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Selective Responses To Risk In Purchasing Grain;
Do Patron and Investor Owned Firms Differ?

by
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writing is easy; all you do is sit staring at a blank sheet of paper until the drops of blood form on your forehead.

Gene Fowler

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CHAPTER 1

INTRODUCTION

The proportion of income that United States' consumers spend on food is low relative to some other countries with \$.75 of every 1985 food dollar going toward marketing.¹ As the farm value share of the consumers' food dollar decreases, the question of increasing efficiency through improved coordination of the food marketing system becomes more important to the economy, and its participants. Within the proportional breakdown between farm level and consumer price is the fact that as the source of the food purchased shifts from animal to crop production the farm value share of the retail price declines (i.e. from 65% in eggs to 10% in white bread).²

In the grain subsector the first handler level in the marketing system has always played an important role in the marketplace. This is due, in large part, to the first-handler grain firm's access to marketable volumes of grain of varying quality, as well as the ability to acquire and utilize diverse sources of market information. Over time the functional organization of the firms has changed through an identifiable

splitting of the grain industry from fairly homogenous processor/merchandisers into two distinct systems, each with a separate function within the firm.³ One system provides the physical processes of handling, conditioning, storing, and transporting the grain crop. While the other, the exchange system, which may or may not be located on site with the physical system, is concerned with establishing a price with respect to considerations of quality, time, and place for delivery of the commodity.

How risk is proportioned between economic agents is important to the economy as a whole, as Arrow has pointed out, "...it is profitable for all concerned that risks be shifted to the agency best able to bear them through its wealth and its ability to pool risks."⁴ Conducting business in the grain industry involves risk to the financial viability of the firm. The degree of risk faced by a firm varies according to its ability to absorb or shift some of the risk to others. In the exchange of grain between farmers and firms at the first handler level of the marketing system, the outright advantage in market power lies with the firm (ignoring the influence patron/owners have on the actions of a cooperative firm). Arrangements that these grain firms might undertake to manage the risk inherent in the exchange of grain are the object of concern in this study.

Apart from the general economy, the farm level of the grain subsector has several specific interests in how well grain firms manage their business risk. First, farmers deal with

first-handlers from a position of inferior relative strength in the marketplace. To a large degree the price a firm offers to farmers for their grain is determined by the considered risk the firm faces in the grain trade. Under the usual conditions farmers are price takers in the marketplace, accepting or rejecting the grain prices offered by the firms. While at times these posted prices may be significantly different between firms, over the course of the marketing year grain prices show a tendency to converge.⁵ The costs of handling grain should even out among competing firms given the relatively flat long run average cost curve characteristic of grain marketing firms.⁶ Therefore, an elevator that does a good job of handling risk should enable its farm customer to obtain the best grain marketing program over time.

A second reason for farmers to be concerned with the attitude first-handler firms take toward risk is the level of unforeseen risk faced in the operation of their own business enterprise. In the event of a first-handler firm bankruptcy the farmer generally bears the brunt of the cost. From 1974 to 1979 an estimated \$21 million was lost in the United States due to the bankruptcy of grain elevators, of this total 90% of the loss was absorbed by farmers, and the remaining 10% was borne by banks or other grain firms.⁷ Successful risk management enables a firm to remain a "going concern" in the grain trade, greatly reducing the probability of bankruptcy, with the losses that would be borne by others. In short, the financial impact of risk and its management

by first-handler grain firms is important to farm level participants in the grain subsector, the food marketing system, as well as the economy as a whole.

Both cooperative and proprietary firms play important and interdependent roles in the grain subsector. During the 1982 marketing year local patron owned firms represented approximately 31% of the total off farm storage in the United States, while they handled roughly 41% of the off farm sales of the 1982 United States grain crop.⁸ Of this grain marketed by local cooperatives 39% was sold to non-cooperative firms.⁹ The mutual role played by patron and investor owned firms prompts questions concerning possible differences between them in the market behavior.

Cooperative theory suggests that there are fundamental differences between the two types of organizations.¹⁰ In addition, survey work at Purdue indicates that managers of patron owned and proprietary firms have different relative rankings among a list of operational goals. Managers of investor owned firms put greater stress on maximizing the return on investment, while cooperatives rank assuring farmers a market for their product and a source of inputs significantly higher than proprietary firm managers.¹¹ The notion has been expressed that a grain firms continued solvency and competitive position is due more to its managerial and operational capability, than to its form of ownership (patron versus investor owned).¹² There has been very little comparative exploration into the risk handling practices of patron and investor owned grain firms; an area where differences

could be exploited to improve coordination of the grain marketing system.

PURPOSE OF THE STUDY:

The broad purpose of this study is to compare patron owned with investor owned firms in terms of the arrangements they make to cope with the risk inherent in the exchange of grain between Michigan farmers and the first-handler grain firms that serve them. Focus will be upon possible distinctions between cooperative and proprietary firms within three specific areas of concern. These areas are: (1) the pricing of grain (2) the methods of exchange firms offer to their farm customers (3) the terms and conditions of grain purchase contracts.

The foundation of this study consists of three separate pieces of research work published in the literature of agricultural economics. First, a study by Richard Helfner, and others, published by the U.S.D.A. as Agricultural Economics Report No. 386, titled The U.S. Cash Grain Trade in 1974: Participants, Transactions, And Information Sources. Second, Grain Pricing, by John Helmuth, published as Economic Bulletin No. 1 by the Commodity Futures Trading Commission in 1977. Third, work done by a number of people associated with the Purdue University Agricultural Experiment Station, published throughout the first half of the 1980's.

The study by Heifner, et. al. was designed to assemble a broadbased view of how the United States grain industry conducts its business, as well as factors in the commercial environment that in 1974 impacted on commerce in the grain subsector. Their work examined the exchange of grain by firms in the grain subsector, focusing upon questions of to and from whom, when, how often, and what quantity of grain was involved in the transactions of the grain firms. In addition, there was an effort to determine the usefulness and relative importance to firms in the grain industry of different sources of information about grain market conditions. The usefulness of Heifner, et.al. to this paper was its overview of the U.S. grain trade, that overview served to distinguish some parameters to guide this study of the Michigan grain trade.

One of the coauthors of the study by Heifner, et. al., John Helmuth, has examined in some detail the way U.S. grain prices are determined and used in the U.S grain industry. Helmuth's study revealed that futures markets are a primary focal point for the "market" price of U.S. grain. Futures prices, represent a global market value,¹³ which serve as benchmark prices modified by grain firms in accordance with their local marketplace environment, before being offered to the farm level by first handler firms.¹⁴ In addition, Helmuth found that country elevators, and subterminals acting as first handler firms, have two important pricing functions in the grain subsector. The first is posting a farm level price for grain reflecting the

relationship between supply and demand conditions in the firm's market area, as well as conditions in the worldwide grain markets.¹⁵ The second is to provide consistent pricing, and smooth movement of grain from the farm producers to the second level assembly stage of the marketing chain.¹⁶

The work coming out of the Purdue University Agricultural Experiment Station was an attempt to determine the impact that form of ownership has upon the performance of agribusiness firms. Similar to this study, considerable emphasis was placed on the comparative performance of patron versus investor owned enterprises at the first handler level of the U.S. food marketing system. The Purdue research on the grain subsector of the food marketing system placed primary emphasis upon performance dimensions related to physical plant characteristics, and financial indicators of the condition of first-handler grain firms. Up to this point their work has largely concluded that there is a greater expected difference than statistically significant difference in the performance of cooperatives and proprietary agribusiness firms.¹⁷ Two findings in a Ph.D. Dissertation published at Purdue directly relate to the objectives of this study. First, there are significant differences between grain firms of a particular state, or region with similar types of agricultural conditions, and grain firms operating in other states or regions.¹⁸ Second, while the similarities outnumbered the differences there were some significant distinctions between patron and investor owned grain

firms in the grain purchasing practices of firms operating in Indiana, Illinois, Iowa, and Kansas.¹⁹

SOURCES OF INFORMATION:

Information incorporated into this study was obtained using five different methods. The first procedure was a series of interviews conducted over the telephone or in person. These interviews provided insight into the personal concerns and viewpoints of some managers and grain merchandisers of firms serving Michigan farmers. The role of those interviewed, as an agent between the sellers to and buyers of grain from the first-handler firm, has an impact on the degree of risk the firm faces in its operation. Statements expressed in the interviews provided an intuitive "picture" of the orientation that first-handler firms have toward business risk and farm-firm relationships. The information assembled from the interviews formed a backdrop for gathering and interpreting information from the other sources.

The second step of the research was a survey mailed to a cluster sample of first-handler grain firms drawn from the membership of the Michigan Agri-Dealers Association.²⁰ From their 1987 Annual Directory a list of 76 firms were identified as the sample group. Each of the 76 firms were mailed a questionnaire (see Appendix A and B) 53 of the forms were returned yielding 51

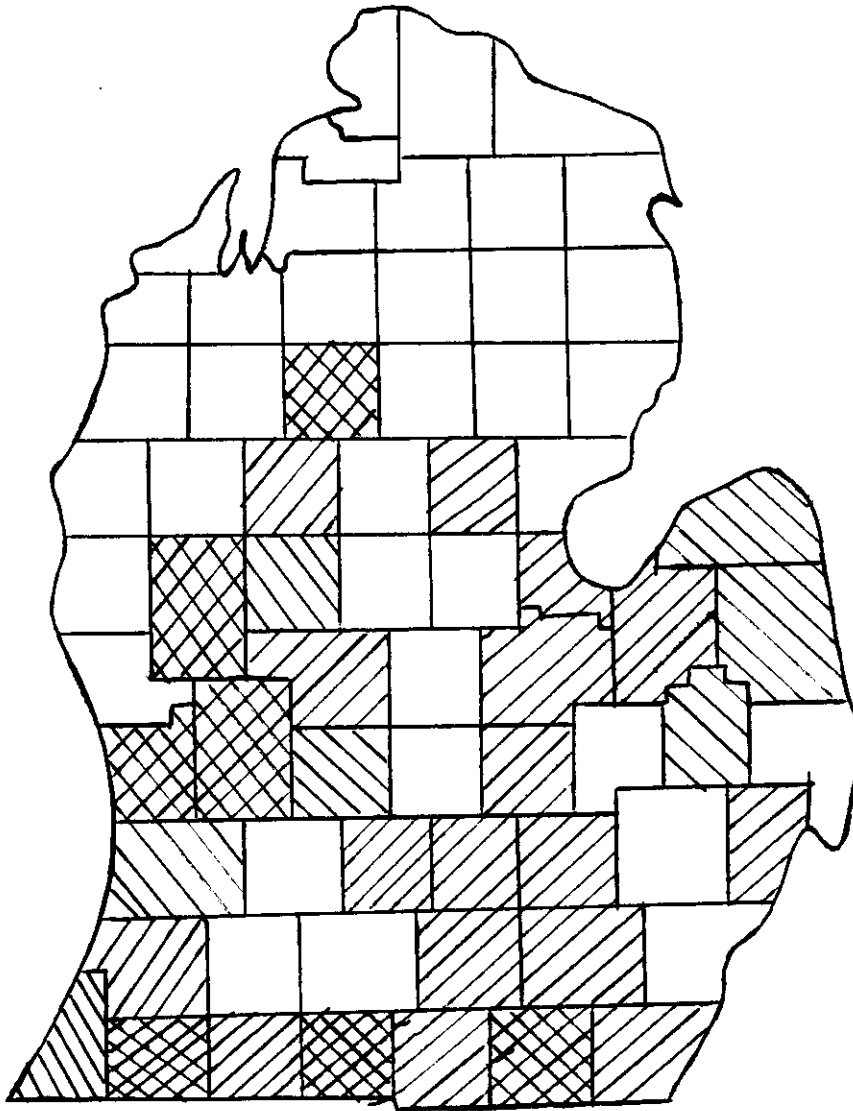
responses that were all or in part usable, 30 from proprietary firms and 21 from cooperatives (see Figure 1-1 for the location of responding firms). The investor owned firms were primarily incorporated enterprises, only four firms identified themselves as unincorporated single owner or partnerships. The patron owned firms were only required to identify themselves as cooperatives, omitting any categorical distinction other than investor or patron owned in the survey responses.²¹

This survey aimed at accumulating two distinct sets of information. The first is the pattern of grain sales and purchases by first handlers in Michigan. The second dealt with the perception first-handler firms have of their role in the grain marketing decisions of potential farm customers. Potential in the sense that while they may not currently patronize the firm, they are located within a market area to which the firm could provide service. Not all of the survey information was used in this report.

The data from the survey has a different nature than the information gathered through the interviews. Responses to interview questions are subject to some bias (perhaps unconsciously) as a result of how the respondent feels they "should" reply to the question. Putting aside the issue of anonymity, responses to survey questions are focused to a greater extent, and while not perfectly objective they do incorporate less situational (environmental) bias than answers to similar questions asked in an interview setting. The information gained from the

Figure 1-1

Map of Survey Respondents



Ownership Structure of Responding Firms



Investor Owned Firms Only



Patron Owned Firms Only



Investor and Patron Owned Firms

survey provides a fairly objective view of the practices in the Michigan elevator industry at a point in time.

The third source of insight for this project are the grain purchase contracts offered to farmers by proprietary and cooperative firms. These contracts are an explicit source of information about the level and location of risk a particular firm chooses to accept in contractual commitments with its customers. The terms and conditions that the contracts impose on a transaction may serve to reflect distinctions between patron and investor owned firms in allocating risk in the exchange of grain.

The fourth and fifth sources of information utilized in this project were records of grain prices. A primary source of price information used in this study were two sets of published statistics, one set was published by the Chicago Board of Trade, the other by the Michigan Agricultural Reporting Service. The information from the Board of Trade involved records of the price of corn futures contracts, as well as Chicago and Toledo cash corn prices from the years 1984 and 1985. Records of grain prices received by Michigan farmers were obtained from the Michigan Agricultural Statistics annual covering the 1984 and 1985 marketing years.

In addition to the published price statistics, unpublished records of daily "cash" prices posted by several Michigan country elevators were obtained. These records contain the grain prices offered to farmers by one cooperative and two investor owned firms, one in and one out of the cooperative's immediate market

are.²² In each case these price statistics represent individual recordkeeping practice, not records of the firm, because of this they are not a continuous record for the given year, reflecting the periodic illness and vacation time of the recorder.

As far as possible information gathered through the survey and interview process considered grain as a catch all commodity category, with no distinction drawn between the variety of grains handled by the sample of first-handler firms. Soybeans were also accepted as grains in responses received from the firms, however, due to the "specialty" nature of the crop, replies concerning other beans (specifically navy beans) were excluded from the survey and interview responses. When examining price relationships differences in the individual grain markets must be recognized. Wheat, soybeans, and corn were all considered for the price analysis section of this study. Corn was selected as the most suitable due to its character as a fairly homogenous good with widespread marketing options, creating a highly liquid marketplace.

HYPOTHESIS:

In establishing a testable hypothesis for this project there are two identifiable paths that could have been followed. The first extends from organization theory, and is based upon theoretical distinctions between patron and investor owned firms

This approach contends the two types of organizations will exhibit different behavior in the marketplace. The second path is founded on the market structure characteristics of the grain industry. This approach asserts there is an insignificant difference between the behavior of cooperative and proprietary first-handler grain firms. This section will briefly discuss each of these approaches, then select the null hypothesis to be used throughout this study.

Investor owned firms are organized around the interests, and financial gain of the parties providing funds for the firm's formation and/or operation. In other words, proprietary firms impose financial risk, and bestow financial benefits on parties in relation to the capital they have put in control of the enterprise. In contrast patron owned firms may be defined as,

...a voluntary contractual organization of persons having a mutual ownership interest in providing themselves needed service(s) on a nonprofit basis. It is usually organized as a legal entity to accomplish an economic objective through joint participation of its members. In a cooperative the investment and operational risks, benefits gained, or losses incurred are shared equitably by its members in proportion to their use of the cooperative's services. A cooperative is democratically controlled by its members on the basis of their status as member-users and not as investors in the capital structure of the cooperative.²³

Abstracting from this definition the U.S.D.A. Agricultural Cooperative Service has identified four "Principles of a Farmer Cooperative": (1) cooperatives are owned and democratically controlled by those who use their services (2) net margins are distributed to users in proportion to their use of the cooperative

(3) the returns on investment are limited (4) cooperatives are financed substantially by those who use their services.²⁴ The basic criteria governing the distribution of financial gains from a cooperative is use of the firm's resources. This represents a fundamental distinction between patron, and investor owned firms which distribute financial gains according to the level of capital parties have in the enterprise.

In light of that important distinction between cooperative and proprietary firms effort has gone into developing a "Theory of the Cooperative Firm". The literature reporting developments in this theory represents ongoing work throughout this century.²⁵ Central to that work has been an attempt to identify and quantify behavioral patterns of patron owned firms, distinct from investor owned enterprises. In summing up the theoretical distinction drawn out in the Helmberger-Hoos model²⁶ Knutson writes, "...while the cooperative strives to maximize the return to its member-patrons, the corporation, in the process of maximizing its profit, strives to minimize returns to its patrons."²⁷ Looking at empirical work on cooperative finance Knutson phrases the behavioral distinction in another way, "The only essential difference between the cooperative and the noncooperative is that the noncooperative maximizes its profits while the cooperative maximizes its savings."²⁸

These two statements by Knutson reflect the orientation of a cooperative toward improving the income of its patron-owners. While income is not restricted to financial terms, with marketing

cooperatives the goal of higher income is largely sought through increases in the price paid to farmers for their products. Those prices might be raised simply by a cooperative firm entering a market area and expanding competition for grain in that marketplace.²⁹ Where grain prices are already at a competitive level a cooperative might serve to counter economies of scale in physical or fiscal size that disadvantage farmers, providing another source (or set) of services to farmers in a community. The alternatives provided by a patron owned firm could be an important source of "income" to its patron owners that would not be available through a proprietary firm.

Price and income considerations aside, patron owned firms may structure grain purchases from farmers in a different manner than proprietary firms. John Staatz has expressed the idea that due to asset fixity and possible opportunistic behavior by first-handler firms in the exchange of grain cooperatives may deal with farmers in a different way than investor owned firms.³⁰ One important distinction between the two types of firms could be in the use of contracts to purchase grain from farmers. For both the firm and farmer exchange through grain contracts involves greater risk than cash/spot transactions. The degree of risk in grain contracting combined with the disparate ownership structure may produce different contracting behavior by patron and investor owned firms.

The relationship between the cooperative and its patron-owners introduces two aspects of cooperative firm grain

contracting that may not exist between proprietary firms and their farm customers.³¹ First, in a cooperative firm the potential for a patronage refund means that the final terms of a grain purchase are not known to the farmer until after the exchange is made. Second, the relationship between a cooperative and its patron-owners may be conducive to less formal contractual arrangements than used by proprietary firms in purchasing grain.³² That flexibility in contracting behavior arises from the mutual interdependence of interests between the cooperative and its customers, as owners of the firm and user of the firm's services. The result of those two aspects of a cooperative grain firm's farm level contracting is a transaction with terms and conditions contingent upon future actions that are yet to be realized when the contract is entered.

The central issue of this study is; is there a distinction in the risk handling procedures of patron and investor owned first-handler grain firms, and if so what is it? Following the approach just outlined leads to the hypothesis that behavior of patron and investor owned firms in the marketplace is different.

A different approach places first-handler grain firms in a "contestable" market structure, and develops behavioral hypotheses that account for the implications of that type of market. Supporting this line of thought Caves and Pugel declare,

The grain trade shows some traits of a "contestable" market, in which actual sellers are few but exposed to displacement by entrants. Scale economies in the industry rest on fixed facilities (such as terminal elevators) that can be easily transferred between firms, and on administrative networks for organizing and using information, that represent little durable, fixed investment.³³

In addition, they believe because firms act as both buyers and sellers of grain their short run interests diverge,³⁴ and that grain firms behave as "price takers" in the marketplace.³⁵ Given contestable market conditions in the grain industry there is reason to believe that grain firms react to risk in much the same way, regardless of the ownership structure.

Lending empirical support to this position, research at Purdue indicates that approximately 60% of grain purchases by grain and farm supply firms in Indiana, Illinois, Iowa, and Kansas were made on a cash basis.³⁶ Furthermore, their results indicated that "In no case was there a statistically significant difference between the way cooperative and proprietary firm managers purchased their grain."³⁷ Following the market structure approach leads to the hypothesis that there is no difference between the risk handling behavior of cooperatives and proprietary grain firms.

Acknowledging that each position contains valid arguments for its case, does not absolve this writer from the need to declare a null hypothesis for the statistical procedures in this study. This study will operate under a null hypothesis of no difference between cooperative and proprietary first handler level grain firms in handling the risk inherent in the exchange of grain

between the farmer and the firm. Therefore, the alternative hypothesis will be that there is a difference between patron and investor owned first-handler grain firms in the arrangements made to cope with risk in grain transactions.

Statistical tests of the hypothesis will at the .05 level of significance. That level has been chosen due to its quality as a "focal point" in the literature of agricultural economics. In most cases, where the null hypothesis fails to be rejected at the .05 level, the significance level for rejection will be reported in the body of this study. The t tests were performed for two tail tests, while the Chi Square and F ratios were one tailed tests.

PLAN OF THE STUDY:

This chapter has introduced the importance of risk management to some key participants in the United States food system. In addition, the groundwork of this study has been laid, outlining the participants, objectives, data sources, and null hypothesis the following chapters will use to explore the comparative risk handling practices of first handler level cooperative and proprietary grain firms.

Chapter Two performs an analysis of price as an instrument of risk management by the grain firm. That analysis is undertaken through a focus on three specific topics. First, a look at the

role of futures markets in grain pricing. The second topic of Chapter Two is hedging in the grain markets. Hedging is examined in light of its effect on risk, as well as the frequency which the sampled firms use it in their operations. The third area is an examination of corn prices offered in several different markets. This section of the chapter compares prices for No. 2 yellow corn posted by several patron and investor owned country elevators in mid-Michigan, the average corn price received by farmers throughout the State of Michigan, as well as the corn prices established in the Toledo and Chicago grain markets.

Chapter Three discusses the exchange mechanisms that have developed to facilitate, and coordinate the movement of grain from the farm to the first handler level of the marketing system. The exchange mechanisms are dealt with in relation to six fundamentally different categories of grain transactions between a farmer and grain firm: (1) cash sales (2) forward delivery contracts (3) futures market based contracts (4) options market based contracts (5) delayed pricing agreements (6) government programs. Within each general category there are several different, more specific arrangements that are defined and discussed in terms of their operation. As well as the impact of each category on risk in the exchange of grain between the farmer and firm. This chapter concludes with a comparative look at the pattern of grain purchases and sales between the cooperative and investor owned firms that responded to the survey distributed for this study.

Chapter Four focuses upon the explicit terms and conditions contained in the grain contracts that firms offer to their customers. The chapter begins with an overview of the importance of contracting by firms in purchasing grain from farmers. The bulk of the chapter deals with a comparative study of ten contracts offered by a sample group of cooperative and proprietary firms. Thirteen different clauses are identified in the sample group of contracts, followed by a discussion of the impact they have on risk in the contractual relationship.

Chapter Five discusses three different topics beginning with a summary of the results of this study, followed by the author's conclusions drawn from those results. The third subject points out several issues arising from this project that deserve greater attention for future research.

NOTES

- 1 U. S. Department of Agriculture, 1986 Agricultural Chartbook Agriculture Handbook No. 663 (November 1986), p. 54.
- 2 Ibid., p. 53.
- 3 R. G. Heifner et al., The U. S. Cash Grain Trade in 1974: Participants, Transactions, and Information Sources U.S.D.A., Economic Research Service, Agricultural Economic Report No. 386 (September 1977), p. 1.
- 4 K. J. Arrow, Aspects of the Theory of Risk Bearing (Helsinki: Yrjo Jahnsson Foundation, 1965), p. 48.
- 5 L. Davis and L. Hill, "Spatial Price Differentials for Corn Among Illinois County Elevators" American Journal of Agricultural Economics 56 (February 1974), p. 143.
- 6 R. C. Keen, "Comparative Performance of Cooperative and Proprietary Grain and Farm Supply Firms" Ph. D. Dissertation, Purdue University, (1985), p. 282.
- 7 J. W. Siebert, "An Early Warning Model for Grain Elevator Bankruptcy" American Journal of Agricultural Economics 65 (August 1983), p. 563.
- 8 C. L. Hunley, Marketing and Transportation of Grain By Local Cooperatives U. S. D. A., Agricultural Cooperative Service, Research Report No. 47 (March 1985), p. 3.
- 9 Ibid., p. 5.
- 10 P. Helmberger and S. Hoos, "Cooperative Enterprise and Organization Theory" Journal of Farm Economics 44 (May 1962), pp. 275-290.
- 11 E. M. Babb and R. C. Keen, Performance of Midwest Cooperative and Proprietary Grain and Farm Supply Firms Purdue University Agricultural Experiment Station, Research Bulletin No. 366 (March 1982), p. 14.
- 12 See for example; Garoyan, 1983; Keen, 1985; Rhodes, 1983.
- 13 J. Helmuth, Grain Pricing Washington D.C.: Commodity Futures Trading Commission, Economic Bulletin No. 1, (September 1977), p. 9.
- 14 Ibid., p. 10.
- 15 Ibid., p. 41.
- 16 Ibid., p. 14.
- 17 L. F. Schrader et al., Cooperative and Proprietary Agribusinesses: Comparison of Performance Purdue University Agricultural Experiment Station, Research Bulletin No. 982 (April 1985).

18 Keen, op cit., p. 122.

19 Ibid., p. 135.

20 Based upon Cochran's statement that when "...faced with a choice between different sampling units, the guiding rule is to try to select the one that returns the greatest precision for the available resources." in G.W. Snedecor, Statistical Methods Applied to Experiments in Agriculture and Biology (Ames IA: Iowa State University Press, 1956), p. 496. The author felt that a cluster sample of the main offices of first-handler grain firms, with several branch offices important to the Michigan marketplace, would obtain the best estimate of industry-wide practices of first-handler grain firms in Michigan. The surveyed firms were selected according to the following criteria; the business is centered around the purchase of grain from Michigan farmers; listed member of M.A.D.A. in 1987; storage capacity was listed in the Annual Directory of the Association; the firm was not contacted in some other way for this project.

21 The author recognizes a distinction between local, regional, and federated cooperatives, as well as the more specific classification pursued in Shaffer, 1978, but feels that categorizing the firm as either proprietary or cooperative is adequate for the objective of this study.

22 The prices used for comparison in this study are correlated to the extent that they rely upon the same underlying price base. The potential difference in market areas, management, and organization serve to create a large degree of independence of price within a competitive variance. Analyzing that variance is the concern of this study, therefore the prices are examined under the assumption of independence.

23 J. R. Baarda, Cooperative Principles and Statutes: Legal Descriptions of Unique Enterprises U.S.D.A., Agricultural Cooperative Service, Research Report No. 54 (March 1986), p. 5.

24 Ibid., p. 4.

25 Historically there is a great deal of work scattered throughout the Journal of Farm Economics (now the American Journal of Agricultural Economics), for a broad overview of cooperative theory as it has developed in the United States up to the 1980's see the works of such people as Ivan Emelianoff, Peter Helmberger (as well as the article listed above with Sidney Hoos), Richard Phillips, and Frank Robotka.

26 Helmberger and Hoos, op cit..

27 R.D. Knutson, "Cooperatives and the Competitive Ideal" Journal of Farm Economics 48 (August 1966), p. 113.

28 Ibid., p. 115.

29 Rhodes in his paper "Cooperatives and Contestable/Sustainable Markets" in Cooperative Theory: New Approaches ed. by J.S. Royer, U.S.D.A., Agricultural Cooperative Service, ACS Service Report No. 18 (July 1987), pp. 108-116. writes that cooperatives might serve as a competitive yardstick in competition with proprietary firms. Staatz in "The Structural Characteristics of Farmer Cooperatives and Their Behavioral Consequences" pp. 33-60 of the same volume expresses a belief that the rationale behind the cooperative as a competitive yardstick is that they will price their services differently than proprietary firms.

30 J.M. Staatz, "Farmers' Incentives To Take Collective Action Via Cooperatives: A Transaction Cost Approach" in Cooperative Theory: New Approaches ed. by J.S. Royer, U.S.D.A., Agricultural Cooperative Service, ACS Service Report No. 18 (July 1987), pp. 87-107.

31 Drawn from Shaffer's article "Thinking About Farmers' Cooperatives, Contracts, and Economic Coordination" in Cooperative Theory: New Approaches ed. by J.S. Royer, U.S.D.A., Agricultural Cooperative Service, ACS Service Report No. 18 (July 1987), pp. 61-86.

32 Williamson in The Economic Institutions of Capitalism (New York: The Free Press, 1985), pp. 69-72, discusses three different "classes" of contracting, Classical, Neoclassical, and Relational. Classical contracting involves full specification of all relevant contingencies with an emphasis on "legal rules, formal documents, and self-liquidating transactions". Neoclassical contracting recognizes the difficulty of incorporating "all" possible contingencies into some contracts, and specifies arbitration procedures to resolve future disputes over performance by the parties to the contract. Relational contracting procedures arise out of the desire to maintain ongoing relations between the parties despite the effects of uncertain future events. The emphasis in relational contracting is to resolve future contingencies in a way that sustains the contractual relationship between the parties. Some believe that cooperative contracting procedures resemble relational contracting, whereas proprietary firm's grain contracts with farmers tend toward the neoclassical or classical category of Williamson's taxonomy of contracting.

33 R.E. Caves and T.A. Pugel, "New Evidence on Competition in the Grain Trade" Food Research Institute Studies 18 (1982), p. 263.

34 Ibid., p. 270.

35 Ibid., p. 273.

36 Babb and Keen, op cit., p. 2.

37 Ibid., p. 15.

CHAPTER 2

RISK and the PRICING OF GRAIN

Uncertainty is the foundation stone in the assessment of risk in a commercial undertaking.¹ Uncertainty in the marketplace manifests itself in two distinct ways, as social or as individual uncertainty.² Social uncertainty is the uncertainty one holds about the decisions made by other agents in the economy, as well as what future prices will be. Individual uncertainty is the level of uncertainty someone has about their own market decisions, as well as what prices will be. The common rootstock of both social and individual uncertainty is the infinite cost of perfect knowledge, knowledge about the absolute and relative prices an agent faces as a basis for decision making in the marketplace. To the degree that uncertainty relates to price and the price level it can be traced to the amount of price instability that participants observe and react to (expect) in a market.

A great amount of risk that farmers and firms face in the exchange of grain stems from the uncertainty created by the fluctuation of grain prices. The instability of grain prices is an attribute of the grain markets, an attribute resulting from the interplay of variability and predictability impacting on the

formation of grain prices. Predictability relates to infinitely costly perfect knowledge, hence to fallible decision making by participants in their attempts to evaluate alternative courses of action in the marketplace. Variability is connected with the basic economic issues of quantity supplied and demanded in the marketplace. Variability in grain markets stems from supply factors such as; the natural constraints of geology, geography, weather, and disease or pest infestation; structural constraints such as the location and size of the facilities available at grain marketing points, including the role that might be played by the existence of asset specificity; government policies; as well as institutional constraints upon the process of exchange, either informal due to traditional custom, or formalized through the strength of law. Demand side variability has come to represent a significant source of instability in the United States grain industry, largely as a result of the increasing importance played by international trade,³ and the impact government policies have on it. Compared to foreign trade, demand for grain in the domestic market for animal feedstuffs, human consumption, and industrial uses has a large, but relatively stable role in the variability of prices in the grain markets.⁴

This chapter examines the type of price quotations used in the grain trade, as well as how they might be used as a tool for first-handler grain firms to manage the risk faced as they conduct their business. The discussion will be carried on in three separate phases. First, a brief look at the formation of a

"market price" for grain, through a discussion of the principal type of prices important to exchange operations in the grain subsector, including the relationship between futures and cash prices. The second section is an examination of hedging as a tool for first-handler firms to reduce their level of risk in the grain markets. The third part of this chapter is a comparison of corn prices offered to, and by cooperative and proprietary firms. This comparison will be drawn between investor and patron owned firms, the average farm level corn price in Michigan, as well as Board of Trade corn prices in the Chicago and Toledo markets.

PRICE FORMATION:

The formation of grain prices is at the very heart of the grain industry, that idea was perceptively pointed out by Caves and Pugel in writing,

Grain trading is essentially arbitrage between low-price and high-price locations. The grain trading firm must coordinate information from numerous sources and execute transactions based on this information. A company's success depends crucially on the information it has about prices and market conditions in various locations and its ability to anticipate or predict impending changes in these prices.⁵

Woven into the fabric of this statement is the description of a marketplace in which transactions are undertaken through a structure of commodity prices, rather than a single uniform price at which grain is exchanged.

The variety of prices confronted in grain transactions differs according to the quoted source. For instance, Blau in an article originally published in the Review of Economics and Statistics and republished by the Chicago Board of Trade suggests that commodity markets utilize four different types of prices (although not necessarily four different price quotations): (1) cash spot price, the price offered in the cash market for immediate delivery of the commodity (2) cash forward price, the price quoted in the cash market for deferred delivery (3) futures spot price, the futures market bid for essentially spot market transactions (4) futures forward price, which is the futures price as it is usually conceived, a price offered for a commodity contract to mature for delivery of the good within a specified future time period.⁶

On the other hand, John Helmuth in his work Grain Pricing identifies a more distinctive taxonomy involving five different types of commodity prices: (1) cash, a price for the transfer of actual grain either immediately, or in a deferred time period (2) spot, a price at which the transfer of ownership of actual grain in the immediate time period is tied to the delivery of grain to fulfill a futures contract obligation (3) to arrive, similar to Blau's cash forward price, a cash market price quotation is applied to grain for delivery in a forward time period (4) futures, "a grain price determined by a transaction on a contract market which establishes a legally binding contract between buyer and seller to deliver or accept delivery of a fixed quantity of a

certain quality or qualities of grain at a specific delivery point or points during a specific (deferred) calendar month." (5) basis price, a price determined through the process of adjusting a "nearby futures price to the specific, immediate conditions surrounding a transaction to transfer the ownership of actual grain in either the immediate or deferred time period."⁷

The adjustment of grain futures price has been broken down into many different components in the literature. A major interpretative factor to explain the basis of a commodity is the commodity's convenience yield. Convenience yield is the value obtained from having the commodity on hand, available for ones immediate requirements.⁸ The convenience yield is particularly high for a firm with a steady volume of feed business, which needs to provide its customers with a level of service regardless of (sometimes countercyclical to) the pattern of grain marketing throughout the year. Convenience may be broken down into the factors of time and location. The value of time is reflected in the costs imposed by interest, insurance, and storage facilities upon the holding of a commodity.⁹⁻¹⁰ The value of location, implicit in the basis, is related to the costs associated with delivery of the commodity to satisfy demand, such as transportation and storage/handling capacity.¹¹ The quantity and quality of the grain also impacts on the basis adjustment of a futures contract price.¹² Quantity of grain impacts on the costs of handling, as well as the firms ability to reduce its risk through the commodity markets (cash/futures/options). The value

of grain quality relates to the basis as an issue of price discovery, quality determines the specific value of a given quantity of grain relative to the general level of market prices.¹³ Values related to the quality of grain are decided according to recognized grading standards and the buyers particular discount schedule for a commodity. This discount schedule often changes from firm to firm and year to year as a result of a firm's financial obligations and policy, as well as economic or crop growing conditions.

The level of the basis relative to prices in the futures market might also be affected by what some have called "security yield". This term is closely related to the concept of psychic income, it represents a subjective valuation by an individual participant, rather than a positive, objective standard. Specifically, security yield is defined as the felt advantage from holding commodity stocks over and above those for immediate requirements.¹⁴ Despite the recognition that identifying structural factors of the price basis is an open ended issue, and the presence of contango or backwardation a highly debated question,¹⁵ the basis is fundamental to the way in which the grain trade conducts its business.

Both Blau and Helmuth's classification of grain prices perform the same task of combining the value of storage (through varying the time of delivery), quality (through grades and discount schedules), and location of the grain into a variety of marketplace values. The next question is how are these basic

market differences accounted for in a coherent, and cohesive fashion in the global market for grain. In a macromarket sense the futures markets serve as the primary means of price formation in the grain subsector.¹⁶ The micro-macro connection, in the grain markets, is the role of basis prices, Helmuth writes that "...all local basis prices taken together provide a picture of the economic realities in commercial grain marketing channels."¹⁷ Remembering that the basis price is the adjustment of a futures price for local market conditions the answer to our question becomes clear. Price coordination of the grain subsector takes place via the existence of established commodity futures markets which tie together the plurality of price quotations for the major grain crops. The cohesiveness of a pricing structure based upon futures markets has been examined and empirically validated,

...the pricing relations linking an underlying asset, futures on the asset, options on the asset, and options on the futures have been developed and empirically examined. The empirical evidence supports the hypothesis that these pricing links are reasonably tight--generally within the bounds of transaction costs.¹⁸

The cash market operation of large terminal elevators could provide an alternative to the role of futures markets in the formation of grain prices. When looked at from a subsector perspective, however, the grain terminal cash market has been found to be of minimal importance, "Although cash transactions are very common in grain marketing, centralized cash grain markets no longer play an important role in the movement of grain...."¹⁹ A large degree of risk in the grain trade is eliminated by using

futures markets as a centralized pricing mechanism, with the markets at the Chicago Board of Trade often playing a key role as "price setter" in the exchange of grain across national boundaries.²⁰ Holding together the industry wide reliance upon basis prices is, as Helmuth concludes the force of competition in the marketplace,

But what about those entities that never quote a basis price? Are they operating in a different pricing system? Certainly not; they represent entities which are, for some reason uncomfortable with the elements of basis pricing and would rather do business in terms of a cash price. However, since they operate side-by-side with those entities which do use basis pricing, the forces of competition will keep their cash prices closely aligned with the cash prices determined by those entities using basis pricing.²¹

At the first handler level in the grain subsector there is a strong willingness to rely upon the established futures markets in determining the prices offered by firms to the farm level of the marketing system. Again quoting Helmuth's work,

These units [assembly stage] are not in business primarily to speculate on their cash grain position; rather, they are in business to earn a profit from providing services (assembly and storage).²²

The first-handlers establish a firm selling price with the second-handlers for delivery at some future date or sell the grain by shorting futures and then arrive at a bid price to the farmers.²³

In addition, reliance upon the futures markets as a tool for reducing exposure to risk, was expressed by representatives of the first-handler grain firms interviewed during the research for this study.²⁴ Reliance upon futures market grain prices was voiced as

a business decision, without regard to other distinctions that may be drawn between the cooperative and proprietary firms contacted.

Having explored the process of price formation in the grain markets, the remaining sections of this chapter discuss two ways a firm might use grain prices to manage its exposure to market risk, through the practice of hedging, or by strategic alteration of its posted grain prices over the course of the marketing year. Both hedging, and the posting of cash grain prices in the firm's local market area offer an opportunity for the firm to shift some business risk to another party. That opportunity comes in the changing relationship between futures and spot grain prices expressed by the basis price.

HEDGING:

Hedging may be defined as the taking of equal and opposite positions on a contractual and a physical basis, often in separable markets. The perfection or imperfection of the hedge is directly related to the degree of equality that is achieved between the two markets in terms of quantity and basis movement. The following example illustrates a perfect hedge. A country elevator purchases 5000 bushels of corn delivered from the farm at harvest (October) at \$2.00/bushel, the firm then sells a May futures corn contract on the Chicago Board of Trade (their corn contracts are 5000 bushels) for \$2.50/bushel. In May the firm

sells the 5000 bushels of corn in the cash market for \$1.45, while purchasing a May futures contract in corn for \$1.95. In this hypothetical situation the elevator was completely protected from risk in matching the bushels of corn bought and sold in the two markets, as well as the unchanged basis from October to May. The protection afforded by this hedge did not come without cost, the firm incurred a brokerage fee for executing the transaction, plus the initial and maintenance margins required by the Board of Trade to hold a position in the futures market.

A common notion is that a hedge must be placed in the futures market, this obscures the fact that a hedged position could be readily assumed in either an option or forward deliverable contract too. In fact, a forward delivery contract may have the advantage of more nearly equal quantity over a futures or options contract, but not without some other disadvantages.²⁵ In placing a successful hedge, the form of contract is not as critical as the interaction of the contract and the market for the underlying commodity. The key to successful hedging is to satisfy the basic hedge condition, which is "...that a hedge is established when potential changes in the market value of the delayed delivery contract are negatively and highly correlated with changes in the value of the commodities or assets that are being hedged."²⁶ Due to its predominance, in the worlds of application and research, the remainder of this discussion of hedging will assume the hedge is placed in the futures market, rather than in options or forward delivery contracts.

The objective of hedging is founded upon the existence of unexpected fluctuations in grain "market" prices. The motivation for a firm to assume a hedged position is often attributed to a desire to shift the risk of commercial enterprise stemming from vagaries of the market. That view was largely unchallenged prior to the mid 1940's, when Holbrook Working began to publish his conclusions about the futures markets. Working's studies asserted that hedging is primarily a profit making activity by firms, opposing the then common view of hedging as risk protection. Working saw the potential for profits arising from accurate expectations of basis changes over time.²⁷ He substituted his view of hedging as a profit opportunity for the traditional view of hedging as a risk protection activity until late in his active career, when Working conceded that the two positions were not mutually exclusive.²⁸ The joining of these two viewpoints, as supplements to each other, in the pragmatic environment of commerce has been verified in a recent study,

Most firms judge that the risks associated with the latter situation, [holding unhedged grain stocks when market prices are falling] including bankruptcy, far outweigh the potential profits that might accrue in the former case. [holding hedged grain stocks when market prices are rising] Hence, they use the futures markets to insulate most of their inventory from wide fluctuations in value caused by price level changes and to secure carrying charges for their physical inventories.²⁹

Working expresses the combination of these two motivating forces in two ways. First, in a list of four principle reasons that firms hedge, and second in the form of a taxonomy of hedging

activity. The four reasons Working feels that firms hedge in the futures market are, 1) it facilitates buying and selling decisions by focusing on relative price changes (basis change) rather than absolute prices changes of a commodity 2) greater freedom for business action through buying and selling at what are "judged to be favorable" prices 3) a reliable basis for conducting storage of commodity surpluses in the relationship between spot and futures prices 4) a reduction in business risk, although reflecting his early view of hedging as a profit opportunity Working writes that "...any curtailment of risk may be only an incidental advantage gained, not a primary or even a very important incentive to hedging."³⁰ These four ideas were written in the formative years of Working's investigations. The opportunity to profit comes through a reduction in the risk level faced by a firm operating from a hedged position. The reduction in risk stems from factors such as an improved information base for decision making, and an increase in commodity market liquidity through using the futures markets.³¹

The interdependence of reduced risk and increased opportunity for profit from hedging is also evident in a later article by Working, in which he identifies five separate categories of hedging activity. 1) Carrying Charge; this type of hedging is done in anticipation of a change in the basis in order to gain income from holding a commodity in storage. 2) Operational; hedging undertaken in the course of business to aid purchase and sales decisions. 3) Selective; this is hedging

done "to some extent" in order to avoid a business loss, but not as a routine practice. 4) Anticipatory; anticipatory hedging is speculative in the sense that the hedge is placed as a temporary substitute for a merchandising contract to be made at a later date. 5) Pure Risk Avoidance; this is hedging done as protection from the risks of holding commodity stocks.³² These categories reflect the multipurpose character of hedging in a business enterprise, those purposes are a mixture of the firm's desire to shift the risk of transactions to another party, and its desire to increase the commercial opportunities for profit.

The central concern of this study is upon risk in the exchange of grain, therefore we shall ignore the profit potential of hedging, and focus attention on its use as a tool for firms seeking protection from business risk. In order to examine the effect of hedging on business risk it is necessary to specify both the participants in the hedge, and the type of risk they may encounter. There are three primary participants in hedging transaction, the hedger, a speculator, and the exchange. The distinction between traders as a hedger or speculator may be drawn based upon the primary underlying motive governing their behavior, security versus profit. A more concrete distinction could be based upon the degree of a traders involvement with the commodity traded. Those participants using the futures market as an adjunct to their connections with the cash market for the underlying commodity may be accurately classified as hedgers. Whereas, those who trade in the futures market as an enterprise in

itself are principally speculators in the marketplace. The exchange interposes itself between those seeking the protection of a hedge in the marketplace, and those willing to accept some risk based on the possibility of speculative returns from advantageous price movements. In this role the exchange functions as a clearinghouse for the contracts bought and sold each day in the futures marketplace.

Both hedgers and speculative traders in the futures markets fall into two distinct groups, long or short. The designation of long and short has two different meanings, it may refer to a specific transaction, or it may refer to a trader's overall position in the marketplace. In terms of the latter meaning, a trader assumes a long position when he has purchased a greater quantity of an asset than he is committed to sell. Whereas a trader assumes a short position in a market when he has committed a greater quantity of the asset for sale than he owns. Relating this distinction to the concerns of this study, specific transactions, a long hedger is a participant who purchases a futures contract, while a short hedger sells a futures contract. A trader is net long if he holds grain (either stored inventory or future purchase commitments) in excess of his commitments for grain sales. A trader is net short if his grain sales commitments are greater than his available grain holdings.

The type of risk traders encounter follows in a straightforward fashion from the fundamental nature of the futures market. An intrinsic quality of futures markets is the existence

of price variability in the market for a commodity,³³ which imposes a level of risk upon participants in that commodity's marketplace. The operation of a futures market breaks price risk down into two fundamentally different types, absolute and relative. Absolute price risk stems from the movement of daily quotations in the market, it is moderated by the imposition of price limits on the level of change in commodities prices over the course of one trading day. Relative price risk comes from an unexpected change in the relationship of futures and spot prices signified in the basis. Relative price risk is indirectly affected by daily price limits on futures prices through the relationship of futures and spot grain prices, albeit without the stringent effect that the limits impose on futures prices. By participating in the futures market a speculative trader accepts a degree of absolute price risk on the grounds that the flat price level of the commodity may move against his position, be it long or short. Whereas an agent who uses the futures market as a hedge for their position in the cash market for the commodity assumes a relative price risk.

How effective as a risk reduction tool is a hedge in the futures market? The specific degree of effectiveness is related to the structure of the market for a specific commodity.³⁴ But in general the effectiveness of a hedge is contingent upon four factors. First, the costs of assuming a hedge, the lower the cost the more cost effective a hedge will be in reducing risk. Second, the basis change should be reliable enough for agents to form

accurate expectations about future prices. Expectations that are accurate in the direction of basis change, not necessarily the amount. Third, a hedge provides greater protection the closer the contract specifications (reflecting grade and quantity) are to a hedgers position in the cash commodity market. Fourth, reflecting reduced uncertainty and greater relevance, hence value of available information, there is evidence to indicate that a hedge placed in nearby contracts affords greater security from risk than contracts offered in more distant time periods.³⁵

Hedging does not eliminate all the risk involved in holding commodity stocks. Instead it changes its nature, and allows an agent unwilling (or able) to bear the risk to shift it onto a party that is willing to accept it. In this way the futures market can provide a grain firm with an effective, generally reliable method of sheltering itself from the risk of unfavorable fluctuations in grain prices. The focus of the following research is on hedging through futures contracts, due to their dominance as the instrument of choice by those involved in commercial grain hedging.

FREQUENCY OF HEDGING BY FIRMS:

Information reported in this section is largely drawn from the survey distributed for this study to a cluster sample of Michigan first-handler grain firms. The firms were asked to

choose between the comparative categories of never/occasionally/routinely in response to the question, "How often does this firm hedge its position in the futures markets?". That question sought to construct a relative ranking of the surveyed firms inclination for accepting risk, under the assumption that a risk averse firm would tend to hedge in the futures market more frequently than a firm with a higher risk tolerance. This research did not attempt to measure the strength of an individual firm's aversion to risk. The primary objective was to determine if patron owned and investor owned firms would display different levels of risk aversion in their replies.

The compiled responses also indicated another trend that did not appear to be directly related to the firms ownership structure. An overview of the survey responses revealed a possible correlation between a firm's storage capacity, and its likelihood of hedging in the futures market (see Table 2-8). Storage of grain involves an investment by the firm, investment in both physical facilities, as well as the grain inventory owned by the firm or stored by farmers. The increased investment, and the decision to hold a grain inventory to capitalize the commodity's time value increases the firm's risk in adverse price movements. If a firm holding an inventory of stored grain faces increased risk, then a relationship between storage capacity and hedging by a firm would be expected.

Each of these two points, the distinction between cooperative and proprietary firms in hedging activity, and the

influence of storage capacity on frequency of hedging by a firm will be discussed throughout the remainder of this section. The investigation will be carried out through an analysis of replies received from the surveyed Michigan first-handler grain firms, as well as a comparison to the results of a United States grain subsector survey distributed in 1975.³⁶

Of the 51 firms that responded to the survey question about hedging practices, 30 were investor owned and the remaining 21 were cooperatives. The overall responses (see Table 2-1) to each category were spread evenly enough to permit a Chi Square test for difference in the frequency of hedging between the two types of firms.³⁷ The test failed to reject, at the .05 level of significance, the null hypothesis that investor and patron owned firms hedge their position in the futures markets with the same frequency, $H_0: IOF=POF$. The statistical scores for each response category by type of ownership structure is given in Table 2-2. The Chi Square test statistic from the survey (.379 with 2 degrees of freedom) is relatively strong, it would remain insignificant up to approximately the .9 level of significance, where the critical statistic is .211 with 2 degrees of freedom.

Table 2-1

Frequency of Hedging by Michigan First-Handler Grain Firms
(raw score/%)

	Never	Occasionally	Routinely	Total
Investor				
Owned	8/26	11/37	11/37	30/100
Firms				
Patron				
Owned	6/29	9/42	6/29	21/100
Firms				
Total	14/28	20/39	17/33	51/100

[Source: Michigan Survey, 1988]

Table 2-2

Contingency Table of Hedging Frequency/Ownership Structure

	Never	Occasionally	Routinely
Investor			
Owned Firm	.0067	.0497	.1
Patron			
Owned Firm	.0096	.71	.1429

[Source: Michigan Survey, 1988]

$\chi^2 = .379$ with 2 degrees of freedom

In addition, a look was taken at the ownership structure of the proprietary firms that responded to the survey. These firms were divided in their form of organization between single owner or partnership arrangements and those firms that are incorporated under Michigan law. It was felt that corporations would hedge their position more frequently than firms organized as either a sole proprietorship or partnership. This belief was based upon two suppositions, first, that an incorporated firm has a larger overall investment at risk in an enterprise. Second, routine use of hedging constitutes a type of standard operating procedure, and the greater separation of ownership and management in a corporation leads to greater adoption of standard operating procedures for daily business transactions, than in a firm controlled by a single owner or partnership. Therefore, an incorporated grain firm would hedge more frequently than a proprietary grain firm organized as a sole proprietorship or partnership. Unfortunately not enough single owner/partnership owned firms replied to the survey for a valid statistical analysis of that hypothesized relationship. Although some sole proprietorships or partnerships may be submerged in the data as corporations with one or two stockholders (one respondent indicated they were a family owned corporation) these were not made explicit in the survey responses.

Another comparison is possible between the results obtained from this survey of Michigan first-handler grain firms, and the results of a U.S.D.A. Grain Industry Survey that covered

the behavior of domestic grain subsector participants in 1974. While respondents to the U.S.D.A. survey include participants in the grain trade other than first-handler grain firms,³⁸ the results provide an interesting comparison across a 13 year time span. Responses to the U.S.D.A. Grain Industry Survey as they are reported by Helmuth are given in Table 2-3 below, be cautioned that these results include terminal and export elevators, soybean processors, and feedlots which are not involved in the results of the survey reported in Tables 2-4 or 2-5.

Table 2-3

% Frequency of Hedging Related to Business Type (U.S.)

	Never	Occasionally	Routinely	Total
Single Owner/ Partnership	71.2	20.8	8.0	100
Cooperative	60.3	25.1	14.6	100
Corporation	50.7	27.0	22.3	100

[Source: Helmuth, 1977]

Table 2-4
 % Frequency of Hedging by Firms
 Related to Ownership Structure (MI)

	Never	Occasionally	Routinely	Total
Investor				
Owned Firm	26.6	36.7	36.7	100
Patron				
Owned Firm	28.6	42.8	28.6	100
Total	27.5	39.2	33.3	100

[Source: Michigan Survey, 1988]

Table 2-5
 % Frequency of Hedging
 Related to Business Type (MI)

	Never	Occasionally	Routinely	Total
Single Owner/ Partnership	0	75.0	25.0	100
Cooperative	28.6	42.8	28.6	100
Corporation	30.8	30.8	38.5	100*

[Source: Michigan Survey, 1988]

* may not equal 100 due to rounding error

The compiled results of the U.S.D.A. survey and the survey distributed throughout Michigan for this study have a substantial degree of similarity. The principal difference between the two surveys is in the far greater number of national respondents that never engage in hedging. That observation is not surprising due to the diversity of business operations other than first handler level grain firms that are included in a subsector survey. In order to bring this wide disparity into focus Table 2-6 reports the results of a Chicago Board of Trade study of futures and options markets.

Table 2-6

% of Corn Futures Users by Business Operation

Grain Merchandisers	
or Exporters.....	67
Wet or Dry Corn Milling.....	3
Feed Manufacturing	
or Milling.....	12
Food Manufacturing.....	3
Other Grain Processing.....	2
Grain Broker.....	4
Feed or Seed Dealer.....	5
Futures Commission Merchant.....	6
Other.....	14

NOTE: These results exclude livestock/poultry or feed grain farming operations.

[Source: Chicago Board of Trade Study, 1984]

The vast majority of business enterprises that utilize the corn futures market are those directly involved in handling and merchandising grain. That group includes grain elevators which are the target subjects of this study. Outside of that group of business operations the use of corn futures falls off rapidly, which would lead a great number of those subsector participants to respond in the U.S.D.A. survey that they never hedge in the futures markets. Compensating for this set of replies would reduce the large number of never use hedging responses in the U.S.D.A. survey. Another statistic showing the commitment of firms in the corn futures market have for hedging rather than speculating is reported in Table 2-7. On pragmatic grounds the responses reenforce the observation that futures markets are a viable means for grain firms to use in managing the exposure to risk of their enterprise.

Table 2-7

Traders Use of Corn Futures for Hedging vs. Speculation

Are accounts traded for purposes of hedging risks?

YES: 88%

NO: 12%

Does firm's policy permit trading for purposes other than hedging?

YES: 25%

NO: 75%

[Source: Chicago Board of Trade Study, 1984]

Applying the information presented in the last two tables as a corrective factor to the data reported in Tables 2-3, 2-4, and 2-5 allows a crude comparison of the two sets of information. Results of the comparison between the U.S.D.A. subsector survey, and this study's survey of Michigan first-handler firms suggest three conclusions.

First, to a large degree, hedging takes place irrespective of the basic supply and demand forces involved in pricing grain. The two surveys were taken roughly 10 years apart, in the course of which many changes have taken place in the market and institutional structure, as well as the price level (nominal and real) reflected in the supply and demand environment of the grain subsector.

Second, firms engaged in the handling and/or merchandising of grain (requiring the assumption of title) in contrast to those involved in physical processing, represent the majority of enterprises involved in the corn futures market. The largest fraction of those firms utilize the futures markets as a hedge, rather than as a speculative instrument in their business operation. Therefore, hedging in the futures markets can be viewed as an aspect of cohesiveness within the business practices of grain handling/merchandising firms in the United States grain subsector.

Third, the cohesive set of business practices, illustrated through the frequency of hedging by first-handler grain firms in Michigan, does not grossly differ between cooperative and

proprietary firms.

Storage Capacity as a Variable

A second perceived trend in hedging frequency was a direct relationship between the storage capacity of a firm and its involvement in futures hedging. The apparent connection was observed in the survey of Michigan firms, and in the national survey conducted by the U.S.D.A., noted in Helmuth's report Grain Pricing.³⁹ This section of the study will explore the connection perceived between grain storage capacity and frequency of hedging activity by a firm.

The listed storage capacity of Michigan firms in the 1987 Annual Directory of the Michigan Agri-Dealers Association, had a mean average of 663,090 bushels. The storage capacity of the 51 firms that responded to the survey had a lower mean average of 640,280 bushels. The difference between the two groups was insignificant at the .05 level (absolute value of the t statistic is .158) indicating that the sample group fairly reflects the average storage capacity of the underlying population of first-handler grain firms in Michigan.⁴⁰

To examine the relationship between the storage capacity of a firm and its degree of hedging frequency four questions will be posed. First, do the survey results indicate that with increasing storage capacity a grain firm's use of futures hedging also increases? Second, does the average storage capacity of the

surveyed firms differ according to their ownership structure? Third, does the average storage capacity of firms within the three categories of hedging frequency differ between proprietary and cooperative firms? Fourth, how do the results of this survey of Michigan first-handler grain firms compare with the national results stated in Helmuth's report? The first question asks how valid is the perception that hedging frequency increases as a firm's storage capacity increases. The second and third questions seek to determine if the relationship between storage capacity and hedging activity holds irrespective of the organization's structure as a cooperative or proprietary firm. While the fourth question deals with the similarity of Michigan grain firms behavior with their counterparts across the United States.

The hypothesis that frequency of hedging by a grain firm increases as its storage capacity increases entails two corollary questions. The first asks if in fact the survey responses do indicate a direct connection between the quantity of a firm's grain storage and the likelihood of hedging activity. The second issue inquires into the strength of disparity between the average storage capacity of firms in each of the three categories of hedging frequency listed in the survey.

Assembling the survey respondents into groups according to storage capacity gives some indication of a direct relationship between a firm's amount of grain storage and its propensity to hedge in the futures markets. Table 2-8 below conveys both the reported and expected values for each category from the survey of

Michigan first-handler grain firms. There is a wide disparity in the reported, compared to the expected values at the corners of the table. In contrast there is a narrow difference between those who report occasionally hedging and the expected values in that column. The numbers in Table 2-8 lend some credence to the belief in a connection between a grain firms use of hedging, and its amount of grain storage capacity.

Table 2-8

Observed and Expected Values of Hedging Frequency
Related to Storage Capacity (MI)

Storage (1000 bushels)	Never		Occasionally		Routinely		Total
	O	E	O	E	O	E	
0 < 300	8	4.3921	7	6.2745	1	5.333	16
300 < 600	6	4.392	6	6.2745	4	5.333	16
600 < 1000	0	1.922	3	2.745	4	2.333	7
1000 >	0	3.294	4	4.706	8	4	12
Total	14		20		17		51

[Source: Michigan Survey, 1988]

In order to confirm the hypothesized relationship between hedging and storage capacity a Chi Square test was performed on the data reported in Table 2-8.⁴¹ That test failed to reject the null hypothesis of no connection between the two variables at the .05 level of significance. The obtained value was 12.5224 (6 degrees

of freedom) while the critical value for rejection of the null hypothesis was 12.5916. The initial support given by the categorized survey responses to the first corollary of the hypothesized relationship failed to be corroborated by the statistical analysis of the data. Although the Chi Square statistics are close enough to reject the null hypothesis at the next "higher" level of significance.

The second question involved in this hypothesis asks, does the average storage capacity differ between the three categories of hedging frequency listed in the survey of Michigan firms? To investigate that issue the storage capacity of firms was averaged in each of the survey's hedging categories (Never/217,353 bushels, Occasionally/422,304 bushels, or Routinely/1,021,378 bushels) then t tests were performed upon the paired categories. The test results are given in Table 2-9, in each case the t scores rejected the null hypothesis of no difference between the average storage capacities and use of hedging.

Table 2-9
Comparison of Average Storage Capacity
and Frequency of Hedging (MI)

<u>Paired Categories</u>	<u>(t score)*</u>	<u>Critical t score</u>
Never-Occasionally	1.925 (32 d.f.)	1.697 (30 d.f.) [.10]
Never-Routinely	2.639 (29 d.f.)	2.045 (29 d.f.) [.05]
<u>Occasionally-Routinely</u>	<u>2.252 (35 d.f.)</u>	<u>2.032 (35 d.f.) [.05]</u>

[significance level]

* absolute value

(Source: Michigan Survey, 1988)

The comparisons between Never and Routinely, and Occasionally and Routinely were significantly different at the .05 level, while the comparison between Never and Occasionally was different at the .1 level of significance, but not at the .05 level. That result reflects the dominant influence of several firms with a much larger storage capacity than others upon the average storage capacity of all the routinely hedging firms in the sample group.

The hypothesis that frequency of hedging by a firm increases as its grain storage capacity increases cannot be unequivocally sustained. While much of the data reported here lends support, a direct connection between the variables cannot be claimed. The more general contention that frequency of hedging by firms increases as the average storage capacity increases does have statistical evidence to support it. Those numbers are not unambiguous, however, due to susceptibility in the figures to

weighting by extreme outliers in the data.

Having examined the survey data in an industry wide sense attention now shifts back to the central concern of this study, distinctions between cooperative and proprietary firms. The pertinent question is, do the totaled survey results mask a distinction between patron and investor owned firms? That issue is examined in light of the second and third questions raised in the introductory paragraphs of this section. Does the average storage capacity of the surveyed firms differ according to their ownership structure, and does the average storage capacity of firms within each category of hedging frequency differ between cooperative and proprietary firms?

There was a difference in the quantity of grain storage between the cooperative and proprietary firms that responded to the survey. The 21 patron owned firms returning the survey averaged 473,480 bushels of storage, whereas the 30 investor owned firms averaged 761,070 bushels of storage at the surveyed facility. Despite this large absolute difference in the average capacity of cooperative and proprietary firms, the null hypothesis of no difference between the means cannot be rejected at the .05 significance level ($t=1.31$) although it would be rejected at the .2 level where the critical test statistic is approximately 1.30 with 49 degrees of freedom.⁴² Not unexpectedly, the absolute difference is reflected in a much greater variation in the average capacities of investor owned firms than in the patron owned survey respondents. That variation is borne out in a highly significant

F ratio of 6.8547, with (29, 20) degrees of freedom. Treated as two separate categories, however, investor and patron owned firms do not significantly differ in their capacity for grain storage.⁴³

The third question asks if the average storage capacity of firms within each category of hedging activity (Never, Occasionally, or Routinely) differed between investor and patron owned firms? The perceived relationship connecting a firm's quantity of grain storage and its likelihood of hedging in the futures markets has not proved out across the whole survey of first-handler firms. Submerged in the lump sum data, however, there may be a significant distinction between proprietary and cooperative firms in the relationship of storage capacity, and the occurrence of hedging.

Table 2-10 displays the results of t tests comparing the mean storage capacity of patron and investor owned firms in each of the three categories of hedging frequency listed in the survey of Michigan firms.⁴⁴

Table 2-10

Comparison of IOF and POF Average Storage Capacity/Hedging

<u>Frequency of Hedging</u>	<u>(t score)</u>	<u>Critical t score, [.05 sig.]</u>
Never	.661 (12 d.f.)	2.179
Occasionally	.358 (18 d.f.)	2.101
Routinely	1.298 (15 d.f.)	2.131

H_0 : IOF=POF

[Source: Michigan Survey, 1988]

Analysis by t tests failed to reject the null hypothesis of no difference between the average storage capacity of cooperative and proprietary firms in each category of hedging frequency. In each case the statistical value was insignificant at the .05 level of significance, however, each category does reject the null hypothesis at a significance level with a fairly high probability of rejecting a true null hypothesis (Type 1 error). The significance levels for rejecting the null hypothesis in the three categories are; never at .60; occasionally at .80; routinely at .30. Once again, analysis of the survey data finds no strong indication of a difference between patron and investor owned firms grain marketing operations at the 95% level of confidence.

So far this section of the study has examined the connection between the frequency of a firm hedging in the futures markets and its amount of grain storage. This has been done in terms of the total survey response by Michigan firms, as well as with respect to possible distinctions between a cooperative or proprietary ownership structure. The remaining question is, how do the responses of the Michigan firms involved in the survey for this study compare with the behavior of their counterparts across the United States, reported in Helmuth's 1977 publication, Grain Pricing?

The breakdown of responses by storage capacity to the question of hedging frequency, from Helmuth's study, are reported in Table 2-11. The overall pattern of the data is similar in both Table 2-11 and Table 2-8. In each case the frequency of hedging

by firms in the never and occasionally groups diminish as storage capacity increases. Whereas routine hedgers show an increasing percentage of firms as the quantity of storage increases. The data is inadequate to draw definitive conclusions from these numbers, but it seems intuitively apparent that Michigan grain firms exhibit behavior similar to other members of the grain industry across the United States.

Table 2-11

% Frequency of Hedging Related to Grain Storage Capacity (U.S.)

Storage

(1000 bushels)	Never	Occasionally	Routinely	Total
0 < 100	77.0	17.7	5.3	100
100 < 250	51.8	29.8	18.4	100
250 < 500	46.2	37.3	16.5	100
500 < 750	47.9	26.3	25.8	100
750 < 1000	36.7	30.3	33.0	100
1000 < 2000	37.0	21.3	41.7	100
2000 < 5000	34.3	9.4	56.3	100
>5000	16.2	4.0	79.8	100

[Source: Helmuth, 1977]

The conclusions drawn from the information presented in this section are summarized in four points. First, in light of the statistics presented a direct connection between hedging

frequency and the storage capacity of Michigan first-handler grain firms is ambiguous. Second, there is no statistically significant difference at the .05 level between the storage capacity of cooperative and proprietary first-handler grain firms in Michigan. Third, there is no significant distinction between Michigan patron and investor owned first-handler grain firms in the relationship between the frequency of a firm's hedging, and its amount of storage capacity. Fourth, Michigan first-handler grain firms hedging activity in the futures markets is comparable to the larger United States grain industry.

PRICE IN RISK MANAGEMENT:

Historically grain markets have a reputation of fluctuating prices. Although heavily influenced by commodity prices in the futures markets, the prices that first-handler firms offer to their farm customers can be a tool for the firm's risk management program. Futures markets provide firms a way of mitigating their flat price risk through hedging, although in doing so they accept a certain degree of basis risk. The changing basis of commodities traded in the futures markets allows prices to adjust to local market conditions, but it also allows firms to post prices that represent a particular level of risk aversion (often referred to as expectations). Separation of these two points is not clear cut due to the homogenizing effect that

marketplace competition has on commodity prices.

Acknowledging the effect of competition on price, the issue here is what effect does the ownership structure of a firm have upon its posted grain prices. That issue entails two different questions, first, is there a distinction between the posted grain prices of cooperative and proprietary firms serving the same market area? Second, is there a distinction between the posted grain prices of cooperative and proprietary first-handlers and the price of grain in a regional (Michigan) and national/global marketplace (Chicago Board of Trade).

To legitimately answer those questions the sample prices must be compared in terms of relative price level and variance. In order to analyze those two aspects each corn price will be compared through the use of F ratios, and t statistics.⁴⁵ Relying on that combination of tests will allow for a fair and accurate comparison of the prices offered by two proprietary and one cooperative firm, identifying any distinction between investor and patron owned firms over a given marketing year.

Six different corn prices will be examined, covering the 1984 and 1985 marketing years. The Chicago and Toledo cash corn prices along with the average price paid to farmers in Michigan will serve as standards for the comparison between one patron owned firm, and two different investor owned companies. One of the investor owned firms is not in the co-op's market area (IOF_1) while the other (IOF_2) is in direct competition for corn with the patron owned firm. The posted prices of IOF_1 will be used in the

1984 marketing year, and IOF₂'s prices will be compared for the 1985 marketing year. Each of the firms are "country elevators" with similar capacity for stored grain and railroad service. A word of caution, the prices used in this analysis are posted gross prices, not net. They are applicable for dry No. 2 yellow corn, and do not reflect discounts or premiums, or patronage refunds from the cooperative.

Table 2-12

Corn Price Variability in Five Markets

<u>MONTH/YEAR:</u>	<u>10/84</u>	<u>11/84</u>	<u>12/84</u>	<u>1/85</u>	<u>2/85</u>	<u>3/85</u>	<u>4/85</u>	<u>5/85</u>
<u>MARKET:</u>								
CBOT Futures	1.039	1.058	1.106	1.022	1.05	1.069	1.021	1.047
CHI Cash	1.049	1.04	1.043	1.028	1.043	1.04	1.025	1.042
TOL Cash	1.097	1.089	1.058	1.054	1.058	1.066	1.049	1.071
POF	1.032	1.067	1.034	1.074	1.057	1.004	1.023	1.044
IOF ₁	1.109	1.052	1.063	1.045	1.028	1.047	1.081	1.047
<u>MONTH/YEAR:</u> <u>6/85</u> <u>7/85</u> <u>8/85</u> <u>9/85</u>								
<u>MARKET:</u>								
CBOT Futures	1.04	1.239	1.043	1.086				
CHI Cash	1.051	1.112	1.059	1.189				
TOL Cash	1.065	1.115	1.12	1.229				
POF	1.049	1.042	1.07	1.295				
IOF ₁	1.02	1.04	1.101	1.209				
<u>MONTH/YEAR:</u> <u>10/85</u> <u>11/85</u> <u>12/85</u> <u>1/86</u> <u>2/86</u> <u>3/86</u> <u>4/86</u> <u>5/86</u>								
<u>MARKET:</u>								
CBOT Futures	1.068	1.062	1.039	1.047	1.076	1.084	1.072	1.163
CHI Cash	1.131	1.09	1.037	1.043	1.079	1.076	1.05	1.089
TOL Cash	1.136	1.154	1.062	1.058	1.1	1.072	1.085	1.115
POF	1.114	1.109	1.032	1.041	1.047	1.088	1.071	1.117
IOF ₂	1.108	1.109	1.027	1.041	1.047	1.088	1.071	1.117
<u>MONTH/YEAR:</u> <u>6/86</u> <u>7/86</u> <u>8/86</u> <u>9/86</u>								
<u>MARKET:</u>								
CBOT Futures	1.11	1.333	1.135	1.216				
CHI Cash	1.146	1.179	1.256	1.126				
TOL Cash	1.139	1.169	1.341	1.219				
POF	1.072	1.098	1.435	1.131				
IOF ₂	1.072	1.116	1.414	1.146				

Table 2-12 compares a crude measure of corn price variability in five different marketplaces for each month of the 1984 and 1985 marketing years. The statistics were obtained by

dividing the highest price by the lowest priced offered each month in each of the five markets considered in this study.⁴⁶

The general trend of the ratios indicate that the cash markets exhibit slightly more price variability than futures markets at the Chicago Board of Trade,⁴⁷ with the Toledo cash corn market more variable than the Chicago cash market for corn. This finding is not unexpected if the futures markets act as the primary institution for price formation in the grain trade, a position supported by the results of this study. Futures prices are generally expected to be less variable, due to the effect that "local" supply and demand conditions would have upon them in the smaller "fringe" markets. Effects that would have little impact on a central trade-wide price base.

One exception to this observation occurs in the months of July and September when the futures prices are more variable than cash market prices. July and September are two important periods in the production of corn in the United States, in July the planting anxiety is over and attention turns to the impact of weather conditions on expected yields of the corn crops. Uncertainty involving the weather might manifest itself as increased price variability in the futures market prices. September represents another period of heightened uncertainty in the futures markets, as traders anticipate the arrival of new crop corn, and express any uncertainty that exists over the impact of weather conditions on the availability and quality of the incoming crop. Facing this scenario, traders in the smaller market areas

with more perfect information about their immediate market environment should (and apparently do) react with less radical changes in corn price offerings than traders operating in the larger futures marketplace.

The general trends exhibited in Table 2-12 are suspect due to the inherent nature of the statistic reported. The statistic used accounts for the rough variability of corn prices over the course of a given period of time, but fails to reflect the array of prices available in the marketplace. Consequently its value as a measure of pragmatic price differences available to grain sellers is limited. In order to determine if there is a substantive difference in the posted corn prices of cooperative and proprietary firms another technique is used involving comparative means and variance analysis.⁴⁸ The resulting F ratios and t statistics are presented below in Table 2-13.

Table 2-13

Statistical Comparison of Corn Market Prices, Mean-Variance

Market Pairs	t statistic	F ratio
(1984) Chicago-Michigan	3.6697* (22)	2.6804 (11,11)
Chicago-Toledo	1.294 (22)	1.3065 (11,11)
Toledo-Michigan	2.4145* (22)	2.0515 (11,11)
IOF ₁ -POF	.6912 (22)	2.856* (11,11)
IOF ₁ -Michigan	0 (22)	3.6804*(11,11)
POF-Michigan	.947 (22)	1.2887 (11,11)
(1985) IOF ₂ -POF	0 (22)	.9976 (11,11)
IOF ₂ -Michigan	-1.0806 (22)	1.5232 (11,11)
POF-Michigan	-1.0791 (22)	1.5269 (11,11)

(degrees of freedom)

* significant at the .05 level

The results presented in Table 2-13 for grain firms in Michigan reiterate the findings from a comparison of firms across a much larger section of the United States.⁴⁹ The largest surprise in these figures are the two 0 t statistics. The statistics comparing the three price standards, Chicago, Toledo, and Michigan average, show the tight relationship that exists between Chicago as the major commodity brokerage market and Toledo as a delivery point for the Chicago marketplace, that statistic becomes significant at the .30 level. The average Michigan grain price is

significantly different than the Chicago and Toledo markets at the .05 level, that is not entirely unexpected given the nature of transportation costs for the Michigan market (movement of grain is somewhat restricted due to Michigan's geography) as well as seasonally strong local demand for corn as a feedstuff.

The insignificant F ratios between all three prices leads to the conclusion that corn prices move within the same range. That discovery lends additional support for the case made earlier that futures markets serve a price basing function in the grain markets. The strength of the connection between the markets is illustrated by the different approximated significance levels for rejecting the statement of no difference in the variance of prices between the three marketplaces. Chicago-Michigan, .10; Chicago-Toledo, .50; Toledo-Michigan, .25. Those statistics indicate that the less separation (geographical or financial) there is between the markets the greater probability of incurring a Type 1 error in rejecting the null hypothesis.

With the exception of the F ratio for IOF_1 and the average Michigan corn price, distinctions between the sampled firms and the statewide average were insignificant at the .05 level. The 1984 POF-Michigan relationship was significant at the .50 level, while the 1985 IOF_2 -Michigan and POF-Michigan F ratios become significant at the .25 level. The exception, in 1984, may be explained by the unusually competitive market environment IOF_1 was involved in throughout most of the 1984 marketing year (one of its competitors went bankrupt before the end of the year). This high

degree of competitive behavior may have caused the variance of its prices to significantly exceed the statewide price variance. Noting that the mean prices between IOF₁ and the Michigan marketplace were not significantly different at any level during the 1984 marketing year indicates that the firm may have tried to "capture" grain in its facility at times of increased grain movement, and then "make up the difference" during times of diminished farm level grain marketings. Unlike the IOF₁-Michigan relationship the statistic comparing the patron owned firm and the average Michigan price in the 1984 marketing year does reject the null hypothesis, at the .40 level. For the 1985 marketing year the IOF₂-Michigan and POF-Michigan comparisons reject the null hypothesis at the .30 level of significance.

The linkage between the investor owned firms and the cooperative also follows the expected pattern, failing to reject the null hypothesis of no difference in average prices throughout both marketing years. In the 1984 marketing year, despite a significantly different F ratio,⁵⁰ the difference between mean prices was insignificant even though the firms serve different farm level market areas, in fact the null hypothesis can only be rejected with 50% confidence. In 1985 the sampled first-handler firms were in direct competition for farm level corn, and comparison between the average corn prices offered by those firms could hardly be less dramatic. Over the course of the 1985 marketing year the average posted corn price was the same for the cooperative and proprietary firms. In addition, the F ratio

constructed to assess the variance in posted prices between the firms was not only insignificant at the .05 level, but it was very nearly a perfect match too (.9976, where a value of 1 indicates no absolute difference) becoming significant at the .75 level.⁵¹

The findings presented here are similar to those found in a wider survey of firms during work done at Purdue. They found that the prices paid to farmers by investor and patron owned firms were not significantly different,⁵² and that although the average margins of firms as a percent of corn, soybeans, and wheat sales were higher for investor than patron owned firms, they were not significantly so.⁵³ These results viewed together reinforce the conclusion that grain pricing is a top down phenomenon, originating in a central marketplace that serves to unify the structure of prices grain subsector.

SUMMARY:

This chapter undertook an examination of price quotations, and the principal way they might be used by firms in the grain industry to manage risk. The overarching picture that has emerged is a group of participants bound together through the pricing structure that has developed in their industry. Participants have developed a means to manage risk through a focal point market, which has resulted in similar behavior by firms across geographical boundaries. In direct response to the questions

asked at the beginning of this chapter several conclusions suggest themselves.

While there are a number of different type of prices quoted in the grain industry, the futures markets serve as a foundation on which the prices are based. The tie between cash grain prices and futures prices revolves around the basis. The basis acts to adjust the foundation futures price for market conditions and relationship between the immediate grain buyer and seller. The reliance of first-handler grain firms upon futures markets as a means of price discovery is not altered by a firms organization as a cooperative or proprietary firm.

Furthermore, futures markets provide a means of price protection for grain firms through hedging their inventories. The evidence indicates there is no distinction between patron and investor owned firms pattern of hedging activity. Although there is some evidence to suggest that as grain storage capacity increases so does the frequency of a firm's use of futures markets for hedging.

In addition, no evidence was found to indicate that investor and patron owned firms behave differently in the grain prices they make available to their farm customers. There do appear to be market areas separable by price, particularly the absolute price level. The variance of available prices, however, is insignificant between and within these competitive areas. Indicating the homogenous behavior of first-handler firms in Michigan and, drawing upon studies mentioned above, the United

States as a whole.

NOTES

1 This statement is an implication of Frank Knight's distinction between risk and uncertainty as it is discussed in Seligman's book Main Currents in Modern Economics, pp. 661-662.

2 W.C. Labys and C.W.J. Granger, Speculation, Hedging, and Commodity Price Forecasts (Lexington MA: Heath Lexington Books, 1970), pp. 17-18.

3 See R.J. Myers and C.F. Runge, "The Relative Contribution of Supply and Demand to Instability in the U.S. Corn Market" North Central Journal of Agricultural Economics 7 (January 1985).

4 These points are developed in greater detail in D. Colman, The United Kingdom Cereal Market (Manchester: Manchester University Press, 1972).

5 Caves and Pugel, op. cit., p. 268.

6 G. Blau, "Some Aspects of the Theory of Futures Trading" in Selected Writings on Futures Markets ed. A.E. Peck (Chicago: Chicago Board of Trade, 1977), p. 13.

7 Helmuth, op. cit., p. 1.

8 Blau, op. cit., p. 11.

9 H. Working, "Theory of the Inverse Carrying Charge in Futures Markets" Journal of Farm Economics 30 (February 1948), p. 4.

10 Helmuth, op. cit., p. 5.

11 Ibid.

12 Ibid.

13 P.L. Farris, "The Pricing Structure for Wheat at the Country Elevator Level" Journal of Farm Economics 40 (August 1958), p. 613.

14 Blau, op. cit., p. 11.

15 Contango exists when the current futures price is greater than the current cash/spot price. Backwardation refers to a current futures price less than the current cash/spot price for a commodity. See the articles by Telser, Cootner, Gray, Fama and French, and Kolb et. al. in the bibliography of this study for a sample of the literature on this question.

16 Working, op. cit., p. 7.

17 Helmuth, op. cit., p. 7.

18 H.R. Stoll and R.E. Whaley, "The New Options Markets" in Futures Markets: Their Economic Role ed. A.E. Peck (Washington D.C.: American Enterprise Institute for Public Policy Research, 1985), p. 251.

19 A.E. Peck, ed., "The Economic Role of Traditional Commodity Futures Markets" in Futures Markets: Their Economic Role (Washington D.C.: American Enterprise Institute for Public Policy Research, 1985), p. 10.

20 Embargoes, Surplus Disposal, and U.S. Agriculture U.S.D.A., E.R.S., Agricultural Economic Report No. 564 (December 1986), p. 4-23. Also S. Pininiger, "Trade and Pricing Issues of International Grain Marketing" in Agricultural Marketing Strategy and Pricing Policy ed. Dieter Elz (Washington D.C.: The World Bank, 1987), p. 47.

21 Helmuth, op. cit., p. 18.

22 Ibid., p. 15.

23 Ibid., p. 14.

24 See Appendix C.

25 For a selection of articles exploring this issue see the works listed in the bibliography by Telser and Higinbotham, Jarrow and Oldfield, Nelson, Cox et. al., and Paul et. al..

26 A Study of the Effects on the Economy of Trading in Futures and Options (Chicago: Chicago Board of Trade, December 1984), p. II-8.

27 B.S. Yamey, "The Economics of Futures Trading: Some Notes and Queries" in Futures Markets ed. M.E. Streit (Oxford: Basil Blackwell Publisher Ltd., 1983), p. 28.

28 Ibid., p. 29.

29 Ag Econ Report No. 564, op. cit., p. 4-25.

30 H. Working, "Hedging Reconsidered" in Selected Writings of Holbrook Working (Chicago: Chicago Board of Trade, 1977), pp. 137-138.

31 A key point in the profit potential of hedging lies in the nature of the cash/futures price relationship. Those two prices tend to converge towards the futures contract expiration date, that narrowing of the basis from the time a hedge is placed until its removal creates a profit opportunity for the hedger.

32 H. Working, "New Concepts Concerning Futures Markets and Prices" in Selected Writings of Holbrook Working (Chicago: Chicago Board of Trade, 1977), pp. 249-253.

33 See I. Dalzeill, "Sources of Agricultural Market Instability" Ph.D. Dissertation, Michigan State University, (1985), pp. 119-120. and L.G. Telser and H.N. Higinbotham, "Organized Futures Markets: Costs and Benefits" Journal of Political Economy 85 (October 1977), pp. 987 and 998.

34 See R.G. Heifner, "Hedging Potential in Grain Storage and Livestock Feeding" U.S.D.A., E.R.S., Agricultural Economic Report No. 238 (January 1973), pp. 9, 10, 14, and 18. and R.W. Kolb, J.V. Jordan, and G.D. Gay, "Futures Prices and Expected Future Spot Prices" Review of Research in Futures Markets 2 (1983), p. 119.

35 See D. Bigman, D. Goldfarb, and E. Schechtman, "Futures Market Efficiency and the Time Content of Information Sets" Journal of Futures Markets 3 (1983). Heifner, Ag Econ Report No. 238, op. cit.. W.W. Willson, "Hedging Effectiveness of U.S. Wheat Futures Markets" Review of Research in Futures Markets 3 (1984). M.A. Hudson, R.M. Leuthold, and S.F. Gboroton, Commodity Futures Price Changes: Distribution, Market Efficiency, and Pricing Commodity Options Center for the Study of Futures Markets Working Paper 127, (June 1986).

36 This survey is described in detail in both Helmuth, op. cit., pp. 15-16. and Heifner, et. al., op. cit., pp. 4-5.

37 A Chi Square test was used to examine if the categorized hedging frequency responses exhibited a significant relationship with a firm's organization as a patron or investor owned firm.

38 The U.S.D.A. survey also covered terminal and export elevators, soybean processors, feedlots, flour mills, and commercial feed manufacturers, as well as other members of the grain subsector not in the first handler level, that were not considered in the research for this study.

39 Helmuth, op. cit., pp.18-20.

40 A t test was used to determine if there was a significant difference in the storage capacity of sampled firms and the population of Michigan firms listing their storage capacity in the Michigan Agri-Dealers Association 1987 Annual Directory. The null hypothesis was no difference between the two groups mean storage capacity, and the critical t score for a 2 tailed test with .05 significance level was extrapolated at 2.01. The t score computed from the survey returns failed to reject the null hypothesis, with 95% confidence. In fact, the difference remains insignificant at a .90 level of significance.

41 A Chi Square test was employed to determine if the survey responses exhibited an increasing degree of hedging as storage capacity increased. An even spread of responses in the categories would support the null hypothesis, indicating no dependence between the two variables. A test statistic greater than the critical Chi Square score of 12.5916 (6 degrees of freedom, .05 level of significance) would support the alternate hypothesis of a relationship between a firm's hedging frequency and amount of storage capacity.

42 A 2 tailed t test was used to test for a significant difference in the mean storage capacity of cooperative and proprietary firms. The extrapolated critical t statistic to reject the null hypothesis of no difference at a .05 significance level is 2.0116, with 49 degrees of freedom.

43 This differs from some findings at Purdue that patron owned firms tend to be significantly larger than investor owned firms. See Keen, op. cit.. and S.D. Burbrink, "An Analysis of Factors Affecting the Financial Performance of Country Grain Elevators" M.S. Thesis, Purdue University, (1981).

44 Due to their small sample properties t tests were used to test for significant differences within the three categories of hedging frequency between the means of patron and investor owned firms.

45 In the analysis for this study prices were lumped into monthly statistics. This reduced the number of observations and allowed t tests to be used to test for significant differences in mean price levels, due to their small sample properties. The price basis maintains the assumption of independent samples, allowing F ratios to be used to indicate significantly different variance in price.

46 This measure of price variance is discussed by Timmer in "Food Marketing and Price Policy," in Agricultural Marketing Strategy and Pricing Policy, ed. D. Elz (Washington D.C.: The World Bank, 1987), pp.73-74. Dalzeill, op. cit., pp. 43-49. discusses ten widely used single variable methods of measuring instability.

47 The Chicago Board of Trade was chosen over other futures markets due to its dominant market position in the region studied.

48 See footnote 44 above.

49 Keen, op. cit., p. 132. and Babb and Keen, op. cit., p. 32.

50 Adding to the explanation for the greater variance in the proprietary firm's posted corn prices given in the previous paragraph, the farm market of the patron owned firm contains relatively more on farm storage than the area served by the investor owned firm. That should reduce the variance of the cooperative's posted corn price relative to the proprietary firm in the comparison studied.

51 Patronage refunds were not considered in the prices obtained for this analysis. Although they would alter the statistics presented in this study, there are at least two factors that I believe reduce the impact that accounting for refunds would have on the conclusions of this report. First, the existence of a stable core of customers for each firm raises doubt over the effective difference that refunds have on farmer preferences between types of first-handler firms. Second, refunds are essentially an ex-poste condition, which introduces another degree of uncertainty into a sell/not sell decision by the farmer. I believe that uncertainty serves to discount the effect of a patronage refund on a farmer's decision to sell grain. Both of these statements are the author's opinion, and might be interesting objects of future inquiry.

52 Keen, Ibid..

53 Babb and Keen, Ibid..

CHAPTER 3

EXCHANGE METHODS

The movement of grain through the subsector directly and indirectly involves a number of different parties with an interest in the transactions. As each of these parties vie with one another in pursuit of their interest, parameters are formed for the exchange of grain, that framework is filled out, and the exchange of grain occurs. In practice there is no set pattern that the exchange of grain follows throughout the whole of the grain trade. The domestic movement of grain from the farm level to first handlers in the United States grain subsector is dominated by market transactions, rather than intrafirm, and/or centrally planned methods of coordinating the exchange.

Within the broad category of market transactions there are a variety of methods used to move grain from the farm level to first-handler grain firms. In order to examine the mechanics of grain transactions in the second part of this chapter the larger category of market transactions is broken down into six smaller categories. These sub-categories are cash sales; forward delivery contracts; futures market based exchange; options market based exchange; delayed pricing; government programs. Each of

those categories involve a fundamentally different approach to the exchange of grain. That difference is illustrated in the way each type of transaction deals with four primary elements of a market transaction; specifying performance criteria for the participants; transfer of ownership; establishing a price; physical delivery of the good.¹

Central to the theme of this study is the issue of risk in the exchange of grain between farmers and first-handler grain firms. In a broad sense transaction risk in the grain industry has four principal aspects, price, basis, output (i.e. production or yield) and default. If the exchange mechanism serves as a relatively neutral constraint on the behavior and roles of both participants, rather than a condition imposed by one party on the other party of a transaction, these four sides of risk can be condensed and treated as two substantially different risk issues. Price and basis risk can be viewed as two sides of risk as a monetary issue, while output and default risk are two related concerns of a contractual risk issue. That assumption will be made, and the variety of exchange methods available for the movement of grain from the farm to the first handler level of the grain subsector will be examined in light of these two different classes of risk, in this chapter.

Chapter Two dealt with the question of price and basis risk from the firm's point of view, and Chapter Four will look at a number of terms and conditions contained in the contracts offered by firm's to their farm customers. This chapter will

focus upon the mechanism of exchange² and its impact on both parties to a transaction. The primary objective of this study is to answer questions about distinctions in the risk managing behavior between Michigan cooperative and proprietary first-handler grain firms. With that goal in mind, the discussion in this chapter will be carried out through three different questions. First, is there a distinction between patron and investor owned firms in the methods of exchange offered to farmers? Second, how do the different exchange arrangements treat the four elements of a market transaction? Third, how does the type of exchange mechanism impact upon the risk of a transaction?

DISTINCTIONS BETWEEN IOF'S AND POF'S:

Representatives of ten different firms were interviewed for this study (see Appendix C for a list) seven were investor owned and three were patron owned grain firms.³ The responses given in these interviews were open ended, therefore the cumulative report given here will be descriptive, rather than the objective statistical analysis used in the previous chapter. Hopefully this method of presentation will convey some of the personal, intuitive process of the grain trade, expressed by those interviewed.

There was no definitive relationship between the firm's ownership structure and the grain marketing alternatives it

provided to its farm customers. Each firm offered a variety of choices to farmers covering the range of grain marketing options discussed in the next section of this chapter. In response to questions about personal likes and dislikes between the different alternatives, all of the people interviewed felt that in a given situation each of the marketing alternatives had pros and cons for the farmer and the firm. Each exchange contains unique factors, therefore an advantage in one case might be a disadvantage in another specific transaction. Instead of consistently favoring one particular type of transaction over another, those interviewed expressed a willingness to "work with" a farmer in order to obtain what is "best" for that customer, within guidelines judged prudent by the firm.

The prudent guidelines vary to a large degree according to the grain buyers subjective assessment of the transaction environment. Such issues as the past record of dealings between that farmer and the firm, current conditions in the "grain markets", and the firm's current position were all mentioned as parameters for an individual transaction. The changing and subjective nature of those contingencies made it impossible for those interviewed to state absolute guidelines covering the scope of their farmer-firm grain dealings.

The subjective factors mentioned above point out the critical role that personal relationships play in the movement of grain from the farm to a particular firm. Despite the fact that those interviewed largely believed that farmers "shopped around"

and therefore had an awareness of price differences between firms, all of the people interviewed stated that their business revolved around a stable, core group of farm customers. While the cooperatives expressed in stronger terms than the investor owned firms that their customers (owners) were less likely to be swayed by minor price differences.⁴ All of the firms spoken with perceived a strong degree of farmer loyalty to specific organizations. That loyalty is believed to be based upon year around consistency in service, rather than periodic "good deals" the firm may offer to farmers.

The fact that each firm interviewed offered essentially the same marketing alternatives to farmers regardless of its ownership structure does not imply that no distinctions were revealed in the interviews. While all of the people interviewed felt that each marketing option had strong, as well as weak points in a given exchange setting, two trends emerged through questions about the firm's likes or dislikes in grain purchasing practices. One trend involved the firm's willingness to accept risk in farm to firm grain transactions, and the other concerned the perceived level of farmer proficiency in grain marketing.

Given the uncertain environment in agriculture and the Michigan elevator industry at the time of the interviews, it was not suprising that statements about grain purchasing practices incorporated concern about security from business risk. The approach that the firms interviewed took toward business risk roughly split the firms along cooperative versus proprietary

lines. Patron owned firms preferred to hedge the risk level by utilizing a variety of exchange methods.⁵ Their goal was to prevent placing "all eggs in one basket" and maintain a secure position through a mixture of methods that allow a smooth flow of commodities.⁶ In contrast, all but two investor owned firms⁷ felt that the simplicity and convenience of cash marketing, combined with a low level of forward delivery contracting to aid the farmer's future planning was best at the farm-first handler level. The expressed advantages to the firm of a predominant cash marketing program by farmers was the reduction in uncertainty over what grain the firm controlled.

The proprietary firm's belief in the advantage to farmers of a high level of cash marketing, combined with some forward delivery contracts introduces another clear distinction between patron and investor owned firms that emerged from the interviews. All of the proprietary firms expressed that insufficient farmer knowledge was a critical factor in the grain marketing process. Those firms perceived that farmers lack the knowledge and "necessary discipline"⁸ to successfully market their grain through futures market pricing options. Cooperative firms also acknowledged a difficulty in fully exploiting the range of marketing options due to a lack of farmer knowledge. Opposed to the proprietary firms inclination toward cash and forward delivery contract marketing by farmers, the patron owned firms viewed part of their "mission" to overcome that shortcoming in their customers. Consequently, unlike the investor owned firms, lack of

farmer knowledge was not expressed by the cooperatives as a hindrance to explicit use of the futures markets by farmers in marketing their grain.

The result of the interviews was an unambiguous statement that both cooperative and proprietary firms were committed to offering a full array of alternatives to farmers for marketing their grain. Less clear cut was a belief in the "best" way for farmers to market their grain. All of the people paid at least lip service to the view that there is no one best method to transact grain between the farm and first handler level, because each option has good points and bad. Between the lines, however, a picture emerged of different perceptions by investor and patron owned firms over what is best. Proprietary firms tended to emphasize cash sales based on the simplicity and convenience. Cooperatives were more consistent in stating a preference for farmers to spread the sale of their grain across a variety of sales instruments.

In order to check the generality of that observation through a broader sample group (broader in the sense of larger, as well as more diverse size and type of business operations) a question was included in the survey of Michigan first-handler grain firms. That question asked firms to; "From the standpoint of the firm, please rank in order of preference the following categories of transactions between the firm and the farmer." The values ranged from 1 for the most preferred, to 5 for the least preferred by the firm, the averaged responses and comparative

t statistics are reported in Table 3-1 below.⁹

Table 3-1
Averaged Ranking of Preferred Exchange Methods

	Cash	Govt. Program	Forward Delivery Contract
IOF Average	1.4444	2.4444	2.6296
POF Average	1.2222	2.5555	2.8889
t statistic	1.2896	-.3114	-.8232
43 d.f.			
Rejection Region	.30	.80	.50

	Futures Markets	Options Markets
IOF Average	3.8519	4.7037
POF Average	3.7222	4.6111
t statistic	.4723	.5784
Rejection Region	.70	.60

H_0 : IOF=POF

[Source: Michigan Survey, 1988]

The averaged responses do not support the post-interview observation that proprietary firms favored cash sales more than patron owned firms, in fact they point to the reverse conclusion. Also unanticipated from the interview process was the second place ranking of government programs. Only one firm (investor owned) expressed a preference from the firm's standpoint for using

government programs over other marketing options. That preference was based on the security of holding government commodity certificates.¹⁰ Along with that lone statement representatives of two other proprietary firms expressed the belief that government programs have limited the effectiveness of some grain marketing alternatives, principally variations on option contracts.¹¹ Other than those two points the averaged responses by surveyed firms followed the pattern expected from the interviews.

The t statistics for each category fail to reject the null hypothesis of no difference between patron and investor owned firms at the .05 level of significance. The higher t score for cash sales (relative to the other categories) led to testing that category for significance in its own right. The test rejected an unequivocal first place ranking of cash sales at the .05 significance level for both types of firms. The t score for the cash sales averaged response of investor owned firms was 3.604 with 26 degrees of freedom, and for patron owned it was 2.204 with 17 degrees of freedom. The critical t statistics at the .05 significance level is 2.056 for the proprietary, and 2.11 for the cooperative group of firms. In each case the survey statistics indicate that cash sales are not unambiguously favored by firms over other farm to firm marketing alternatives.

The heading of this section contains the implicit question, is there a distinction between patron and investor owned firms in the methods offered to farmers for the sale/purchase of grain? In view of the information collected from first-handler

firms, through interviews and survey responses, the answer to the question must be "no". Each type of firm offers a wide array of marketing alternatives to the farmer. There does seem to be a discrepancy between cooperative and proprietary firms in their preferred options, however, the evidence is not strong enough to draw a line of distinction between patron and investor owned firms.

CATEGORIES OF EXCHANGE:

In order to explore the mechanics of farm to first-handler firm grain transactions in a manageable fashion the array of marketing alternatives is broken down into six sub-categories.¹² These categories are, cash sales; forward delivery contracts; futures market based exchange; option market based exchange; delayed pricing; government programs. These six categories are not an arbitrary taxonomy, the structural characteristics represent fundamentally different ways of moving grain from the farm to the first handler level in the U.S. grain marketing system.

The objective of this section is to examine each of these six types of exchange arrangement in terms of their differences. These differences will be discussed in light of how they resolve four principal elements of a transaction, specification of performance; establishing a price; transfer of ownership; physical

delivery of the commodity to the buyer.

The first category to be examined is cash sales of grain by a farmer to a grain firm. The importance of cash sales exceeds other exchange mechanisms in terms of the volume of grain moving from the farm level into the marketing system.¹³ Some sources have estimated that 60% of grain purchases by firms from farmers are on a cash sale basis.¹⁴ Cash sales of grain by farmers can be differentiated according to the terms of payment. Payment by the firm may be either immediate (upon delivery) or deferred to a stated future date, following the desires of the seller. In each case the terms of the exchange are established at the time of the sale. The commodity is in a deliverable condition (harvested) that each party can determine in due course (delivery) according to the agreement.

The exchange price in a cash sale is explicit, being the posted price of the buyer at the time of the sale. This price is the gross price for the grain, which is then adjusted for the condition of the delivered commodity. Adjustments from the gross to the net sale price are made according to an understood schedule of premiums and discounts based on accepted grain quality standards.

The transfer of ownership of the grain from the seller to the buyer is immediate at the time of the sale. It is that timeliness of the transfer which accounts for the security firms believe they have in cash sale transactions. In the words of one interviewed industry participant, with the cash market "you are

sure of where you stand".¹⁵

Physical delivery of the grain from the seller to the buyer is primarily contingent upon the quantity of grain involved in the transaction and its location, the grain may or may not already be in the firm's "house". If the grain is in the firm's inventory then delivery has already taken place and the exchange can be consummated on paper. If the grain is in the farmer's possession, then depending upon the quantity sold and the method of transport, delivery could be either immediate or spread out over an agreed upon short term time period. In some cases the seller may agree to deliver the grain to a firm other than the initial purchasing firm. There is generally a price incentive for the seller to deliver the grain to facilities other than the immediate buyer's.¹⁶

In some instances delivery of the grain is to take place later in the same, or often in the next marketing year. The mechanism for the exchange of grain on this basis is a forward delivery contract. Other than cash sales, many of the people interviewed felt that forward delivery contracts were the most easily understood (therefore best) exchange mechanism among farmers. Forward delivery contracts also ran a close third in the preferred method of exchange expressed by Michigan first-handlers in the survey distributed for this study (see Table 3-1), and account for approximately 29% of the corn, 31% of the soybeans, and 11% of the wheat purchased by firms in Indiana, Illinois, Iowa, and Kansas in the 1978 marketing year.¹⁷

The performance specifications of forward delivery contracts offered to farmers vary in format from firm to firm. The next chapter of this study will examine in detail a sample of contracts available to Michigan farmers from both cooperative and proprietary firms. The need for a contract enforceable over time, creates a transaction with terms of trade more structured than many cash sales. In addition the ability to limit the relevant parties to two (farmer and firm) allows greater freedom in setting out the terms of the exchange, than with some other types of exchange, such as contracts based upon other contracts thereby adding an explicit third party to the agreement.

The price established in a forward delivery contract is based upon the prevailing price in the futures market for a contract deliverable in the desired time period. At the level in the marketing system where farm-first handler exchange takes place, the forward delivery contract is generally priced according to the futures contract expiring during the harvest period for the crop being contracted, adjusted for the basis.

Contracting a crop not yet produced introduces contrasting perspectives in the transaction over when ownership of the grain is transferred. I believe that the issue is indeterminate depending upon the frame of reference each party to the contract operates from. Both sides see forward delivery contracts as tools for planning, however, farmers view delivery on the contract as an end, while firms view delivery on the contract as a beginning of the marketing process. Traditionally farmers have taken the point

of view that inability to deliver on a contract nullifies their commitment, that stance is commonly referred to as the, "you cannot get blood from a stone" position in contractual squabbles. This carries the implication that ownership of the grain is transferred at delivery on the contract. On the other hand, firms that offer forward contracts to farmers incorporate the contracted commodity into their business planning, taking the position that the contracted crop has existence in its pre-harvest condition, and therefore ownership is in essence transferred at the time of contracting. This issue has resulted in recent lengthy Michigan court cases, between farmers and the firms forward contracting with them for navy beans.

Physical delivery of the contracted grain takes place in the same manner as a cash sale. While this discussion has been carried with the implicit assumption that the contracted grain is in the (pre)production stage, there is no reason why it could not be part of the firm or farmer's existing stored inventory. In either case physical delivery of the grain will take place prior to the date contracted, to the location specified in the agreement.

Forward delivery contracts are not the only means of moving grain from the farm level through contracts based on anticipated production. In addition to their role in grain price formation, futures markets provide a method for farmers to sell grain to first-handler firms. The use of futures markets as a direct outlet for marketing grain is almost nonexistent relative

to the alternatives available.¹⁸ Also, outright use of futures contracts by farmers for protection from risk is in the range of 10 to 15% for all farmers, according to the Chicago Board of Trade.¹⁹

No doubt a substantial part of the reason for the small number of farmers trading in futures contracts is the first-handler firms reluctance to promote the activity. Several firms do provide an opportunity for their customers to interact with the Board of Trade in Chicago, through video terminals that display the trading in the futures markets,²⁰ but the overall feeling among those interviewed was that farmers generally lack the requisite knowledge and skill to successfully market their grain through futures contracts.²¹ Despite their disinclination toward farmers marketing grain through futures markets, firms commonly offer two distinctly different type of marketing alternatives that take advantage of the nature of futures contracts, basis and hedge- to- arrive contracts (average pricing contracts exist, but not to the degree of these two).

Basis contracts enable the farmer to take advantage of a favorable existing basis at a later time period. It allows fixing the basis for the sale of a given quantity of grain, while leaving the price open. The precise terms of trade are spelled out at the time the contract is made. The firm guarantees an agreed upon difference between cash (the firm's posted price) and futures market price, and the farmer agrees to deliver a specific quantity of grain at a particular location, within a given period of time.

In some situations the firm may allow the farmer to shift the contract period ahead, tying it to another futures contract and postponing performance (completion) of the contract. Grain quality considerations are related to the grade traded in the futures contracts (No. 2 yellow) with deductions made in accordance with the quality of the actual grain delivered.

With this type of exchange the "price" established is the differential of the basis for which the contract is written. The actual sale price of the grain will fluctuate in direct relationship to the specific futures contract that the basis contract is written against. That creates a grain sale that is essentially without a price, until the performance date of the contract is reached.

Ownership of the grain is transferred at the completion of the terms of the contract. That would be when the contracted grain is delivered, and priced out according to the terms of the contract.

Physical delivery against a basis contract generally takes place over a given period of time between the initial arrangement and the required delivery date for the futures contract it is written against. The location for delivery is specified in the contract, and may not be the facilities of the contracting firm. Although the choice of futures contract will be determined if the grain is to be current, or past production pulled out of storage.

Comparing basis and hedge-to-arrive contracts, specification of performance, transfer of ownership, and physical

delivery of the contracted grain correspond between them. The principal difference lies in the price formation process that each follows. Basis contracts fix the price differential, but leave the price of the underlying futures contract variable, hedge-to-arrive contracts freeze the futures contract price, but leave the basis open to fluctuation.

Hedge-to-arrive contracts establish a price for the sale of grain at the price of a futures contract chosen at the time the contract is made. This price is in effect a target price chosen as a result of the seller's expectation that the price of that contract will decline before delivery of the commodity is completed.

Farm level marketing through the options market is a relatively new phenomenon. An important distinction between the purchase of an option versus a futures contract is that purchasing an option still allows the buyer to do nothing, letting the option expire. The purchase (or sale) of a futures contract, however, requires additional action by the purchaser (seller) at the contract's expiration (delivery date). The sample of first-handler firms contacted for this study, both through interviews and the survey, were nearly unanimous in downplaying the attractiveness of options contracts as a marketing alternative for the farmer. The survey of firm preferences ranked options last of five choices among both investor and patron owned firms. Those interviewed were able to express their dissatisfaction, and the overwhelming perception was that in the existing market

environment (1987) the premium was too high to make the purchase of an option worthwhile.²² There was also the strong belief among those interviewed that, like marketing through futures contracts, farmers did not know enough about options to use them effectively.

Perceptions aside, at least two forms of options contracts are available to farmers through first-handler firms in Michigan. In the first, the firm accepts an option to purchase the farmers grain at a certain price within a specified period of time. At the end of the time for which the option is granted by the farmer the contract becomes nullified. The price established is at the discretion of the farmer as the option grantor. The firm is under no obligation to purchase the grain if the "market" price does not (or even if it does) reach the figure agreed to in the option-to-purchase contract. Ownership of the grain is transferred when the firm exercises its option at the price desired by the farmer. Physical delivery of the grain sold takes place within the time frame specified in the contract.

The second type of options contract offered more frequently by the firms interviewed is called a minimum price contract. Minimum price contracts differ from option-to-purchase agreements by incorporating elements of forward delivery contracts with the agricultural options contracts that form the foundation of option-to-purchase transactions. The difference manifests itself in mandating an obligation of the parties to the exchange, rather than simply conveying a unilateral right to conclude the transaction (or not) in the hands of one of the parties. That

means with a minimum price contract the exchange of grain will take place, removing any uncertainty that may exist under an option-to-purchase agreement.

The terms of performance are fully detailed in the minimum price contract. Including quantity, discounts and price schedules, as well as a statement of delivery requirements for the contracted grain.²³

The price established in a minimum price contract stems from the two parts of the contractual structure. The initial base price is related to the firm's posted price for the given commodity. That price is then altered by costs the firm incurs in securing an options contract to allow the farmer to gain from increases in the price of grain. The cost of guaranteeing a certain minimum price to the farmer varies with the price desired, in relation to the strike price of the option contract backing up the arrangement. The actual price the grain trades for may be higher than that established in the contract, contingent upon price movements in the futures markets which have a positive impact on the firm's posted price, but as the name implies it will not be lower.

Ownership of the grain is transferred when the farmer concludes the pricing agreement by accepting a given price within a specified time period, or at the expiration date of the contract.

Physical delivery of the grain takes place in accordance with the conditions agreed upon in the contract. If the grain is

not already in the firm's stored grain inventory delivery may be specified at another location, within a certain period of time.

A fifth type of exchange mechanism found at the farm-first handler level of the grain marketing system involves delayed pricing of the grain. This is different than the deferred pricing mentioned earlier, under a deferred pricing agreement title to the grain is not transferred without an explicit price, or formula agreed upon for reaching a sale price. Delayed pricing agreements, however, transfer ownership of the grain before an explicit price (posted or formula) is established. The outstanding example of delayed pricing arrangements are price later agreements.²⁴

Price later agreements convey title of the grain to the firm, leaving it to be priced and sold by the farmer at a future date. The terms of price later agreements assume a different importance to each of the contractual parties. From the farmers perspective price later agreements are primarily storage agreements, the grain remains unpriced (hence unsold in the usual sense) and the farmer continues to pay storage costs to the firm until the grain is priced and sold by him. For the firm, price later agreements are a tool for accepting farm level grain, and moving it up the marketing system, without filling up limited (therefore crucial) storage capacity at times of heavy grain inflows, such as harvest. That aspect of a price later agreement reduces a firm's capital requirements and risk.

Before a price later agreement can be made the grain must

be delivered to the firm, with the grade established and accounted for in the firm's inventory. The price may be established any time in the future (based on the firm's posted price) although firm's often make an effort to have these agreements priced out within the marketing year. Fees and costs, such as storage charges, are deducted from the selling price of the grain at the time of sale.

The final category of exchange mechanism discussed in this chapter falls under the broad heading of government programs. That general classification covers a lot of ground which is not relevant to the focus of this chapter or this study. The bulk of government farm programs, loans, target prices, and the farmer owned reserve programs, do not constitute methods of moving grain from the farm to the first handler level of the marketing system. On the other hand, with the institution of the payment in kind concept in the early 1980's as a way of reducing government grain inventory stocks, government programs began to encompass the exchange of grain between farmers and first-handler firms. The generic commodity certificates (CCC-6), that began to be issued by the U.S.D.A. in the spring of 1986, represented a common way of moving grain into the marketing system through first-handler firms, when the primary research was done for this study.

That method, referred to as PIK and ROLL, involved the redemption of grain pledged by farmers as collateral for government loans through the use of the commodity certificates issued by the U.S.D.A.. The PIK and ROLL transaction is between

the farmer and the local A.S.C.S. office, it does not necessarily involve a firm, proprietary or cooperative, unless the grain is in the firm's government storage inventory. The importance of this type of exchange is in providing grain to be moved from the farm level into the marketing system, a process in which a grain firm may be involved.

The performance specifications for this type of exchange are laid out by the rules established in the formation of the payment in kind program. These rules are standard throughout the programs area.

The final price established in a PIK and ROLL transaction depends upon four different prices factored together in the exchange; the given county rate on government loans; the A.S.C.S. "posted county price" for grain redeemed by commodity certificates; the local cash price for grain offered by firms in the area; the premium attached to the exchange value of the commodity certificates. Although none of these prices have a fixed value (the county loan rate being a type of administered price is inherently more stable than the others) each is taken as a given by the farmer in their decision to undertake a PIK and ROLL exchange. The final price depends on the mixture of those four different prices, if the farmer holds the grain in the farmer owned reserve, then the storage fees forgone in the PIK and ROLL would also be a factor in the price determination.

Ownership of the grain reverts to the farmer when the certificates are surrendered in repayment of the government loan.

Prior to that time the grain is held in storage as collateral against the loan, and whoever is providing the storage service (possibly the farmer) receives payment from the government for services rendered.

Movement of the grain is outside the scope of the transaction itself, although it is undoubtedly a factor in the farmer's decision making process prior to the transaction. Therefore, physical delivery of the grain is largely irrelevant in the actual PIK and ROLL transaction. As long as the farmer retains title the grain is considered delivered at its stored location.

RISK IN THE CATEGORIES OF EXCHANGE:

This section of Chapter Three asks the question; how does the type of exchange mechanism impact upon the risk of a transaction? The last section of this study detailed six categories of methods used to move grain from the farm to the first handler level; cash sales; forward delivery contracts; futures market based; options market based; delayed pricing; government program. Each of those categories involves the four types of risk identified in the introduction to this chapter, price, basis, output, and default. Furthermore, each method of structuring the exchange of grain creates a different proportioning, and degree of risk on the participants in the

exchange.

As cash sales of grain are structured the principal risk comes from monetary, price/basis risk, not from contractual, output/default risk. The relevant timeframe is the immediate present, without direct concern by either party over the establishment of constraints on future actions. Uncertainty and expectations of the future are expressed in the offered and accepted terms and conditions (primarily price and quantity considerations) of the exchange. This makes for a "simple" exchange easily understood, without concern over future performance by the participants.

The nature of a cash sale is that the seller forgoes the benefit of either an increasing price or decreasing basis that might be gained with another type of exchange. That loss does not create exposure to risk, just the opposite, it reduces the price/basis risk of holding grain inventories through a decision made in the face of uncertainty. The seller does face some default risk in a deferred payment arrangement, but due to the nature of a cash sale the grain has either been delivered, or is in a deliverable position, eliminating exposure to output risk in the sale.

The cash sale of grain imposes the greatest risk in a transaction upon the buyer. Having paid a fixed price for the grain the buyer has opened the door for price or basis changes adverse to their position. In addition, the buyer accepts some output risk from the uncertain response by farmers to the grain

prices posted by the firm for cash sales, a risk that diminishes over the course of the marketing year as grain inventories are accounted for.

Forward delivery contracts serve as a type of extension of cash grain sales conditions into a future time period. In that capacity they reduce some uncertainty over future prices for grain (albeit an ex ante position) hence some degree of the price/basis risk faced by farm level planners. Entering into a forward delivery contract, however, increases the exposure to default/output risk over that in a cash grain transaction.

The seller using a forward delivery contract reduces monetary risk by fixing a price for a given quantity and quality of grain to be placed on the market in the coming year. Some price/basis risk continues through uncertainty over the contract-cash market price at the time of delivery on the forward contract. That uncertainty exists due to the ongoing incorporation of information into the grain price, and the implicit basis relationship. The tradeoff may be to the farmer's benefit if it allows the shifting of some business risk onto a third party, such as a lending institution.

A forward delivery contract seller's risk from failed production, and/or contractual default increases substantially over cash grain sales.²⁵ Weather patterns are an ever present concern in assessing the future yield of crops. While the lack of liquidity in forward delivery contracts, combined with recent structural changes in the first handler level have increased the

risk of contract default in many "traditional" farmer-firm relationships.

In setting the price for grain purchased through a forward delivery contract the grain buyer has the means to reduce most exposure to price/basis risk. The connection between the futures markets and grain prices was discussed in the previous chapter, it is sufficient to note that firms explicitly use futures in setting the price on forward delivery contracts.²⁶ The use of futures in determining the price for forward delivery contracts ties that price to the firm's schedule of daily posted prices, as well as connects it with the larger web of grain "market" prices. The position might also be sold in the futures, covered by an option contract, or allocated to a future sale of grain by the firm up the marketing ladder. All of these actions serve to reduce the price/basis risk of buyers offering forward delivery contracts to grain sellers.

Unlike cash grain marketings, the default/output risk to buyers using forward delivery contracts is substantial. The evidence gathered indicates the bulk of forward contracts are written for the harvest period.²⁷ Just as weather may affect the production risk of grain sellers, it affects those buyers contracting for future production, and in this case output risk is largely analogous to the risk of default facing grain buyers. This topic will receive greater attention in the next chapter through an examination of terms and conditions of contracts used by first-handler firms.

Forward delivery contracts are based on a local firms posted grain price, which implicitly incorporates price information from futures markets. Basis and hedge-to-arrive contracts represent two different ways of explicitly incorporating futures markets into the movement of grain from farm to first handler level. These contracts reduce some of the risk that grain buyers are subject to under forward delivery contracts, leaving grain sellers with slightly greater risk exposure, whichever type of contract they choose.

Farmers, as grain sellers using these instruments must make an assumption about futures price movements, requiring a larger base of information than cash or forward delivery contract grain sales. The seller is assuming the risk of insufficient production to cover the quantity/quality of grain contracted, and the entailing risk of default on the contract the same as a forward delivery contract. But, in choosing a contract with a price explicitly based on the futures market the seller is lessening the degree of price/basis risk, price risk in a basis contract, and basis risk in a hedge-to-arrive agreement. This risk is less than under a forward delivery contract stemming from the price dampening effect of the larger futures market price, versus the more volatile local posted price for grain delivered to a first-handler firm under a forward contract.

With these contracts grain buyers have shifted some price/basis risk onto the futures markets through their function as a price base. Although these contracts reduce the grain

buyer's monetary side of risk in purchasing grain, they still leave them vulnerable to output/default by the grain seller as a result of lower than expected levels of crop production.

Two methods of exchange based upon option contracts,²⁸ option-to-purchase agreements and minimum price contracts, might be used by grain sellers to reduce their price/basis risk. These two contracts are fundamentally different, the option-to-purchase involves the farmer selling a call option to the firm. The minimum price contract involves the firm offering the farmer a forward delivery contract that incorporates a call option premium into the contract price, in effect setting a price floor that still allows for upward price movement over the life of the contract. The different structure of these contracts creates a disparate distribution of risk between the buyers and sellers in a transaction.

Both of these contracts eliminate downside price risk for the grain seller. Minimum price contracts also negate the seller's risk from a widening basis, which option-to-purchase agreements do not. Option-to-purchase agreements are not the wisest choice for those who must sell grain within a given time period, due to the buyer's discretion to either exercise the option, or not. With minimum price contracts, however, the open question is not "Is the grain going to be sold?", but "At what price will the grain be sold?".

For the grain buyer both of these contractual alternatives present a minimal price/basis risk. In each case the contracts

can be based on units of 5000 bushels, allowing the buyer to pass risk on to the larger Chicago options market. In some cases options based contracts are also used by first-handlers to facilitate movement of grain upstream in the marketing system,²⁹ providing a firm's purchases and sales to be tied together.

This type of exchange method is quite useful for the moving grain out of storage throughout the marketing year. In that case the output/default risk of using these contracts is minimal to nonexistent. Minimum price contracts due to the mandated delivery terms carry a somewhat higher risk of default than option-to-purchase agreements, that may be "covered" in the futures market. If these contracts are used as pre-harvest sales instruments, however, they carry the same output/default risk as other pre-production forward contracting mechanisms discussed above.

Price later agreements have come to represent two things in the farming community. First, a popular method of moving grain from the farm level into the marketing channel accounting for 40% of Michigan corn stored off the farm in 1979.³⁰ Second, an increasingly risky type of transaction for the farmer when business conditions in agriculture worsened in the early part of the 1980's. The first point is an indication of the stable relationship built between first-handler firms, and many of their farm customers. The second point stems from the structure of the transaction, where title to the grain is surrendered by the farmer prior to selling the grain, without receiving compensation for the

transfer of rights (in fact storage costs continue to accrue). This situation creates the highest level of risk to the grain seller among those exchange methods available to the farmer.

Under a price later agreement the grain seller holds all of the price/basis risk. The farmer reduces his marketing alternatives, speculating that the posted price of the firm the grain was delivered to will move higher (by more than storage costs) as the marketing year progresses. In assuming this speculative position, the farmer is without the downside price/basis protection offered by other types of exchange practices.

The firm, as grain buyer, faces no price risk if the stored grain (owned by the firm) is properly hedged (basis risk remains with a straight hedged position). The advantage of a price later agreement to the firm is that it enables grain to be accepted by, and moved through the firm into the grain marketing system, when available storage capacity is insufficient, or nonexistent. If the firm uses grain stored under a price later agreement in a speculative fashion (unhedged) and the market moves against it, then it assumes a large price risk, as well as the risk of default on the agreement.

As the grain is already produced and stored, output risk is not a factor in a price later (delayed pricing) situation. Default risk borne by the farmer is a significant factor for both the seller and the buyer. The willingness of a farmer to place his grain under a price later agreement is related to the degree

of trust built up between the farmer and the firm offering the contract. The farmer is accepting the risk that the firm may default upon the contract through improper business practices. The firm, on the other hand, accepts the obligation to minimize the risk of default through careful inventory management. Failure to fulfill the obligation, and/or default on the contract would endanger the firm's role as a going concern.

As might be expected, a PIK and ROLL transaction creates a much different distribution of risk than the other five categories of exchange discussed in this chapter. The farmer's role continues to be an important factor, but the firm plays a less important part than in the other types of exchange. Firms lose most of the power they wield in other types of transactions, constrained by the parameters of the government program, sharing their accustomed role with the local A.S.C.S. office they fill a largely clerical function in the transaction. The primary player in a PIK and ROLL is the farmer, who is both the prime mover, and principal beneficiary of the transaction.

A properly executed PIK and ROLL reduces price/basis risk faced by the farmer. Price risk is eliminated because the critical factor is not the price level, but the "basis" between the posted county price (a function of a given terminal market) and the local posted price for grain. Properly executed means that the transaction is done in one day's time. The critical prices are subject to change from day to day, therefore timeliness is necessary to reduce the basis risk by holding the relevant

prices and costs fixed at a known level.

Risk from default is nonexistent within the rules of the exchange. The grain is "guaranteed" available, and the commodity certificates have some liquidity themselves. Also, not being a pre-production transaction output risk is also not a major concern in a PIK and ROLL procedure.

SUMMARY:

This chapter described a variety of methods used by farmers and first-handler grain firms to arrange the exchange grain between them. Three specific objectives were to, first, reveal any distinctions between patron and investor owned firms in the grain marketing alternatives offered to farmers. Second, discuss how the available marketing options structure a grain transaction between the farm and first handler level. Third, survey how the different nature of the categories of exchange impacts on the risk borne by the parties as grain buyer and seller. The goal here is to summarize the responses to those three topics.

Interviews failed to reveal a substantial distinction between patron and investor owned firms in the marketing options available to farmers. The key word is "available", each firm was prepared to develop a transaction suitable for the farm customer, but that does not mean each person interviewed liked all of the

possible marketing arrangements. The majority of proprietary firms interviewed preferred cash sale marketing, while cooperatives expressed a greater willingness to use a variety of transaction types. This stems from a perception among cooperative firms that farmers can overcome a lack of the knowledge necessary to successfully engage in direct futures and options market trading. Survey responses, however, indicated that the two types of firms do not significantly differ in ranking by preference five categories of exchange methods.

Examination of six categories of exchange revealed that there are definite distinctions between them in how a transaction is structured. The two critical factors involved are arriving at a price, and the transfer of ownership. The pricing connection between all the methods is the use of Chicago Board of Trade futures prices, as a reference point. Cash sales, forward delivery contracts, and delayed pricing transactions are primarily posted price arrangements. Futures and options market based exchange, as well as the government program examined, although they bear a resemblance to formula pricing also contain elements of a private treaty exchange where the final price is determined through direct negotiation between the buyer and seller.

The organization of each type of transaction carries with it a different balance of risk. Weather is a critical factor in any pre-harvest grain contract, moving grain out of storage into channels of the marketing system reduces principal output/default risk by the seller. The buyer can minimize default risk through a

prudent business plan, shifting risk onto larger markets (futures/options) when possible, and continuing to build stable farm-firm relationships. Price and basis risk are to some degree mutually exclusive, stemming from the base used in arriving at a contract price.

NOTES

1 V.J. Rhodes, "Pricing, Coordination, and the Organization of Agricultural Subsectors" in The Organization and Performance of the U.S. Food System ed. B.W. Marion (Lexington MA: Lexington Books, 1986), p. 418.

2 Specific definition and operational discussion of these mechanisms is widely available elsewhere and will not be covered in this study.

3 Representatives from Agri Sales and Battle Creek Farm Bureau were interviewed in person, all of the other interviews were conducted over the telephone. Each interview consisted of eight questions allowing comparisons to be drawn between the firms. In addition to the eight standard questions, each person interviewed was asked their perceptions on separate issues involving the firm, its marketplace, and the first handler level of the grain subsector. These secondary questions followed from the individual responses and were not standardized for comparison.

4 Representatives of cooperatives saw their farm customers (owners) as a homogenous group, whereas representatives of proprietary firms responded to questions about their farm customers in terms of a sliding scale from stable to price shoppers.

5 The only firm interviewed that favored options contracts under current conditions was Blissfield Coop, the others felt that the cost outweighed the benefits, relative to other forms of risk protection.

6 Interview with John Kohr, Cooperative Elevator Co., December 12, 1987.

7 The dissenters were The Andersons at Albion who stressed a high level of cooperation between farm and firm in order to obtain the highest price possible for the customer, and Metamora Grain in Ohio who had no preference at all how the grain was purchased. Interviews with Arman Hartung, The Andersons, Albion Grain Division, October 12, 1987, and Dave Duncan, The Metamora Elevator Co., October 21, 1987.

8 Interview with Don Seidl, Northern States Bean Co., October 9, 1987.

9 The averages reported in Table 3-1 are mean rankings of each category by the surveyed firms. T tests were performed on differences in the mean response of investor and patron owned firms in each category. The critical t statistic for a 2 tailed significance test at the 95% level was extrapolated to be 2.0179 with 43 degrees of freedom. For each category the t statistics obtained from the survey data failed to reject the null hypothesis of no difference between the ranked preferences of proprietary and cooperative firms.

10 Interview with Dave Duncan, op. cit..

11 Interviews with Phil Hageman, Parrish and Heimbecker Inc., October 20, 1987, and Henry Petrosky, Auburn Bean and Grain Co., October 15, 1987.

12 This division is derived from information provided by American Bean and Grain, Cargill Inc., and Dr. J. Ferris, Dept. of Agricultural Economics, Michigan State University.

13 A.E. Peck, op. cit., p. 10.

14 Babb and Keen, op. cit., p.2.

15 Interview with Don Seidl, op. cit..

16 Interview with Terry Bell, Blissfield CO-OP Co., October 13, 1987.

17 Keen, op. cit., pp. 357-359.

18 Less than 1% of all futures contracts are settled by physical delivery of the underlying commodity. K.D. Garbade and W.L. Silber, "Cash Settlement of Futures Contracts: An Economic Analysis" Journal of Futures Markets 3 (1983), p. 451.

19 G. Angell, Agricultural Options (New York: AMACOM, 1986), p. 8.

20 When the primary research was conducted for this study, Blissfield CO-OP Co., Cooperative Elevator Co., and Agri Sales supplied video access to the Chicago Board of Trade, there may be others at this time.

21 Representatives of Berger and Co., Northern States Bean Co., The Metamora Elevator Co., Berger and Co., and Parrish and Heimbecker Inc. all explicitly stated that lack of farmer knowledge limited the use of futures markets.

22 Interviews with representatives of Auburn Bean and Grain Co., Cooperative Elevator Co., Northern States Bean Co., and Parrish and Heimbecker Inc..

23 A sample contract written specifically as a minimum price contract is available in H.J. McDonald, The Minimum Price Contract-A New Marketing Alternative N.C.R. Extension Publication No. 217, (no date).

24 Price Later Agreements were first offered to Michigan farmers by The Andersons in the 1950's. W.W. Bauer, Michigan Agriculture (1800-1980) (Saginaw: Michigan Grain and Agri Dealers Assoc., 1982), p. 96.

25 Crop insurance can be purchased by the farmer to reduce the level of output/default risk of contracted grain, but as long as insurance is not stipulated in the grain contract it entails a transaction outside the farm-first handler level concerns of this study.

26 M.N. Leath, L.H. Meyer, and L.D. Hill, U.S. Corn Industry U.S.D.A., Economic Research Service, Agricultural Economic Report no. 479 (February 1982), pp. 75-76.

27 Posted forward prices, obtained in conjunction with the daily prices discussed in chapter two of this study, were all based upon harvest season delivery. In addition, representatives of Agri Sales Inc., The Andersons, Auburn Bean and Grain Co., Blissfield CO-OP Co., Cooperative Elevator Co., The Metamora Elevator Co., Northern States Bean Co., and Parrish and Heimbecker Inc. stated that forward delivery contracts play a large role in grain marketing by farmers.

28 Option contracts give the holder the right to buy or sell a specified futures contract at a predetermined price (strike or exercise price) until the expiration date. The premium is the price of the option paid by the buyer to the seller, part of which is held as margin money. Call options convey to the buyer the right to purchase a given futures contract at a specified price, within the life of the option.

29 The Cooperative Elevator Co. is one of the firms interviewed (The Metatmora Elevator Co. was the other) that talked of actively promoting upstream processed grain sales by first handler firms. They offer maximum price contracts to those customers, as well as minimum price contracts to the farm level.

30 Bauer, op. cit..

CHAPTER 4

CONTRACTS

The structure of a market exchange is established by the way each of the four basic elements in a transaction are dealt with in the exchange. It was apparent throughout the discussion in Chapter Three that the arrangements governing a particular purchase and sale of grain are specified within the grain contract. Therefore, knowledge of the contractual terms and conditions is essential to understanding the exchange between farmers and first-handler grain firms. It was felt that a comparative study of available grain contracts might also reveal distinctive behavior by patron and investor owned firms. The purpose of this chapter is to examine the role contracting plays in the exchange of grain, and to examine the effects that the provisions of grain contracts has on risk in the transaction.

DEGREE OF CONTRACTING:

The importance of contracts in the movement of grain from the farm to first handler level has been documented in the 1974

study of the United States grain industry by Helfner, et. al. (see Table 4-1) and reiterated in Helmuth's work Grain Pricing.¹ These national survey results are similar (but not identical) to information gathered in the survey of Michigan first-handler grain firms distributed for this study (see Table 4-2).

Table 4-1

Distribution of Grain Purchases From Farmers, by Time of Purchase
Relative to Time of Delivery, 1974 (%) (U.S.)

Time of Purchase

<u>Days for Delivery</u>	<u>Corn</u>	<u>Wheat</u>	<u>Soybeans</u>
> 30	20	14	20
1-30	35	19	29
Same Day	37	49	40
Priced After Title Change	8	18	11
<u>Total</u>	<u>100</u>	<u>100</u>	<u>100</u>

[Source: Helfner, et. al., 1977]

Table 4-2

Distribution of Grain Purchases From Farmers, by Time of Purchase
Relative to Time of Delivery, 1987 (%) (MI)

Time of Purchase

<u>Days for Delivery</u>	<u>Percent of Grain Purchases</u>
> 30	10
1-30	18
Same Day	52
Priced After Title Change	20
<u>Total</u>	<u>100</u>

[Source: Michigan Survey, 1988]

In the national survey 63% of corn purchases, 51% of wheat purchases, and 60% of soybean purchases from farmers were made under a forward delivery, deferred or delayed pricing arrangement. In comparison, the Michigan survey revealed that approximately 48% of grain purchases were made on that basis, while almost 52% were made at the time of delivery, or change of title in the 1986 marketing year. The Michigan survey did not differentiate between commodities, other than the separation of grain from beans.

There are several possible explanations for the difference in responses to the two surveys. First, over the 12 years between surveys structural fundamentals of the marketplace might have changed. This could be due to factors such as different relative price levels, increasing mechanization and debt on the part of

both farms and firms, or the increasing age of farmers may alter their selling habits. Second, the Michigan market may have more part-time or hobby farmers for which the benefits of grain contracting do not outweigh the costs of increased complexity and output risk. Third, relative to other states, Michigan may have more on-farm storage, allowing farmers in Michigan to capture storage rents from traditional price-basis movement in cash prices throughout the marketing year. Fourth, encompassing each of the other possibilities, the relationship between farmers and first-handler firms in Michigan may be founded on a more personal basis. A closer personal relationship between farm and firm would involve a greater level of trust, this would partially explain the higher level of delayed pricing arrangements in Michigan than on average across the U.S.. Fifth, condensing the relative volume of different grains reported in the national survey under the broad heading of "grain" in the Michigan survey may have skewed the comparative results.

The relative lower level of contract purchases reported by firms in the Michigan survey finds corresponding support in another survey of firms in Indiana, Illinois, Iowa, and Kansas by Keen at Purdue² (see Table 4-3).

Table 4-3

Grain Purchasing Practices, Indiana, Illinois, Iowa, Kansas (%)

	Corn		Wheat		Soybeans	
	POF	IOF	POF	IOF	POF	IOF
Purchased by						
Contract	29.7	28.73	12.27	9.94	30.11	32.42
Purchased by						
Deferred Pricing	5.94	9.59	3.27	4.1	7.38	11.35
Brokered Direct	13.85	13.04	8.15	5.52	10.33	11.48

[Source: Keen, 1985]

The similarity between purchasing practices of cooperative and proprietary firms indicated by Keen's results are also supported by the survey of Michigan first-handler firms. In testing the hypothesis that patron and investor owned firms differ in the time distribution of grain purchases (as an indicator of the type of purchase arrangement) the null hypothesis fails to be rejected in any category at the .05 level of significance. Failure to reject the null hypothesis at that level indicates, with a high degree of certainty, there is no difference between investor and patron owned firms in the data categorized from the survey of Michigan firms. The t statistics and averaged percentages from the Michigan survey responses are given in Table 4-4.

Table 4-4

Firm's Grain Purchase Practices,
Cooperative vs. Proprietary (MI)

Time of Purchase	Percent of Grain Purchases		t statistics
<u>Days to Delivery</u>	<u>POF</u>	<u>IOF</u>	<u>(48 d.f.)</u>
< 30	8.4762	11.0345	.669
1-30	16.9048	19.4138	.36
Same Day	52.0	51.931	-.008
<u>Priced After Title Change</u>	<u>22.619</u>	<u>17.6207</u>	<u>-.77</u>

[Source: Michigan Survey, 1988]

H_0 : IOF=POF

Critical t is extrapolated at 2.013 at .05 level of significance
(2 tailed test) with 48 degrees of freedom

CONTRACT COMPARISON:

Despite the lower reported use of grain contracting in Michigan than nationally, with around 48% of the grain moving off the farm under some type of contract, it is still an important means of coordination in the Michigan marketplace. Contracts were obtained from ten firms serving the Michigan grain market in order to compare how the terms and conditions of grain contracts available to Michigan farmers vary between cooperative and proprietary firms. Five contracts were provided by cooperative and five by investor owned firms. The patron owned firms are;

B & W Co-operative Inc.; Blissfield Co-op Co.; Cooperative Elevator Co.; Eaton Farm Bureau Co-op; Mid-States Terminals Inc.. The proprietary firms represented are; Agri Sales Inc.; American Bean and Grain Corporation; The Andersons; Auburn Bean and Grain; Berger and Company.³ In the case of each request for copies of their grain contracts the firm responded that only one basic contract form is used, regardless of the specific type (structure) of the exchange.⁴ The basic contract is filled out to meet the requirements of the particular purchase arrangements desired by participants in a transaction.

The ten contracts varied widely in format appearance from an open ended, fill in the necessary space (4,5,D) to a more formal fill in the blank (A,E) with remainder having aspects of both. Most of the contracts contained two separate sections, one outlining the specifications relevant to the exchange, and the other listing the general terms and conditions under which the contract is entered. The first section was common to all of the contracts examined, containing spaces for the following information. Names of the parties to the agreement; date; contract number; net quantity of contracted commodity (pounds/or bushels, with the exception of Agri Sales which also provided an option for specific acreage); commodity; base for price determination; shipping period; place of delivery. Those categories detail performance specifications for each contractual agreement, but convey little information about the risk specific to parties under that firm's contract compared to another firm's

purchase agreement. Information about the degree of specific risk in a given contract is largely gleaned from the second section of the contract's format, and it is that section which supplies the material for the following comparative analysis.

The constraints imposed on participants in a transaction by the conditions stated in the basic contract are summarized in thirteen different clauses. Not all of these statements were phrased the same in each contract, nor were all of them found in each of the ten contracts studied. Despite different wording all of them express the same limitation on an exchange, and occur in at least two of the contracts. The thirteen conditions will be categorized and discussed under the following headings:

contracting situation; outside constraints; clear title; tacit acceptance; estate obligation; discounts; weights and grades; inferior grade; contract extension; full elevator; deliveries applied; overage/underage; payment conditions. The remainder of this chapter will focus on a comparative analysis of all ten contracts as a set, without devoting explicit attention to the patron/investor owned dichotomy. Instead the focus will be on which firm's contract contains which conditions, and the implications for risk according to the specific contract clauses.

Contracting Situation

The contract situation involves the conditions under which the grain contract was arranged. In addition to the basic

information established in the first section of the contract, several firms included a provision for the manner in which the contract was agreed to (2,4,D) either over the phone, or in person. Three contracts also made a notation of the time of day that the contract was made (2,4,5).

Both of these clauses seek to clarify a contract's origin for two different purposes. The use of telephones to buy and sell grain has reduced the cost of bringing the parties together. It has also introduced a possible method to nullify a contract, particularly in some type of farm partnership arrangements. Fixing the origin of a contract as either in person, or over the telephone reduces the firm's risk of having the contract contested. Over approximately the last 15 years the time of day has come to play a larger role in the pricing of grain sales, due to periods of high price fluctuations in the commodity markets. Opening prices are often quite different from the day's closing price. By fixing the time a contract is agreed to the risk of confusion over the price established in the contract is reduced for both parties.

Outside Constraints

In some cases contractual disputes result in some form of litigation. In other cases reliance upon a set of rules or traditions outside the immediate agreement may eliminate the point in contention. Three contracts in the sample group explicitly

subject the contractual arrangement to the rules of a given trade association. The association governing the framework of those three contracts is the National Grain and Feed Dealers Association (1,5,C). One of the firms (1) also included the Michigan Bean Shippers, reflecting the variety of uses for the standard contract format. Another firm's contract allows the association rules to be modified by mutual agreement of the contracting parties (C).

Inclusion of this clause clearly lowers the uncertainty level over the bounds of the agreement, or resolution of disagreements for both parties to the contract. It also strengthens the position of the firm, which is in a better position to be aware of, as well as have input to alter the rules of the governing association.

Clear Title

Fundamental to the exchange of any good is the right of the seller to convey the good how, when, and to whoever they choose. That requires the seller to have the right to transfer title of the good, and that the title is clear of claims by a third party unknown to the buyer. A clause stipulating that condition states in one of the sampled contracts that the seller,

...hereby warrants that at the time of delivery he will have good and merchantable title and the right to sell the commodity hereinabove described and that said commodity will be free and clear of all liens, mortgages, and encumbrances of any kind or nature whatsoever. Seller will promptly notify Purchaser in advance of encumbering

the commodity.⁵

The assessment of risk is apparent, this type of condition protects the buyer from purchasing grain without full knowledge of other claims of ownership on the grain. Not all of the "clear title" clauses are as complete as the example above, but the majority of contracts sampled (1,3,5,A,B,C,E) contain a similar statement to protect the buyer from a fraudulent seller.

Tacit Acceptance

More than half of the contracts (1,2,3,5,B,C) also contain an explicit statement declaring that failure of the seller to immediately advise the buyer of any "...discrepancies, objections to or disagreements with such terms and conditions shall be construed as an acceptance of the contract."⁶ A transaction with this statement, mandating the seller's tacit acceptance of the contractual agreement, has a clear proportioning of risk between the parties. The buyer, who has written the basic contractual format is reducing his uncertainty by shifting the burden of misunderstanding onto the seller, after a given time period. This may ultimately lower the overall risk to parties in the exchange, by forcing unspoken assumptions or expectations of the seller into the open where they can be acknowledged and dealt with. The unknown factor here are the assumptions and expectations the buyer has in the interpretation of the contract, which this clause does not effect.

Estate Obligation

In the event of a death, two of the contracts (2,E) bind the seller's estate to fulfill the terms of the contract. The clause states, "This Agreement shall be binding upon the heirs, administrators, executors or successors of the parties hereto."⁷ The effect of that statement is to reduce the buyer's risk of litigation by agents of the seller in the event of the seller's death. If the contract was entered into in good faith, this contract condition has negligible impact on the degree of risk borne by the seller or the seller's estate.

Discounts

Nine of the ten contracts contain an explicit provision setting the grade, premiums, and discounts that apply to grain delivered against the contract (1,2,3,5,A,B,C,D,E). These standards are handled in two principal ways. In some cases the schedule in effect at the time of delivery is used as a default schedule unless the contract requirements specify otherwise (1,B,C) some firms simply follow the premium and discount table in effect at the time of delivery (2,3,E). The other method incorporates the premium and discount schedule within the terms and conditions of the contract itself (5,A,D) without regard for discounts prevailing in cash sales at the time of delivery.

The competitive structure of the first handler level

serves to keep the grades, premiums, and discounts offered to farmers tied to a central market (a focal point) for grain in a local area. This central market may be a second tier processor the firm supplies with grain. Often, however, it is the futures markets, especially when the contract price is based on futures or options contracts. In either case the issue of risk is a mute point. The quality of grain delivered at harvest is largely outside the control of the farmer. Also, farms are generally not equipped to "condition" grain delivered out of on farm storage. The inability of the farmer to significantly effect the quality of grain delivered against a contract, combined with the lack of viable standards other than the contract itself (which due to competitive market forces tends toward futures market standards) erases the relevance of risk in setting grades, premiums, and discounts for a contract freely entered into.

Weights and Grades

The primary issue of weights and grading involves the question of whose measurements are to count as the "last word" in a dispute. Few of the sample contracts are explicit on this point. Those that are contain a clause directly establishing the governing weights and grades in the contract (1,5,D) or rely on the buyers ability (2). Any risk relating to this point stems from the existence of fraudulent business practices, intentional or inadvertent. In either case the power largely resides with the

firm as a result of the structural characteristics of interaction between the firm and the farmer in the marketplace. Consequently, in an exchange between those two parties the farmer bears the burden of risk in questions involving the measurement of weights and grades of delivered grain.

Inferior Grade

In some situations the grain delivered on a contract may not meet the criteria established in the contract for the commodity, or in the worst case scenario the grain may not meet the lowest commercially traded grade for that commodity. Six of the ten contracts contain a statement pertaining to the delivery of grain failing to meet the contract specifications (1,2,3,A,B,C). Two of the contracts (2,C) state that grain delivered on a contract must meet Federal Food, Drug, and Cosmetic Act requirements. The other four reserve the right to impose the declared discounts, or to refuse delivery if the grain does not meet the lowest quality commercial grade (1,3,A,B). In addition, one contract (A) states the adjustment will only take place if the quality of grain delivered is selling under the contracted grade at the time of delivery (A). The implication is the farmer will receive no compensation (premium) for grain delivered that exceeds the grade agreed to in the contract.

The question of risk in this issue is similar to the discussion of discount schedules above. In both cases the

important point is the farmer's relative inability to effect a substantial difference in the quality of grain delivered (assuming "good farming practices"). Where discounts are related to upstream quality requirements, hence largely out of the firm's control, decisions about inferior quality grain delivered against a contract fall squarely in the firm's domain. The choice to accept or reject grain is the firm's, whose measures are usually the standard in this exchange. The power of the firm in the exchange places the risk directly on the farmer, if he has neither the capacity to condition and/or blend quantities of grain, nor the variety of marketing outlets available to the firm.

Contract Extension

The shipping period for contracted grain is laid out in all of the sampled contracts.⁸ Five of the ten contracts, however, allow the time of delivery to be extended beyond the stated agreement (1,2,3,B,E). In each of these contracts the extension is at the discretion of the buyer (B and E both require that the seller be notified in writing). Furthermore, no alteration by the buyer of the shipping period removes the obligations of the seller under any of the contracts.

The following clause dealing with lack of storage is similar to this one, with the same implication for risk to the parties of the transaction. Therefore, an assessment of risk in an exchange with a clause to extend the contracted shipping period

will be postponed until after the next section is surveyed. Then both the contract extension, and the full elevator clause will be discussed in terms of their impact on risk in a transaction.

Full Elevator

The increasing productivity of United States agriculture, combined with the fixed nature of grain storage and handling facilities in the short run, occasionally the quantity of grain delivered at harvest outstrips the handling capacity of first-handler firms. In other words, the elevator is full. In that event, seven of the ten contracts examined contain a provision altering the delivery conditions of the contract (1,2,3,A,B,C,E). Four of the seven place no time limit on the possible delay in contracted delivery (2,A,B,C). Two make the vague, but pragmatic statement that the seller shall withhold delivery until space is available (1,3). The other declares that,

Should the elevator be full on date seller wishes to make delivery, seller agrees to hold grain for a period not to exceed 96 hours until elevator has sufficient space to accept delivery. Within the limits set forth in this agreement, it is agreed and acknowledged by both parties that time is of the essence under the terms of the agreement.

The implication of this condition, as well as the provision to extend delivery at the buyers option discussed previously, is to remove contractual risk from the firm and place it on the buyer. None of the contracts make a comparable, explicit provision to adjust contract terms for unforeseen events

forcing the seller to postpone delivery. The possibility of delayed delivery and the impact of time and weather conditions on the harvest process, as well as crop quality, combine to place substantial risk on the farmer as a result of the firms delaying delivery on a contract. That risk is to a certain degree mitigated when grain is delivered out of on farm storage, but then the risk of delayed delivery impacts on the time constraint of a farmer's scheduled activities.

Deliveries Applied

An incremental contracting program results in a number of contracts written between the firm and a given farm customer. This complicates the assignment of grain deliveries to the appropriate contract, an issue addressed in six of the ten contracts sampled (1,2,3,4,D,E). Two of the firms apply deliveries to the oldest contract between the farmer and firm (1,E). The other four require an explicit matching of the delivered grain to a specific contract.

This statement reduces the risk of misunderstanding between the contractual buyer and seller. It serves a clarifying function, outlining the bookkeeping procedures used in filling a contract, rather than addressing questions of risk arising from the structure of an exchange.

Overage/Underage

The odds are slim the exact amount of grain called for in a contract will be the amount delivered. That leads to the issue of how to handle the grain delivered over the contracted quantity, as well as what policy does the firm rely on if the farmer fails to deliver the amount committed in the contract. Failing to deliver enough grain to cover the contract places the seller in default. That is a more serious state of affairs than delivering more than is called for, where the important question is primarily how to price the grain delivered over the quantity contracted. The seriousness is reflected in the number of contract clauses concerned with underage, versus those dealing with an overage. Seven (1,2,3,A,B,C,E) of the contracts contain a clause dealing with seller default, three (2,A,C) contain a statement concerned with pricing grain delivered in excess of the contract. Each condition is dealt with in two different ways within the contracts, with or without a penalty fee.

In each case a seller in default is held to replacement cost of the undelivered grain. Replacement cost is determined according to the difference between the contract price and the firms posted cash price (at the delivery point) for the commodity the day following expiration, multiplied by the bushels of grain necessary to cover the contract. In addition, two firms also impose an additional penalty fee for default on the seller (2,C).

Only three firms include a contract provision for pricing

grain delivered over the contracted quantity. All three rely on the posted cash price at the delivery point to determine the purchase price of the overage. One firm (A) also includes the option of storing the grain for sale at a later time.

A related issue is allowing the seller to "buy out" the contract prior to expiration. None of the contracts covered the possibility, but the interviews indicated that provision for that action is widespread among firms. In response to the question, "Do you allow farmers to buy out of their contracts?" only one firm (Agri Sales Inc.) stated that they do not. All of the other firms interviewed stated they do allow farmers out of their contracts, with payment of a penalty fee to cover "paperwork". One firm will wave the fee depending upon the liquidity of the grain involved¹⁰ (corn for example is more liquid than other commodities). Another firm has a two tier fee schedule, a nominal amount to cover the firm's expense in the event of crop failure, and a higher fee to act as a disincentive if the buy out is determined to be a speculative attempt to gain an advantage from post-contracting price movement.¹¹

Conditions dealing with an over or under supply of grain delivered against a contract are attempts to minimize risk through incentives, not shift the risk from buyer to the seller as some of the clauses have done. Once the shipping period and delivery schedule are determined the seller has the principal power over grain deliveries. The buyer (with the exceptions dealt with in the contract extension and full elevator conditions) can do little

to control that aspect of the exchange, unless the seller is willing to cooperate. By stating up front in the contract how overage and underage will be compensated the buyer is making the seller aware of the costs and benefits of his actions. This also applies to the willingness (but not encouragement) of most firms to allow the customer to buy out of a contract, with the knowledge that there is a penalty fee.

Payment Schedule

Only four contracts refer to the timing of payment to the seller for contracted grain (S,A,D,E). All four follow a set schedule determined in the contractual agreement. One contract phrases the schedule in terms of the earliest time the seller is entitled to payment (D). Two others leave the time and proportioning of payment up to the specific agreement (S,A). The fourth (E) splits payment between time of delivery and another future date written into the contract (likely the expiration date, but it does not say).

Instead of imposing, or shifting risk, a predetermined payment schedule reduces it for both parties to a contract. The increased information provided by a pre-set schedule of payment aids the planning operation of both the farmer and firm. Furthermore, by making a payment schedule part of the terms and conditions the contract has increased value to the seller as a financial instrument.

SUMMARY:

This chapter treated three questions, first, how important are contractual arrangements in the exchange of grain from farmers to first-handler grain firms? Second, is there a difference between cooperative and investor owned firms in contracting grain purchases from farmers? Third, what do the contracts offered to farmers say about the firm's approach to risk?

As an indicator of grain firms frequency of grain contracting with farmers, a survey of Michigan first-handler grain firms explored the distribution of grain purchases from farmers relative to time. Results showed that contracts account for roughly half of the grain purchases from farmers by firms. A survey of 1974 practices indicated that nationally contracts account for a higher proportion of movement of grain off the farm than in Michigan. Although more recent research (published in 1985) has shown that Michigan first-handlers purchase grain under contracts about as often as firms in Indiana, Illinois, Iowa, and Kansas. All three studies support the proposition that contracts play an important role in the exchange of grain between the farm and first handler level.

The survey of Michigan first-handler grain firms also found no distinction in time of purchase, relative to delivery between Michigan cooperative and proprietary first-handler grain firms.

A comparative examination of contracts from five patron

and five investor owned firms showed no distinct pattern of difference between them. Without regard for the type of firm offering the contract, the contracts generally attempted to remove risk from the firm in three ways. The first, is eliminating possible sources of misunderstanding between the buyer and seller. Second, the contracts shifted whatever risk that could be borne by the seller onto him, even if the firm could better handle it. Third, the contracts sought to reduce the number of contingencies that might arise to hamper the firm's operation. This often reduced uncertainty, lowering the overall level of risk in the transaction, benefiting both parties to the contract.

NOTES

- 1 Helmuth, op. cit., p. 36.
 - 2 Keen, op. cit., pp. 357-359.
 - 3 For the sake of brevity when referring to the sampled contracts the firm's names will be coded as follows.
 - 1 B & W Co-operative Inc.
 - 2 Blissfield Co-op Co.
 - 3 The Cooperative Elevator Co.
 - 4 Eaton Farm Bureau Co-op
 - 5 Mid-States Terminals Inc.

 - A Agri Sales Inc.
 - B American Bean and Grain Corporation
 - C The Andersons
 - D Auburn Bean and Grain
 - E Berger and Company
 - 4 An exception is the use of price later agreements which were viewed by the firms as storage, rather than exchange agreements.
 - 5 Berger and Company, "Grain Sale and Purchase Agreement".
 - 6 Blissfield Co-op Co., "Purchase Confirmation and Contract".
 - 7 Berger and Company, op. cit..
 - 8 When asked if they would offer a contract beyond the farthest futures contract only Blissfield Co-op Co., The Metamora Elevator Co., and The Andersons indicated that they would. In each case the contract would be tied to the nearest futures contract.
 - 9 Berger and Company, op, cit..
 - 10 Interview with Phil Hageman, op. cit..
 - 11 Interview with Don Seidl, op. cit..
-

CHAPTER 5

CONCLUSIONS

This study began noting the issue of increased efficiency in the food marketeting system through improved coordination of the grain subsector. As well as the critical role risk plays in the interchange between the farm and first handler level upon the grain marketing system. The central objective has been to examine the arrangements first-handler firms employ to manage business risk in farm to firm grain transactions.

That objective has been undertaken by posing and answering two related questions. First, through what means do first-handler grain firms mitigate the risk involved in the purchase of grain from farmers? Second, do proprietary and cooperative first-handler firms differ in the way they manage the level of risk in the purchase of grain from farmers? Discussion of the first question involved an explanation of how risk is channeled and the effect of each method. The second question applied those answers in a comparative analysis of investor and patron owned firms. That analysis examined three actions, by first-handler firms serving the Michigan grain market, to shift the risk of farm to firm grain transactions. (1) Hedging in the futures markets (2) the

marketing alternatives (including prices) available to farmers (3) the terms and conditions contained in the grain purchase contracts firms offer farmers. The results indicated no significant difference between Michigan cooperative and proprietary first-handler grain firms in each of those three areas.

There was no significant distinction in the frequency of hedging by cooperative and proprietary firms. Behavior of the firms surveyed in Michigan resembled similar firms in the larger national grain marketing system. The prices firms offered to farmers for their grain were influenced by the local market environment, but no difference was found between the sampled investor and patron owned firms serving the same market area (patronage refund aside). In different market areas little difference was found that could not be accounted for by differential marketing costs.

The ownership structure of the firms also failed to be a distinguishing variable in the type of grain purchasing alternatives offered to farmers. Nor was a distinction found among surveyed firms in ranking the general categories of purchasing alternatives, from the most to least preferred. Each of the six general categories of exchange methods imposed a different balance of risk on a grain sale. Ultimately, the risk in each arrangement came down to the impact of weather on crop production, and/or the exposure of participants to changes in price (absolute or relative).

A comparative examination of terms and conditions of contracts binding firms and farmers together also failed to distinguish between the ownership structure of the sampled firms. Without regard for the firm's organization as a proprietary or cooperative firm, the explicit constraints imposed by the contracts served to reduce risk in the firm's operation. This was accomplished by shifting the burden of risk from the grain buyer to the seller wherever possible. The structure of the contracts was open enough, however, that the actual use of them could vary even under the contractual conditions of the exchange. Interviews indicated that aspect was very subjective, for that reason it was not given detailed consideration in this study. What was examined, as a substitute measure of purchasing practice, was the surveyed firms' spread of grain purchases from farmers in relation to the time of delivery. The survey responses again revealed no significant differences between the grain purchasing practices of patron and investor owned first-handler grain firms in Michigan.

These findings do not necessarily mean that cooperative and proprietary firms are identical, or that the mixture of patron and investor ownership among first handler grain firms is either ideal or irrelevant. In theory, the competitive nature of the grain trade should serve to homogenize the practices of first-handler firms examined in this study. Other activities that may contribute to coordination were not given adequate consideration. Principal among those ignored factors is the dissemination of information from firms to their farm customers.

That is an area where the firm's obligation to its owners might yield different levels of efficiency and effectiveness in the dispersion of information.

One example uncovered during the research for this study is the different perceptions investor and patron owned firms have about the influence of knowledge on the explicit use of futures markets by farmers. Both type of firms saw the lack of farmer knowledge as a problem in fully exploiting exchange through futures markets, but cooperative firms were more likely to see the problem as surmountable.

That difference in perceptions has ramifications for future development, and use of option market based exchange between first-handler firms and their farm customers. Use of option contracts at that marketing point has been limited due to the "newness" and relative complexity of the option market exchange mechanics. The potential exists, however, for options contracts to improve coordination of the grain industry, by enriching the information content of grain prices.

This study has been centered on possible distinctions between patron and investor owned first handler grain firms. Rather than ask the broader question, "How do firms handle the risk in grain transactions?" this project began with a focus on several specific ways the firms could reduce their level of risk when purchasing grain from farmers. Ignoring the prior question of "how" shifted the emphasis and narrowed the scope of this study. Beginning where this study left off four different ideas

present themselves as useful extensions of this report in future research.

First, this project has operated from the perspective of the grain firm. In fact, no farmers were contacted during any phase of the research. Yet as producers and fundamental sellers of grain the question remains to be answered, what do farmers perceive to be important in a grain contract, and does it change in different environments?

Second, the basis plays an important part in the purchase price firms offer to farmers. Several different factors that are considered in the basis were discussed in Chapter Two of this paper, one factor not explicitly dealt with was on-farm grain storage. The amount of on-farm storage for grain varies from one market area to another throughout Michigan, and presumably the United States also. The questions are, how does the quantity of available on-farm storage in different local grain markets impact on the basis price of grain in those areas throughout the marketing year? In some instances does patron investment in the cooperative firm serve as an alternative to on-farm storage? In addition, how does on-farm grain storage impact on the use of warehouse receipts versus price later agreements by firms in different market areas?

Third, several firms contacted during the research phase of this study were seeking to enhance their market position through sales of value added products, another aspect of that linkage are the minimum and maximum price contracts offered by

first-handler firms. The question is what are the possibilities of expanding that linkage across the first handler level, and what would the structural implications be for the grain elevator industry?

Fourth, a number of variables enter into a firm's decision to hedge its grain inventory. In this paper several of those factors were examined with mixed results. The topic that suggests itself is, is the firm's choice to hedge its grain inventory the result of a cumulative effect, rather than an individual variable, and if so, what is the relative importance of different factors in the decision?

APPENDIX A

The survey illustrated in Appendix B was sent to each of these firms during either the fall of 1987, or winter of 1988.

The Cutler-Dickerson Co.	Adrian
Bergy Brothers	Alto
C.F. Braun Co.	Ann Arbor
Iltner Bean and Grain Co.	Auburn
Bangor Elevator Inc.	Bangor
Britton Elevator Inc.	Britton
Buchanan Co-Ops Inc.	Buchanan
Caledonia Farmers Elevator Co.	Caledonia
Capac Farmers Elevator	Capac
Kellogg Elevator Co.	Carson City
Community Mills Inc.	Cassopolis
Honeggers and Co. Inc.	Chelsea
Lott Elevator Inc.	Cohoctah
Countrysmark Inc.	Coldwater
Constantine Co-Op Inc.	Constantine
Decatur Elevator	Decatur
Harvest Mills Inc.	Durand
Mathews Elevator Inc.	Fowler
Fowlerville Cooperative Assn.	Fowlerville
Fremont Co-Op Produce Co.	Fremont
Hamilton Farm Bureau Co-Op Inc.	Hamilton
Crop Aid Elevator Inc.	Hudson
Ida Farmers	Ida
Lake Odessa Co-Op Assn.	Lake Odessa
Lapeer County Co-Op Inc.	Lapeer
Marlette Farmers Co-Op Elevator Co. ...	Marlette
Mason Elevator Co. Inc.	Mason
Cone Elevator	Milan
Morrice Grain and Bean Co.	Morrice
Michigan Agricultural Commodities	Newaygo
Countrysmark Inc.	Portland
Briskey Elevator	Quincy
Reading Feed and Grain Inc.	Reading
Reese Farmers Co-Op	Reese
Snover Co-Op Elevator Co. Inc.	Snover

Ruth Farmers Elevator Inc.	Ruth
Countrymark Inc.	St. Johns
The Andersons	White Pigeon
Zeeland Farm Services Inc.	Zeeland
Farmers Co-Op Elevator Co.	Zeeland
Armada Grain Company.....	Armada
Avoca Elevator Company.....	Avoca
Barryton Co-op Assoc. Inc.....	Barryton
Wagenschutz Grain Inc.....	Britton
Atlas Feed and Grain.....	Clinton
Lakeshore Agri-Services.....	Colon
Joers Farm Center.....	Concord
Marks Brothers and Co. Inc.....	Decatur
Karner Brothers Inc.....	Dundee
Voyce's Elevator Inc.....	East Leroy
Elkton Co-op Farm Produce Co.....	Elkton
Evart Elevator Company.....	Evart
Falmouth Co-op Company.....	Falmouth
Gladwin Farmers Exchange Inc.....	Gladwin
Grand Ledge Produce Co.....	Grand Ledge
Hanover Feed and Grain Co.....	Hanover
Wruble Elevator Inc.....	Harbor Beach
Homer Fertilizer and Feed.....	Homer
Jones Farmers Co-op.....	Jones
Kent City Co-op.....	Kent City
Farmers Co-Operative Grain Co. of Kinde..	Kinde
Marysville Farm Center.....	Marysville
Maybee Farmers Co-op Inc.....	Maybee
McBain Grain Co.....	McBain
Millington Elevator and Supply Co.....	Millington
Moline Co-op Milling Co.....	Moline
Brown Milling Inc.....	Mt. Pleasant
Bay Terminal Inc.....	Pinconning
All Weather Elevator Inc.....	Ravenna
Farmers Elevator Co.....	Richmond
Cooperative Elevator Co.....	Sebewaing
Citizens Elevator Co. Inc.....	Vermontville
Webberville Feed and Grain Co.....	Webberville

APPENDIX B

SURVEY

What county is this facility located in? _____

Approximately how much grain storage does this firm have? _____

1. What term that best describes this facility:

- | | |
|----------------------|--------------------------|
| Country elevator | <input type="checkbox"/> |
| Subterminal elevator | <input type="checkbox"/> |
| Feed mill | <input type="checkbox"/> |
| Terminal elevator | <input type="checkbox"/> |
| Other _____ | <input type="checkbox"/> |

2. Please check this firm's type of business organization:

(Check whichever apply to this firm)

- | | |
|-----------------------------|--------------------------|
| Single owner or partnership | <input type="checkbox"/> |
| Cooperative | <input type="checkbox"/> |
| Corporation | <input type="checkbox"/> |

3. How often does this firm hedge its position in the futures markets?

- | | |
|--------------|--------------------------|
| Never | <input type="checkbox"/> |
| Occasionally | <input type="checkbox"/> |
| Routinely | <input type="checkbox"/> |

4. Approximately what percent of your purchases from farmers were made:

- | | | |
|---|--------------------------|--------------------------|
| More than 30 days before delivery | <input type="checkbox"/> | <input type="checkbox"/> |
| 1 to 30 days before delivery | <input type="checkbox"/> | <input type="checkbox"/> |
| Upon delivery or change of title | <input type="checkbox"/> | <input type="checkbox"/> |
| After change of title (delayed pricing) | <input type="checkbox"/> | <input type="checkbox"/> |

5. Does this firm purchase grain from other elevators or grain merchants?

- | | | |
|-----|--------------------------|------------------------------|
| Yes | <input type="checkbox"/> | If yes answer next question. |
| No | <input type="checkbox"/> | If no proceed to question 7. |

6. Approximately what percent of these purchases were made:
- | | | |
|---|---|---|
| On the day of delivery | [|] |
| 1 to 10 days before delivery | [|] |
| 11 to 30 days before delivery | [|] |
| 31 to 60 days before delivery | [|] |
| More than 60 days before delivery | [|] |
| Grain was not physically delivered to this firm | [|] |
7. Approximately how many different buyers did this firm sell grain to in the past year?
-
8. Approximately what percent was sold to the largest buyer?
-
9. Approximately what percent of these sales were made:
- | | | |
|-----------------------------------|---|---|
| On the day of delivery | [|] |
| 1 to 10 days before delivery | [|] |
| 11 to 30 days before delivery | [|] |
| 31 to 60 days before delivery | [|] |
| More than 60 days before delivery | [|] |
10. Does this firm provide information about the grain markets to its customers?
- Yes ☐ If yes proceed to the next question.
- No ☐ If no proceed to question 14.
11. How is this information disseminated? (check each method that is used)
- Meetings/seminars
- Newsletters
- Local newspaper
- Radio reports
- Telephone contact
- One on one conversation
- Other _____
-

12. If meetings/seminars are given, how often?

- 1 to 2 times a year ☐
- 3 to 4 times a year ☐
- 5 to 8 times a year ☐
- More than 8 times a year ☐

13. Are these meetings/seminars open to:

- All who are interested ☐
- All customers ☐
- Selected customers ☐
- Selected farmers (not necessarily customers) ☐

14. How much impact do you feel the provision of current market information has on the farmer's marketing decisions?

- Very little ☐ Some ☐ Substantial ☐

15. From the standpoint of the firm, please rank in order of preference the following categories of transactions between the firm and the farmer (1 most, 5 least preferred):

- Cash market ☐ ☐
- Futures market ☐ ☐
- Government program (storage, PIK and roll, etc.) ☐ ☐
- Options market ☐ ☐
- Forward delivery contract ☐ ☐

APPENDIX C

List of firms interviewed:

Agri Sales Inc. (Mulliken), Alvin Fox, September 28, 1987.

The Andersons (Albion), Arman Hartung, October 12, 1987.

Auburn Bean and Grain Co. (Auburn), Henry Petrosky, October 15, 1987.

Battle Creek Farm Bureau Assn. (Battle Creek), Larry Martz, September 5, 1987.

Berger and Company (Saginaw), John McClellan, October 13, 1987.

Blissfield Co-op Company, (Blissfield), Terry Bell, October 13, 1987.

The Cooperative Elevator Co. (Pigeon), John Kohr, December 2, 1987.

The Metamora Elevator Co. (Metamora OH), Dave Duncan, October 21, 1987.

Northern States Bean Co. (Lansing)/[American Bean and Grain Inc.], Don Seidl, October 9, 1987.

Parrish and Heimbecker Inc. (Brown City), Phil Hageman, October 20, 1987.

BIBLIOGRAPHY

- Allingham, M. "Intertemporal Efficiency In The Grain Markets." Center for the Study of Futures Markets, Working Paper Series, CSFM-56 (May 1983).
- Angell, G. Agricultural Options. New York: AMACOM, 1986.
- Arrow, K. Aspects of the Theory of Risk Bearing. Helsinki: Yrjö Jahnsson Foundation, 1965.
- Baarda, J.R. Cooperative Principles and Statutes: Legal Descriptions of Unique Enterprises. U.S.D.A. Agricultural Cooperative Service. Research Report No. 54 March 1986.
- Babb, E.M., and Keen, R.C. Performance of Midwest Cooperative and Proprietary Grain and Farm Supply Firms. Purdue University Agricultural Experiment Station Bulletin No. 366 (March 1982).
- Bauer, W.W. Michigan Agriculture (1800-1980). Saginaw: Michigan Grain and Agri-Dealers Association, 1982.
- Bhattacharyya, G.K., and Johnson, R.A. Statistical Concepts and Methods. New York: John Wiley and Sons Inc., 1977.
- Bigman, D.; Goldfarb, D.; and Schectman, E. "Futures Market Efficiency and the Time Contents of the Information Sets." The Journal of Futures Markets. 3 (1983): 321-334.
- Blau, G. "Some Aspects of the Theory of Futures Trading." in Selected Writings on Futures Markets. edited by A.E. Peck. Chicago: Chicago Board of Trade, 1977.
- Burbrink, S.D. "An Analysis of Factors Affecting the Financial Performance of Country Grain Elevators." M.S. Thesis. Purdue University, 1981.
- Burington, R.S., and May, D.C. Jr. Handbook of Probability and Statistics with Tables. Sandusky OH: Handbook Publishers Inc., 1958.

- Canarella, G., and Pollard, S.K. "Efficiency of Commodity Futures: A Vector Autoregression Analysis." The Journal of Futures Markets. 5 (1985): 57-76.
- Caves, R.E. "Organization, Scale, and Performance of the Grain Trade." Food Research Institute Studies. 16 (?): 107-123.
- Caves, R.E., and Pugel, T.A. "New Evidence on Competition in the Grain Trade." Food Research Institute Studies. 18 (1982): 261-274.
- Chicago Board of Trade, A Study of the Effects on the Economy of Trading in Futures and Options. (December 1984).
- Cochran, W.G., in Snedecor, G.W. Statistical Methods Applied to Experiments in Agriculture and Biology. Ames IA: Iowa University Press, 1956.
- Colman, D. The United Kingdom cereal market. Manchester G.B.: Manchester University Press, 1972.
- Cootner, P.H. "Returns to Speculators: Telser vs. Keynes." Journal of Political Economy. 68 (August 1960): 396-404.
- Culver, J.A. "Futures and Options Markets: Managing Economic Instability in Agriculture." in The Future of the North American Granary: Politics, Economics, and Resource Constraints in North American Agriculture. edited by C. Ford Runge. Ames: Iowa State University Press, 1986.
- Dalzeil, I.L. "Sources of Agricultural Market Instability." Ph.D. Dissertation. Michigan State University, 1985.
- Davis, L., and Hill, L. "Spatial Price Differentials for Corn among Illinois Country Elevators." American Journal of Agricultural Economics. 56 (February 1974): 135-44.
- Fackler, P.L. "The Informational Content of Option Premiums." Ph.D. Dissertation. University of Minnesota, 1986.
- Fama, E.F., and French, K.R. "Commodity Futures Prices: Some Evidence on Forecast Power, Premiums, and the Theory of Storage." Journal of Business. 60 (1987): 55-73.
-

- Farris, P.L. "The Pricing Structure for Wheat at the Country Elevator Level." Journal of Farm Economics. 40 (August 1958): 607-624.
- Fort, R.D. Commodity Futures Price Distribution and The Theory of Futures Trading. Center for the Study of Futures Markets, Working Paper Series, CSFM-122 (January 1986).
- Friedman, D.; Harrison, G.W.; and Salmon, J.W. "The Information Role of Futures Markets: Some Experimental Evidence." in Futures Markets. edited by M.E. Streit. Oxford: Basil Blackwell Publisher Ltd., 1983.
- Garbade, K.D., and Silber, W.L. "Cash Settlement of Futures Contracts: An Economic Analysis." The Journal of Futures Markets. 3 (1983): 451-472.
- Gardner, B. "How Price Instability Complicates the Analysis of Price Supports." Northeastern Journal of Agriculture and Resource Economics. 14 (October 1985): 113-19.
- Garoyan, L. "Developments in the Theory of Farmer Cooperatives: Discussion." American Journal of Agricultural Economics. 65 (December 1983): 1096-98.
- Gray, R.W. "The Search for a Risk Premium." in Selected Writings on Futures Markets. edited by A.E. Peck. Chicago: Chicago Board of Trade, 1977.
- Heflebower, R.B. Cooperatives and Mutuals in the Market System. Madison: University of Wisconsin Press, 1980.
- Heifner, R.G.; Driscoll, J.L.; Helmuth, J.W.; Leath, M.N.; Niernberger, F.F.; and Wright, B.H. The U.S. Cash Grain Trade in 1974: Participants, Transactions, And Information Sources. U.S.D.A., E.R.S., Agricultural Economic Report No. 386, September 1977.
- Helmberger, P.G. "Cooperative Enterprise as a Structural Dimension of Farm Markets." Journal of Farm Economics. 46 (August 1964): 603-17.

- Helmberger, P., and Hoos, S. "Cooperative Enterprise and Organization Theory." Journal of Farm Economics. 44 (May 1962): 275-290.
- Helmuth, J. Grain Pricing. Economic Bulletin No. 1. Washington D.C.: Commodity Futures Trading Commission, September 1977.
- Herbst, A.F. Commodity Futures Markets, Methods of Analysis, and Management of Risk. New York: John Wiley and Sons, 1986.
- Hill, L.D.; Brophy, J.P.; and Leath, M.N. Production, Utilization, and Marketing Patterns for Illinois Grains and Soybeans. University of Illinois Agricultural Experiment Station, AERR no. 196 (June 1984).
- Holder, D.L., and Sporleder, T.L. "Forward Deliverable Contract Markets." in Marketing Alternatives for Agriculture Is there a better way?. Publication No. 7. New York State College of Agriculture; Cornell University, 1976.
- Hudson, M.A.; Leuthold, R.M.; and Gboroton, S.F. Commodity Futures Price Changes: Distribution, Market Efficiency, and Pricing Commodity Options. Center for the Study of Futures Markets, Working Paper Series, CSFM-127 (June 1986).
- Hunley, C.L. Marketing and Transportation of Grain By Local Cooperatives. U.S.D.A. Agricultural Cooperative Service, Research Report No. 47, March 1985.
- Jarrow, R.A. "Forward Contracts and Futures Contracts." Journal of Financial Economics. 9 (1981): 373-382.
- Keen, R.C. "Comparative Performance of Cooperative and Proprietary Grain and Farm Supply Firms." Ph.D. Dissertation. Purdue University, 1985.
- Kenyon, D. "Options Trading: Is It For Farmers." Virginia Agricultural Economics. Blacksburg: Virginia Cooperative Extension Service, September/October 1984.
- Knutson, R.D. "Cooperative Strategies in Imperfectly Competitive Market Structures--A Policy Perspective." American Journal of Agricultural Economics. 56 (December 1974): 904-912.
-

- Kolb, R.W.; Jordan, J.V.; and Gay, G.D. "Futures Prices and Expected Future Spot Prices." Review of Research in Futures Markets. 2 (1983): 111-123.
- Labys, W.C., and Granger, C.W.J. Speculation, Hedging, and Commodity Price Forecasts. Lexington MA: Lexington Books, 1970.
- Leath, M.N.; Meyer, L.H.; and Hill, L.D. U.S. Corn Industry. U.S.D.A., E.R.S., Agricultural Economic Report No. 479 (February 1982).
- Murra, G.E. "Risk Management and Marketing." Economics Newsletter. edited by D.C. Taylor. Brookings SD: South Dakota Cooperative Extension Service, August 29, 1986.
- Myers, R.J., and Runge, C.F. "The Relative Contribution of Supply and Demand to Instability in the U.S. corn market." in North Central Journal of Agricultural Economics. 7 (Jan. 1985): 70-78.
- Paul, A.B. Farmers' Use fo Cash, Forward Contracts, Futures Contracts, and Comodity Options. U.S.D.A., E.R.S. Agricultural Economic Report No. 533 (May 1985).
- Paul, A.B. "Liquidation Bias in Futures Price Spreads." American Journal of Agricultural Economics. 68 (May 1986): 313-321.
- Paul, A.B. "The Role of Competitive Market Institutions." U.S.D.A. Agricultural Economics Research 26:2 (April 1974): 41-48.
- Paul, A.B.; Heifner, R.G.; and Helmuth, J.W. Farmers' Use of Forward Contracts and Futures Markets. U.S.D.A., E.R.S. Agricultural Economic Report No. 320 (March 1976).
- Peck, A.E. "The Economic Role of Traditional Commodity Futures Markets." in Futures Markets: Their Economic Role. edited by A.E. Peck. Washington D.C.: American Enterprise Institute for Public Policy Research, 1985.

Pinniger, S. "Trade and Pricing Issues of International Grain Marketing." in Agricultural Marketing Strategy and Pricing Policy. edited by D. Elz. Washington D.C.: The World Bank. 1987.

Raup, P.M. "Cooperatives, Capper-Volstead, and the Organization and Control of Agriculture." in Agricultural Cooperatives and the Public Interest. Madison: North Central Regional Project NC-117, Monograph 4, 1978.

Rhodes, V.J. The Agricultural Marketing System. 2nd ed. New York: John Wiley and Sons, 1983.

Rhodes, V.J. "Cooperatives and Contestable/Sustainable Markets." in Cooperative Theory: New Approaches. U.S.D.A., Agricultural Cooperative Service, Service Report No. 18 (July 1987) pp. 108-116.

Rhodes, V.J. "The Large Agricultural Cooperative as a Competitor." American Journal of Agricultural Economics. 65 (December 1983): 1090-95.

Rhodes, V.J. "Pricing, Coordination, and the Organization of Agricultural Subsectors." in Chapter 7 of The Organization and Performance of the U. S. Food System. edited by B.W. Marion. Lexington MA: D.C. Heath and Co., 1986.

Robotka, F. "A Theory of Cooperation." Journal of Farm Economics. 29 (February 1947): 94-114.

Roy, E.P. Cooperatives: Development, Principles, and Management. 4th ed. Danville IL: Interstate Printers and Publishers Inc., 1981.

Schmiesing, B.H.; Blank, S.C.; and Gunn, S.P. "The Influence of Technological Change on Grain Elevator Pricing Efficiency." North Central Journal of Agricultural Economics. 7 (July 1985): 95-107.

Schrader, L.F.; Babb, E.M.; Boynton, R.D.; and Lang, M.G. Cooperative and Proprietary Agribusinesses: Comparison of Performance. Purdue University Agricultural Experiment Station Bulletin No. 982 (April 1985).

Seligman, B.B. Main Currents in Modern Economics. New York: The Free Press of Glencoe, 1962.

Shaffer, J.D. "On the Ownership and Control of Farmer Cooperatives." Agricultural Cooperatives and the Public Interest. Madison: North Central Regional Project NC-117, Monograph 4, 1978.

Shaffer, J.D. "Food System Organization and Performance: Toward a Conceptual Framework." American Journal of Agricultural Economics. 62 (May 1980): 310-18.

Shaffer, J.D. "Preference Articulation and Food System Performance." mimeograph. 1979.

Shaffer, J.D. "Thinking About Farmer's Cooperatives, Contracts, and Economic Coordination." in Cooperative Theory: New Approaches. U.S.D.A., Agricultural Cooperative Service, Service Report No. 18 (July 1987) pp. 61-86.

Siebert, J.W. "An Early Warning Model for Grain Elevator Bankruptcy." American Journal of Agricultural Economics. 65 (August 1983): 563-566.

Sporleder, T.L., and Holder, D.L. "Vertical Coordination through Forward Contracting." in Marketing Alternatives for Agriculture Is there a better way?. Publication No. 7, New York State College of Agriculture; Cornell University, 1976.

Staatz, J.M. "Farmers' Incentives To Take Collective Action Via Cooperatives: A Transaction Cost Approach." in Cooperative Theory: New Approaches. U.S.D.A., Agricultural Cooperative Service, Service Report No. 18 (July 1987) pp. 87-107.

Staatz, J.M. "The Structural Characteristics of Farmer Cooperatives and Their Behavioral Consequences." in Cooperative Theory: New Approaches. U.S.D.A., Agricultural Cooperative Service, Service Report No. 18 (July 1987) pp. 33-60.

- Stoll, H.R., and Whaley, R.E. "The New Options Markets." in Futures Markets: Their Economic Role. edited by A.E. Peck. Washington D.C.: American Enterprise Institute for Public Policy Research, 1985.
- Telser, L.G., and Higinbotham, H.N. "Organized Futures Markets: Costs and Benefits." Journal of Political Economy. 85 (October 1977): 909-1000.
- Timmer, C.P., "Food Marketing and Price Policy." in Agricultural Marketing Strategy and Pricing Policy. edited by D. Elz. Washington D.C.: The World Bank, 1987.
- U. S. Department of Agriculture. 1986 Agricultural Chartbook, Agriculture Handbook No. 663 (November 1986).
- U. S. Department of Agriculture. Embargoes, Surplus Disposal, and U.S. Agriculture, Agricultural Economic Report No. 564 (December 1986).
- Williamson, O.E. The Economic Institutions of Capitalism. New York: The Free Press, 1985.
- Wilson, W.W. "Hedging Effectiveness of U.S. Wheat Futures Markets." Review of Research in Futures Markets. 3 (1984): 65-77.
- Working, H. "Hedging Reconsidered." in Selected Writings of Holbrook Working. Chicago: Chicago Board of Trade, 1977.
- Working, H. "New Concepts Concerning Futures Markets and Prices." in Selected Writings of Holbrook Working. Chicago: Chicago Board of Trade, 1977.
- Working, H. "Theory of the Inverse Carrying Charge in Futures Markets." Journal of Farm Economics. 30 (February 1948): 1-28.
- Yamey, B.S. "The Economics of Futures Trading: Some Notes Queries." in Futures Markets. edited by M.E. Streit. Oxford: Basil Blackwell Publisher Ltd., 1983.
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