 27 conceptual performance measures, and more than 50 operational performance methods, he suggests a disaggregated welfare analysis where gainers and losers are explicitly identified. Such an approach would place relatively more emphasis on welfare analysis and rigorous descriptive techniques, and relatively less emphasis on partial sophisticated inferential statistics and "big models." This type of approach might even make agricultural economists more readily understood by policy makers!

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DISCUSSION

by Alex F. McCalla*

General Comments: The relationship between market structure and market performance has bedeviled economists and agricultural economists for at least a generation. The focus of this session was to be methodology and the testing of that methodology. Unfortunately, the papers presented today offer us little that is new in this regard.

The Dahl and Thompson paper and the Wilson and Anderson paper apply fragmented statistical tests which do not give us an aggregate performance measure. The two papers, Rosson and Cook and Cook and Wilson, offer some methodological possibilities but stop far short of helping us decide which of the multiplicity of possible performance indicators we should choose. Further, they offer us no help in aggregating multiattribute performance indicators.

The Schruben paper offers us no help at all. Finally, policy makers would not derive much more help as to how to go ahead with policy decisions than if they had not read the papers.

Specific Comments: I now turn to specific comments on each of the papers.

The Dahl and Thompson paper attempts to measure spatial price efficiency in the U.S. corn market, including whether transportation prices are efficient. It does not allow the conclusion that the price formation mechanism in the U.S. market is competitive. Spatial, and in fact time, pricing efficency in a market based on central market price formation (a basis pricing system) is consistent with competitive markets, oligopolistic markets, and monopolistic markets. Thus they overdraw their conclusions.

The other variables discussed are not tested. The paper contains some conjectures as to why economies of scale may exist but nothing more. The major point raised is in regard to the role of information.

The Wilson and Anderson paper deals with the Canadian grain marketing system. It contains a description of the role of the Canadian Wheat Board which is largely accurate. The remainder of the paper is devoted to some partial statistical tests which, in general, show no significant differences in performance between the U.S. and Canadian systems. Again they raise the issue of the Crows Rates arguing somehow that prices actually received by Canadian producers should be reduced by rate difference. The bottom line is actual prices received by producers which they find over the long term not significantly different. But they avoid the real question which is relative profitability of producing wheat in the two countries.

The Rosson and Cook and Cook and Wilson papers have a much broader focus than the two already discussed. Those papers had a limited view of the grain marketing system which includes the physical handling system and the pricing system. These papers involving Cook attempt to define the marketing systems of Australia and Argentina in much broader contexts, and this is a positive approach. The papers contain very good descriptions of both marketing systems and this, in itself, is useful. But when they come to performance indicators

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they have a long way to go. The real difficulty is in selecting and measuring criteria. To be fair it should be noted that these papers are more in the form of research proposals than reports of finished research results.

Schruben's paper is essentially a series of questions. The questions suggest that it is Schruben's view that markets are efficient and Boards cannot be. He seems to be saying that public sector managers are potentially corrupt while the market (and by implication, private sector managers) are better if not perfect. He fails to recognize that markets are made up of people also. My view is that both sets are potentially corruptable.

But the basic deficiency of the paper is that it presents a series of philosophical views which he no doubt believes in, but they have no place in objective analysis. On the other hand, we should recognize that in the absence of solid analysis, philosophical views will be very influential in the decision arena.

Research Questions: I would like to close with some research questions raised by the papers. First, is comparative analysis useful? The partial statistical approaches attempted here seem to show no significant differences. Second, does the study of indicators without looking at the policy environment in which they exist make sense? Third, what is the validity of the Cook, et al., assertion that rigorous descriptive techniques (I would add the word comprehensive) are superior to fragmented statistical measures? Fourth, there still remains the basic problem. If we have a set of performance criteria that capture the complexity of real markets, how do we measure them and aggregate them to get a comprehensive performance measure?