THE UNIVERSITY OF ALBERTA

AN EVALUATION OF FUTURES TRADING ON THE WINNIPEG LIVE FINISHED BEEF CONTRACT

by

© LLOYD E. QUANTZ

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF SCIENCE

DEPARTMENT OF AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

EDMONTON, ALBERTA

SPRING, 1973

ABSTRACT

The usefulness of futures markets in the agricultural economy is well known. However, the futures contract in live finished beef on the Winnipeg Commodity Exchange has failed yet to attract a sufficient volume of trading to serve as a central price discovery "arena" for the Canadian beef industry.

This study evaluates several characteristics of the Winnipeg Beef futures market since its inception in 1968 to isolate those properties which have inhibited growth. The market was shown to provide the industry with protection against price fluctuations but short hedgers were found to be paying a high cost for the protection which they received.

A model designed to isolate a recurring pattern of basis change, indicated that opportunities do exist to maximize profits or minimize losses through judicious timing of hedging operations. Another model, though not conclusive, showed that a relationship between speculation (liquidity) and hedging (open interest) did exist. However, the market remains thin and continuous liquidity appears to be lacking. The importance of this liquidity to the success and usefulness of the futures market requires that all possible innovations and methods be employed to increase the volume of trading.

Several non-quantitative aspects of the market were considered. The inherent specialization of the Exchange membership in the trading of grain futures, the uncertain future of the grain futures trade, and the lack of sufficient livestock supply and price information were deemed to inhibit the growth of the beef cattle futures market.

ACKNOWLEDGEMENTS

Preparation of this manuscript would have been very difficult indeed without the ready assistance of many talented people; their efforts are appreciated. To Mr. J. Copeland, Mr. R. Bence, Miss E. Shapka, Mr. W. Moore, and Miss J. Woloshyn I am gratefully indebted for literary and technical assistance.

The information and inspiration provided by many persons along the way is greatly appreciated. My teachers, professors, fellow students, employers and business associates have been most helpful and inspiring. Many thanks to Dr. M. Hawkins for his assistance, encouragement and willingness to participate in this endeavor. Cattlemen, floor traders, and Exchange officials have helped me to relate the theory to the practice.

My parents, brothers, sisters and friends deserve much credit for the forces which played upon my life to guide me thus far. Finally, Sharon, without your dedication, loyalty and patience the completion of this project would be meaningless.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Purpose of the Study

An active beef cattle futures market could be a useful and desirable market institution in the Canadian livestock industry. The existence and active operation of a commodity futures market in many industries has contributed to improved price competition, has increased capital availability to the industry, has facilitated production planning and, has encouraged the assembling and distribution of information necessary for price prediction.

Evidence of the usefulness to the United States livestock industry of the Chicago Mercantile Exchange's live cattle futures market is indicated by the participation of over 5,500 individuals and firms. They hold futures contracts representing over one million head of choice steers.[1] The existence in Canada of a similar marketing institution, the live finished beef cattle futures market on the Winnipeg Commodity Exchange, has not yet attracted such interest.

---

[1]Commodity Exchange Authority, Trading in Live Beef Cattle Futures (Washington: United States Department of Agriculture, May, 1970), p. 35.

This study is designed to identify problems which may have limited the usefulness of the Winnipeg live beef contract and thus affected the growth of this market. Unfortunately, a greater number of futures markets have failed than have succeeded; however, the failure of some markets provides insights facilitating the identification of problems in the market in question.

Hieronymus gives five principal reasons for the demise of a futures market.[1] First, a market may be legislated out of existence because of behavior or effects deemed undesirable by government (such as onion futures in the United States and wheat futures in Canada). Second, markets have lost their economic basis for existence (such as the storage eggs and cotton futures markets in the United States). Third, markets have failed because of imbalance in contract terms giving an advantage to buyers or sellers (such as the turkey futures market in the United States and the cotton futures market in India). Fourth, markets may be boycotted by commercial interests because they represent an increase in competition. Examples such as the cottonseed oil futures and the onion futures in the United States are not clearly documented as being examples of such commercial behavior but do show evidence of collective action by a commercial group. Finally, markets fail to attract speculation necessary to provide the liquidity needed by hedgers and to balance commercial buying and selling. He also states that:

---

[1]T. A. Hieronymus, Economics of Futures Trading (New York: Commodity Research Bureau, Inc., 1971), p. 325.

> The problem is not that simple: markets are built on commercial use and speculation is attracted but markets will not be used by commercials unless speculation is present. It is difficult to get markets off center.[1]

The Problem

This study is an investigation of a problem; the failure of a futures market. Casual observation of price movements, trading volume, and open interest in the beef futures contract traded on the Winnipeg Commodity Exchange indicates that this market has not developed to the point where it is performing the economic functions generally ascribed to futures markets. These functions are:

a. to provide a market place where buyers and sellers come together to trade,

b. to provide information to facilitate price discovery, and

c. to generate a price which is recognized throughout the industry as an unbiased estimate of the future spot price.

The futures exchange as a financial institution performs a more specific role which includes price insurance, financing, price registration, information dissemination, and trading regulation.[2] The role of the latter is of lesser interest to this study. The economic function of the futures market requires that a market attract a large interest to warrant its existence as a central price discovery arena. However, the

---

[1] Ibid., p. 327.

[2] J.B. Baer and O.G. Saxon, Commodity Exchanges and Futures Trading (New York: Harper Bros., 1948), Chapter II.

live finished beef futures market at Winnipeg does not hold the status of a central price discovery mechanism because of the small volume of cattle traded on futures in comparison to the total volume of cattle being traded in the cash market.

The analysis evaluates several aspects of the beef futures trade which are deemed to be essential (necessary conditions) to the operation of a viable market.[1] First, the economic need for a futures contract must exist; second, the contract terms must not be biased in favor of the buyers, sellers, hedgers, or speculators; third, the market must be composed of hedgers who use it as a commercial marketing tool;[2] and, fourth, the market must contain sufficient speculative volume to provide liquidity. These conditions are presented as necessary but not necessarily sufficient conditions for the successful operation of a futures market.

Hypotheses

The study undertakes an evaluation of the beef futures market by testing four hypotheses which will indicate the existence of the necessary conditions for the success of the market. The first hypothesis to be tested states that a reduction in risk results from the hedging operation in the futures market. If the hypothesis is accepted, the market would be providing the commercially valuable service of reducing risk. The second hypothesis to be tested is that the cost of

---

[1] T.A. Hieronymus, Economics of Futures Trading, Chapter 16.

[2] It is assumed that these hedgers will use the market only if it provides a service at a competitive cost.

holding either a long or short futures position is equal to zero. Acceptance of this hypothesis will indicate that the futures price is an unbiased estimate of future spot prices and the participation by buyers and sellers is balanced. A third hypothesis to be tested is that the level and seasonal pattern of the closeout basis differs throughout the year and at geographically separated locations.[1] From evidence presented by Working, hedgers seek to profit from basis changes and are therefore selective in the timing of their hedging operations.[2] Acceptance of this hypothesis will indicate that selective hedging opportunities do exist. A fourth hypothesis states that pricing activity is continuous. Acceptance of this hypothesis would indicate that a speculative element is present to provide the necessary liquidity for hedging transactions.

Scope and Methodology

The scope of this study encompasses an analysis of those factors which are deemed contributions to the success of a futures market. A successful futures market is defined here as one which performs a central pricing and information function for the industry and is used by a sufficient proportion of commercial concerns to identify it as a reliable, efficient marketing tool. Also, the composition of the

---

[1] Closeout basis (for a short hedge) is defined as the price at which the futures position is liquidated less the price of the cash commodity sale.

[2] Holbrook Working, "Hedging Reconsidered," Journal of Farm Economics, Vol. XXXV (November, 1953), pp. 544-561.

futures market participants should closely approximate the model of a perfectly competitive market.[1]

The breadth of the factors to be analyzed and the depth of the analysis of each will be limited by the availability of data and the creditability of the logic. The techniques employed to test the stated hypotheses are drawn in part from previous studies oriented toward analyzing problems or characteristics of futures trading.

To test the first hypothesis, a risk ratio is developed by comparison of the variance of prices in an unhedged position (cash prices) with the variance of prices in a hedged position (the basis). Thus, the efficiency of the hedge in effectively reducing risk during the life of each contract will be high if the ratio is large (much greater than one) and low if the ratio approaches one. This technique was employed by Gum and Wildermuth in their analysis of the efficiency of a hedge using the Chicago Mercantile Exchange's live cattle futures contract.[2] Weekly average prices during the life of each contract will be used for calculation of variance.

The second hypothesis will be tested by the use of a technique commonly known as "discount buying" and used previously in studies dealing with futures prices as unbiased estimates of spot prices.

---

[1]For a review of the characteristics of a perfectly competitive market, see: C.E. Ferguson, Microeconomic Theory (New York: Irwin-Dorsey Ltd., 1969), Chapter 8.

[2]Russel Gum and John Wildermuth, "Hedging on the Live Cattle Futures Contract," Agricultural Economics Research, 22 (October, 1970).

Gray[1] derives a statistical measure of the tendency for futures prices to rise or fall over extended periods (biasedness) and for which initial and final spot prices are substantially the same. This measure is the magnitude of profits accruing to a continuous long position where switches are performed on the first day of each delivery month when futures become spot.[2] The present study adapts this technique by calculating profits (losses) accruing to a continuous long position in the nearest futures month and adjusting this by the net change in cash prices over the period of time being considered.

The third hypothesis will be tested by use of a multiple linear regression technique. Dummy variables will be used to represent six, bi-monthly periods of the year and relationships between basis in any or all of these periods will indicate a seasonal trend in the basis. Also, by analyzing the basis for three geographically separated markets, the differences in level and seasonality of the basis between areas will be tested.

The fourth hypothesis cannot be tested by directly measuring the volume of speculative trades being made. However, by assuming that day traders become active in response to hedging needs,as represented by the open interest, a test comparing the volume of trading and the open interest will indicate the extent of a speculative element in the

---

[1] R.W. Gray, "The Characteristic Bias in Some Thin Futures Markets," Food Research Institute Studies, Vol. I (November, 1960), p. 296.

[2] Switches are referred to in the trade as those transactions carried out to close out a futures position in one month and take the same position in a later month.

market.[1] A simple linear regression technique will be used to determine estimates of the trading volume given the open interest.

The Data

The cash prices used in testing the first three hypotheses are weekly averages of live choice steer prices at Calgary, Winnipeg, and Toronto public stockyards as reported by Agriculture Canada. The futures prices, volume of trade, and open interest were obtained from a private market reporting agency.[2] The daily closing prices (bids, offers, nominal prices, or trading prices) were averaged for each week. The data used in testing of hypothesis four were obtained by a systematic sampling technique relating open interest on one day of the week to total weekly trading volume.

The Plan of the Study

The first chapter touches on some of the basic tenets of the study and outlines the hypotheses used in the analysis. Chapter II comprises a review of the literature and, as such, draws heavily on work done by Gray, Working, Houthakker, Hieronymus, Yamey and others. The basic concepts which have provided motivation for previous research on futures markets are highlighted here.

---

[1] Holbrook Working, "Tests of a Theory Concerning Floor Trading on Commodity Exchanges," Food Research Institute Studies, Vol. VII (1967, Supplement), pp. 5-48.

[2] Stanley N. Jones, Market Reporting Service, 167 Lombard Avenue, Winnipeg, Manitoba, 1968-72.

Chapter III describes the commerce of the Canadian cattle industry to provide a context in which to study the development and progress of the Winnipeg Commodity Exchange's live finished beef contract. Also included for comparative purposes is a review of the growth of trading on the Chicago Mercantile Exchange's live cattle contract.

Chapter IV describes a general theory of livestock futures markets and their use. The application of futures trading to a commercial operation requires an awareness of hedging policy and price risk management which is included here.

Chapter V presents the four hypotheses showing their relationship to hedging or speculative use of the market. The models with the respective results and conclusions complete the chapter.

Finally, Chapter VI outlines other considerations deemed important to the successful operation of the market. The chapter concludes with several recommendations without which an applied study loses its usefulness.

CHAPTER II

REVIEW OF LITERATURE

The History of Futures Trading

The emergence of the mechanical phenomena of trading in forward delivery contracts (futures) as an integral part of merchandising operations was not immediately recognized as an occurrence worthy of academic scrutiny. However, as lobbyists and legislators began denouncing the activities and function of futures markets (especially the speculators role) and market participants defended their activities, a number of researchers began identifying and studying the principal characteristics, functions, and effects of these markets.

An explanation of the predominant characteristics which distinguish a futures market from all other markets requires an analysis of the evolution of this institution. It is suggested in several works that a need for standardization of trading practices and terms of exchange provided a basic stimulus to establish futures markets as an organized institution.[1] Irwin contends that futures trading grew with

---

[1]H. S. Irwin, Evolution of Futures Trading (Madison, Wisconsin: Mimir Publishers Inc., 1954; C. H. Taylor, History of the Board of Trade of the City of Chicago (Chicago: Robert O. Law, Co., 1917); H. Working, "Economic Functions of Futures Markets," in Futures Trading in Livestock - Origins and Concepts (Madison, Wisconsin: Mimir Publishers Inc., 1970), p. 3.

a move by merchants to contract for forward delivery. He reasons that, although futures contracts may have been designed to standardize and replace forward contracting, it soon became apparent that the delivery option was not practical and that closing out a futures contract by liquidating with an offsetting transaction was more efficient. The shift in practice resulted in a decrease in deliveries and an increase in the use of futures contracts as temporary substitutes for transactions in the cash market, such as forward contracts or inventories.

Evidence of this use for futures contracts is provided by Working, who observed the activities of merchants in the cash and futures markets.[1] Had their purpose been to offset commitments in forward contracts or to protect inventory, a high degree of correlation between cash and futures transactions should have been evident regardless of the profitability of the hedge. However, this not being the case, Working concluded that the use of futures contracts as temporary substitutes for anticipated merchandising transactions was practiced by at least the more sophisticated hedgers.

The History of Hedging

The activity of hedging, whatever its motive, soon became the most economically useful service of the institution as it provided increased capital through reducing risk to finance inventories in annual crops. The merchant could now afford to borrow extra funds because the

---

[1]Working, "Hedging Reconsidered," p. 550.

risk resulting from price changes would be borne by others and he could thus concern himself with the relationship between spot and distant futures prices to guarantee payment of his storage costs. Keynes emphasized the enormity of the financial burden which was no longer borne by the capital-intensive storage industry.[1]

Later, Hoffman[2] published evidence which showed a relationship between the storage function and futures trading activity. That is, stocks of grain were highly correlated with open interest of futures showing that futures markets were hedgers' markets and not speculative markets as previously supposed.

Working presented a case for the inventory hedging view of futures markets by demonstrating that cash-futures price relationships were based on a true price of storage including interest, insurance, profit and convenience yield.[3] This evidence of the usefulness of hedging did not quickly allay the suspicions of governments and the public that the futures trade was a gambling game between speculators and had an unfavorable effect on normal, commercial operations.

The literature on futures trading is replete with contributions both for and against the practice of trading in futures and numerous

---

[1]J. M. Keynes, "Some Aspects of Commodity Markets," Manchester Guardian Commercial, March, 1923, pp. 784-786.

[2]G. W. Hoffman, Grain Prices and the Futures Markets in the United States, Technical Bulletin No. 474 (Washington, D.C.: U.S.D.A., 1941).

[3]H. Working, "Theory of the Inverse Carrying Charge in Futures Markets," Journal of Farm Economics, Vol. XXX, No. 1 (1948), pp. 1-28. Also; H. Working, "Theory of the Price of Storage," American Economic Review, Vol. XXXIX, No. 6 (1949), pp. 150-166.

efforts to legislate against futures trading were occasionally successful. For example, in 1957 in the United States, the banning of the futures contract for onions was brought about because the market did not fit the mold of an inventory hedging market.[1] The problem appears now that the existing theory was not capable of explaining satisfactorily the changing activities and practices which the industry required.

Recent Developments in Futures Markets

The evidence indicates that futures trading has evolved through several stages though the explanation of current practices has been continuously delayed. As has been mentioned, the markets were originally devised as an attempt to facilitate delivery; but, this was soon shown to be impractical and a market for temporary substitutes developed. Then, with diminished use of the market for delivery purposes, its usefulness to hedgers appeared to give way to the speculative urges of traders. However, a realization of the value of future prices as an inventory guide achieved through widely broadcast forward prices on centralized exchanges brought to the market an understanding that the futures trade served well as a parallel market to cash merchandising.

New markets for futures trading in non-storables have enjoyed an impressive growth. However, adequate theory explaining the practices and the nature of the markets is lacking. Recent studies have turned the search for an explanation for hedging in these markets in a new

---

[1] U.S., Congress. House Hearings Before the Committee on Agriculture and Forestry, 85th Congress, 1st Session, May, 1957, 1958.

direction.[1] Tomek and Gray demonstrated the need for a model explaining the use of operational and anticipatory hedging. They observed that potato futures open interest appeared to peak in the growing season rather than in the storage season. The implication is that the need for, and the interest in, forward prices seemed to be higher during the production period than during the storage period of the year.

Bias in Futures Prices

The Risk-Premium Theory

An important challenge to the perfect unbiased market concept of futures trading came in the form of the "Theory of Normal Backwardation" expressed by Keynes in 1923.[2] His explanation of the incidence of profit in futures trading was that risk averters (producers or merchants not willing to undertake ownership of warehouse stocks) were "selling" the distant futures at a price that was biased downward because the speculative traders were not willing to "buy" at a price so high that there was no chance of profit. His risk premium theory, as it was later called, led to a belief that speculators were profiting handsomely by

---

[1]W. G. Tomek and R. W. Gray, "Temporal Relationships Among Prices on Commodity Futures Markets: Their Allocative and Stabilizing Roles," American Journal of Agricultural Economics, Vol. 52, No. 3 (August, 1970), pp. 372-380; J. M. Skadberg and G. A. Futrell, "An Economic Appraisal of Futures Trading in Livestock," Journal of Farm Economics, Vol. 48, No. 5 (1966), pp. 1485-1489; R. L. Ehrich, "Cash-Futures Price Relationship for Live Beef Cattle," American Journal of Agricultural Economics, Vol. 51, No. 1 (1969), pp. 26-40.

[2]Keynes, "Some Aspects of Commodity Markets," p. 789.

merely maintaining an opposite position to the bulk of hedgers.[1] Working showed empirically that in wheat, in particular, speculators paid dearly for the privilege of trading.[2]

The risk premium which hedgers were reported to pay was not found to be universal in all markets at all times. Keynes elaborated that, though normal backwardation was present at all times, the costs of warehousing, depreciation, and interest charges tended to force distant futures prices higher than nearby futures prices, but by an amount less than would be the case if no risk premium was present.[3]

It is generally agreed that the theoretical controversy was discontinued when it became obvious that only empirical answers on the incidence of profits to traders would prove or disprove the theory of normal backwardation. Studies by Kaldor,[4] Dow,[5] Hawtrey,[6] and Blau[7] continued to estimate the size of risk premium or bias in futures markets for storable commodities.

---

[1]J. M. Keynes, A Treatise on Money, Vol. II (New York: Harcourt Publishers, 1930).

[2]H. Working, "Financial Results of Speculative Holding of Wheat," Wheat Studies of the Food Research Institute, Vol. VII (July, 1931).

[3]J. M. Keynes, "Some Aspects of Commodity Markets," p. 143.

[4]N. Kaldor, "Speculation and Economic Stability," Review of Economic Studies, Vol. III (1939-40), pp. 1-27; N. Kaldor, "A Note on the Theory of the Forward Market," Review of Economic Studies, Vol. VII (1939-40), pp. 196-201.

[5]J. C. R. Dow, "A Theoretical Account of Futures Markets," Review of Economic Studies, Vol. VII (1939-40), pp. 185-195.

[6]R. C. Hawtrey, "Mr. Kaldor on the Forward Market," Review of Economic Studies, Vol. VII (1939-40), pp. 202-205.

[7]G. Blau, "Some Aspects of the Theory of Futures Trading," Review of Economic Studies, Vol. XII (1) (1944-45), pp. 1-30.

The proponents of a theory of bias in futures prices attributed to the risk premium paid by hedgers were confronted with the U.S. Federal Trade Commission's findings that there appeared to be no proof that futures prices were anything but an unbiased estimate of the future spot price.[1] This evidence not only cast doubt on the validity of the risk premium concept but also questioned the explanation of hedging as a method of insuring inventory value and thus challenged Working's theory of hedging. His first proposal of a new theory to explain intertemporal price relationships appeared in 1948,[2] followed in 1949 by the more general "Theory of Price of Storage."[3] He explained the relationship between futures prices of two futures months as being a function of the cost of carrying the commodity, allowing that price differences of lesser magnitude (or of negative value) were a reflection of the value attached to the current ownership (convience yield) of the inventory. However, this still did not completely account for hedging on the non-storable commodity markets where future prices are estimates of the spot price at any future period of time depending on the supply and demand factors existing at that time. In these markets, a greater degree of independence between prices of two futures exists.

---

[1]U.S. Federal Trade Commission, Report on the Grain Trade (Washington, D.C.: U.S. Federal Trade Commission, 1920-1926).

[2]Working, "Theory of the Inverse Carrying Charge in Futures Markets," pp. 1-28.

[3]Working, "Theory of the Price of Storage," pp. 150-166.

Other Sources of Bias

Other theories for futures pricing were forthcoming to explain some of the observed biases in specific markets. Gray found that an imbalance between hedging and speculation on thin markets may have been the cause of the observed futures price bias in several of the commodities he studied.[1] Some of the markets, in particular the soybean futures market, have since broadened and this growth has been attributed to the increased attractiveness to speculators who were able to identify and profit from the bias. By trading, in such a manner as to benefit from the bias, speculators tended to reduce such bias and, the added volume and liquidity enhanced the efficiency of hedging operations by commercial interests.

Another alternative explanation of bias was found to be the terms and specifications of the futures contract. Gray[2] found that a bias existed in Minneapolis wheat because the low protein grade of wheat specified for delivery on the contract was usually not a significant portion of the crop and thus the contract came to represent, unofficially, the higher grades available. Also, he explained some bias to be due to changes in convenience yield of the deliverable commodity such that when the available storage space becomes limited, the purchaser of the futures contract receives a premium when selling because others are willing to

---

[1]Gray, "The Characteristic Bias in Some Thin Futures Markets," pp. 296-312.

[2]R.W. Gray, "The Search for a Risk Premium," Journal of Political Economy, Vol. LXIX, No. 3 (June, 1961), pp. 250-260.

trade "out of position" stocks of the commodity for "in-store" stocks at a cost.[1] Summarizing the present concensus in the literature, it appears that bias in futures prices, if it exists, is due only in part to a risk premium which some hedgers are willing, or are forced, to pay. It should also be noted that the successful speculator is one who identifies a recurrent price behavior and acts upon this information resulting in an incremental decrease in the bias in the market. Therefore, it appears that price bias is often associated with a lack of speculative activity.

Hedging Concepts

Motives for Hedging

Evidence indicates that hedgers are necessary to the existence of a futures market and a number of authors have endeavored to develop a theory of hedging. Holbrook Working has been foremost in the field and has contributed a number of articles providing insight into such aspects as the motive of hedgers, the importance of a perfect hedging market, and the services which speculators provide to hedgers.[2]

---

[1] "In store" refers to those registered warehouses where delivery is permitted by the contract holder. "Out of position" stocks cannot be delivered on futures.

[2] H. Working, "Futures Trading and Hedging," American Economic Review, Vol. XLIII, No. 3 (June, 1953), pp. 544-561; Working, "Hedging Reconsidered"; H. Working, "A Theory of Anticipatory Prices," American Economic Review, Vol. XLVIII, No. 2 (May, 1958), pp. 188-99; and H. Working, "Speculation on Hedging Markets," Food Research Institute Studies, Vol. I, (1960), pp. 185-220.

Gray and Rutledge classify the literature on hedging into four categories.[1] The first is the theory that hedging is performed to eliminate risk. This risk transfer theory is a basic motive for many hedgers initially entering the futures market, but it does not readily explain basis changes and the usefulness of imperfect hedges. The risk transfer explanation of hedging has been expounded as far back as 1923[2] and as recently as 1966[3] but several studies of basis change indicate that there are few situations in any commodity over time and space in which the cash price and the futures price move in perfect parallel.[4]

A constant basis is a requirement of the risk transfer concept and the occurence of non-parallel price behavior uncovers a second hypothesis -- that hedging reduces risks associated with price change and, therefore, the futures market is useful only to the extent that it provides the vest risk reducing alternative available. The bulk of analysis of the usefulness of futures markets has emphasized their risk

---

[1]R.W. Gray and D.J.S. Rutledge, "The Economics of Commodity Futures Markets: A Survey," Review of Marketing and Agricultural Economics (December, 1971), pp. 57-108.

[2]C.O. Hardy, Risk and Risk Bearing (Chicago: University of Chicago Press, 1923).

[3]Skadberg and Futrell, "An Economic Appraisal of Futures Trading in Livestock," p. 1488.

[4]Merrill Lynch, Pierce, Fenner and Smith, To the Western Canadian Feedlot Operator (Chicago, Illinois: 1970); Skadberg and Futrell, "An Economic Appraisal of Futures Trading in Livestock," pp. 1485-89; Gum, and Wildermuth, "Hedging on the Live Cattle Futures Contract," pp. 104-106.

reducing attributes and has generally measured risks inherent in the cash market and compared these to the price risks of being hedged.[1] The risk transfer theory remains as a logical conclusion to those who perceive risk as the "variability of possible outcomes" and whose motive for seeking price insurance (at a cost, if necessary) is to remain in business in the long run. Empirical evidence is needed to prove or disprove the hypothesis that a great number of hedgers in certain futures markets hedge to avoid substantial loss.

Observation of trading activity of hedgers suggests a third possible motive; that hedgers improve the sophistication of their operations and find predictable bias in the basis which allows them to reduce risk of adverse basis change and improve the profitability of hedging. This view was presented by Working[2] in 1953 and, although it is a compelling argument to those closely involved in futures trading, it is difficult to show empirically that a hedger is a merchant who gives up his opportunity to speculate on price level change and is instead speculating on the basis change. In other words, he hedges not primarily to reduce risk, but because he expects a favorable basis change. The hypothesis that hedging is useful because basis is predictable is difficult to prove empirically since, what may be a predictable change to one hedger, may not be to another. However, if information

---

[1]T. F. Graf, "Hedging - How Effective is it?" Journal of Farm Economics, Vol. 35, No. 3 (August, 1953), pp. 398-413; G. O. Gutman and B. R. Duffin, "The London Wool Top Futures Market," Quarterly Review of Agricultural Economics, Vol. 8, No. 4 (October, 1955), pp. 185-192; B. S. Yarney, "An Investigation of Hedging on an Organized Produce Exchange," The Manchester School of Economics and Social Studies, Vol. 19 (September, 1951), pp. 305-319.

[2]Working, "Hedging Reconsidered." p. 532.

was equally available to all traders there would be no predictability because there would be no bias.[1] Working outlines four considerations which motivate hedging. He states:

> (1) It facilitates buying and selling decisions. When hedging is practiced systematically, there is need only to consider whether the price at which a particular purchase or sale can be made is favourable in relation to other current prices; there is no need to consider also whether the absolute level of the price is favourable.
>
> (2) It gives greater freedom for business action. The freedom most commonly gained is that of buying, for example, when a particular lot of the commodity is available at a relatively low price, regardless of its absolute level (this freedom is related to, but distinct from the facilitation of decision mentioned above); often, moreover, the freedom gained is to make a sale or purchase that would not otherwise be possible at what is judged a favourable price level, as when a cotton grower sells futures in advance of harvest, a textile mill buys futures because cotton prices are judged to be favorable, but the desired quantities of cotton cannot be bought immediately in the spot market.
>
> (3) It gives a reliable basis for conducting storage of commodity surpluses. The warehousing of surplus commodity stocks is a very uncertain and hazardous business when based on trying to judge when the price is favorable for storage; hedging allows operation on the basis simply on judgment that the spot price is low in relation to a futures price.
>
> (4) Hedging reduces business risks. There is usually reduction of risk when hedging is done for any of the previous three reasons (though often not under the second reason), but any curtailment of risk may be only an incidental advantage gained, not a primary or even a very important incentive to hedging.[2]

Working also finds that arbitrage hedging is explained by a merchant's desire to profit by changes in basis because of inter-commodity,

---

[1]The theory that predictability can be equated to bias and that perfect knowledge eliminates such bias is easily shown when we assume that, by acting on expectations, a trader incrementally reduces the bias and many traders with the same information would reduce it to a predictable outcome not significantly different from zero.

[2]Ibid, pp. 560-561.

inter-temporal, or inter-spatial price variations.[1] Much of his inquiry and explanation of hedging motives and practices is applicable to futures trading in semi-storable or non-storable commodity markets.

Hedging in Non-Storage Markets

Several articles review the differences and similarities of the traditional futures market concepts for storable commodities as they apply to commodities which are continually produced and consumed and are storable for shorter periods of time.[2] Skadberg and Futrell predicted rather limited success for live cattle futures markets and suggested several characteristics which they deemed responsible. Peculiar relationships between price and quality, production and consumption, and cash and futures positions led them to state that:

> We believe that there has been a tendency to transfer conventional futures market logic to these new markets without appropriate adaptation or consideration of the nature of the markets concerned.[3]

---

[1]Working, "Futures Trading and Hedging," p. 18.

[2]Skadberg and Futrell, "An Economic Appraisal of Futures Trading in Livestock," pp. 1485-1489.

[3]Ibid, p. 1485.

Ehrich[1] and Elder[2] studied the cash-futures price relationships for the Chicago live cattle futures market and analyzed the spread between feeder cattle prices (cash) and finished cattle futures prices (cash). This spread, Ehrich reasoned, was the relevant basis to use to determine gains or losses on a hedged position. Elder proposes that hedgers predict a net selling price which included an expected change in the cash-futures price relationship over the life of the hedge.

---

[1]Ehrich, "Cash-Futures Price Relationships For Live Beef Cattle," pp. 26-40.

[2]A. E. Elder, Risk, Uncertainty, and Futures Trading, Staff Paper Series, No. P. 69020 (Minnesota: Department of Agricultural Economics, University of Minnesota, August, 1969).

CHAPTER III

THE LIVESTOCK FUTURES MARKET IN CANADA

The Nature of the Beef Industry

The existence of an active futures market is dependent upon an economic need for transfer of ownership through forward contracts. Such a need will be influenced by the characteristics of the Canadian beef industry; the nature of production, marketing and processing; the structure and conduct of firms in the industry; and the prevailing financial and legislative climate. This chapter outlines some of the factors which provide the "environment" to which the live beef futures trade must adapt if it is to be a commercially viable marketing tool.

The Production of Beef in Canada

The beef cow herd, constituting the first step of the production process, totaled over 3.3 million head on December 1, 1971 and produced annually over 2.5 million head of calves for eventual slaughter or herd replacement purposes.[1] Most of the production of beef

---

[1]Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: Statistics Canada, 1971), p. 17.

cattle takes place in the three prairie provinces where 60 percent of total nondairy cattle in Canada are produced. Figure 3.1 illustrates the geographical distribution of the beef industry and shows that two major beef production areas exist -- Southwestern Ontario and Southeastern Alberta.

The distribution of beef production between these two centres reflects the production cost differences as well as the regional differences in demand for finished beef. Southwestern Ontario benefits from the efficiency of high-producing corn and soybean crops, setting a base for cattle feeding operations. The large centers of population in this region provide a market for finished beef but the same population pressures have generally inflated land values so that higher cost production of forage crops and feeder cattle increases the costs of inputs in the feeding industry.

Alberta experiences a relatively different cost structure for industry inputs. Readily available feeder cattle in the foothills and parkland regions, as well as in the short grass areas in the eastern half of the province, provide for lower feeder cattle costs.

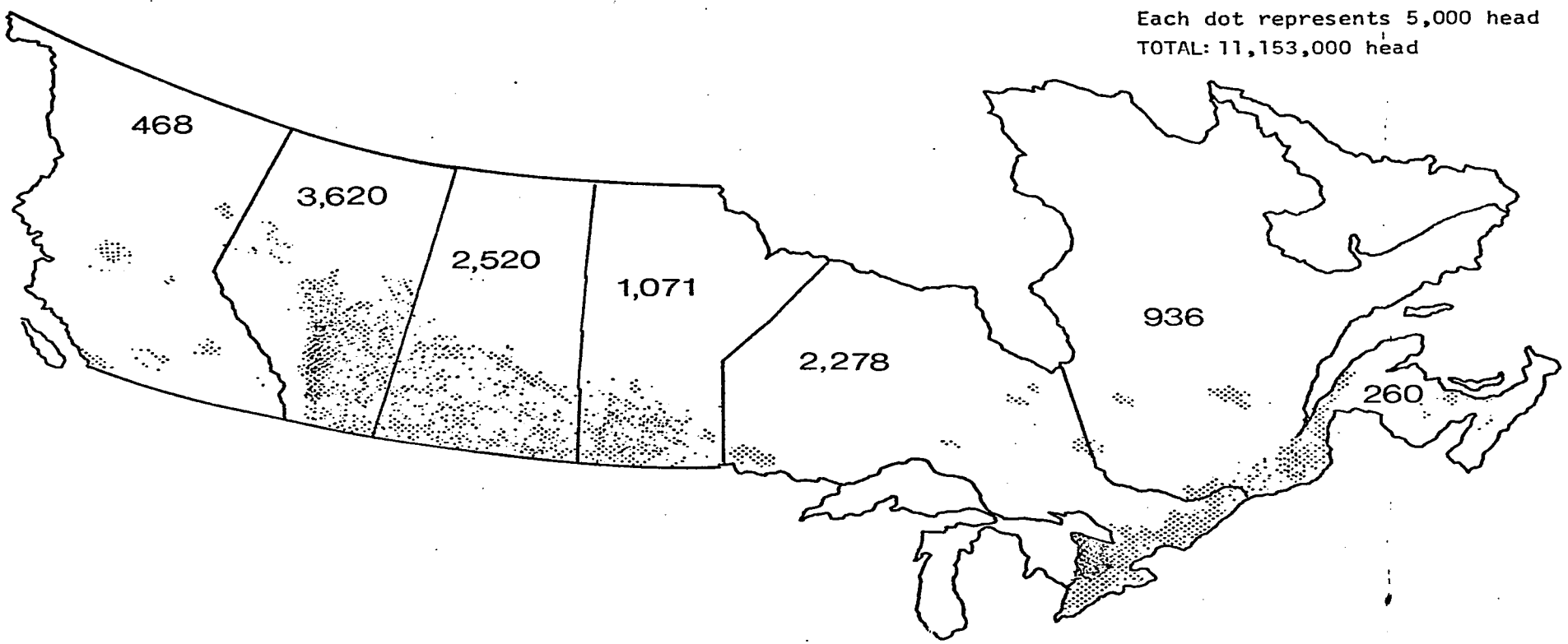
Relative feed costs favor Alberta producers, but the severity of winters has tended to hamper full utilization of these benefits.[1] The demand for beef in Alberta is insufficient to absorb total production

---

[1]A recent study has indicated that cold dry winters cause less stress on cattle than cool humid conditions. See A.J.F. Webster, "Direct Effects of Cold Weather on the Energetic Efficiency of Beef Production in Different Regions of Canada," Canadian Journal of Animal Science, 50 (December, 1970), pp. 563-573.

FIGURE 3.1

CANADA: NUMBER OF NONDAIRY CATTLE, 1971
(Approx. 000's)



SOURCE: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: DBS).

making Alberta a surplus beef production area as well as a surplus feeder calf region. The number of cattle on farms represents approximately the beef cow herd, while the number of steers in each region approximates the size of the feeding industry. Table 3.1 shows the regional differences in beef production and indicates that a greater proportion of steers in Canada are fed in Ontario than in Alberta.

TABLE 3.1

REGIONAL DIFFERENCES IN BEEF PRODUCTION, 1970

	% of Total Cows	% of Total Steers
Alberta	27	26
Ontario	26	43

SOURCE: U.S.D.A., F.A.E. Report No. 77 (Washington, D.C.: U.S.D.A., 1972), p. 38.

Other areas of Canada involved in the production of nondairy cattle are Saskatchewan, Manitoba, and the St. Lawrence Valley in Ontario and Quebec.

Table 3.2 shows the size and growth of cattle production in various regions by classes of cattle over the twelve year period, 1960-1971. The greatest increase in cow numbers has occurred in the prairie region, while increases in steers, representing, approximately, the feeding industry, have been almost equal between Ontario and the prairies. In 1971, the prairie region contained only slightly more than half the total cattle numbers but over 75 percent of beef cow numbers. Regions other than Ontario and the prairies (mainly Quebec and British Columbia)

TABLE 3.2

NUMBER OF LIVESTOCK ON FARMS, BY TYPE OF ANIMAL AND REGION, CANADA, 1960-1971

Class and Region	1960	1961	1962	1963	1964	1965
Nondairy cattle:						
Manitoba	703	691	780	858	930	899
Saskatchewan	1,596	1,564	1,640	1,807	1,945	1,831
Alberta	2,171	2,227	2,311	2,569	2,786	2,845
Prairie Provinces	4,470	4,482	4,731	5,234	5,661	5,675
Ontario	2,043	2,213	2,324	2,276	2,323	2,217
Other Canad	1,262	1,302	1,315	1,374	1,383	1,314
Total Canad	7,775	7,997	8,370	8,884	9,367	9,206
Beef cows:						
Manitoba	220	231	251	284	315	318
Saskatchewan	611	643	681	740	806	820
Alberta	817	858	877	904	955	992
Prairie Provinces	1,648	1,732	1,809	1,924	2,076	2,130
Ontario	296	318	344	352	355	342
Other Canada	237	254	278	339	410	455
Total Canada	2,181	2,304	2,431	2,619	2,841	2,927
Steers:						
Manitoba	91	75	99	97	102	90
Saskatchewan	146	121	135	144	137	135
Alberta	210	919	247	276	286	310
Prairie Provinces	447	415	481	517	519	535
Ontario	427	459	525	540	565	555
Other Canada	102	114	105	111	123	111
Total Canad	976	988	1,111	1,168	1,201	1,201

Continued

TABLE 3.2 (continued)

Class and Region	1966	1967	1968	1969	1970	1971
Nondairy cattle:						
Manitoba	876	831	783	875	921	955
Saskatchewan	1,870	1,810	1,717	1,877	2,031	2,184
Alberta	2,848	2,865	2,785	2,900	3,063	3,358
Prairie Provinces	5,594	5,506	5,285	5,652	6,015	6,497
Ontario	2,249	2,367	2,325	2,300	2,322	2,340
Other Canada	1,272	1,284	1,293	1,350	1,409	1,399
Total Canada	9,115	9,157	8,903	9,302	9,746	10,236
Beef cows:						
Manitoba	298	328	311	330	355	383
Saskatchewan	802	830	802	830	880	980
Alberta	972	1,056	1,020	1,080	1,155	1,240
Prairie Provinces	2,072	2,214	2,133	2,240	2,390	2,603
Ontario	325	365	360	375	383	395
Other Canada	485	281	279	301	330	240
Total Canada	2,882	2,860	2,772	2,916	3,103	3,338
Steers:						
Manitoba	96	99	87	105	95	100
Saskatchewan	143	149	123	145	155	160
Alberta	320	350	337	365	320	370
Prairie Provinces	559	598	547	615	570	630
Ontario	590	575	550	500	530	520
Other Canada	112	116	117	118	122	125
Total Canada	1,261	1,289	1,214	1,233	1,222	1,276

SOURCE: Livestock and Animal Products Statistics 23-203 Ottawa. Quarterly Bulletin of Agricultural Statistics, 21-003, Ottawa.
Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: DBS, 1960-1970);
Statistics Canada, Quarterly Bulletin of Agricultural Statistics, Cat. No. 21-003 (Ottawa: DBS, 1960-1970).

contained almost 22 percent of total cattle numbers but under 11 percent of beef cow numbers. This illustrates the concentration of dairy cattle in these areas.

In considering the output of this industry, the improved quality of product, as well as the increase in productivity, are probably the predominant characteristics of production during the 1960-1971 period. Over the twelve year period, total beef production increased by 42.3 percent from a cow herd which increased 29.8 percent.[1] This effect is partially due to the increased weights of cattle being slaughtered, as reflected in increased carcass weights (see Table 3.3). The percentage of cattle grading choice and good has increased as a consequence of heavier slaughter weights reflecting the increased feedlot finishing of cattle which generally involves high-energy concentrates.

Movement of Beef in Canada

Given the regional differences in production, it would be logical for feeder cattle and carcass beef to move into the high demand areas of Montreal and Toronto. Table 3.4 shows the geographic distribution of the population in Canada and the estimated weekly domestic disappearance of cattle by area. The surplus or deficit indicates the direction of movement of beef to the eastern half of Canada (Manitoba-Ontario boundary) and takes the form of feeder cattle, slaughter cattle,

---

[1]Statistics Canada, Livestock and Animal Products Statistics, (1970), p. 70.

TABLE 3.3

YEARLY AVERAGE WEIGHT OF BEEF CARCASSES

Year	Average cold-dressed weight of cattle slaughtered
1960	512.4 pounds
1961	518.8 pounds
1962	518.1 pounds
1963	530.9 pounds
1964	530.3 pounds
1965	519.3 pounds
1966	533.6 pounds
1967	538.1 pounds
1968	547.1 pounds
1969	553.5 pounds
1970	560.7 pounds
1971	556.7 pounds

SOURCE: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: DBS, 1960-1971).

TABLE 3.4

SUPPLY DISPOSITION OF BEEF IN CANADA

	% of Human Pop.[a]	Est. Weekly Dom. Disapp.[b] (No. Head)	Weekly Slaughter in Province (No. Head)	Weekly Surplus or Deficit (No. Head)
B.C.	10.4	5,834	757	- 5,077
Alberta	7.5	4,208	19,538	+15,330
Saskatchewan	4.3	2,412	2,995	+ 583
Manitoba	4.6	2,581	8,179	+ 5,598
TOTAL: WEST	26.8	15,035	31,469	+16,434
Ontario	35.7	20,028	17,599	- 2,429
Quebec	27.9	15,652	3,818	-11,834
Maritimes	9.6	5,385	710	- 4,675
TOTAL: EAST	73.2	41,065	22,127	-18,938
TOTAL: CANADA	100.0	56,100	53,596	- 2,504

[a]Population, June 1, 1971.

[b]Calculated weekly average domestic disappearance pro-rated by population.

SOURCE: Meat Packers Council of Canada, Facts, Figures, Comments (Islington, Ontario: Meat Packers Council of Canada, March, 1972), p. 2.

and carcass beef. Table 3.5 indicates the rail movements of livestock during the period 1960-1971. Figures for origin and destination of carcass beef are unavailable but the recent decline in movements of live cattle and calves is assumed to be met by an increase in carcass shipments.

Cattle and calf slaughter by various provinces is illustrated in Table 3.6. Stabilized slaughter in Ontario and increasing slaughter in the prairies, particularly Alberta, would lend importance to the movement of carcass beef from west to east. Over one half of the calf slaughter occurs in Quebec. However, dairy farms, the largest source of these calves, are beginning to increase finishing, thus decreasing the calf slaughter and adding to total beef supplies in Canada.

Export and Import Trade

Cattle trade across international boundaries is an important part of the Canadian beef industry. Exports of cattle weighing 200 pounds or more (largely to the U.S.) are highly variable and dependent on the price differentials between the two countries. A rapid growth in the exports of young calves has been experienced during the 1960's, as illustrated in Table 3.7. Exports of fresh or processed beef also increased steadily throughout the same period with most rapid gains made in the fresh chilled and frozen categories. These exports, shown in Table 3.8, were mainly made to the United States.

Beef imports generally consist of live and carcass movements from the United States and canned, pickled and frozen beef from Australia and New Zealand. Tables 3.9 and 3.10 show the breakdown of imports by origin and by type of product for the years 1961-1971. Australia and

TABLE 3.5

MOVEMENT OF LIVESTOCK BY RAIL FROM WEST OF WINNIPEG TO EASTERN CANADA

Year	Slaughter	Feeding	Stockyards	Total
		- (no. of head) -		
1960	121,727	76,450	24,474	222,651
1961	93,421	91,137	28,306	212,864
1962	52,727	49,444	15,921	118,092
1963	55,777	54,955	18,741	129,473
1964	83,703	89,985	34,616	208,304
1965	93,651	105,323	31,088	230,062
1966	113,211	108,055	31,541	252,807
1967	115,363	128,195	42,419	283,977
1968	132,435	106,055	23,820	262,310
1969	119,579	55,068	13,101	187,748
1970	114,695	47,725	19,819	182,239
1971	80,904	34,682	16,533	132,119
Total	1,175,193	947,074	300,379	2,422,646

SOURCE: CDA, Annual Livestock Market Review (Ottawa: Queen's Printer, 1960 - 71).

TABLE 3.6

CATTLE: SLAUGHTERING IN INSPECTED ESTABLISHMENTS BY PROVINCE, 1961 TO 1971

Year	Maritime Provinces	Quebec	Ontario	Manitoba	Saskat-chewan	Alberta	British Columbia	Canada
Cattle								
1961	35,165	207,792	664,916	389,283	119,410	534,173	90,734	2,041,473
1962	41,701	209,436	707,841	324,581	112,569	562,166	69,865	2,028,159
1963	35,508	208,392	758,128	331,183	115,972	606,293	71,240	2,126,716
1964	38,782	236,347	859,541	393,231	133,887	686,084	74,388	2,422,260
1965	44,889	263,597	981,233	470,420	150,943	746,674	76,758	2,734,514
1966	38,004	205,253	930,122	462,907	168,906	813,669	86,278	2,705,139
1967	36,200	196,407	877,536	450,690	152,984	846,419	81,552	2,641,788
1968	30,621(1)	217,429	915,319	467,666	156,037	899,931	97,376	2,784,379
1969	30,212(1)	227,429	923,126	428,085	162,311	860,475	86,842	2,718,567
1970	32,111(1)	238,929	896,922	422,236	153,845	895,320	61,470	2,700,833
1971	36,905(1)	198,528	915,126	425,296	155,722	1,015,967	39,364	2,786,908
Calves								
1961	11,377	368,168	119,964	91,959	15,062	68,812	14,944	690,286
1962	13,437	391,042	123,801	77,824	13,807	71,140	19,178	710,229
1963	10,194	385,485	129,839	67,373	9,870	53,143	15,486	671,390
1964	10,599	411,743	150,169	78,728	12,055	67,293	19,732	750,319
1965	12,015	474,345	175,397	101,573	14,062	86,811	30,525	894,728
1966	7,473	418,574	150,385	86,996	11,453	70,275	20,440	765,596
1967	8,366	406,491	139,142	85,778	9,966	67,312	21,760	738,815
1968	6,942(1)	364,837	137,614	70,863	8,548	63,656	15,951	668,411
1969	4,401(1)	368,173	119,747	42,281	4,597	31,562	9,387	580,148
1970	4,070(1)	330,515	114,345	25,643	2,311	18,917	3,361	499,162
1971	3,424(1)	301,465	114,073	22,354	2,620	17,879	2,425	464,240

(1) Including Newfoundland.

SOURCE: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: DBS, 1971).

TABLE 3.7

CATTLE EXPORTS BY DESTINATION AND CLASS, 1961-71

(number of head)

Year	Destination			Classes				Total
	United Kingdom	United States	Other Countries	Pure Bred	Dairy	Other		
					Weighing 200 lb. or more	Weighing 200 lb. or more	Weighing less than 200 lb.	
1961	79	495,290	7,770	24,239	20,032	430,048	28,820	503,139
1962	67	484,922	7,247	22,153	17,522	416,011	36,550	492,236
1963	5	272,071	6,493	21,969	12,583	208,709	35,308	278,569
1964	17	214,423	7,752	22,089	16,031	135,165	48,907	222,192
1965	32	592,800	20,091	28,218	24,887	498,978	60,940	612,923
1966	23	521,840	15,242	32,467	21,528	377,073	106,037	537,105
1967	1	248,818	13,054	23,740	13,538	138,303	86,292	261,873
1968	658	339,490	13,510	27,903	16,149	172,040	137,566	353,658
1969	78	229,747	12,665	33,472	25,153	56,959	126,926	242,490
1970	8	225,139	21,882	46,703	41,745	31,505	127,076	247,029
1971	76	229,356	15,789	37,784	49,908	332,239	125,200	245,221

SOURCE: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: DBS, 1971).

TABLE 3.8

BEEF EXPORTS BY TYPE OF PRODUCT, 1961-71

(thousand lbs.-dressed carcass)

Year	Fresh, chilled or frozen	Pickled in barrels	Other	Total
1961	34,224	2,244	1,068	37,536
1962	24,660	1,782	1,214	27,656
1963	21,796	2,425	1,343	25,564
1964	38,065	3,122	1,583	42,770
1965	95,822	4,641	1,830	102,293
1966	73,666	3,503	1,583	78,752
1967	43,273	2,782	1,589	47,644
1968	74,100	4,442	1,788	80,330
1969	77,035	4,029	1,748	82,812
1970	137,043	5,937	2,155	145,135
1971	135,415	5,202	2,319	142,936

SOURCE: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: DBS, 1971).

TABLE 3.9

BEEF IMPORTS BY COUNTRY OF ORIGIN, 1961-71[a]

(thousands lbs.-dressed carcass)

Year	Country of Origin									
	United Kingdom	United States	Australia	New Zealand	Argentina	Brazil	Paraguay	Uruguay	Other Countries	Total
1961	9	19,833	15,853	8,078	8,997	--	1,930	535	326	55,561
1962	16	18,420	23,744	9,241	4,322	--	1,242	207	92	57,284
1963	33	17,731	22,659	11,684	7,323	214	2,534	751	861	63,790
1964	336	18,846	13,602	4,829	6,083	435	1,417	321	1,941	47,810
1965	463	14,294	11,500	2,036	4,533	1,817	1,389	1,388	1,234	38,654
1966	431	20,372	11,346	3,579	5,083	3,105	2,106	125	2,071	48,518
1967	1,108	27,722	15,230	7,308	13,558	2,345	2,779	654	2,630	73,413
1968	1,409	19,908	18,136	8,406	10,507	1,592	831	1,069	956	62,814
1969	1,500	17,291	45,241	103,330	17,406	143	3,718	178	1,817	190,626
1970	1,729	18,953	78,311	102,516	11,982	6,975	926	--	1,615	223,007
1971	1,834	34,742	37,576	85,286	2,417	6,871	2,822	--	1,238	172,786

[a]Including canned beef and imports subsequently re-exported.

SOURCE: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: DBS, 1971).

TABLE 3.10

BEEF IMPORTS BY TYPE OF PRODUCT, 1961-71[a]

(thousand lbs.-dressed carcass)

Year	Fresh chilled or frozen[b]	Pickled, in barrels	Canned	Other[c]	Total
1961	16,402	14,743	24,327	89	55,561
1962	23,128	14,563	19,498	95	57,284
1963	24,195	14,856	24,642	97	63,790
1964	13,879	14,613	19,211	107	47,810
1965	7,335	11,654	19,544	121	38,654
1966	14,520	14,703	19,161	134	48,518
1967	29,806	18,098	25,320	189	73,413
1968	27,819	15,219	19,617	159	62,814
1969	148,627	11,579	30,288	132	190,626
1970	185,171	11,363	26,357	116	223,007
1971	129,186	14,362	19,153	85	172,786

[a]Including imports subsequently exported.

[b]Includes veal, fresh, chilled or frozen.

[c]Estimated beef content of sausage.

SOURCE: Statistics Canada, Livestock and Animal Products Statistics, Cat. No. 23-203 (Ottawa: DBS, 1961-1971).

New Zealand have noticeably increased their shares of total imports while the United States has remained a consistent exporter in the Canadian markets. The growth in imports in the form of fresh, chilled or frozen beef in the last three years largely reflects the Oceania output where efforts have been made to develop these products for export.

The Cattle Feeding Industry

The processing of feeder cattle in specialized feedlots has grown rapidly in Canada in recent years. Some of this growth, at least in the prairie region, was undoubtedly due to the practice of engaging in livestock feeding in an effort to maximize the returns from grain growing as the world grain export markets developed an over-supply condition beginning about 1966. The federal government program, LIFT,[1] also aided the development of cattle production and feedlot finishing as some 840,000 acres of prairie wheat land were converted to perennial pastures thus increasing forage for cattle and calf production. With the growth of the industry centered primarily in Alberta, its slaughtering industry has expanded and a growing volume of carcass meat has been shipped to Ontario and Quebec points at improved transportation rates thereby giving this province's industry a better position in the continental meat trade.

Another development in the feedlot industry has been the integration of meat packing firms into livestock feeding activities.[2]

---

[1] LIFT -- Lower Inventories for Tomorrow -- a Federal government program designed to reduce excessive wheat stocks and diversify acreage to summerfallow or forage crops.

[2] Interviews with packing firm representatives.

Ownership and control of livestock production facilities, to various degrees, represents an effort by meat processors to maintain a degree of control over the short-term supply of slaughter animals, thus facilitating a more efficient operation of the slaughtering and processing plant. The entrance of these packer-controlled feedlots into the industry represents a possible area of reduced pricing efficiency.

The practice of custom feeding allows the packing firm the flexibility of drawing on reserves of cattle already owned (and on feed) or of purchasing daily requirements on the local or terminal markets. The additional financial and managerial capabilities of the larger firms places most producers at a disadvantage in production and marketing. However, the increase in fixed costs as a proportion of total costs in the processing industry (due to labor contracts and specialized equipment) requires an increasingly stable flow of slaughter animals over the short run. An alternative to daily accumulation activities is the forward contracting for supplies from producers at set dates and prices. This practice does not appear to be widespread in the Canadian live beef industry.

The industrial performance of the feeding industry is affected not only by the market structure of the industry but by the conduct of the firms in the market. Various market organizations and practices are being developed to provide increased bargaining power to the feedlot operator--the seller of slaughter cattle. Member-owned Canfax[1] provides

---

[1]An organization originally established by the Western Stock Growers Association to provide information to subscribing producers aid producer marketing decisions. This organization is now operated by The Canadian Cattlemen's Association, Calgary, Toronto.

daily information to its subscribers regarding current bids, offers, and sales of beef cattle. Some operators now invite packer-buyers to inspect specified lots of cattle, take sealed bids, and sell the cattle to the highest bidder or not at all. This puts the operator in a better bargaining position than if the cattle had been transported many miles to a packing plant or terminal market before being offered for sale.

The Livestock Slaughtering and Meat Processing Industry

Based on value of shipments the slaughtering and meat processing industry is Canada's third largest manufacturing industry. Faced with new technology in beef production, transportation, and slaughtering, the meat packing industry has undergone a geographical decentralization as plants are being constructed smaller in size, more specialized in activity, and in closer proximity to supplies of live cattle.

The meat packing industry shows evidence of operating under oligopolistic conditions nationally and often in local situations the market consists of very few firms.[1] It is estimated that of the total number of federally inspected cattle in Canada, over 63 percent were inspected in plants of the three largest firms: Canada Packers Ltd., Swift Canadian Co. Ltd., and Burns Foods, Ltd. Their shares of the meat market in 1960 were 35.0 percent, 15.4 percent and 12.9 percent respectively.[2]

---

[1]George Winter, Conduct in Canadian Food Marketing (Ottawa: Agricultural Economics Research Council of Canada, 1969).

[2]Restrictive Trade Practices Commission, Report Concerning the Meat Packing Industry (Ottawa: Queen's Printer, 1961), p. 115.

In the stages of livestock marketing the industry is situated intermediately between the widely scattered producers who have no regular selling pattern and the retail food chains which require consistent quality and volume on a regular basis. The processing firms are inclined towards a concentrated market structure by this situation because of the considerable degree of concentration in the food retailing industry. Also, the variability of supply causes the industry to carry excess cooling and storage capacity.[1]

The problem of variability of supply is being met by integration into the cattle feeding industry and by use of formal or informal agreements with producers. Ability to distribute supplies of cattle evenly over time would reduce average fixed costs, including labor costs which under recent union agreements specify minimum and maximum hours per week. The development of this trend towards integration tends to lessen the pricing efficiency in the market place by reducing the efficiency of price discovery in the daily and weekly accumulation activities of the packing firms.

Marketing Institutions

An important determinant of the competitiveness and efficiency of the Canadian beef marketing system and, thus, the characteristics of the environment for a beef futures market, is the performance of the marketing institutions which are involved in the commerce of beef.

---

[1] Anne McLean-Bullen, "An Examination of Economic Factors Affecting the Location and Operation of the Beef Packing Industry in Canada with Particular Reference to Alberta," (unpublished M.Sc. Thesis, University of Alberta, 1972).

Terminal markets, auction markets, commission firms, government agencies, meat brokers, wholesalers, retailers, and other facilitative institutions form a marketing network which defines the environment of a risk-bearing institution such as the futures market.

The Terminal Market

Trading activity on the terminal markets indicates a declining trend in handling of slaughter cattle.[1] For example, in 1970, 39.4 percent of all slaughter cattle passed through centralized exchanges in major trading centers in Alberta. This is down considerably from 59 percent sold in this manner in this province in 1960. These markets are considered important price barometers in the live cattle trade and the information (price and volume) generated influences the behavior of sellers and buyers in the market. However, some dissatisfaction with the terminal markets by users is evident.

Hawkins and Hurnanen surveyed producer opinion of various marketing institutions.[2] They found that a principle reason for by-passing terminal markets and shipping directly to packing plants was the high selling costs which were attributed to stress, shrinkage, and decreased volume, resulting in higher average fixed costs. Intra-session price uncertainty also led to producers by-passing these markets. Although trading volume has decreased relative to cattle slaughter, the importance of the price generated has increased because the industry

---

[1] Canada Department of Agriculture, Annual Livestock Market Review (Ottawa: Queen's Printer, 1962, 1966, 1971).

[2] M. H. Hawkins and R. R. Hurnanen, "Beef Cattle Marketing Problems in Alberta," (presentation prepared for 15th Annual CAES Workship, Banff, Alberta, June, 1970).

continues to use terminal price for settlement when delivering direct to packers.

Country Auction Markets

Country auction markets, which once played a considerable role in marketing of slaughter cattle, are discredited by producers for conflict of interest.[1] Operators of these institutions were reportedly involved in buying and selling for their own accounts. This reason, combined with market variability due to erratic attendance by packing firm buyers, has led many producers to choose alternate marketing channels.

Commission Firms

The producers expressed concern with commission firms which were involved in feedlot enterprises. They felt also that the agents contributed to the high costs of marketing slaughter cattle through terminals by charging full fees even though the seller may "bid in" his own cattle because of an unfavorable price.[2]

Other Institutions

A marketing alternative which has been instrumental in replacing the terminal market, but is not formally an institution, is the on-farm purchasing of live cattle by packers. The practice is

---

[1] Ibid., p. 24.

[2] A common practice in the auction sale system involves the seller being able to make the final bid on his cattle if the other bids were not to his satisfaction.

widespread and packer buyers have been able to use producer loyalty, non-price benefits, and other special concessions to obtain regular supplies of known quality from producers. A growing practice in Western Canadian feedlots is sale-by-tender where uniform lots of cattle are sorted and bought by sealed bid before the cattle leave the premises.

These alternative institutions form the basic elements of the commercial cattle market place within which the live beef futures trade must function. The trend toward direct marketing of slaughter cattle, shifts in pricing activity to the carcass level, and the apparent increasing concentration of supplies at the producer level have led to growing concern over a pricing mechanism (the futures market) based on the terminal market price. It is reasoned that the phase of the marketing process generating the most accurate and widely used price should become the basic unit of the futures trade. The carcass trade seems to offer a more clearly defined classification system and, should rail-grade marketing continue to grow in relation to other methods, the futures trade may successfully operate in this market.

Government Involvement in the Market

Activities of government agencies involved in the marketing network include brand and disease inspections, licensing, and carcass grading. One activity necessary to the existence of nationally consistent marketing standards is the grading of slaughtered animals in the packing plant. However, no such standardization exists in the live cattle trade making it difficult to base fixed contractual arrangements on a live animal basis.

In Canada, the legislative control of beef pricing is almost nonexistent as movements of inspected meat within and between provinces responds to the supply-demand balance at each stage of the marketing process and in each geographical area. However, the exports and imports of carcass and boneless beef and of slaughter and feeder cattle are controlled by tariffs and health restrictions imposed bilaterally and unilaterally by governments involved. This tends to provide some degree of domestic price independence from the continental and international beef market.

Finally, an important area of government involvement in the industry is the collection and distribution of information in the market place. This activity can aid the development of a competitive and efficient livestock and meat market.

A Note on Pricing Efficiency and Futures Markets

The trend in the marketing of beef has been to emphasize the efficiency of marketing, stressing the physical movement of the perishable product. This has occasionally resulted in narrower markets where the function of price discovery is performed by fewer participants because volume of trade declines and the price becomes less useful as an indicator of supply and demand forces in the larger market.

A well-established futures market provides a forum for improved pricing efficiency. Large volumes of the specified commodity are bought and sold daily as many traders meet in a well-defined area and trade under clearly defined rules. The futures contract provides a clear description of the commodity being traded which serves to lessen non-price competition. The influence of any one firm in the market is

insignificant as size restrictions and safeguards against price manipulation are an integral part of the futures trade. Factors influencing supply and demand in the commodity market are given broadest possible coverage and new information is widely disseminated by many market observers and traders.

The price which is generated by a futures market can improve the total efficiency of the cash market as a loss in operational efficiency is not required for a gain in pricing efficiency. However, the cash market price, which the futures price attempts to predict, must be a widely accepted proxy for the total industry and cannot in itself be biased towards nor controlled unduly by buyer and seller. Therefore, the beef market, it is felt, can benefit from the activity of a futures market if there already exists an unbiased pricing mechanism in the cash market. The futures market, then, offers the trade a vehicle for broadening of pricing activity.

The Live Beef Cattle Futures Trade

The Winnipeg Commodity Exchange

The Winnipeg Commodity Exchange began in the basement of the Winnipeg City Hall in 1887 as the Winnipeg Grain and Produce Exchange.[1] A reorganization in 1908 established the Winnipeg Grain Exchange as an unincorporated association and, with a relocation of facilities, it became a major grain marketing institution for Western Canadian grains moving to Eastern areas and Europe.

---

[1]The following data were obtained from the Office of the Secretary, Winnipeg Commodity Exchange.

The Exchange provided facilities for spot[1] and futures trading exclusively in grains until 1967 when a Live Finished Beef Cattle Futures Contract was approved by the membership. This was followed by a Maritime Potato Futures Contract in 1968 and a Gold Futures Contract in 1972. The addition of cattle, potatoes and gold resulted in the name being changed to the Winnipeg Commodity Exchange in 1972, thus reflecting the broader interests of the Exchange.

The Exchange consists of 325 members who, by virtue of having purchased a "seat" (share) and paying annual membership dues, have trading privileges on the "floor" of the Exchange. They may transact business for other member participants as well as for themselves or companies which they represent. Members also are entitled to trade through their employees under certain conditions.

Facilities are provided by the Exchange to serve the trading interests of the market. Some of these facilities include an octagonal "pit", communications services, weather summaries and, price quotations on spot market transactions and various futures exchanges. In addition, the Winnipeg Grain and Produce Exchange Clearing Association Limited, a limited liability company composed of shareholders who also must be members of the Winnipeg Commodity Exchange, operates as a central clearing agency between all buyers and sellers of futures contracts. That is, after each day's trading, all Clearing Association members must report purchases and sales to the "clearing house" which then substitutes itself

---

[1]Spot trading refers to the physical commodity market where a considerable volume of trade for immediate delivery is transacted.

as the buyer to all sellers and the seller to all buyers to ensure performance of all contract commitments. The financial backing of this clearing house is such that it is able to meet all obligations to either buyers or sellers regardless of the solvency of any member.[1]

The Clearing Association members are required to deposit a specified margin on each commodity in which they are net long or net short.[2] The members' customers -- generally Exchange members or non-members from the general public -- are required to deposit margin with the Clearing Association member on the futures position which they hold. Each day, all market positions held by members are adjusted for margin and each member must similarily call for margins from customers not fully margined.[3]

Trading activity in the Maritime Potato Contract became nil and in early 1972 the contract was withdrawn by the Exchange. The Live Cattle Futures Contract and the Gold Futures Contract now represent the only non-grain commodities being traded on the Exchange.

---

[1]The financial strength of this Association is based on rules which enforce the following general procedure upon failure of its members to meet obligations:

(a) the defaulting member's contracts are liquidated,
(b) if insufficient funds are recovered, the members margin (performance bond) is used,
(c) if this is not sufficient, the member's contribution to the Guarantee Fund is utilized,
(d) if necessary, the contribution of all members to the Guarantee Fund is utilized.

[2]Exchange members who are not members of the Clearing Association must report through a clearing member.

[3]If prices have risen, "short" positions lose money and additional funds must be deposited to maintain a minimum level of protection from further price advance. If the price has fallen, the clearing house pays the member who then credits the customer's account with the gains. The reverse procedure would apply for a "long" position.

The Live Finished Beef Cattle Futures Contract

Inaugurated in August, 1968, the Live Beef Cattle Futures Contract, set out in the By-laws and Regulations of the Winnipeg Commodity Exchange, calls for delivery of 25,000 lbs. of live steers weighing between 900 and 1,200 lbs. and yielding carcasses grading Canada Choice with a minimum yield of 57 percent cold weight.

At the beginning of trading, the par delivery point[1] was at Winnipeg, and with only the Ontario Stockyards in Toronto as an alternate delivery point at a premium of one dollar per hundred weight. A change early in 1972 allowed for delivery in Calgary with a discount of one dollar and fifty cents under the Winnipeg par delivery point. In September, 1972, the delivery specifications were again changed to allow Calgary to become the par delivery point, Winnipeg delivery to be at a one dollar premium, and Toronto delivery to be at a two dollar and fifty cent premium per hundred weight. Additional details of the contract are provided in Appendix A.

The adjustments to the contract specifications appear to have been made in an effort to lessen the occasional discrepancy between cash and futures prices during the delivery month. Due to occasionally limited supplies of choice grade steers at Winnipeg, the tendency appeared to be that futures prices rose relative to cash prices during delivery month. Therefore, by first allowing for delivery in Calgary then shifting the price differential between Calgary, Winnipeg and Toronto, the market was reasoned to be less disposed towards "squeezes"

---

[1] Par delivery refers to the time, form, quality and place aspects of commodity being traded on the Exchange. Par delivery point is the location where the futures price is based.

in that deliveries could be made much more efficiently from the larger Calgary market.[1]

Development of Market Activity

Since the inception of trading in Live Beef Cattle Futures in 1968, market activity has failed to develop to the point where a price discovery process of importance to the industry is evident. The pricing activity of a futures market may be approximated by the trading volume while a measure of the importance of the price generated is given by the total number of contracts held.[2] Figure 3.2 indicates the trading volume and open interest since early 1969. Except for seasonal advances, the trading has failed to expand.

A comparison of activity on this market to activity on the cash cattle market in Canada reveals the relative size of the market and provides a measure to assess the role of the price discovery process on the Exchange. The average annual slaughter of beef cattle in Canada between 1965 and 1971 was about 2.8 million head or equal to 54,000 head per week.[3] At a peak of trading activity on the Exchange there were

---

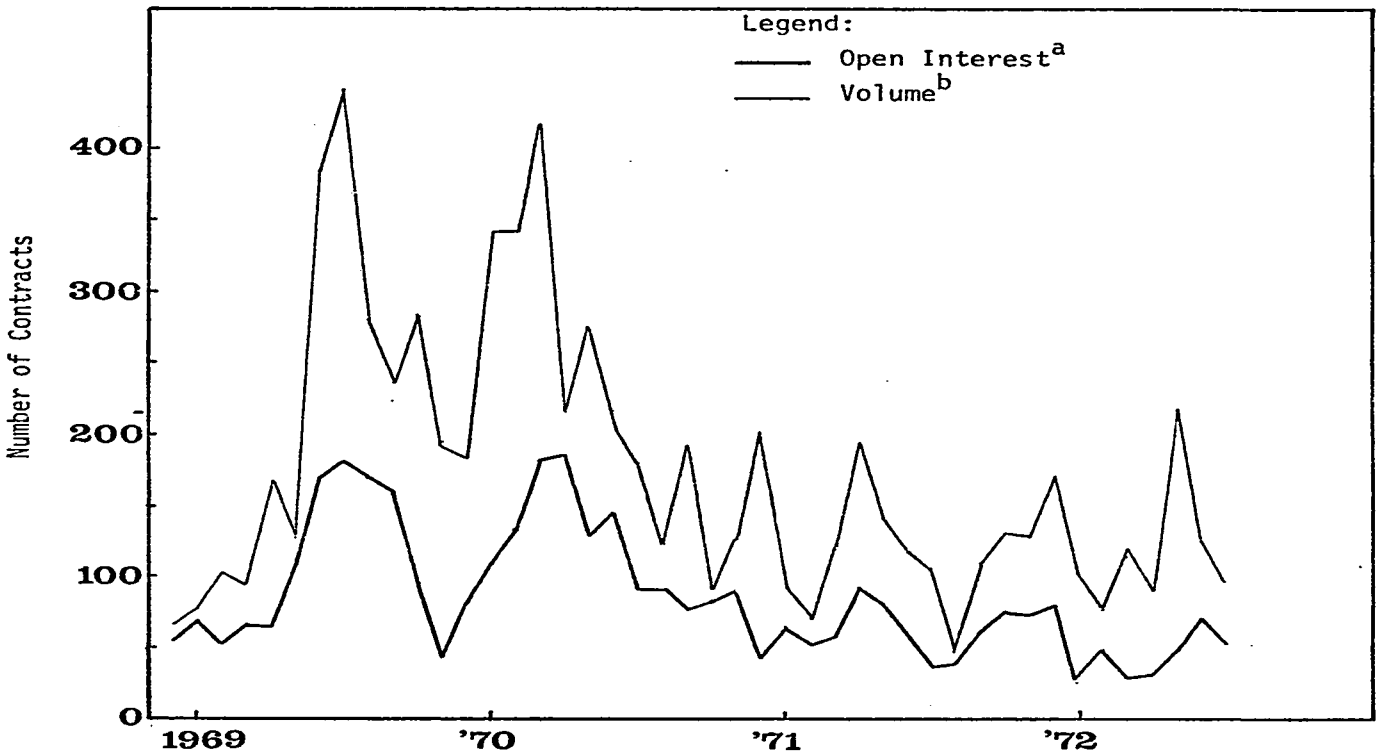
[1]Squeezes generally occur when deliverable supplies in the cash market are limited due to transportation problems and the "shorts" find it less costly to buy back futures at unfavorable prices than make delivery.

[2]Trading volume refers to the number of transactions occurring during a specified period of time and is generally measured in terms of the number of contracts either bought or sold (not both). Open interest, or the number of contracts held at any point in time by all traders, is counted by counting only the number of long positions.

[3]Canada Department of Agriculture, Livestock and Meat Trade Report (Ottawa: CDA, 1968-1972).

FIGURE 3.2

GRAPH OF TRADING VOLUME AND OPEN INTEREST:
WINNIPEG LIVE FINISHED BEEF FUTURES



[a] Open interest as recorded on last Thursday of month.

[b] Total monthly trading volume.

slightly over 200 contracts traded in one week -- equivalent to 5,000 head of cattle. Therefore, a maximum of 10 percent of total cattle traded were represented by transactions in the futures market. However, throughout the life of the contract, the trading volume has averaged only forty-five trades per week -- equal to only 2.1 percent of total cattle slaughter or about 5.0 percent of the choice cattle slaughter.

The degree to which the futures market price is utilized in marketing and planning decisions will depend upon the size of trade relative to the spot market. Although no absolute minimum size level may be specified, the growth of the futures trade in live cattle on the Chicago Mercantile Exchange provides a basis for comparison.

The Chicago Mercantile Exchange's Live Cattle Market

Much of the interest in livestock futures has resulted from the live cattle futures trading begun in November, 1964 at the Chicago Mercantile Exchange. Preliminary planning and development of the Winnipeg cattle futures was patterned after this example and thus a brief review of this market is warranted.

Measured by the volume of contracts traded, the growth of trading activity has been rapid and stable. Table 3.11 indicates that during the years 1964 to 1972, the volume of live cattle futures contracts traded represents a considerable proportion of total commercial slaughter in the United States and an even higher proportion of the deliverable quality livestock, i.e., choice grade steers.

The contract calls for delivery of 40,000 lbs. of live choice grade steers of given quality, conformation and estimated yield, weighing between 1,050 and 1,250 lbs., and delivered at Omaha, Nebraska.

TABLE 3.11

VOLUME OF CHICAGO LIVE CATTLE FUTURES TRADING

Year	Total Commercial Slaughter - U.S.	Annual Trading Volume	Percent of Total
	(000's hd)	(000's hd)	
1964	30,778	63	0.2
1965	32,342	2,372	7.0
1966	33,715	6,832	20.0
1967	33,868	11,991	35.0
1968	35,055	10,124	28.0
1969	35,239	40,547	115.0
1970	35,024	23,153	65.0
1971	35,577	29,848	83.0
1972	35,774[a]	60,000[a]	168.0

[a]Estimates.

SOURCE: Chicago Mercantile Exchange, Chicago Mercantile Exchange Yearbook (Chicago: Chicago Mercantile Exchange, 1964-1972).

Other specified qualities, weights, and points of delivery are possible with appropriate adjustment. Delivery on the contract is generally lower than 2 percent of the total number of contracts indicating that the parallel movements of cash and futures prices is sufficiently close to make it largely unnecessary to close out a contract with delivery.

A survey of market participants conducted by the United States Department of Agriculture for the Commodity Exchange Authority shows the breakdown of occupational groups and their involvement in the live cattle market on May 29, 1969.[1] Table 3.12 shows that the predominant hedging positions were held by livestock farmers and meat packers. Meat packers held a much greater proportion of short positions in relation to their total positions than did the livestock farmers, beef producers, and ranchers. This surprising phenomena indicates that, although livestock slaughter house operators and meat packers may be buyers of live cattle, the risk borne by these firms in the inventories of owned cattle outweighs the risk of price change on acquisition of slaughter supplies.

Speculative volume in the market was drawn from a wide variety of occupational groups and, on the day of the survey, speculators as a group held predominantly long positions. Livestock farmers, beef producers, and ranchers also held a large share of speculative contracts (second only to brokerage houses and employees dealing in futures trading).

---

[1]Commodity Exchange Authority, Trading in Live Beef Futures (Washington: U.S.D.A., May, 1970).

TABLE 3.12

POSITIONS OF TRADERS: CME LIVE CATTLE, MAY 29, 1969

Occupational Group	Speculators			Hedger			Total		
	Number of Traders	Positions[a] Long	Short	Number of Traders	Positions[a] Long	Short	Number of Traders	Positions[a] Long	Short
Meat Industry:									
Livestock farmers, beef producers, and ranchers	563	2,919	2,229	1,160	6,006	7,669	1,723	8,925	9,898
Livestock dealers	159	1,619	538	46	263	486	205	1,882	1,024
Auction market operators	12	99	12	4	5	11	16	104	23
Livestock commission firms	18	50	10	3	4	19	21	54	29
Livestock slaughter house operators and meat packers	49	237	184	38	1,448	4,036	87	1,685	4,220
Meat processors and fabricators	9	33	76	0	0	0	9	33	76
Meat wholesalers	22	67	41	2	0	83	24	67	124
Meat jobbers, hotel and restaurant purveyors	2	1	5	0	0	0	2	1	5
Meat brokers	2	0	5	0	0	0	2	0	5
Meat retailers and butcher shops	4	2	3	0	0	0	4	2	3
Grocery and chain store organizations	18	76	19	4	102	0	22	178	19
Sub Total	858	5,103	3,122	1,257	7,828	12,304	2,115	12,931	15,426
Other Occupations:									
Farmers and farm managers	1,019	1,599	2,259	12	57	26	1,031	1,656	2,285
Brokerage houses and employees	156	4,052	2,548	9	57	151	165	4,109	2,699
Floor traders	30	1,518	1,087	0	0	0	30	1,518	1,087
Other occupations[b]	2,194	5,673	4,120	83	262	568	2,277	5,935	4,688
Sub Total	3,399	12,842	10,014	104	376	745	3,503	13,218	10,759
TOTAL	4,257	17,945	13,136	1,361	8,204	13,049	5,618	26,149	26,185

[a] Number of contracts.

[b] Included are: poultry handlers and processors; tradesmen; grain companies; investment clubs; lawyers; accountants; physicians; teachers, university professors; professional engineers, chemists, architects, economists, consultants; other proprietor (non-farm); housewives; students; etc.

TABLE 3.12

POSITIONS OF TRADERS: CME LIVE CATTLE, MAY 29, 1969

Occupational Group	Speculators			Hedger			Total		
	Number of Traders	Positions[a] Long	Short	Number of Traders	Positions[a] Long	Short	Number of Traders	Positions[a] Long	Short
Meat Industry:									
Livestock farmers, beef producers, and ranchers	563	2,919	2,229	1,160	6,006	7,669	1,723	8,925	9,898
Livestock dealers	159	1,619	538	46	263	486	205	1,882	1,024
Auction market operators	12	99	12	4	5	11	16	104	23
Livestock commission firms	18	50	10	3	4	19	21	54	29
Livestock slaughter house operators and meat packers	49	237	184	38	1,448	4,036	87	1,685	4,220
Meat processors and fabricators	9	33	76	0	0	0	9	33	76
Meat wholesalers	22	67	41	2	0	83	24	67	124
Meat jobbers, hotel and restaurant purveyors	2	1	5	0	0	0	2	1	5
Meat brokers	2	0	5	0	0	0	2	0	5
Meat retailers and butcher shops	4	2	3	0	0	0	4	2	3
Grocery and chain store organizations	18	76	19	4	102	0	22	178	19
Sub Total	858	5,103	3,122	1,257	7,828	12,304	2,115	12,931	15,426
Other Occupations:									
Farmers and farm managers	1,019	1,599	2,259	12	57	26	1,031	1,656	2,285
Brokerage houses and employees	156	4,052	2,548	9	57	151	165	4,109	2,699
Floor traders	30	1,518	1,087	0	0	0	30	1,518	1,087
Other occupations[b]	2,194	5,673	4,120	83	262	568	2,277	5,935	4,688
Sub Total	3,399	12,842	10,014	104	376	745	3,503	13,218	10,759
TOTAL	4,257	17,945	13,136	1,361	8,204	13,049	5,618	26,149	26,185

[a] Number of contracts.

[b] Included are: poultry handlers and processors; tradesmen; grain companies; investment clubs; lawyers; accountants; physicians; teachers, university professors; professional engineers, chemists, architects, economists, consultants; other proprietor (non-farm); housewives; students; etc.

CHAPTER IV

THE THEORY AND USE OF LIVESTOCK FUTURES

Futures Markets in General

This chapter deals briefly with those aspects of the theory which describe the general characteristics of the futures market and, more specifically with the theory of price and basis behavior in the futures market for non-storage commodities such as livestock. The theory and application of livestock futures as a business management tool is included to clarify policy implications in hedging decisions.

The general theory of futures trading relies on the model of a perfectly competitive market. Therefore, it is consistent with optimal pricing efficiency where price changes are influenced instantaneously and solely by factors known, or perceived to have, an effect on the fundamental supply or demand schedules of the commodity. The conditions of perfect competition may be listed as: 1. a large number of buyers and sellers so that no one individual has an influence on price, 2. a homogenous product which can be objectively measured and described, 3. a free entry and exit to and from the market, 4. full information (or at least all participants having equal information), and 5. lack of differentiation between buyers, sellers, or product.

The regulations governing futures trading are generally designed to enhance the possibility that these properties exist in the market. Limitations of size of market position, prevention of collusive activities, and encouragement of large numbers of participants are actions designed to decrease opportunity for price manipulation. A clearly defined product in the form of a uniform contract limits intra-product differentiation. Free and efficient entry by anyone wishing to buy or sell and unrestricted exit to those no longer interested at given prices enhance the operation of the market. Finally, public dissemination of information and efforts to minimize possibilities of differentiation between individual participants by setting of standards of business conduct tend to aid pricing efficiency by reducing non-price activities.

All of the above activities illustrate the impact of the theoretical concept of the perfectly competitive model. Activities and characteristics deviating from the conditions of this model generally result in non-competitive practices which reduce the efficiency of pricing and diminish the usefulness and accuracy of price as an agent in the optimal allocation of resources. The potential maladies resulting from a failure to maintain the conditions of the perfectly competitive model are numerous. A few include: thin markets (lack of liquidity), non-random price behavior,[1] excess price volatility, and biases against

---

[1]Randomness in prices generally means that successive price changes are independent. Work on this aspect of commodity futures prices is presented in: Teweles, Harlow, and Stone, The Commodity Futures Trading Guide (New York: McGraw-Hill, Inc., 1969), Chapter 8.

buyers or sellers. Specific examples of some aspects of potential maladies in the Winnipeg Live Finished Beef futures market are considered in Chapter VI.

The Theory of Futures Price Behavior in Non-Storage Markets

Review of Price Relationships in Storage Markets

The successful use of the futures market by the cattle industry requires that the participants be aware of some of the differences between conventional futures markets, in storable commodities (grains, metals, etc.) and the markets for non-storable commodities. Therefore, a review of these more basic differences and a theory of price behavior in the latter is contained in this section.

A trading of livestock futures contracts was antedated by the trade in grains by at least one hundred years. From this historical use of the futures market system has grown an explanation of price relationships and basis behavior in terms of the price of storage. This concept, espoused by Working in 1949, rests on three facts: 1. a need for inventory holding made necessary when the commodity is produced at one time of the year and consumed throughout the remainder of the year, 2. the performance of the storage function requires an economic reward because of the costs involved and, 3. futures contracts cost virtually nothing to hold.[1]

It follows, then, that the relationship between the current spot price and a deferred futures price will be equal to the costs of

---

[1]Working, "The Theory of Price of Storage," pp. 1254-1262.

storing the commodity until the futures and spot prices converge in the delivery month. If the price of a deferred future rises above the cash price by an amount greater than the cost of holding inventory until that date, it becomes profitable to buy the commodity and sell an equivalent quantity in the deferred futures option. Thus, a maximum discount (cash under futures) is established.

This discount may become less than the maximum due to the attractiveness of owning the commodity inventory for purposes other than return on storage space and the futures prices may become inverted -- near futures higher than deferred. The decrease in the price of storage results from decreased availability of deliverable storage stocks caused, for example, by transportation difficulties or harvesting delays.

Working's theory explains the cash-futures price relationships during the storage period of the year when no production is taking place. If we analyze the cash basis for the new crop futures during the period of production,[1] an explanation of the basis behavior of non-storage markets emerges. During this period, the futures price is no longer a representation of the price of storage but is, instead, an attempt to forecast the supply and demand balance which will exist at harvest. A short hedged position in this period is primarily an effort to retain a profitable price for the eventual cash sale and the price of storage is

---

[1] "Cash basis" is generally defined as: "a statistical statement reflecting (as of any given time) the premium or discount of the cash price for a deliverable product of contract grade over or under the nearby future." See: H. B. Arthur, Commodity Futures as a Business Management Tool (Boston: University of Boston, 1971), p. 66.

important only in the degree to which the year-end carry-over of stocks is affected by prospective supply from current production.[1]

The cash-futures price relationship in livestock futures reflects the same supply-demand projections which are reflected during the production phase of a storable commodity. However, due to the physical characteristics of the perishable commodity and the nature of the production process, some of the factors influencing the cash basis[2] and the inter-month spreads in the livestock market deserve attention.

The Cash Basis in Livestock Futures

Of the several variables determining the cash basis, the most common source of variation is that resulting from interregional differences between prices of the particular weight, grade, and sex of livestock marketed and the par delivery specifications called for in the contract. Grading of livestock is generally accomplished by approximation of yield or retail value,[3] while the futures price is based on a known minimum retail value in terms of weight, grade, and carcass yield. Therefore, the price difference between the two grades of livestock which produce varying quantity and quality of end products is variable over time according to the final demand for the individual and aggregate end products. For example, if relative demand for "ground beef" increases, the price spread between lower grades and choice grades of

---

[1]Hieronymus, Economics of Futures Trading, p. 160.

[2]Although the cash basis generally refers to the premium or discount of the cash price for a deliverable product of contract grade over or under the nearby future, the term as used here refers to what the trade calls "my basis", meaning other than the deliverable commodity.

[3]Yield generally refers to the percentage of salable carcass from the live animal on a weight basis.

live cattle tends to narrow and, consequently, the basis of the lower grade animal decreases (that is, cash price gains on futures).

A second factor affecting the cash basis is the weight of livestock being marketed. If producer's reaction to profitable, but decreasing, prices is to accelerate marketings of cattle, the result will be a net decrease in the total beef supplies as well as a change in the future temporal distribution of cattle marketings. That is, since the slaughtered cattle will no longer be available for further finishing, the cash price should decrease relative to the nearby futures. The opposite effect occurs if increased prices are expected (nearby futures above cash) and producers hold back market weight cattle to feed them to heavier weights. The current supply decreases while expectations of larger near term supplies increase with current prices moving up in relation to near-by futures. The effect which this behavior has on the cash basis is limited by the span of time during which it is profitable to retard or accelerate the marketing of the livestock.[1]

A third factor influencing the cash basis is the interregional variation of the livestock price. Changes in interregional price differences are generated by variation in the supply and demand balance in each region. Since all production of livestock does not take place in the area of the futures delivery point or points specified in the futures contract, the cash basis for areas other than the specified point may vary according to the relative changes in supply or demand. These three

---

[1]This mechanism causing current prices to respond to future expectations is called "reservation demand" and is covered in: Ezekiel, "Statistical Analysis and the Laws of Price," Quarterly Journal of Economics, 42 (February, 1928), pp. 199-227.

factors determine the relationship which will exist between the cash price at any geographic location and the price of the nearby futures.

Spread Relationships in Non-Storage Markets[1]

The behavior of difference between the cash price and the deferred futures price in the livestock futures market is influenced by inter-month spread fluctuations in addition to the cash basis variance. Spreads in the market for a storable commodity represent the expected price of storage and tend to remain fairly stable except when stocks reach a critical minimum level making a squeeze possible.[2]

Two hypotheses may be postulated for the behavior of spreads in non-storage markets: first, that the spread represents the difference between projections of supply and demand for the two futures months involved; second, that the spread represents the price of inter-temporal allocation of production capacity.

The former would require that considerable independence be evident between various futures months as supply-demand projections were affected by factors indicating the pattern of future supply and demand. Hieronymus' review of three years of cattle futures prices on the Chicago Mercantile Exchange found a minimal degree of independence of prices between various futures months. He states that:

---

[1]Spread refers to the difference between any two futures months; also called straddle.

[2]Willard Thiesson, "A Study of the Cash Basis for Rapeseed," (unpublished M.SC. thesis, University of Alberta, 1970).

> Nothing can be concluded from the apparent absence of independent variation. It may be that the market does not look carefully at the supply-demand circumstances that will exist in each delivery month in the future. Or it may be that the market does look carefully and concludes that the supplies and demands will be a smooth continuum and that prices will not pursue an erratic course.[1]

The second hypothesis requires that premium or discounts be paid for production over a period of time -- in effect, a "price of processing".[2] A gradient of rising inter-temporal prices, as illustrated in Table 4.1, would indicate that a premium is being offered for processing (allocation of resources to production) during the February-June period. For production during this period a revenue gain of $2.50 (above returns on the weight added throughout feeding) will be realized by the producer. This gain is the price being paid for temporal allocation of facilities to production.

TABLE 4.1

INTER-MONTH SPREADS: AN EXAMPLE

Delivery Month	Price/cwt
February	$33.50
April	$35.00
June	$36.00
August	$35.00
October	$35.00

SOURCE: Chicago Mercantile Exchange Yearbook, 1971-72.

[1]Hieronymus, Economics of Futures Trading, p. 166.

[2]This could be likened to the "price of storage" concept.

The June to October spread indicates that temporal allocation of facilities to production during this period will result in a loss due to decreasing value of the end product. This theory of the price of temporal allocation of production facilities assumes that expectations of future prices for the end product are not reflected in the prices of the inputs -- an assumption not generally founded in the empirical world. However, the incidence of profit or loss from fluctuating prices over time must be borne by some stage of the production process or be related to an inherent natural cost factor. Therefore, the spread does represent, at very least, an expectation of the time path of a price which will represent neither an extra profit nor extra loss to the producer of the end product.

Empirical evidence supporting this hypothesis of futures prices in non-storage markets is found in observation of the interdependence of movements of widely separated futures months. Logically, an increase of $1.00 per hundred weight in the near month futures price of live cattle should have an insignificant impact on the price of the six month futures. However, as illustrated in Table 4.2, there tends to be a lack of independence of price movement in the two contracts.

TABLE 4.2

CHICAGO MERCANTILE EXCHANGE LIVE CATTLE MID-MONTH FUTURES PRICES, 1969

Date	April Contract		October Contract	
	Closing Price	Monthly Price Change	Closing Price	Monthly Price Change
Nov. 15, 1968	$26.20		$26.05	
		+75		+77
Dec. 13, 1968	26.95		26.82	
		+.05		-20
Jan. 15, 1969	27.00		26.62	
		+1.25		+1.48
Feb. 14, 1969	28.25		28.10	
		+2.25		+1.82
Mar. 14, 1969	30.50		29.92	
		-.05		-77
Apr. 15, 1969	30.45		29.15	

SOURCE: Chicago Mercantile Exchange, Trading in Live Beef Cattle Futures (Washington: USDA, Commodity Exchange Authority, May, 1970), pp. 28-29.

The April, 1969 contract is closely correlated with the October, 1969 contract, indicating that futures market participants expect adjustments in supply and/or demand to have an impact on the latter equal to the former. This evidence would indicate that price changes reflect the levels of futures prices more than the inter-temporal price spreads.[1] Moreover, the type of information being discounted in the market is apparently of two types: first, information which affects general values of the commodity based primarily on the cash market price movements; second, information which indicates the expected differences in the supply-demand balance between the futures months.

As the commodity progresses towards the finished state, the "cost of adjustment" in the production input mix increases and the premium or discount becomes more pronounced as it becomes evident that either too much or too little capacity was allocated for production during the relevant time period. The final (expiring) spread levels are constrained on the one hand by the cost of marketing an unfinished product and on the other hand by the cost of withdrawing supplies from the market and maintaining the live product. In the first case, the cost of underutilization of capacity; in the second, the cost of overutilization

---

[1]The other alternative (i.e., that futures prices in non-storage markets are estimates of expected supply and demand at the future maturity date) requires that traders assess each piece of new information and relate its impact according to the time period in which the effect will be felt.

of capacity.[1] The increasing spread levels are illustrated in Figure 4.1 where the difference between the prices of the two futures months widens over the "life" of the spread.

The futures spreads in the livestock sector represent a source of variation in the cash futures price relationship in addition to the cash basis. The ability to accurately forecast a change in spread level is assured to increase the occurence of successful hedges. Of the many factors which may be relevant in forecasting the inter-month spread, the knowledge of the resources allocated appear most useful to the participant.[2]

The Hedging Use of Livestock Futures

Several concepts are basic to an understanding of the use of futures markets for hedging. First, in broad terms, the activity of hedging includes all financial and legal operations which endeavor to offset commitments and minimize the effects of changes in variables external to the system. More specifically, when dealing with futures

---

[1]The determination of optimum input in production is dependent upon the price relationship of the inputs and outputs. See: J. Doll, V. Rhodes, and J. West, Economics of Agricultural Production, Markets, and Policy (Homewood, Illinois: Richard D. Irwin, Inc., 1968), pp. 67-76.

[2]Evidence of this is seen in the importance to the futures traders of certain reports on cattle, hogs and chickens. These reports indicate placements and livestock production-in-progress and tend to provide information indicating expected inter-month differences of supplies.

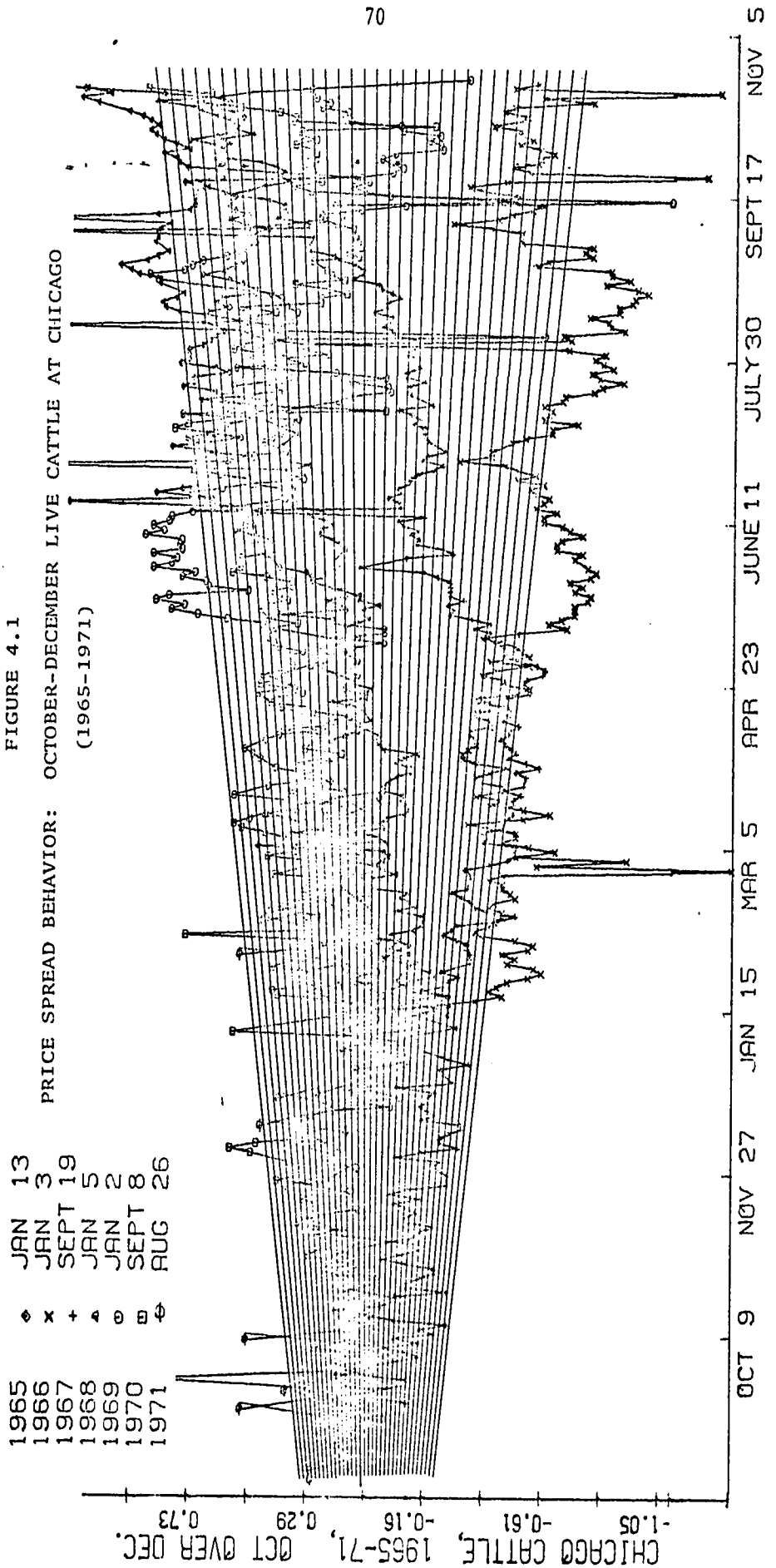


FIGURE 4.1

PRICE SPREAD BEHAVIOR: OCTOBER-DECEMBER LIVE CATTLE AT CHICAGO (1965-1971)

markets, hedging is the matching of "analogous parts" to facilitate business operations by taking position in futures opposite to that held in cash inventory or commitment.[1] Analogous parts may be defined as those items or commitments which are identical in all respects and are consequently subject to the same price-determining variables. This implies that prices move in a parallel fashion and that losses in one market are offset by gains in another.

The lack of an exact, parallel relationship between cash and futures prices, as observed in most futures markets, reflects the variable aspects of time, form, and place which tend to differentiate between various lots of a commodity. This non-parallel component of the cash and futures price relationship is classified as the residual part and is the essence of basis changes.[2] The residual part is that component of the price relationship which the basis trader attempts to forecast and is the item which caused Working to question the commonly held belief that hedgers used the futures market primarily to avoid

---

[1]Henry Arthur, Commodity Futures as a Business Management Tool (Boston: Harvard University, 1971), p. 51.

[2]Here, basis refers to the difference between cash price of a specific lot of a commodity and the near month futures. This basis varies according to those aspects of time, form, and place which are different between the par delivery of the contract and the cash commodity. Ibid., p. 52.

price risk.[1] In the livestock industry, a cattle feeder buying and feeding unfinished cattle to sell at a future date as slaughter cattle must identify the analogous and residual parts of price relationships in order to determine the risk exposure and, thus, the action necessary to manage that risk.

The prices of feeder cattle and finished cattle tend to move in the same direction but not necessarily by equal amounts. Therefore, if the feedlot operator buys a quantity of feeder cattle equal to the number of finished cattle sold, the degree of price risk inherent in inventory holding is equal to the residual component of the relationship between feeder and finished cattle prices.[2] Without using futures to offset risk of price change, the analogous parts of the price movements of feeder cattle and finished cattle, respectively, may provide some protection. However, the feedlot operator may find the risk of an unprotected residual part unacceptable and may wish to utilize a hedging mechanism which offsets this risk.

A second concept of importance to the hedger is that of net market position. The effect which a price change will have on a firm is dependent upon the amount of commodity sold but not bought or, conversely, bought but not sold. The components of a position include inventories as well as commitments to buy or sell. These quantities of commodity, when

---

[1]Working, "Hedging Reconsidered." Basis traders are generally those individuals who sacrifice the opportunity to speculate in price level changes and prefer instead to speculate in basis changes by taking appropriate cash and futures positions.

[2]This is a common practice among larger feedlots.

summated, will result in: 1. a balanced (matched) position such that price level changes are inconsequential, 2. a net long position, so that a price decline results in a loss on the excess (net) inventory or commitment "bought but not sold" or, 3. a net short position such that a price rise results in a loss on the excess commitment "sold not bought".[1]

The livestock processor (feeder) may be able to contract for cash forward delivery of finished cattle and so becomes net short so that rising prices of feeder cattle will result in a loss, though only on "paper". Conversely, if he contracts for cash forward purchases of feeder cattle or feed grain, he becomes net long such that a price decline in these commodities results in a "paper" loss.[2]

A final concept associated with hedging is the impact of accounting procedures and methods on the earnings of a firm dealing in commodities where prices are variable. Two major alternative procedures exist for the pricing of inventories in a processing firm. Over a specific time period, generally an accounting period, the firm may, first, adjust inventory value at the current raw material acquisition price and sell the processed product at the current price, or second, adjust inventory value based on the original cost price while the product continues to sell at current prices. The former is referred to as

---

[1]The terms "long" and "short" are used to indicate market positions. The former position results from purchases exceeding sales and the latter results from sales exceeding purchases.

[2]A "paper" loss or gain refers to a change in the book value of assets which does not affect cash flow or the profit and loss statement.

"Lifo" (last in--first out), while the latter is referred to a "Fifo" (first in--first out). As Arthur[1] explains, a "Lifo" accounting method may be redundant when used with a futures position (hedge) whereas the "Fifo" method places the inventory on a current market basis and leaves the inventory unprotected from risk of price change.[2]

Many of the larger feedlots who maintain a relatively consistent size of inventory are effectively hedging through Lifo accounting. To enter a futures position would be tantamount to speculation unless it merely offsets a momentary net long or short position in the market.[3] In this accounting procedure, the inventory becomes regarded as a long-term capital asset.

Management of Price Risk

The management of risk is an important aspect of the science of management. Whether a manager visualizes his function as that of employing his resources most efficiently in production and processing activities or that of properly anticipating price changes and taking the necessary positions in the market to gain from these changes, is dependent upon his abilities, interests, and information "environment". However, management of market position is a function which he cannot avoid even though the result may be the maintenance of a net zero (or fully hedged) position.

---

[1]Arthur, Commodity Futures as a Business Management Tool, pp. 107-111.

[2]However, inventory hedging by "Lifo" accounting is less effective when input and output markets exhibit substantial differences in organization and product characteristics.

[3]Anticipatory hedging may be undertaken by placing a hedge against expected commercial operations.

Several alternative arrangements for management of price risk do exist and all are used to some degree unconsciously and collectively, if not individually.[1] Of these alternatives, hedging on an active futures market provides many advantages which other methods do not. The efficiency of futures transactions, the large trader interest making possible the almost instantaneous acceptance of opposite commitments at close to the current price, and the flexibility of position size are among the greatest advantages of this market. However, of the alternatives open to the firm, the use of futures depends upon:

1. The impact of possible price changes on the business.
2. The skills of the manager in evaluating opportunities in cash price relationships.
3. The long-term objectives of the firm.
4. The view that the futures market is the most efficient and accurate hedging mechanism available.

The formation of policies applicable to the use of futures markets for any one firm will be determined by the individual firm's characteristics and peculiarities. However, the various uses may be grouped and related to indicate the range of alternative hedging policies. Table 4.3 illustrates the spectra of uses beginning with the greatest price certainty and ending with the greatest price uncertainty for various primary objectives for which a firm may require a futures market operation. For example, the use of futures to control net position and

---

[1]Some possible alternatives are: (a) use of an active futures market, (b) adjust market position by cash market transaction, (c) avoidance of inventory or committed positions -- i.e., brokerage or commission man, (d) Lifo accounting method, (e) spreading risk through cost sharing and averaging formulae, (f) co-operatives, government supports, (g) diversification of enterprises, (h) increased equity in operation items a - f. See: Arthur, Commodity Futures as a Business Management Tool, p. 116.

thus exposure to price risk may take the form of hedging at any time the net position is different from zero. The same primary objective can result in hedging irregularly when a useful or potentially profitable futures-cash relationship exists or as basis cycles are used to advantage.[1]

A second objective (Table 4.3, Column 2) involves the use of futures as a guide to cash market operations. If profitable prices can be obtained in futures, the commercial operation is expanded to maximize turnover at fixed, profitable prices. This objective allows a firm to attain maximum leverage on its equity. The remaining three objectives (Table 4.3, Columns 3, 4, and 5) illustrate other uses of futures depending upon particular situations in the market or within the firm. Profit margins and incentives (Table 4.3, Column 5) relate to futures market operations in which the primary focus is not on protection from general price swings but on the residuals or basis changes. The flexibility of policy for each objective makes heding use of futures markets adaptable to most commercial enterprises.

The hedging policy for use in livestock futures will be dependent upon the characteristics of the futures market as well as the alternative local livestock marketing institutions and the financial structure and managerial skills of the firm. It should be stressed that the success of a hedge should only be measured with reference to the objective for which the futures position was initiated. For example,

---

[1]Basis cycles are recurring movements of basis caused by variance in price-determining factors between grades, locations, and seasons.

TABLE 4.3

ALTERNATIVE HEDGING POLICIES

Degree of Price Risk	Net Position Control (1)	Gross Position Control (2)	Procurement Tool (3)	Marketing Tool (4)	Profit Margins and Incentives (5)
Maximum Protection	1. Fully hedged (zero net position)	1. Maximize turnover	1. Assured source of supply	1. Delivery channel	1. Lock in margins contract prices based on later futures price
	2. Partial hedge (constant, not zero net position)	2. Spreading and arbitrage	2. Lock in handling margin	2. Fix price of inventory	2. Basis operations
	3. Variable hedge (budgeted net position)	3. Hedge excess over Lifo base	3. Maintain value of temporarily reduced Lifo stock	3. Set price for anticipated production	3. Determine volume of business based on assured margin target
	4. Variable hedge (to profit from price swings)	4. Hedge seasonal storage	4. Anticipate future purchases	4. Cover risks on unpriced delivery commitments	4. Temporary substitute until actuals available
		5. Reduce cash tied up in inventory	5. Balance market position--actuals not available	5. Liquidate risk of excessive inventory--lack of sales	5. Buy futures low, sell high based on expectations for cash market
Fully Exposed		6. Speculate--no co-ordination between cash and futures transactions	6. Speculate--futures not related to even expected commercial activity	6. Sell futures further ahead than possible in cash market	

SOURCE: H. B. Arthur, Commodity Futures as a Business Management Tool, pp. 336-337.

a loss on the futures account may be part of a successful hedge if it was initiated to gain from the change in basis. Also, a firm may wish to sell livestock at the most opportune price available and may choose a futures position to execute this decision. The loss on the futures position, if any, may be considered unnecessary and the hedge may be deemed to be unprofitable. However, the decision to sell was speculative even though the futures transaction combined with the cash position constituted a hedge.

CHAPTER V

MODELS, RESULTS, AND CONCLUSIONS

The four models chosen for the quantitative analysis of the live finished beef futures trade in Winnipeg are designed to test the four hypotheses described in Chapter One and represent but a part of the approach required to establish an encompassing review of the market in question.

Model I

The first hypothesis stated that a reduction in risk results from the use of the futures market as a hedge for live cattle. If the hedge does reduce risk, then it is assumed to be an economically beneficial procedure, implying that there is a demand for risk transfer by the livestock industry. Such a demand appears to be a necessary condition for the successful operation of a futures market. The model used to test the initial hypothesis is similar to that used by Gum and Wildermuth which had been previously tested on the Chicago live cattle futures market.[1]

---

[1] Gum and Wildermuth, "Hedging on the Live Cattle Futures Contract," p. 104.

A ratio of the variance of cash cattle prices to the variance of the basis is calculated. This ratio of variances indicates the degree of reduction of price risk afforded by the hedge and may be tested using an F-test.[1]

Theoretical Implications of Hedging Efficiency

In Model I, the basis is defined as the difference between the price of a given futures contract and the cash price at the time of the observation.[2] Fluctuations in the basis, therefore, represent the uncertainty associated with the prediction of basis change and thus the calculation of a net effective futures price. The knowledge of such a price is deemed to aid more accurate prediction of profits and is the supposed impetus for hedging.

---

[1]For a discussion of the properties and uses of the F-statistic see: S. B. Richmond, Statistical Analysis (New York: The Ronald Press Company, 1964), pp. 306-316.

[2]An alternative model used by M. G. Pavaskar, Hedging Efficiency of the Cotton Futures Market (Bombay: University of Bombay, 1968), was considered, but the results of the study on U.S. cattle hedging were felt more comparable to the present study. The Pavaskar model involved the use of the following ratio:

$$E = \frac{F_t - F_o}{R_t - R_o - C}.$$

F_t and R_o are the futures and cash prices, respectively, when the hedge is placed; F_t and R_t are the futures and cash prices when the hedge is closed; and C is the cost of carrying the commodity. Therefore, efficiency of hedging is high when E approaches positive unity and low when E approaches negative unity.

The vagaries of cash price variation are well known to livestock producers and several mechanisms have evolved to buffer the effects of price change.[1] Many commercial operators are capable of withstanding price changes in the cash market through use of these buffer mechanisms. They may not be readily receptive to use of the futures market unless the alternative for "hedging" clearly favors the futures market in terms of efficiency. Therefore, a substantial reduction in price uncertainty using the futures market or a particular risk exposure in the commercial enterprise or both are necessary to induce a rational hedging use of the futures market.

The efficiency of the hedge, measured in terms of the risk ratio, must be evaluated pragmatically due to a lack of comparative ratios for other buffer mechanisms available to the commercial operator.[2] However, ratios greater than unity indicate that the hedge does at least decrease price variability, while ratios of less than unity indicate a degree of variability in the basis greater than that existing in the cash market.[3]

---

[1]See Chapter IV, p. 75.

[2]The Gum and Wildermuth study provides a basis for comparison with the only other widely used live cattle futures market, but these ratios were also pragmatically evaluated.

[3]This does not necessarily mean futures prices are more variable than cash prices for the variance is computed on the difference between cash and futures and negatively correlated price moves would increase variance of basis.

The following form of the model was established:

$$E = \frac{V_C^2}{V_B^2}$$

where: V_C^2 = variance of cash prices at each selected market,

C = cash prices at selected markets, weekly average choice steer prices,

V_B^2 = variance of basis at these selected markets,

B = basis -- futures minus cash for each delivery month -- weekly observations,

E = measure of efficiency.

The Data

The price series for the cash price of choice grade live cattle was obtained from the Livestock and Meat Trade Report, C.D.A., Ottawa. The weekly average prices of slaughter steers at Calgary, Winnipeg, and Toronto were used for 192 weeks (November, 1968 to August, 1972) in the calculation of the variance of cash price. Futures prices used were those reported by Stanley N. Jones, Daily Market Quotation Service, Winnipeg and are the daily closes for each contract on the Winnipeg Exchange's Live Finished Beef futures.[1] A systematic sample of weekly observations was obtained for each contract.[2] The three series of basis

[1]Due to occasional lack of daily trades in some contracts, the series includes bids, offers, and nominal prices.

[2]For a discussion of the systematic sampling technique see: Richmond, Statistical Analysis, p. 329.

were obtained by subtracting the prices at the three cash markets from the futures price series.

The Results

The ratio of the variance of the residual components in both a hedged and an unhedged position is shown in Table 5.1. The variance of cash prices at Calgary, Winnipeg, and Toronto, respectively, were 4.61, 4.37, and 4.95 times larger than the variance of the basis. These ratios are higher than those in the Gum and Wildermuth study which used cash prices at three major U.S. markets to determine hedging efficiency.[1]

Model II

The second hypothesis stated that the cost of holding a long or short futures position in the Winnipeg Finished Beef Futures market should be equal to zero. The model designed to test this hypothesis employs a technique known as "discount buying" which involves a systematic program of buying the near month futures, holding it until maturity, then switching into the next futures.[2]

Theoretical Implications of Bias in Futures Price

Ideally, the futures price is an unbiased estimate of future cash prices and consecutive futures price changes are random in nature. Also, the implication is made that, should bias occur in a futures market such that futures price is generally below the realized spot price,

---

[1]Gum and Wildermuth, "Hedging on the Live Cattle Futures Contract."

[2]Switching is the term applied to moving a futures position into a later month and is commonly done by placing an order to simultaneously liquidate and buy the chosen futures.

TABLE 5.1

HEDGING EFFICIENCY OF VARIOUS MARKETS

Item	Calgary	Winnipeg	Toronto
	Variance -- in cents per lb.		
Variance of cash	8.188	7.957	8.299
Variance of basis	1.78	1.82	1.68
Ratio of variance	4.61[a]	4.37[a]	4.95[a]
Gum and Wildermuth	**Phoenix**	**Chicago**	**Denver**
Ratio of variance	3.06[a]	3.14[a]	3.58[a]

[a]significant at the 95 percent level.

the success of that futures contract may be limited by the unwillingness of traders to take a short position. Therefore, to ensure that the activity and size of the market are not hindered by the reluctance of traders to take one side of the market, an unbiased futures price should be present.

Previous studies have been made of a variety of futures markets for a variety of commodities to ascertain the degree of unbiasedness of the price.[1] The results have been varied but it is generally held that no large actively traded futures market has been satisfactorily shown to be consistently biased by either underestimating or overestimating the spot price. However, studies of thinly traded, inactive futures markets have revealed biases in price which have either been the cause of or the result of a lack of hedging and speculative use.[2]

Specifications of the Model

The model which is used to indicate the existence of unbiased prices is a measure of the profitability of holding a continuous long position. The results of this discount buying program must be adjusted by two factors before consideration of the final profit or loss (bias). First, the commission charge for executing a trade must be deducted and

---

[1]For a review of these studies see: Gray and Rutledge The Economics of Commodity Futures Markets: A Survey, pp. 63-75.

[2]Ibid., p. 75.

second, the net change in spot prices from the initial purchase until the final sale must be deducted. Commission charges represent equal costs to buyers and sellers. Since any losses by longs (shorts) which cannot be considered a profit by shorts (longs) cannot be included as a bias, the amount of commission costs must be deducted.

The trend of cash cattle prices during the 1968-1972 period of live cattle futures trading on the Winnipeg Commodity Exchange was generally upward. This requires that a discount buying system be modified to include the cash price bias inherent in the cattle market. The adjustment is made by reducing (adding to) the accumulated profits (losses) by the amount of the net change in prices.

The following form of the model was specified:

$$P = (F_{tn} - F_{on}) - (R_t - R_o) - c_n$$

where: P = Net profits (losses) resulting from the discount buying program in dollars per hundredweight.

F_o = Futures price at time of purchase of the futures contract.

F_t = Futures price at time of sale of the futures contract.

R_o = Cash price at the beginning of the buying program.

R_t = Cash price at the end of the buying program.

c = Commission charge on futures contract per round turn per hundredweight.

n = The contract number (i.e., 1-22).

The Data

The data used to test the hypothesis using the above model were obtained from the same sources as the data in Model I. However, mid-month futures prices (or the nearest date to the 15th of the month

on which a closing quote was available) were used. The average weekly price of Canada choice steers at Winnipeg was used for purposes of obtaining the adjustment necessary for cash price trend. The commission rate is that round turn rate established by the exchange for non-members on over-night trades and is equal to $25.00 per contract. Since the contract calls for 25,000 lbs. of beef, the commission charged is at the rate of $0.10 per hundredweight.

The Results

The discount buying program is shown in Table 5.2 The summation of the profits and losses resulted in a gross profit of $34.27 per hundredweight for the 22 switching operations. However, cash prices showed a net increase over the period of $10.38 per hundredweight which was deducted from the gross profits to reflect the total amount by which the futures market may have underestimated the future spot prices. Also, the total commission costs of $2.22 ($0.10 per hundredweight per contract) are deducted as a normal cost of trading leaving net profits of $21.69 per hundredweight or $0.99 per hundredweight per trade. The average net profit per trade should be zero in a market where the futures price is an unbiased estimation of the futures spot price.

The results of the model may be tested by use of the t-statistic where the variance of the total population is not known but the mean is known to be zero. It was found that the hypothesis that profits on a continuous long position are equal to zero in the Winnipeg live cattle futures market were rejected at the 95 percent level. Thus, the null hypothesis may be accepted, implying that futures prices tend to under-estimate future spot prices.

TABLE 5.2

RESULTS OF DISCOUNT BUYING PROGRAM

	Purchase				Sale		
	Date (o)	Contract Bought(n)	Price(F_o)		Date (t)	Price(F_t)	Difference
			($/cwt)			($/cwt)	
1968	Nov. 15	Jan.	$27.02	1969	Jan. 22	$28.00	+$0.98
1969	Jan. 22	Mar.	26.50		Mar. 20	29.75	+ 3.25
	Mar. 20	May	29.30		May 21	35.25	+ 5.95
	May 21	July	34.25		July 22	34.20	- 0.05
	July 22	Sept.	31.72		Sept.19	29.50	- 2.22
	Sept.19	Nov.	28.52		Nov. 19	27.70	- 0.82
	Nov. 19	Jan.	27.80	1970	Jan. 21	32.00	+ 4.20
1970	Jan. 21	Mar.	31.35		Mar. 20	33.00	+ 1.65
	Mar. 20	May	31.90		May 20	32.55	+ 0.65
	May 20	July	30.95		July 22	31.05	+ 0.10
	July 22	Sept.	29.65		Sept.21	29.30	- 0.35
	Sept.21	Nov.	28.70		Nov. 19	30.30	+ 1.60
	Nov. 19	Jan.	30.00	1971	Jan. 20	33.00	+ 3.00
1971	Jan. 20	Mar.	32.00		Mar. 22	33.25	+ 1.25
	Mar. 22	May	32.10		May 21	34.80	+ 2.70
	May 21	July	32.65		July 21	33.25	+ 0.60
	July 21	Sept.	32.00		Sept.21	33.75	+ 1.75
	Sept.21	Nov.	32.80		Nov. 19	34.50	+ 1.70
	Nov. 19	Jan.	33.80	1972	Jan. 20	36.70	+ 2.95
1972	Jan. 20	Mar.	34.87		Mar. 21	36.05	+ 1.18
	Mar. 21	May	35.10		May 19	38.20	+ 3.10
	May 19	July	36.30		July 20	37.40	+ 1.10

		Total	$34.27
Less:	Cash Price Adjust.	10.38	
	Commissions	2.20	12.58
	Total Net Profit:		$21.69
	Net Profit Per Trade:		$ 0.99[a]

[a]Significant at 95 percent level.

Model III

The hypothesis that inter-temporal and inter-spatial variations in basis do not exist will be tested by use of a dummy variable regression technique using the basis at three major livestock markets -- Calgary, Winnipeg, and Toronto.

Theoretical Implications of Basis Variation

Futures markets have traditionally been viewed as risk transfer markets where a hedger buys or sells contracts to reduce the risk of price change in the spot market. It is still generally held that hedging is primarily performed by many individuals and firms in various markets to reduce price risk. However, behavior of some commercial hedging interests in the market would indicate that other reasons for hedging exist.

A major reason for many sophisticated hedgers participating in futures is the profit afforded by recurrent and predictable basis behavior.[1] The live finished beef futures market, it is implied, will be used by a segment of the commercial trade if profitable basis trading opportunities exist. By determining the predictability or normality of basis behavior of this market, its appeal to these hedgers will be assessed and acceptance of the hypothesis will indicate that selective hedging opportunities exist.

---

[1]Working, "Hedging Reconsidered," pp. 544-561.

Basis behavior is generally attributed to seasonal and regional factors influencing supply and demand of the commodity. The basis changes as hedgers respond to the opportunities afforded in the futures market combined with the need for futures positions arising from their cash market transactions. Therefore, other factors involved in explaining basis changes, dependent upon hedgers needs, are more difficult to quantify.

Specifications of the Model

The analysis of variance model used to evaluate the behavior of basis was constructed in an attempt to isolate the seasonal and regional variation in the basis. At each of the selected markets, the basis for each contract during each specified two month period of the year was used as the dependent variable. Each two month period was represented by a zero-one dummy variable. That is, the value of the independent variable was one only if the basis observation (dependent variable) fell within the two month period represented by the independent variable. All other dummy variables were assigned a value of zero for that observation. Using a regression analysis technique, the difference between the basis values of the selected bi-monthly periods was determined. The seasonality of the basis, then, was indicated by the values of the regression coefficients for each futures contract at each selected cash market.

The following general form of the model was used:

$$Y = b_0 + b_1X_1 + b_2X_2 + \ldots + b_nX_n ,$$

where: Y = the weekly average futures price for a given contract (i.e,, Jan., Mar., etc.) minus the weekly average cash price at a specific market (basis).

X_1 = dummy variable for the period January - February.

X_2 = dummy variable for the period March - April.

X_3 = dummy variable for the period May - June.

X_4 = dummy variable for the period July - August.

X_5 = dummy variable for the period September - October.

X_6 = dummy variable for the period November - December.

The categorization of basis observations into the above periods for the purpose of the regression analysis was accomplished by establishing a matrix based on the zero-one dummy variable system. That is, for observation of basis, Y_1, X_1 woul be 1 if the observation occurred during the months January or February and X_2 to X_6 would be zero.[1] However, since trading of each futures contract did not generally begin until ten months prior to maturity, the matrix did not include a dummy variable representing the bi-monthly period which followed the delivery month of the contract being used for the basis observations. Also, the November - December period described by X_6 was used as the fixed term and set equal to one in each regression set (except in the September futures when no data was available for the period).

The procedure of analysis chosen involved:

1. The regression analysis of Calgary basis for the January, March, May, July, September, and November futures, successively.

---

[1]For further explanation of the dummy variable regression refer to: W. G. Tomek, "Using Zero-One Variables with Time Series Data in Regression Equations," Journal of Farm Economics, Vol. XL (1963), pp. 813-840.

2. The Winnipeg basis for the same contracts.

3. The Toronto basis for the same contracts.

The Data

The futures prices used in the analysis were weekly averages of closing price quotations as reported by the Winnipeg Commodity Exchange. The cash prices used were those reported by the Canadian Department of Agriculture as weekly average prices for live Canada choice steers classified as slaughter cattle and sold at the terminal markets at Calgary, Winnipeg, and Toronto. The basis series was obtained by subtracting the weekly average futures prices for each contract from the average cash price during each week.

The Results

The analysis of variance test, in the form of the dummy variable regression, allowed for testing of the hypothesis that basis values were randomly distributed throughout the year thereby implying no seasonally recurring factors in the cash-futures price relationship. The analysis indicated that seasonality in the basis was present for several futures contracts, namely, January, September, and November.[1] The basis of the other three contracts, March, May, and July, showed no evidence of seasonal behavior.

---

[1]The F-statistic was used to determine significance of seasonal variation. If the hypothesis that basis is randomly distributed throughout the life of a contract is not true, the variation between the dummy variables will tend to be larger than the variation of the dummy variable. Thus, if the hypothesis is rejected, the alternate hypothesis that seasonality does exist between the defined periods of the year may be accepted.

Table 5.3 shows the results of the model for all contracts at Calgary. The three contract months which exhibited a seasonal basis (January, September, and November) were characterized by relatively large negative values for the independent variable, X_3, representing the May - June period of the year. This effect may be partially explained by the tendency for cash prices to rise during this period of the year. (See Appendix B, Figures 1, 2, 3, and 4.)

The results for Winnipeg and Toronto markets are summarized in Tables 5.4 and 5.5, respectively, and are essentially the same as those for Calgary. However, differences which were evident between the selected markets result from the differences in the relationship of the cash prices between the three markets during the specified period.

For example, the November basis at Toronto (Table 5.5) between the March - April period and the July - August period increased $0.24 per hundredweight while at the same time the November basis at Calgary increased $0.94 per hundredweight and at Winnipeg it increased $1.03 per hundredweight. This would indicate that the cash price increased at Calgary and Winnipeg relative to the Toronto level thus resulting in larger gains in basis to a short hedger at Calgary or Winnipeg than at Toronto over this period.

Application of the Results to Hedging

The results of the analysis may be summarized in a form useful to the hedger. Table 5.6 shows the basis values at the three selected markets throughout the year for each delivery month. A hedger may use the results of the analysis in two ways; first, to determine the

TABLE 5.3

ANALYSIS OF VARIANCE OF BASIS AT CALGARY

Contract	Intercept	Regression Coefficients (T-Value) b_1	b_2	b_3	b_4	b_5	F-Value	R^2	S.E.
		Basis -- the dependent variable, in cents per 100 lbs.							
January	81.7	34.0 (0.99)		-346.0[b] (-11.27)	-197.0[b] (-7.44)	12.0 (0.49)	50.20[a]	66.1	96.8
March	31.6	15.4 (0.77)	112.5[b] (3.95)		-112.5[b] (-2.59)	69.2[b] (3.21)	8.58	25.0	82.3
May	- 5.7	28.2 (1.29)	60.1[b] (2.62)	138.4[b] (4.52)		-54.3 (-1.17)	6.76	21.1	87.2
July	58.7	-65.6 (-1.11)	-71.6 (-1.22)	-86.7 (-1.46)	84.7 (1.34)		6.90	23.7	96.8
September	190.6	-112.8[b] (-2.27)	-209.0[b] (-5.36)	-360.7[b] (-10.03)	-168.9[b] (-4.70)		28.34[a]	57.4	105.9
November	129.2		-271.2[b] (-7.12)	-345.7[b] (-11.22)	-175.3[b] (-5.80)	-5.1 (-0.17)	72.30[a]	76.7	78.4

[a]The hypothesis that all regression coefficients equal zero is rejected at the 99 percent level.

[b]The coefficient is different from zero at the 95 percent level.

TABLE 5.4

ANALYSIS OF VARIANCE OF BASIS AT WINNIPEG

Contract	Intercept	Regression Coefficients (T-Value) b_1	b_2	b_3	b_4	b_5	F-Value	R^2	S.E.
		Basis -- the dependent variable, in cents per 100 lbs.							
January	17.13	30.9 (0.77)		-383.3[b] (-11.01)	-248.1[b] (-8.16)	-63.4[b] (-2.24)	44.04[a]	63.1	111.1
March	-31.83	11.1 (0.44)	48.6 (1.37)		-201.6[b] (-3.73)	-8.0 (-0.30)	4.62	15.2	102.5
May	-67.35	22.1 (0.88)	23.9 (0.90)	93.2[b] (2.64)		-105.1 (-1.97)	3.32	11.6	100.6
July	17.08	-109.8 (-2.03)	-127.7[b] (-2.37)	-152.1[b] (-2.81)	-9.0 (-0.16)		6.44	22.4	88.7
September	22.66	-40.6 (-0.88)	-171.1[b] (-4.70)	-300.5[b] (-8.95)	-120.8[b] (-3.60)		25.25[a]	54.6	98.8
November	64.19		-333.1[b] (-9.60)	-386.4[b] (-13.76)	-230.1[b] (-8.30)	-80.2[b] (-2.92)	83.21[a]	79.1	71.4

[a]The hypothesis that all regression coefficients equal zero is rejected at the 99 percent level.

[b]The coefficient is different from zero at the 95 percent level.

TABLE 5.5

ANALYSIS OF VARIANCE OF BASIS AT TORONTO

Contract	Intercept	Regression Coefficients (T-Value) b_1	b_2	b_3	b_4	b_5	F-Value	R^2	S.E.
		Basis -- the dependent variable, in cents per 100 lbs.							
January	-105.31	25.1 (0.7)		-328.7[b] (-10.38)	-228.5[b] (-8.38)	-78.8[b] (-3.10)	40.23[a]	61.0	99.7
March	-154.77	22.15 (0.93)	80.73[b] (2.38)		-170.66[b] (-3.29)	-20.78 (-0.81)	5.54	17.7	98.1
May	-189.3	32.2 (1.14)	74.15[b] (2.50)	168.4[b] (4.25)		-108.9 (-1.82)	6.90	21.5	112.8
July	-136.25	-71.6 (-1.03)	-46.2 (-0.67)	-52.9 (-0.76)	88.6 (1.19)		4.21	15.9	114.0
September	- 91.72	-19.5 (0.39)	-87.6[b] (-2.25)	-240.3[b] (-6.69)	-101.0[b] (-2.81)		14.76[a]	41.3	105.8
November	- 91.26		-192.9[b] (-4.59)	-281.5[b] (-8.28)	-169.2[b] (-5.06)	-65.2 (-1.96)	27.37[a]	55.4	86.4

[a]The hypothesis that all regression coefficients equal zero is rejected at the 99 percent level.

[b]The coefficient is different from zero at the 95 percent level.

TABLE 5.6

BASIS VARIATION ADJUSTMENTS

Location	Delivery Month	Intercept Adjustment	Period of Year				
			Jan.-Feb.	Mar.-Apr.	May-June	July-Aug.	Sept.-Oct.
		(1)	(2)	(3)	(4)	(5)	(6)
			(cents per pound live weight)				
Calgary	Jan.	.81	.34	--	-3.46	-1.97	.12
	Mar.	.32	.15	1.13	--	-1.13	.69
	May	- .06	.28	.60	1.38	--	- .54
	July	.59	- .66	- .72	- .86	- .85	--
	Sept.	1.91	-1.13	-2.09	-3.61	-1.69	0
	Nov.	1.29	--	-2.71	-3.46	-1.75	- .05
Winnipeg	Jan.	.17	.31	--	-3.88	-2.48	- .63
	Mar.	- .31	.11	.49	--	-2.02	- .08
	May	- .67	.22	.24	.93	--	-1.05
	July	.17	-1.10	-1.28	-1.52	- .09	--
	Sept.	.23	- .41	-1.71	-3.00	-1.21	0.0
	Nov.	.64	--	-3.33	-3.86	-2.30	- .80
Toronto	Jan.	1.05	.25	--	-3.28	-2.28	- .79
	Mar.	-1.55	.22	.81	--	-1.71	- .21
	May	-1.89	.32	.74	1.68	--	-1.09
	July	-1.36	- .72	- .46	- .53	.89	--
	Sept.	- .92	- .19	- .88	-2.40	-1.01	0.0
	Nov.	- .91	--	-1.93	-2.82	-1.69	- .65

relationship of the current basis with that of previous basis values or second, to aid in anticipating basis changes.

The first use requires the addition of the value from column one (Intercept Adjustment) with the value given in the column representing the period of the year selected (Table 5.6, Columns 2 to 7) for the futures month being used. The resulting value may be compared with the current basis to determine the possible direction of basis change.

The second use requires that the two periods of the year -- the time of placing and of lifting the hedge -- be compared to determine the possible changes during the life of the hedge. If prior to placing the hedge, the comparison indicates that the basis may become less favorable (for the short hedger an increase), then the hedge would not be placed at that time. However, if the comparison indicates that the basis would improve (for the short hedger a decrease), the hedge would be placed.

Model IV

Commercial use of a futures market by hedgers is considered an essential factor in the success of the market. The participation of hedging interests in a futures market is assumed to be proportional, though not exactly equal, to the total open interest (number of contracts outstanding). Also, the activity generated by speculative interests is assumed to be proportional to the volume of trading, especially above a level of trading attributable to hedgers taking or lifting hedges. Since

hedgers and speculators in active futures markets have been shown to be mutually interdependent in the operation of a futures market, it follows that trading volume is generally dependent upon open interest.[1] (Also, the reverse relationship should hold; that is, open interest is dependent upon volume.)

The hypothesis that trading volume is dependent upon open interest was tested for the live finished beef futures market at Winnipeg, Acceptance of this hypothesis implies that hedgers attract speculators who in turn generate trading volume. However, if the trading volume is not found to be related to open interest, a lack of "hedger oriented" speculative activity is indicated.[2]

Specification of the Model

The model uses a regression technique to relate trading volume (the dependent variable) to open interest (the independent variable).

The following form of the regression model was specified:

$$Y_1 = b_o + b_1 X_1 + u_1$$

where: Y_1 = Trading volume expressed as contracts traded per week.

X_1 = Open interest reported for a particular day of the week for all contracts.

The estimated relationship is:

$$\hat{Y} = \hat{b}_o + \hat{b}_1 X$$

---

[1] Working, "Speculation on Hedging Markets," pp. 189-190.

[2] Working, "Test of a Theory Concerning Floor Trading on Commodity Exchanges," p. 36.

The Data

The open interest and volume of trading, as recorded by a commercial market news service, was used for the regression analysis. Total weekly trading volume for all contracts and a systematic weekly sample of open interest levels were obtained for purposes of the model.

The Results

The results of the simple regression analysis are summarized in Table 5.7. The hypothesis that trading volume is dependent upon open interest is accepted as b_1 is significantly different from zero at the 95 percent level. Also, the simple correlation of open interest and volume indicates that a positive relationship does exist between the two variables.

TABLE 5.7

RESULTS OF REGRESSION ANALYSIS, MODEL IV

Item	Open Interest (X)	Volume (Y)
Statistical:		
Mean	92	46
Variance	1971.9	1213.0
St. Dev.	44.4	34.8
Simple Correlation	.53	(.53)
Regression:		
Coefficient (b_1)	.41	
St. Error	.05	
T-Value	7.97	
R^2	27.65%	
Intercept (b_o)	7.8	
Degrees of freedom	166.0	

Weaknesses in the Data and Technique

Some inaccuracy of the data used for futures prices was due to the lack of trades in all contracts each day to establish a continuous series of prices at which trades were made. The use of bidding and asking, prices tended to decrease the value of this data.

The technique employed in statistically evaluating the market was deficient in three aspects. First, Model III, used for testing the seasonality of basis, may have been refined somewhat and developed further to reveal more accurately the behavior of basis. However, for the purposes of this study, the model was considered sufficient.

Second, the fourth model exhibits two major weaknesses which would appear to reduce the usefulness of the results. The assumptions relating hedger participation to open interest and trading volume to speculative participation require further proof. Also, the data used for trading volume was a weekly summation of daily market activity and may have obscurred the lack of a continuous liquidity which hedgers appear to require.

Finally, a thorough statistical evaluation of the market could have been enhanced if additional information relating to the composition of participants in the market was available. For example, a survey of hedgers may have revealed other problems or attitudes which could have been evaluated. However, the effort of examining each possible characteristic of the market must be viewed with an objective of achieving an overall surplus of benefits over costs. It was intended that the present study strike the correct balance.

Conclusions

The hypothesis which were tested by use of the above models and data were designed to provide a quantitative analysis of several characteristics of the Winnipeg live finished beef futures market. These characteristics were deemed to be necessary (but not necessarily sufficient) conditions for the broad participation of hedgers in the market.

The results of Model I indicated that the futures market did provide a risk reducing mechanism in that the variation of the basis was less than the variation of the cash prices. Viewed another way, the variance of the cash price series was threefold more than the variance of the basis.

The second hypothesis, that futures prices were unbiased estimates of the future cash price, was tested and rejected. Instead, Model II showed that futures prices underestimated the future cash price by an average of $0.50 per hundredweight per month. This cost, borne by those holding short positions in the market (as do the majority of hedgers), may have caused a reduction in hedging use of the market as other less costly alternatives were found for reducing business risk resulting from price change.

The identification of the cause of the bias in the futures prices is not a major purpose of this anlaysis but several brief explanations are proposed. First, the discount buying program included the period of time during each contract when traders made offsetting sales to liquidate (cover) their long (short) positions instead of taking (making) delivery to fulfill the futures contract commitments. If those holding long positions were more willing to accept delivery than the short hedgers were willing or able to make delivery, an upward

bias in futures prices would have resulted.

Second, an upward bias in price would result if short hedgers were willing to continually take futures positions at prices lower than the spot price or near-month futures. This would indicate a lack of competitive buying interest or long hedging interest early in the trading life of the contract. Finally, futures prices in non-storage markets have been observed to reflect lower values for deferred futures as the general commodity price level increases and higher prices for deferred futures as the commodity price level declines. Since live cattle prices rose over the period of the study, the upward bias in futures may have been no more than that amount by which the deferred futures would normally discount the possibility of the spot price continuing at these levels. The cost borne by short hedgers, regardless of the reason for the bias, is almost certain to detract from the expansion of the market by increased participation of short hedgers.

Model III was constructed to test the hypothesis that the basis (in this case any and all futures minus cash) varied between periods of the year and between three major spot markets. Previous studies by Working indicated that sophisticated hedgers use the futures market for a variety of reasons, including gaining on changes in basis.[1] Therefore, the occurrence of seasonally or geographically specific basis changes would appear to attract hedgers. Since seasonality was found in the basis changes of several contracts, namely, September, November, and January, some hedging activity may have occurred for these reasons.

---

[1]Working, "Hedging Reconsidered," pp. 560-561.

However, the lack of sophistication by hedgers or the lack of appropriate information upon which to base hedging decisions or both may have detracted from the use of this market by hedgers. Interregional basis changes were not extensive, perhaps because the price differences between the three cash markets are related to each other by the futures price differential.[1] The analysis of variance model using dummy variable regression appears to be suitable for evaluating interregional and inter-seasonal basis changes in futures markets and as an aid to those making medging decisions.

The final hypothesis, tested by a simple regression model, was designed to evaluate the relationship between trading volume and open interest. Further assumptions enabled the results to be used to indicate the relationship of speculation (trading volume) to hedging (open interest). It is considered that an increase in trading volume must occur due to hedgers or speculators placing or lifting futures positions. If all trading volume was derived from the placing or lifting of hedges, it would increase solely as open interest changed.[2]

Since the hypothesis (that open interest and volume are related) was accepted and if the assumptions hold, there is evidence of speculative activity in response to hedgers and thus a degree of liquidity. From this model it is reasonable that hedgers would be interested in participating in this market.

---

[1]The Calgary market was added as an alternate delivery point for the March, 1972 and subsequent contracts. On September, 1972 it became the par delivery point of the contract.

[2]That is, the rate of change of open interest would be equal to the volume of trading.

Summary

The quantitative analysis indicates that the deficient volume of participation by hedgers in the Winnipeg live cattle futures market may be due in part to an upward bias in futures prices. However, evidence of price-risk reduction by hedging and of opportunities to determine seasonal characteristics of basis may have led to some of the hedging activity which has existed. The liquidity of the market appears to be related to open interest but further evidence is necessary to establish conclusively that sufficient daily liquidity exists to facilitate hedging operations.

CHAPTER VI

MISCELLANEOUS CONSIDERATIONS AND RECOMMENDATIONS

The Futures Contract Specifications[1]

Experience in other futures markets and other exchanges has shown that the more closely a contract approximates and facilitates the normal commercial practices with regard to time, form, and place utilities, the more readily acceptable will the futures market be for the largest number of hedgers. The important terms of a futures contract specify grade, quantity, place and time of delivery of a commodity. These terms, in conjunction with the function of transfer of ownership, represent the basic utilities which the marketplace creates.

Grade Specification

The grade specified as acceptable for par delivery should be easily and accurately defined and should represent a large volume of the product being traded commercially. Grading of live cattle for delivery on the futures contract requires that a grading panel composed of livestock commission agents estimate the carcass yield of the live animal

---

[1] See Appendix A for terms of the contract.

(weight of saleable meat, bone, and fat, as a percentage of total live weight) to the nearest 0.5 percent. Official government-approved graders grade carcass beef but not live cattle and thus the futures market participants are required to depend upon the grading panel selected by the local livestock exchange association. There has been no evidence to indicate that estimated yields have been significantly different from those established by government standards after slaughter. However, information has not yet been published to confirm the accuracy of the grading panel and thus improving the credibility of the delivery procedure.

Weight Specifications

A second concern with the grading procedure has been the discrepancy between provinces in estimating carcass yield on a hot or cold basis. Manitoba graders use a cold weight basis while Ontario and Alberta graders use a hot weight basis. The difference is generally about 3 percent due to carcass shrinkage but no adjustment between delivery points is specified in the contract.

The quantity of beef specified in the contract (25,000 lbs.) does not appear to be out of line with commercial lot sizes. However, arbitrage between the Winnipeg and Chicago contracts is more difficult when the contract sizes differ (Chicago, 40,000 lbs. - Winnipeg, 25,000 lbs.).

Delivery Specifications

Delivery locations specified in the futures contract (Calgary Winnipeg, Toronto) are designed to facilitate the delivery of cattle should the futures to cash difference at the delivery point indicate

this is profitable. This insures that cash prices and futures prices are approximately equal during the delivery month and increases the usefulness of the market to hedgers. The contract specifications provide for premiums or discounts above or below the par delivery price. However, the spot price relationship between the markets is not constant causing discrepancies to exist periodically between the futures price and the cash price at one or more locations. Should the discount or premium specified in the futures contract not be reflected in the spot markets during a particular delivery month, then deliveries occur at the market where the futures price is higher than the spot price. This continues until the spot market prices are equal to the differential specified in the futures contract. However, excessive deliveries are not desirable for the proper operation of a futures market.

Preliminary evidence would indicate that a problem has existed in the live cattle futures market due to the discount of $1.50 per hundredweight for delivery in Calgary and the $1.00 per hundredweight premium for Toronto.[1] These differentials were supposedly established on a basing-point price system intended to reflect transportation costs from west to east.[2] However, the spot market prices have not been

---

[1]A recent change (Sept., 1972) in the contract has made Calgary par delivery, with Winnipeg at $1.00 per hundredweight premium and Toronto at $2.50 per hundredweight premium.

[2]The same basing-point pricing system is used in the Chicago Mercantile Live Cattle Contract. See: J. Richard Crow; John B. Riley; and Wayne D. Purcell, "Economic Implications of Nonpar Delivery Points for the Live Cattle Futures Contract," American Journal of Agricultural Economics, Vol. 54, No. 1 (February, 1972), pp. 111-115.

separated by a transportation differential due to areas of demand other than the Ontario market. The result is that the spot market differential is not constant and the "net" futures price is often different from the cash price at the western delivery point.

A final consideration of the contract which should be made is the effect on the market of the seller's delivery option. That is, the individual holding a short position may determine when, where, and what is delivered with appropriate adjustments made for each variation from the specified par delivery. However, while the seller knows what is to be delivered, the buyer must take what is delivered and is often forced to resell on the cash market and to acquire his specific needs elsewhere. This inherent principle in most futures markets does not appear to hamper trading activity appreciably unless the contract includes a broad range of eligible delivery grades, types, and locations.[1]

A futures contract must remain current with industry practices, government legislation, and peculiar trading problems or delivery difficulties. The officers and members of the Exchange bear the responsibility of adapting the contract to the changing commercial environment.

Institutional Factors

The Winnipeg Commodity Exchange constitutes a large and significant institution in the Canadian grain trade with the notable exclusion

---

[1]For a discussion of the effects of seller's delivery option on a broadly based contract see: B.S. Yamey, Short Hedging and Long Hedging in Futures Markets: Symmetry and Asymmetry (London: London School of Economics, 1972).

of wheat. The commercial segment of the membership (those using the market for hedging) is predominantly from the grain industry while the remaining members are independents and company representatives with experience in trading in grain futures. The observation of the Winnipeg Exchange and other exchanges of this type reveals a specialization of membership in a certain commodity or commodity group (ie: grains, livestock, metals). This is to be expected and is, in fact, essential to the proper servicing of the industry which is represented by the commodity. The alternate situation is that in the Winnipeg Exchange, for example, flexibility required to broaden the number of commodities traded is often lacking. As each new commodity is added and fails to provide activity comparable to the grains, the floor traders[1] are reluctant to engage in the new venture as they stand to forfeit good trading opportunities in the grains while expending additional time and resources in an untried commodity trade.

The flexibility of the Exchange and its membership in adopting, promoting, and expanding trade in other commodities is limited by cost as much as by lack of expertise and background. To mention a few, the cost of operating diverse information collection and dissemination systems, of establishing its commercial identity in the new industry, and of providing

---

[1]Floor traders, those involved in speculating in the commodity while trading in the pit, provide a good deal of liquidity to a market. For a further discussion of their specialized function and skills see: Working, "Test of a Theory Concerning Floor Trading on Commodity Exchanges," p. 8.

for continuing research, promotion, and public relations may be excessive in terms of the addition to economic returns of the trading activity on the new futures contract. Experience of other exchanges, particularly in the United States, has indicated that a great deal of effort and cost is involved in successfully developing futures trading in other untried commodities. The problem faced by the Winnipeg Exchange, therefore, is perceived to be a desire to expand the spectrum of commodities traded, on the one hand, a lack of resources or commitment to provide a continuing development program in the new futures contracts, on the other hand.

The Economic and Political Environment

The live cattle futures market, as one of the commodities traded on the Winnipeg Commodity Exchange, is indirectly affected by the economic and political environment prevailing in Canada. The production and marketing of grain has been a sensitive agricultural policy area and the Canadian government has removed much of this activity from an open-market system by legislation establishing alternate marketing mechanisms. The possibility that all grains and oilseeds will be someday marketed under conditions not compatible with futures trading has caused the Exchange membership to assess the alternatives for economic survival and viability in this light. The additional expenditure on development of new futures contracts and trading must be evaluated in terms of the ability of the additional trading activity to generate enough revenue to cover the costs of continued operation of the Exchange without trading in grains, should the government so act.

A second influence of the Federal government on the Exchange has been the government's reluctance to enact legislation already prepared to supervise futures trading. The Grain Futures Act of 1939 provided for a supervisory body to ensure that certain conditions and practices were standardized and enforced. Many individuals (members as well as trades people) feel that the futures trade would benefit from this action through additional information and increased credibility with the producers and the public. However, failure to establish the machinery required for the operation of a supervisory body appears to allow the Federal government greater flexibility in deciding the future of the grain trade and/or the Exchange.

The live cattle futures trade requires that timely, reliable, and relevant information be available on production-in-progress, volume of marketings, prices at major cattle markets, and other types of data pertaining to the supply and demand of the commodity. Much of this type of information does not appear to be readily available to the public nor to the traders on the Exchange floor. The prediction of future livestock prices requires the existence of information which facilitates the prediction of future marketing patterns based upon current production-in-progress. In Canada the government bodies responsible for such information have not yet responded to this need.

Recommendations

The process of development of a futures market from near insignificance to a large forum in which a price discovery function in the industry is centralized, is not a regular nor easily defined process.

Many factors influence this development process and Gray describes it as somewhat similar to a path through dense undergrowth. He states:

> Like a trail through dense undergrowth, a market comes into being only through use, and is improved through increased use. The little used trail, because time and energy are wasted in locating or negotiating it, is more costly to use than the well trodden path. One may pay too much to the guide on a difficult trail to justify the passage; by the same token the payment to the factotum on a thin market may outweigh the advantages of its use. Ony may, of course, learn the trail (or market characteristics) himself; but this too entails a cost.
>
> As the flow of traffic increases, undergrowth is killed, obstacles are moed aside, circumvented, or simply worn away; traffic itself provides an added safety factor; and a trail, in short, becomes more clearly marked and easily traversed. The trail may come to be maintained or artificially improved, as through paving, and traffic over it regulated. Yet should much of its traffic abandon it, a cumulative reversal of the development process is likely to ensue. Maintenance may become slipshod leading to a further decline in traffic; and in time the trail may be completely abandoned, soon thereafter to disappear.[1]

Perhaps the direct analogy provides an operative mechanism for the solution of the problem identified by the previous analyses. Restated, the problem is one of insufficient liquidity to provide a balanced market where the futures price is an unbiased estimate of future spot price.

From the Models

The demonstrated ability of the futures market to provide a risk reducing mechanism for the hedger is a basic strength of the Winnipeg

---

[1] Gray, "The Characteristic Bias in Some Thin Futures Markets," p. 296.

live finished beef futures market and many other futures markets. Producers, meat packers, livestock dealers, and retailers should be made aware of the evidence supporting the risk reducing ability of the futures market.

The discount buying model indicated an undesirable bias against the short hedger. This may be due in part to a lack of sufficient competitive buying interest in the market or the occurence of "squeezes" due to delivery difficulties. The Exchange must encourage the development of market liquidity -- including competitive buying -- to reduce the costs to short hedgers. "Squeezes" may be minimized by ensuring that the delivery location be representative of a large proportion of deliverable cattle relative to the futures open interest.

The third model, an anlysis of basis behavior, is useful to the hedger in determining those criteria necessary for the most economically beneficial use of the market. The increased participation of hedgers who consider basis in the hedging criteria would be a positive addition to the market. Increased education and information by the Exchange may improve the proficiency of hedgers in the market.

The relationship between hedging needs and speculative volume, as generally shown by Model IV, has been shown to be more highly correlated on active futures markets. Although the process of development of this symbiotic relationship is not clearly documented, the need which hedgers exhibit for liquidity when entering and leaving the market is clear. Also, the speculators, especially professional floor traders, are not known to become heavily involved in markets composed of other

speculators; they best understand and accomodate hedging participation. Therefore, the growth of trading by "locals"[1] and hedgers must be parallel. The live cattle futures trade on the Exchange could be improved in its attractiveness to hedgers by an increase in liquidity provided by such locals.

The Contract Specifications

Changes in the contract must be made from time to time as conditions in the cash market dictate. These changes have generally been made in consultation with several interested groups. This practice is commendable and should be expanded as a mechanism to discover the degree to which the contract specifications coincide with the cash market needs.

The grading procedure should be evaluated to determine if the estimated yield of the live cattle is different from the carcass measurement. Complaints that grading is unfair or inaccurate could then be defended by statistical evidence.

The rationalization of a mechanism for determining the differential specified between alternate delivery points should be undertaken. This mechanism should avoid the basing-point pricing technique and be consistant with the principle of non-interference with the cash market price relationships. Whether the mechanism is used to fix differentials for a year or more or whether the mechanism is employed before each

---

[1]Those whose trading activities are largely conducted personally on the floor of the Exchange are generally referred to as "locals."

delivery month, it must be uniform and based on reliable statistical indicators which are readily obtainable.

A final recommendation regarding the contract terms is that the size be increased or decreased to facilitate efficient intermarket spreading between Chicago and Winnipeg.[1] A reduction to 20,000 lbs. or an increase to 40,000 lbs. with a commensurate change in the commission rate may improve this valuable source of liquidity.

Organizational Changes

The members of the Winnipeg Commodity Exchange should consider the possibility of specializing the administration of the cattle futures trade to improve the efficiency of decision-making and encourage the performance of functions such as promotion, education, collection and distribution of information, and improvement of liquidity. Given the specialization of members experienced in the grain trade, the Exchange would do well to study the organization of the Chicago Mercantile Exchange's currently successful International Monetary Market where decision making has been decentralized. Specialization of this type facilitates a more direct relationship between time and resources invested and potential rewards of those with some familiarity with the industry and a desire to develop the new market.

The collection and dissemination of pertinent information by the Exchange should be reviewed. In particular, since the Canadian Beef

---

[1] Spreading between markets involves selling in one, buying in the other, and hoping to realize a gain on the subsequent change in relationship.

Industry is part of a continental market, and the Exchange members and the trading public, in general, may profit by inter-market spreading activity, the price information generated by the Chicago Mercantile Exchange should be instantaneously available on the floor of the Winnipeg Exchange. Information for purposes of explaining the mechanics of trading, the principles of hedging, and the peculiarities of futures markets in non-storable commodities such as live cattle should be widely distributed. With the decline of open marketing in Canadian agriculture, the information function becomes even more important.

Recommendations To Government

The appropriate levels of government in Canada should be aware of the problems and potential of the Winnipeg Commodity Exchange. In particular, the Federal government should declare its intent regarding the future role of the Exchange and the commodities traded therein. The possibility that the futures market system will not be compatible with potential changes in grain marketing procedures has tended to influence the business environment of the Exchange. An aggressive, concerted effort at expanding new ventures by members of the Exchange is unlikely under the present conditions. If the continued existence of the Exchange is imminent, a government-sponsored supervisory body should be established similar to the Commodity Exchange Authority in the United States such that the danger or suspicion of impropriety in the market may be reduced.

Finally, information pertinent to the forward pricing of cattle should be collected and made available by Federal and provincial agricultural departments. The potential success of the live cattle futures trade in the Winnipeg Commodity Exchange would be enhanced by the dissemination of such data.

BIBLIOGRAPHY

ARTHUR, Henry B. Commodity Futures as a Business Management Tool. Boston: Division of Research Harvard Business School, 1971.

BAER, J.B.; SAXON, O.G. Commodity Exchanges and Futures Trading. New York, New York: Harper Bros., 1949.

BAKKEN, H., Ed. Futures Trading in Livestock--Origins and Concepts. Madison, Wisconsin: Mimir Publishers Inc., 1970.

BLAU, G. "Some Aspects of the Theory of Futures Trading." Review of Economic Studies, XII (1), No. 31 (1944-45), 1-30.

BRAND, S. "The Decline in the Cotton Futures Market." Food Research Institute Studies, IV, No. 3 (1964), 225-72.

BRINEGAR, C. S. "A Statistical Analysis of Speculative Price Behavior." Food Research Institute Studies, IX, Supplement (1970).

CANADA, FEDERAL TASK FORCE ON AGRICULTURE, 1969. Canadian Agriculture in the Seventies. Ottawa: Queen's Printer, 1969.

CANADA Department of Agriculture. Canada Livestock and Meat Trade Report. Ottawa: Production and Marketing Branch, 1968-71.

CANADA Department of Agriculture. Annual Livestock Market Review. Ottawa: Queen's Printer, 1960-1971.

CANADA Department of Agriculture. Quarterly Bulletin of Agricultural Statistics, Cat. No. 21-003. Ottawa: C.D.A., 1960-71.

CANADA Statistics. Livestock and Animal Products Statistics, 23-203. Ottawa: Statistics Canada, 1961-1971.

CHICAGO BOARD OF TRADE Commodity Trading Manual. Chicago, Illinois: 1971.

CHICAGO MERCANTILE EXCHANGE Yearbook. Chicago: Chicago Mercantile Exchange, Market News Department, 1964-1972.

COMMODITY EXCHANGE AUTHORITY Trading in Live Beef Cattle Futures. U.S. Department of Agriculture, 1970.

COOTNER, P. H. "Returns to Speculators: Telser versus Keynes." Journal of Political Economy, LXVIII, No. 4 (August, 1960), 396-404.

_____, _____ "Rejoinder." Journal of Political Economy, LXVIII, No. 4 (August, 1960), 415-418.

_____, _____ "Speculation and Hedging." Food Research Institute Studies, VII, Supplement (1967), 65-106.

CROW, R. J.; Riley, J. B.; Purcell, W. D. "Economic Implications of Nonpar Delivery Points for the Live Cattle Futures Contract." American Journal of Agricultural Economics, LIX (1972) 111.

DOLL, J. P.; Rhodes, J. V.; West, J. G. Economics of Agricultural Production, Markets and Policy. Illinois: Richard D. Irwin, Inc., 1968.

EHRICH, R. L. "Cash-Futures Price Relationships for Live Beef Cattle." American Journal of Agricultural Economics, 51, No. 1 (February, 1969), 26-40.

ELDER, A. E. Risk, Uncertainty and Futures Trading. Staff Paper Series, No. P. 69020, Department of Agricultural Economics, University of Minnesota, August, 1969.

EMERSON, P. M. and Tomek, W.G. "Did Futures Trading Influence Potato Prices?" American Journal of Agricultural Economics, 51, No. 3 (August, 1969), 666-72.

FERGUSON, C. E. Microeconomic Theory. Illinois: Richard D. Irwin, Inc., 1969.

GOLD, G. Modern Commodity Futures Trading, 5th (revised) edition. New York: N.Y. Commodity Research Bureau, 1971.

GRAY, R. W. "The Importance of Hedging in Futures Trading; and the Effectiveness of Futures Trading for Hedging." Futures Trading Seminar, Vol. I. Madison, Wisconsin: Mimir Publishers Inc., 1960.

___, ___ "The Characteristic Bias in Some Thin Futures Markets." Food Research Institute Studies, Vol. I (November, 1960), 296-312.

___, ___ "The Relationship Among Three Futures Markets." Food Research Institute Studies, II, No. 1 (February, 1961), 21-32.

___, ___ "The Search for a Risk Premium." Journal of Political Economy, LXIX, No. 3 (June, 1961), 250-60.

___, ___ "The Attack on Potato Futures Trading in the United States." Food Research Institute Studies, IV, No. 2 (1964), 97-121.

___, ___ "Price Effects of a Lack of Speculation." Food Research Institute Studies, VII, Supplement (1967), 177-94.

___, ___ and Rutledge, D. J. S. "The Economics of Commodity Futures Markets: A Survey." Review of Marketing and Agricultural Economics, (1971), 57.

GUM, R.; Wildermuth, J. "Hedging on the Live Cattle Futures Contract." Agricultural Economics Research, XXII (1970), 104.

HARDY, C. O. Risk and Risk Bearing. Chicago: University of Chicago Press, 1923.

HAWKINS, M. H.; Hurnanen, R. R. Beef Cattle Marketing Problems in Alberta. Edmonton: Department of Agricultural Economics, 1970.

HAWTREY, R. G. "Mr. Kaldor on the Forward Market." Review of Economic Studies, VII (1939-40), 202-5.

HELLWIG, Z. Linear Regression and Its Application to Economics. Dergamon Press. London: 1963.

HIERONYMUS, Thomas A. Economics of Futures Trading. New York: Commodity Research Bureau, Inc., 1971.

HOFFMAN, G. W. Grain Prices and the Futures Markets. Washington, D.C.: USDA Technical Bulletin No. 747, January, 1941.

IRWIN, H. S. Evolution of Futures Trading. Madison, Wisconsin: Mimir Publishers Inc., 1954.

JOHNSON, L. L. "The Theory of Hedging and Speculation in Commodity Futures." Review of Economic Studies, XXVII (3), No. 74 (June, 1960), 139-51.

KALDOR, N. "Speculation and Economic Stability." Review of Economic Studies, VII (1939-40), 1-27.

_____, _____ "A Note on the Theory of the Forward Market." Review of Economic Studies, VII (1939-40), 196-201.

KEYNES, J. M. "Some Aspects of Commodity Markets." Manchester Guardian Commercial, European Reconstruction Series, Section 13 (March 29, 1923), 784-6.

_____, _____ A Treatise on Money, Vol. II. New York: Harcourt, 1930.

LARSON, A. B. "Measurement of a Random Process in Futures Prices." Food Research Institute Studies, I, No. 3 (November, 1960), 313-24.

McKINNON, R. I. "Futures Markets, Buffer Stocks and Income Stability for Primary Producers." Journal of Political Economy, 75, No. 6 (December, 1967), 844-61.

MERRILL LYNCH, PIERCE, FENNER AND SMITH, INC. To the Western Canadian Feedlot Operator. Chicago: 1970, Unpublished study.

PAVASKAR, M. G. Hedging Efficiency of the Cotton Futures Market. University of Bombay, India: 1968.

POWERS, M. J. "Effects of Contract Provisions on the Success of a Futures Contract." Journal of Farm Economics, 49, No. 4 (November, 1967), 833-43.

RESTRICTIVE TRADE PRACTICES COMMISSION. Report Concerning the Meat Packing Industry. Ottawa: Queen's Printer, 1961.

RICHMOND, Samuel B. Statistical Analysis. New York: The Ronald Press Co., 1964.

ROCKWELL, C. S. "Normal Backwardation, Forecasting, and the Returns to Speculators." Food Research Institute Studies, VII, Supplement (1967), 107-30.

SKADBERG, J. M. and Futrell, G. A. "An Economic Appraisal of Futures Trading in Livestock." Journal of Farm Economics, 48, No. 5 (December, 1966), 1485-9.

SNAPE, R. H. and Yamey, B. S. "Test of the Effectiveness of Hedging." Journal of Political Economy, LXIII, No. 5 (October, 1965), 540-4.

STEIN, J. L. "The Simultaneous Determination of Spot and Futures Prices." American Economic Review, LI, No. 5 (December, 1961), 1012-25.

TAYLOR, C. H. History of the Board of Trade of the City of Chicago. Chicago: Robert O. Law Co., 1917.

TELSER, L. G. "Safety First and Hedging." Review of Economic Studies, XXIII (1), No. 60 (1955-56), 1-16.

_____, _____ "Futures Trading and the Storage of Cotton and Wheat." Journal of Political Economy, LXVI, No. 3 (June, 1958), 233-55.

_____, _____ "Reply." Journal of Political Economy, LXVIII, No. 4 (August, 1960), 404-15.

_____, _____ "The Supply of Speculative Services in Wheat, Corn and Soybeans." Food Research Institute Studies, VII, Supplement (1967), 131-76.

TEWELES, R. J.; Harlow, C. V.; and Stone, H. L. The Commodity Futures Trading Guide. New York: McGraw-Hill, 1969.

TOMEK, W. G. "Using Zero-One Variables with Time Series Data in Regression Equations." Journal of Farm Economics, XL (1963), 813.

_____, _____ and Gray, R. W. "Temporal Relationships Among Prices on Commodity Futures Markets: Their Allocative and Stabilizing Roles." American Journal of Agricultural Economics, 52, No. 3 (August, 1970), 372-80.

U.S. 85th Congress, 1st Session, House. Hearings before the Committee on Agriculture and Forestry, May 1-3, 1957.

U.S. 85th Congress, 1st Session, Senate. Hearings before a Subcommittee of the Committee on Agriculture and Forestry, August 12, 1957.

U.S. 85th Congress, 2nd Session, Senate. Hearings before the Committee on Agriculture and Forestry, March 22-26, 1958.

UNITED STATES DEPARTMENT OF AGRICULTURE. Canada: Growth Potential of the Grain and Livestock Sectors. Report No. 77. Washington, D.C.: Economic Research Service, USDA, June, 1972.

UNITED STATES FEDERAL TRADE COMMISSION. Report on the Grain Trade. Washington, D.C.: 1920-26.

WEBSTER, A. J. F. "Direct Effects of Cold Weather on the Energetic Efficiency of Beef Production in Different Regions of Canada." Canadian Journal of Animal Science, 50, (December, 1970), 563-573.

WINTER, George R. Conduct in Canadian Food Marketing. Ottawa: Agricultural Economics Research Council of Canada, 1969.

WORKING, H. "Financial Results of Speculative Holding of Wheat." Wheat Studies of the Food Research Institute, VII, No. 81 (July, 1931).

_____, __ "Theory of the Inverse Carrying Charge in Futures Markets." Journal of Farm Economics, XXX, No. 1 (February, 1948), 1-28.

_____, __ "The Theory of Price of Storage." American Economic Review, XXXIX, No. 6 (December, 1949), 150-66.

_____, __ "The Investigation of Economic Expectations." American Economic Review, XXXIX, No. 3 (May, 1949), 150-66.

_____, __ "Futures Trading and Hedging." American Economic Review, XLIII, No. 3 (June, 1953), 544-61.

_____, __ "Hedging Reconsidered." Journal of Farm Economics, XXXV, No. 4 (November, 1953), 544-61.

_____, __ "Whose Markets? Evidence on Some Aspects of Futures Trading." Journal of Marketing, XIX, No. 1 (July, 1954), 1-11.

_____, __ "A Theory of Anticipatory Prices." American Economic Review, XLVIII, No. 2 (May, 1958), 188-99.

_____, __ "Price Effects of Futures Trading." Food Research Institute Studies, I, No. 1 (1960), 3-31.

_____, __ "Speculation on Hedging Markets." Food Research Institute Studies, I (May, 1960), 185-220.

_____, __ "New Concepts Concerning Futures Markets and Prices." American Economic Review, LII, No. 3 (June, 1962), 431-59.

_____, __ "Futures Markets under Renewed Attack." Food Research Institute Studies, IV, No. 1 (1963), 13-24.

_____, __ "Tests of a Theory Concerning Floor Trading on Commodity Exchanges." Food Research Institute Studies, VII, Supplement (1967), 5-48.

YAMEY, B. S. "An Investigation of Hedging on an Organized Produce Exchange." The Manchester School of Economics and Social Studies, XIX (September, 1951), 305-19.

____, ____ "Short Hedging and Long Hedging in Futures Markets: Symmetry and Asymmetry." The Journal of Law and Economics, February, 1972, 413.

APPENDIX A

BY-LAW AND REGULATIONS: THE WINNIPEG COMMODITY EXCHANGE

TRADING IN LIVE FINISHED BEEF CATTLE FUTURES

BY-LAW 500[1]

501. INTERPRETATION

501.01 In this By-law,

(a) "beef futures" means a futures contract for live finished beef cattle;

(b) "bona-fide hedging transaction" means a sale of, or a short position in, any commodity for future delivery, subject to the rules of the Exchange to the extent that such a sale or short position is offset by the owner or the purchaser in the same cash commodity; or conversely that a purchase of, or a long position in any such commodity is offset by a sale of the same cash commodity;

(c) "Board" means the Board of Governors of The Winnipeg Commodity Exchange;

(d) "buyer" means the clearing member who represents the receiver of physical cattle;

(e) "Clearing Association" means the Winnipeg Grain and Produce Exchange Clearing Association Limited;

(f) "clearing member" means a member of the Winnipeg Grain and Produce Exchange Clearing Association Limited who clears beef futures through the Clearing Association;

(g) "Exchange" means The Winnipeg Commodity Exchange;

1 - By-law and regulation as of September 1, 1972.

(h) "live finished beef cattle" means live finished beef steers which when slaughtered and dressed yield "Canada Choice Beef Carcasses" or "Canada Good Beef Carcasses" as defined in such Beef and Veal Carcass Grading Regulations of the Government of Canada as are in effect the day trading is authorized to begin on beef futures against which delivery will be made;

(i) "member" means a member of The Winnipeg Commodity Exchange;

(j) "person" means singular or plural, and includes individuals, associations, partnerships, corporations, and trusts;

(k) "seller" means the clearing member who represents the owner making the actual delivery of physical cattle;

(l) "these By-laws" means the Constitution, By-laws, Rules and Regulations of the Exchange;

(m) "spread" means the simultaneous buying of one quoted month and the selling of a different quoted month, in anticipation of the price relationship between the two months changing;

(n) "switch" means the simultaneous liquidation of a futures contract in one month and the opening of a new contract in another month.

502. PURPOSE OF BY-LAW

502.01 The purpose and intent of this By-law is,

(a) to provide for the establishment and standardization of procedures affecting trading in beef futures; and

(b) to stimulate, increase and improve the sale of live finished beef cattle; and

(c) to co-operate with any person or association in the carrying out of these specific objects.

503. REGULATIONS

503.01 Notwithstanding section 20 of the Constitution of the Exchange, the Board may make regulations, not inconsistent with the Constitution, By-laws and Regulations of the Exchange,

(a) respecting the facilities and procedures to be provided and maintained for the operation of a beef futures market;

(b) providing for the inspection, grading and weighing of cattle;

(c) prescribing the manner in which weights and grades shall be recorded by persons engaged in the buying or selling of cattle;

(d) respecting alternate means to facilitate deliveries in the event of conditions which may interfere with the normal operation of approved livestock yards facilities;

(e) respecting any matter necessary or advisable to carry out effectively the intent and purpose of this By-law.

504. TRADING

504.01 Except where specifically provided in this By-law, the procedures and practices for trading in beef futures are subject to the same procedures and practices as those governing trading in grain, produce and provision as established by the Constitution, By-laws, Rules and Regulations not only of The Winnipeg Commodity Exchange but also where applicable of the Winnipeg Grain and Produce Exchange Clearing Association Limited.

504.02 Trading in beef futures shall be in such manner and times as may be determined by resolution of the Board.

504.03 All beef futures must be cleared through the Clearing Association and such contracts are subject to the By-laws, Rules and Regulations of that Association.

504.04 The Unit of trading for beef futures shall be 25,000 pounds of live finished beef cattle and bids or offers may be made or accepted for single or multiple units.

504.05 The Board may, by regulation, prescribe the number of future positions or holdings in beef futures, long or short, in any contract month, whether owned or controlled or carried for any person, either alone or in conjunction with any other person, which shall be deemed to be a "reportable position"; and may require members of the Exchange and of the Clearing Association to report such reportable positions to the President of the Exchange at such times and in such manner and in such form as shall be prescribed by the Board.

504.06 After facilities for trading in beef futures in any contract month have been withdrawn, outstanding contracts shall be liquidated either,

(a) by delivery through the Clearing Association; or,

(b) by a bona-fide exchange of any outstanding contract for the actual cash commodity, on or before the last delivery day of the particular contract delivery month; or,

(c) closed out by the last delivery day of the current delivery month in the case of open contracts not previously liquidated.

504.07 In the event that any units of live finished beef cattle contracted for future delivery are not delivered at the maturity of the contract, the remedies provided elsewhere in these By-laws shall apply.

504.08 All trades in beef futures by members, firms or corporations must be executed openly and competitively as to price by open outcry in the trading pit of the Exchange or in such other place as may be designed by the Board for the purpose of such trading.

505. DELIVERY

505.01 Amended March 8th, 1972.

Each delivery unit must consist in whole of steers within the weight limits, grades and yields designated by regulation of the Board. Delivery made to the Alberta Stockyards in Calgary shall be deemed to be par delivery. Alternatively, delivery may be made at the Union Stockyards, Winnipeg, or at the Ontario Stockyards in Toronto, at a premium per one hundred pounds to be determined by regulation of the Board.

505.02 Delivery shall be made by transfer from the delivering clearing member to the receiving clearing member of the official Weight, Grade & Yield Certificate in such form as shall be prescribed by the Board, issued by the Manager of the Clearing Association. Such certificate shall cover a specified lot of steers in a sealed pen at the respective public stockyards.

505.03 Every clearing member making delivery shall,

(a) issue a "Notice of Intent to Deliver" to the Clearing Association in such form as shall be prescribed by the Board, and at the same time notify the Secretary of the appropriate Livestock Exchange in order that a grading panel will be available on the delivery day; and,

(b) instruct the registered and bonded livestock commission firm or order buyer firm, handling the lot to be delivered, to notify the Secretary of the appropriate Livestock Exchange when the steers are ready to be graded and weighed; and,

(c) turn over the Weight, Grade & Yield Certificate, properly endorsed, to the receiving clearing member upon receipt of a certified cheque for the amount due; and

(d) reimburse the Secretary of the appropriate Livestock Exchange, when billed, for the laid-down fees payable; and,

(e) carry insurance on the delivery steers until the start of the cash livestock trading on the business day immediately following final payment and acceptance of delivery.

505.04 Every clearing member receiving delivery shall,

(a) make payment against the Weight, Grade & Yield Certificate by certified cheque at the office of the delivering clearing member not later than 3:00 p.m. on the day of delivery; and,

(b) arrange with the commission firm to which the steers have been consigned for their feeding and watering at the respective public stockyards where steers are held from time delivery is completed until steers are disposed of; and,

(c) arrange for disposition of steers within reasonable time, consistent with humane practices.

505.05 Deliveries are only to be made on such business days of the contract delivery month as may from time to time be determined by Regulation of the Board.

505.06 No delivery shall be made on a day which is a holiday as designated by the respective Livestock Exchange, or which immediately precedes a holiday; otherwise the day of delivery may be selected by the seller.

505.07 Notice of Intent to Deliver shall be given on the business day immediately preceding that day in which deliveries are to be made as designated by the Board of Governors. Such notice shall be presented to the Clearing Association not later than the time fixed from time to time by the Board.

505.08 The Clearing Association shall pass Delivery Notices in such form as shall be prescribed by the Board to eligible longs in accordance with its Regulations.

505.09 In the event that a clearing member has an interest, both long and short, for customers on its own books, such clearing member must tender to the Clearing Association such delivery notices as it receives from its customers who are short.

505.10 Amended October 8th, 1969.

No subsequent re-tendering of such notice shall be permitted.

506. GRADING, WEIGHING, AND RELEASE

506.01 Amended March 8th, 1972.

Grading shall be done by a grading panel of three persons. Each panel shall be selected from members of:

(a) The Calgary Livestock Exchange, for deliveries made to the Alberta Stockyards in Calgary; or

(b) The Winnipeg Livestock Exchange, for deliveries made to the Union Stockyards in Winnipeg; or

(c) The Toronto Livestock Association, for deliveries made to the Ontario Stockyards in Toronto.

No employee, owner, official or person who is in any way connected with the livestock commission firm or order buyer firm to which a delivery unit has

been consigned on behalf of the seller or the buyer shall serve as a member of a grading panel. No more than one member from any firm commission firm or order buyer firm may serve on any one panel.

506.02 Grading shall be determined by a majority of the members of a grading panel and such gradings shall be reported to the Secretary of the livestock exchange concerned on a Stockyard Certificate, in such form as shall be prescribed by the Board. Gradings once reported are binding on sellers and buyers of cattle.

506.03 Grading panels shall appraise the yield of cattle at the time of grading and each such appraisal shall be binding upon the parties concerned. Yields which are appraised to be below the percentage required by Regulation shall be entered on the Stockyard Certificate by the grading panel.

506.04 All steers shall appear to be in good health and in normal marketing condition. Any steer that appears to be unhealthy or unable to withstand shipment or which shows evidence of excessive grubbiness is not to be considered as acceptable.

506.05 Weighing shall be under the direction of the officially designated weighmaster on the approved scales of the public stockyards where delivery is to be made. The weight recorded on the official scale ticket from the approved scale shall be deemed to be the official weight and shall be entered on the Stockyard Certificate. Cattle must be weighed within one hour after grading, but after grading and until they have been weighed cattle shall not have access to feed or water.

506.06 Upon the completion of grading and weighing each lot shall be assigned to a pen which shall be locked by a public stockyard officer. Thereupon such pen shall be sealed and identified by number by the grading panel. Both the pen and seal number shall be entered on the Stockyard Certificate by the grading panel.

506.07 It shall be the duty of the Secretaries of the respective Livestock Exchanges to advise the Manager of the Clearing Association forthwith by telephone of the entries by the panel on the Stockyard Certificate, which he shall then authenticate by signature and mail immediately to the Manager of the Clearing Association.

506.08 Upon being advised by telephone, the Manager of the Clearing Association shall make out the Weight, Grade & Yield Certificate and forward it to the delivering clearing member.

506.09 Official notification from the Clearing Association Manager must be received by the Secretaries of the respective Livestock Exchanges before steers may be released from sealed pens. The following procedures shall apply:

(a) Cancellation of the certificate shall be made by obtaining confirmation from the receiving clearing member of the name of the livestock commission firm or order buyer designated to handle the sale or disposal of the steers for the buyer. The Livestock Exchange Secretary shall then inform the designated livestock commission firm or order buyer that it may claim the steers from the sealed pens.

(b) The stockyard company shall release the steers only on the basis where an authorized gate pass is presented by a member of the commission firm responsible for handling the transaction.

507. MARGINS

507.01 No member shall accept or carry an account for a customer trading in beef futures, whether a member o non-member, unless the minimum initial margin has been deposited by such a customer in accordance with the rates which shall be established from time to time by the Board.

Provided, however, that this shall not apply to a non-clearing member who makes his own trades or who, on the floor, gives his orders as trades which are exclusively for his own account and who pays the brokerage himself.

507.02 The rates of margin established by the Board shall only be deemed to be minimum rates and any member carrying an account may call for higher rates at his discretion.

507.03 In the event that the minimum initial margin is not sufficient to meet the minimum maintenance margin established by the Board, a member carrying such an account shall forthwith call for additional margin to raise the account to the initial margin requirement.

507.04 Margin requirements shall be based on each contract comprising the customer's position, both long and short. Credits in excess of maintenance margins and less than initial margin requirements may not be used as margin against fresh contracts. No customer shall be permitted to make withdrawals from an account when the margin thereon is less than the required minimum initial margin, or when the withdrawal would impair such minimum requirements.

507.05 A member may permit a customer, having an established account, to trade during any day without margin on each transaction provided that the final position resulting from the day's trading is margined in accordance with the By-laws, Rules and Regulations of the Exchange.

507.06 When a customer switches an open interest from one contract month to another and the orders for the purchase and sale are placed simultaneously, no additional margins need be required because of such switch.

507.07 Deposits of margin called by the member must be made by the customer within a reasonable time after demand.

507.08 Failure of the customer to make such deposit within such time shall obligate the member to close out the trades of the defaulting customer.

507.09 In the absence of unusual circumstances, a reasonable time shall be considered as being before the close of regular banking hours on the day that the call for additional margin is made, providing call is made one hour before such close.

507.10 In the event that call is made less than one hour before the close of regular banking hours, then margin shall be deposited within half an hour of the opening of regular banking hours on the next business day on which Canadian chartered banks are open.

507.11 If the member is unable to effect personal contact with the customer, a written or telegraphic demand delivered during business hours at the customer's address registered on the books of the member carrying the account shall be deemed sufficient. Provided, however, if an address is not so registered, the posting of notice on the Bulletin Board of the Exchange shall suffice.

508. FEES, COMMISSIONS, AND BROKERAGE

508.01 Fees charged for,

(a) feed, yardage and such other direct handling expenses shall be in accordance with the established tariff rates as set forth in the Tariff Rates for the respective stockyard concerned;

(b) weighing, grading and appraising yield shall be computed by the Secretary of the appropriate Livestock Exchange in accordance with the usual practice and charged to the clearing member responsible.

508.02 Seller shall be responsible for all fees in connection with,

(a) the official Weight, Grade & Yield Certificate, including all charges for weighing, grading and appraisal of yield;

(b) the commission firm at the public stockyards, including fees at the public stockyards for yardage and insurance, up to the start of the cash livestock trading at the point of delivery on the business day immediately succeeding the day on which final payment and acceptance of delivery took place and they shall be borne by the seller until that time.

508.03 Minimum commissions for the purchase and sale of beef futures shall be:

(a) for transactions not closed out on the same day originated,

To non-members	To members
$25.00	$12.50

per contract, round-turn.

(b) for futures transactions closed out on same day originated,

To non-members	To members
$17.00	$10.00

per contract, round-turn.

(c) for spreading transactions,

To non-members	To members
$25.00	$12.50

(all four sides, but not to include switching).

508.04 Minimum brokerage for the purchase and sale of beef futures shall be:

$1.50 per contract, each end.

509. EMERGENCIES

509.01 On the performance of any provision of a delivery, if the performance of a delivery shall be prevented by strikes, fires, accidents, acts of God, or action of Government or by any other cause claimed to be beyond control of seller, then

(a) the seller may notify the Secretary of the Winnipeg Commodity Exchange; and the Board, whose judgement on such claim shall be final, will determine its validity and, if valid, establish a settlement price, based on the quotations for the last day of trading in the delivery month; but

(b) if, however, no notification of such claim is submitted before the final delivery day of the contract month, the settlement procedure prescribed elsewhere in these By-laws shall apply.

REGULATIONS

Pursuant to section 503.01 of By-law No. 500[1] of the Winnipeg Grain Exchange, the Board of Governors has by resolution made regulations as follows:

PART 1 --- TRADING

1. Price fluctuation units on beef futures bid or offer shall be 2½¢ per hundred pounds.
2. The daily range of quotations for beef futures shall not exceed $1.50 per hundred pounds higher or lower than the closing (clearing) prices of the previous business session.
3. Any position or holding in beef futures, long or short, in any contract month amounting to 100 or more trading units shall constitute a reportable position.
5. Trading in beef futures shall be from the hours of 9:30 a.m. to 1:15 p.m. (Central Daylight Time).

PART 11 --- GRADING

1. A delivery unit may vary between 24,500 pounds and 25,500 pounds of live steers each of which weighs between 900 and 1,200 pounds. No steer shall vary more than 100 pounds from the average weight of the lot and each must be relatively uniform in weight in conformance with the usual commercial practices. The decision of the grading panel as to the uniformity of the lot shall be final.
2. Contract Grades deliverable on Live Finished Beef Cattle Futures Contracts shall be: "Canada Choice Beef Carcass", having an estimated minimum yield of 57%; with the privilege of delivering:
   (a) up to six steers per contract unit yielding "Canada Good Beef Carcass", at a discount of 1¢ per pound computed on

the basis of the number of head of such steers times the average weight of the lot;

(b) steers with an assessed yield of less than 57%, which shall be discounted by ¼¢ per pound for each ½% by which they are assessed to fall below 57% yield, computed on the basis of the number of head of such steers times the average weight of the lot;

(c) steers with an assessed yield of 58% or more shall be at a premium of ¼¢ per pound for each ½% by which they are assessed to exceed 57½% yield computed on the basis of the number of head of such steers times the average weight of the lot.

PART 111 --- DELIVERY

1. Par delivery is to the Alberta Stockyards, Calgary. Delivery may also be made to the Union Stockyards, Winnipeg, at a premium over par of $1.00 per cwt; or to the Ontario Stockyards, Toronto, at a premium over par of $2.50 per cwt.

2. Delivery shall only be made on a Tuesday, a Wednesday, or a Thursday in any week of the contract month.

3. Notice of Intent to Deliver may be issued only on the Monday, the Tuesday, or Wednesday, immediately preceding the Tuesday, Wednesday, or Thursday on which deliveries are made and must be presented to the Clearing Association on the prescribed form not later than 11:50 a.m. Winnipeg time. If the seller fails to present deliverable cattle on the date specified in the Notice of Intent, and by the time prescribed in these

Regulations, he shall be penalized ½¢ per pound each day until the requirements are met; provided, always, that delivery meeting contract specifications shall be completed by the last business day in the delivery month.

4. All cattle shipped against delivery shall arrive at the designated yard not later than 9:00 p.m. local time on the Monday, the Tuesday, or the Wednesday immediately preceding delivery.
5. Once a Notice of Intent to Deliver has been issued, it may not be cancelled or withdrawn.
6. Delivery Notice shall be prepared by the seller and presented to the Clearing Association within 30 minutes of the seller having received the Weight, Grade and Yield Certificate, and in any event not later than 1:00 p.m., Winnipeg time.
7. Invoice to be prepared by the seller and presented to the buyer not later than 1:15 p.m. Winnipeg time on the day of delivery.

Form 1 (Front)

STOCKYARD CERTIFICATE NO.

(To be completed by Grading Panel)

The Winnipeg Grain & Produce Exchange Clearing Association Limited

448 Grain Exchange Building

Winnipeg 2, Man.

(Telephone: 942-6936 Area Code 204)

Seller ..... Address .....

Number of Head	Average Weight	Total Weight

Holding Pen No. ..... Seal No. .....

1. No. of Steers Grading to Contract Specifications ..... SEE OVER

2. No. of Steers Not Grading to Contract Specifications .....

Please specify:

Grade	Yield
a)	a) .....
b)	b) .....
c)	c) .....
d)	d) .....
e)	e) .....
Time	Signature of Graders
Fee	1.....
Expenses	2.....
Total	3.....
	.....
	Secretary, Livestock Exchange

Location of Stockyard .....

Time & Date Clearing Association Notified .....

Form 1 (Reverse)

PAR DELIVERY

1. Grade	When slaughtered and dressed to yield Canada Choice Carcasses. Variations to be noted.
2. Weight	Delivery unit 25,000 lb. weighing between 900 - 1,200 lb. No animal shall vary more than 100 lb. from the average weight of the lot.
3. Yield	All steers shall have an estimated minimum yield of 57% Canada Choice Carcass. Yields under 57% shall be so noted.
4. General Health	All animals shall appear to be in good health and normal market condition. Unhealthy or excessively grubby steers shall not be acceptable.
5. Substitutions	The delivery unit may include up to six (6) steers which may be expected, when slaughtered and dressed to yield Canada Good Beef Carcass. All such steers shall be so noted.

Form 2

NOTICE OF INTENT TO DELIVER LIVE STEERS

Winnipeg.....19.....

THE WINNIPEG GRAIN & PRODUCE EXCHANGE
CLEARING ASSOCIATION LTD.

You are hereby notified that the undersigned intends to make delivery under the rules of the Exchange of a delivery unit of Beef Cattle (Live Steers) on

..... (date):

Place of Delivery .....

Date of Arrival .....

Consigned to .....
(Licensed Livestock Commission Merchants)

Address .....

.....
Clearing Association Member

.....
Address

.....
Signed by

Assigned by Clearing Association to

.....

Re-tendered to .....

Time of Presentation:

Notice of Intent to Deliver must be presented before 11:00 a.m. on the day preceding delivery.

Re-tender of Notice must be presented before 10:30 a.m. on the day of delivery.

Notice of Intent may not be cancelled or withdrawn.

Form 3

OFFICIAL WEIGHT, GRADE & YIELD CERTIFICATE No. .....

Winnipeg ..... 19.....

This Certificate is receivable by The Winnipeg Grain Exchange and The Winnipeg Grain & Produce Exchange Clearing Association Limited as prima facie evidence of the truth of the statements contained therein.

Stockyard	Pen Number	Seal No.	No. Head	Total Weight	Average Weight

1. No. of Steers meeting contract specifications .....
2. No. of Steers not meeting contract specifications .....

Grade	Yield
a)	a) .....
b)	b) .....
c)	c) .....
d)	d) .....
e)	e) .....

Time Issued .....

.....
Manager, Clearing Association

Form 4

LIVE STEERS DELIVERY NOTICE

Winnipeg ..... 19.....

THE WINNIPEG GRAIN & PRODUCE EXCHANGE
CLEARING ASSOCIATION LIMITED

Assigned by Clearing Association to:

.....

Time .....

Livestock Yard .....

No. of head .....

Average Weight .....

Total Weight .....

Grading Certificate No. .....

Livestock Commission Merchant .....

.....
Clearing Association Member

Time of Presentation:

The original of this Notice shall be presented within 30 minutes of the Seller's receiving the Weight, Grade and Yield Certificate.

Time of Payment:

Payment against the Weight, Grade & Yield Certificate covered by this Notice must

APPENDIX B

CASH AND BASIS

PRICE CHARTS

FIGURE B.1

CHOICE STEER PRICES AT CALGARY, WINNIPEG, AND TORONTO, 1969

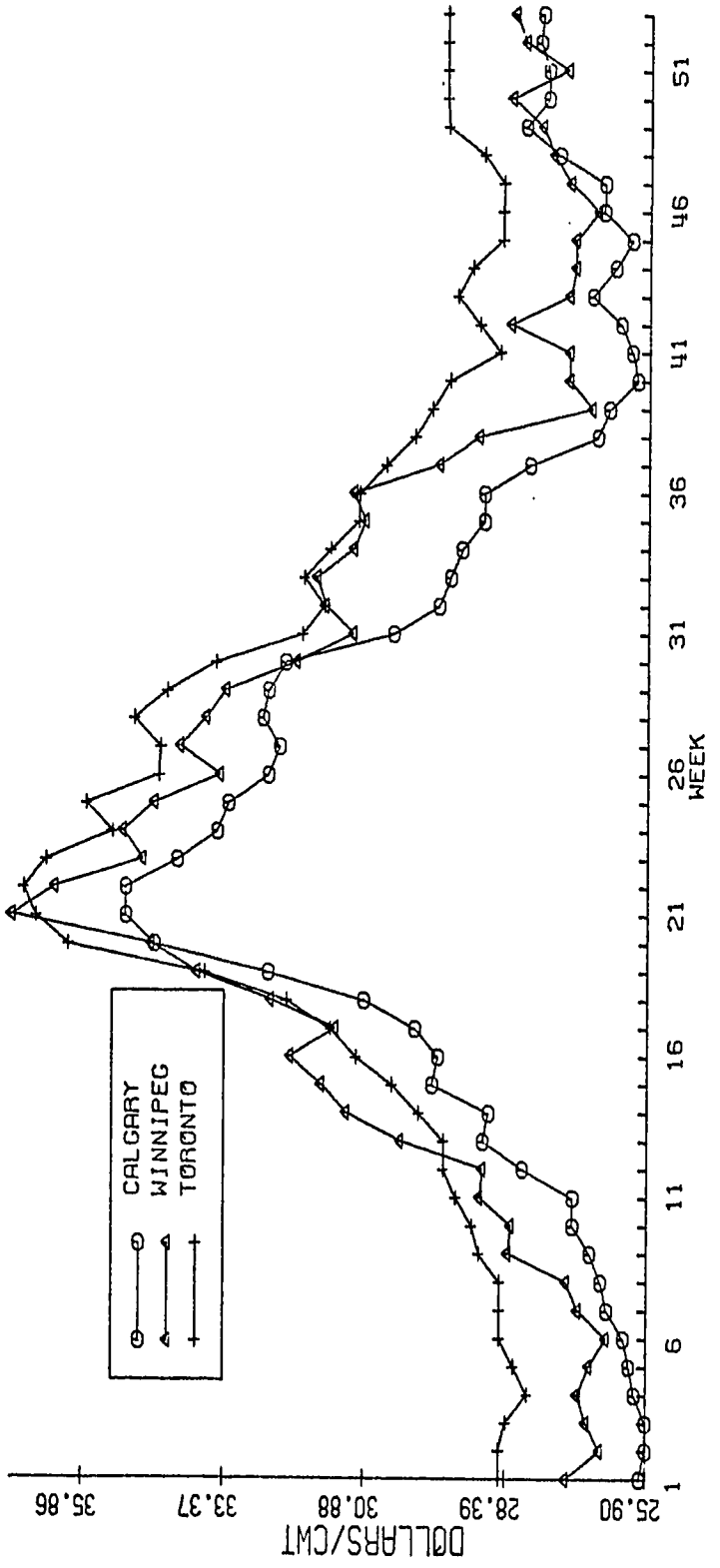
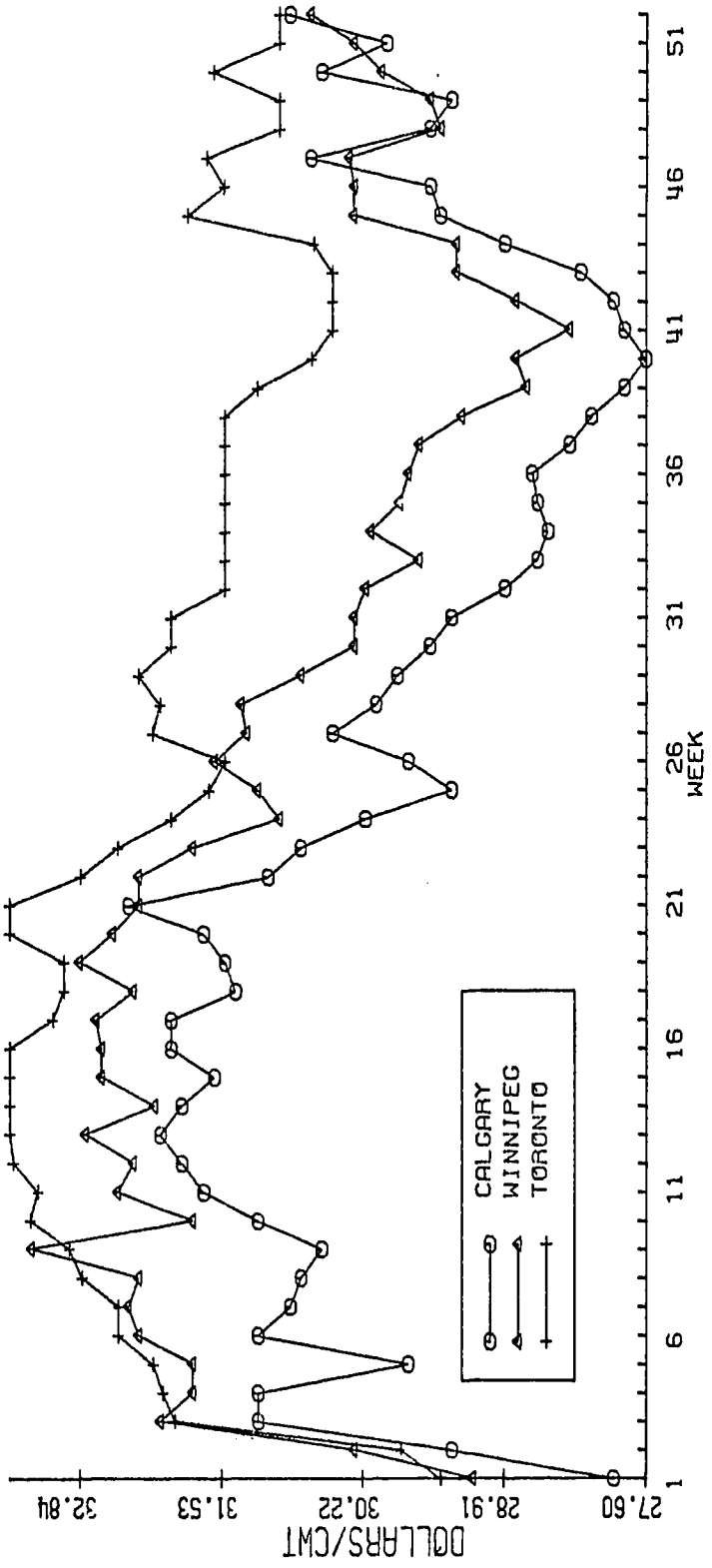


FIGURE B.2

CHOICE STEER PRICES AT CALGARY, WINNIPEG, AND TORONTO, 1970



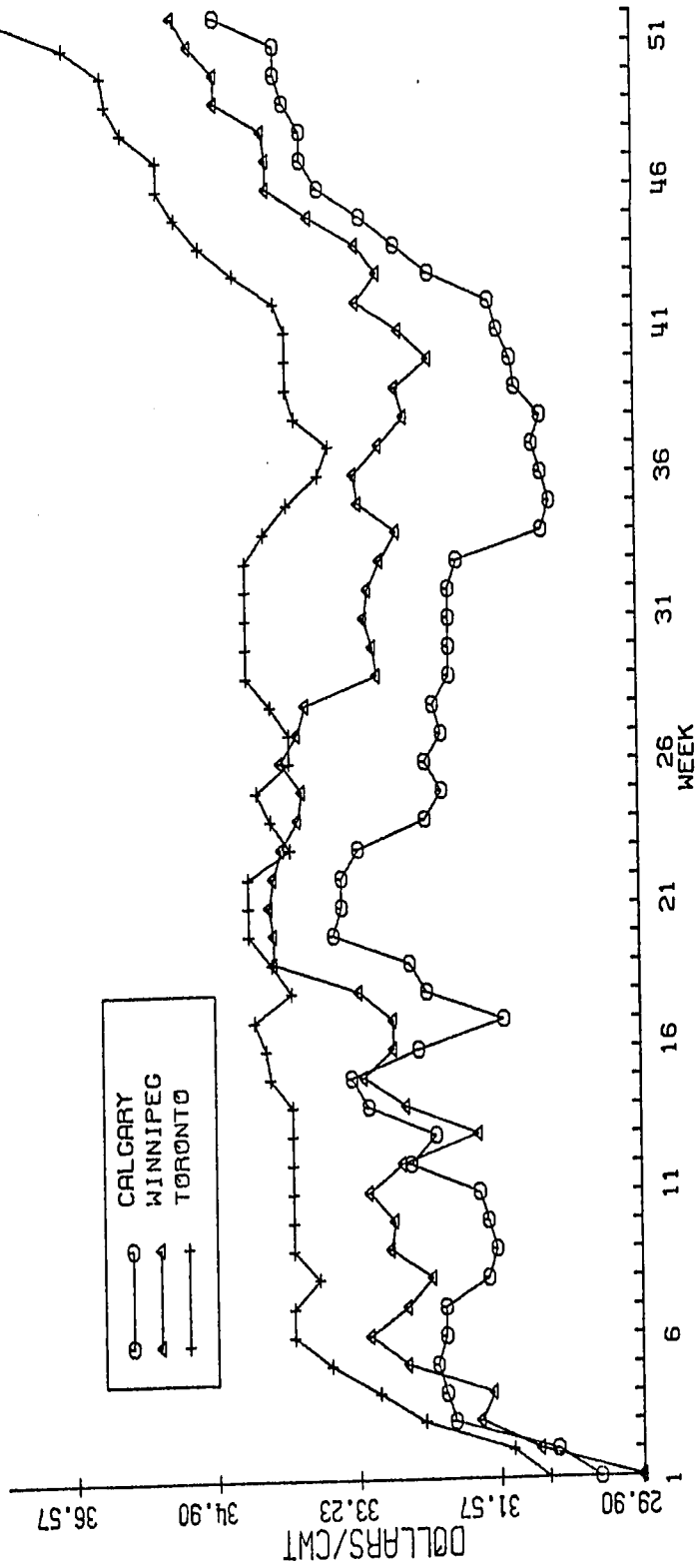


FIGURE B.3

CHOICE STEER PRICES AT CALGARY, WINNIPEG, AND TORONTO, 1971

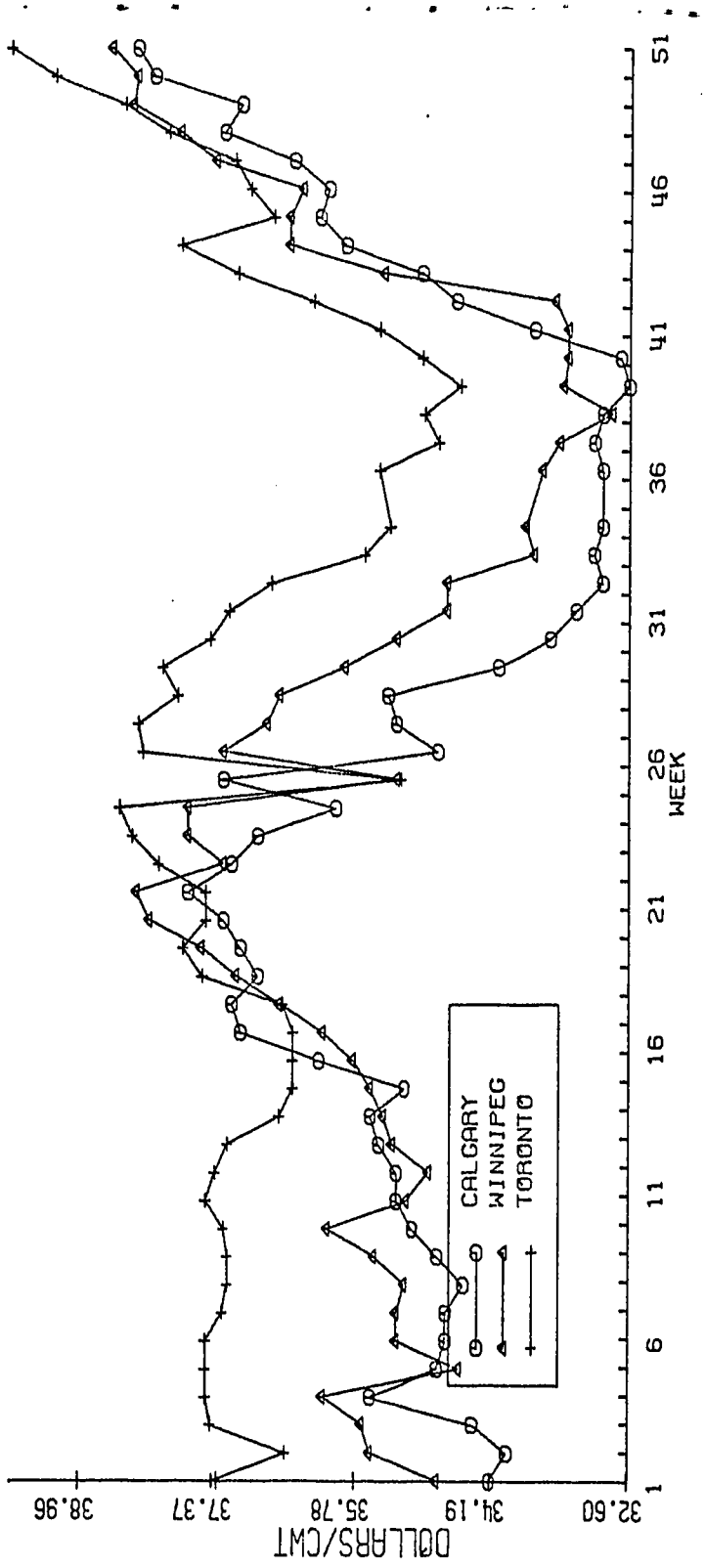
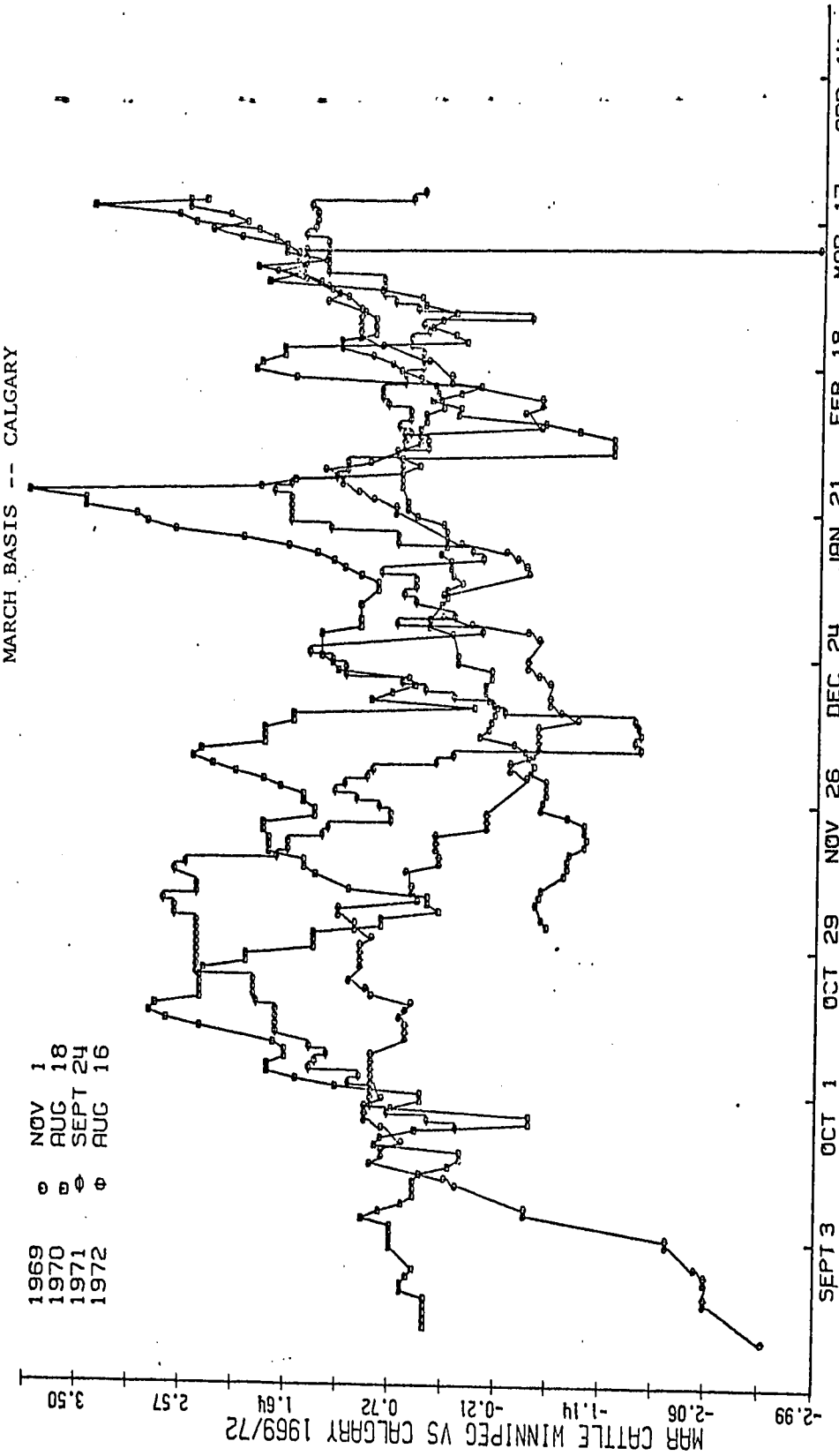


FIGURE B.4

CHOICE STEER PRICES AT CALGARY, WINNIPEG, AND TORONTO, 1972

FIGURE B.5

MARCH BASIS -- CALGARY



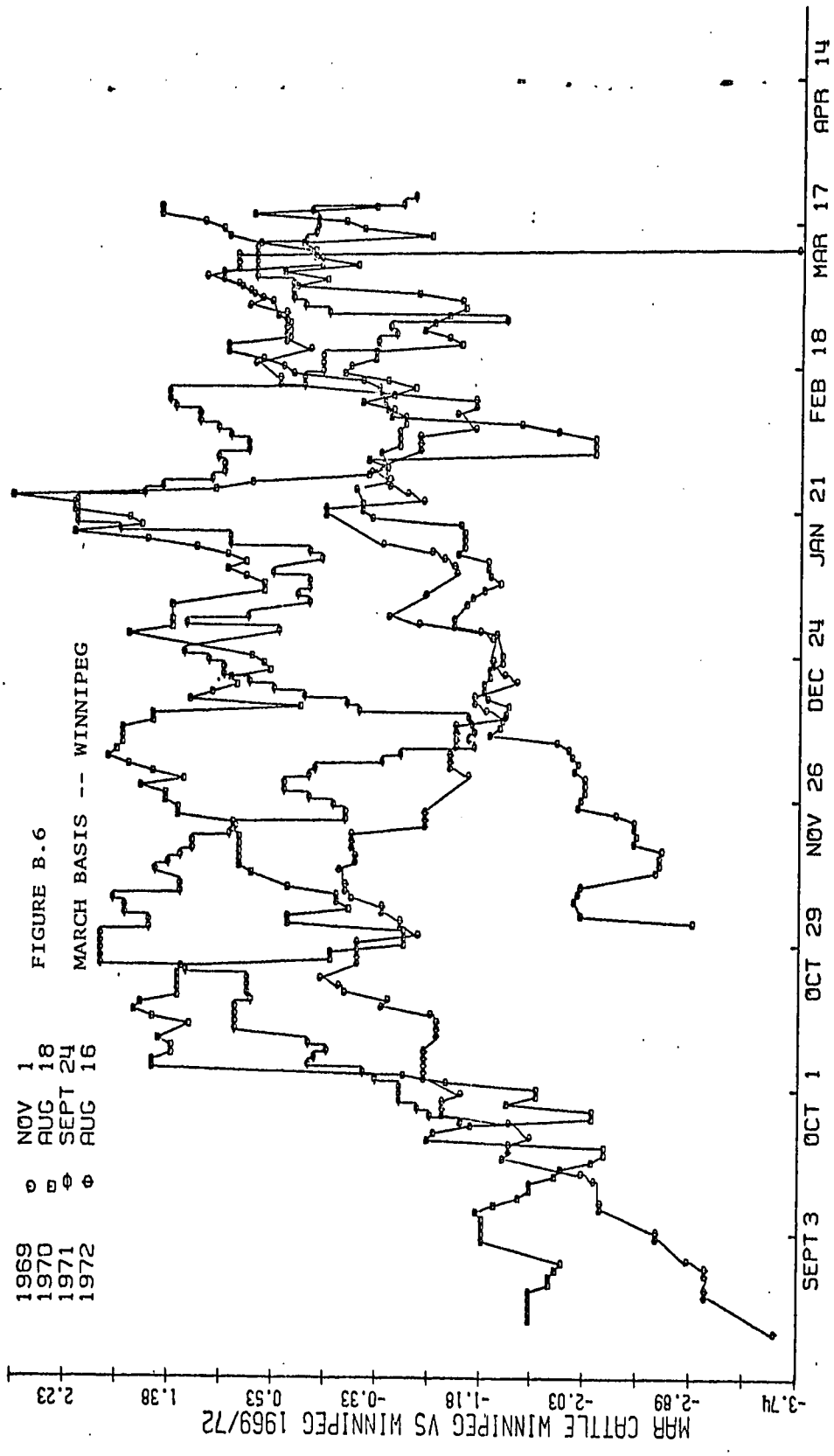


FIGURE B.6
MARCH BASIS -- WINNIPEG

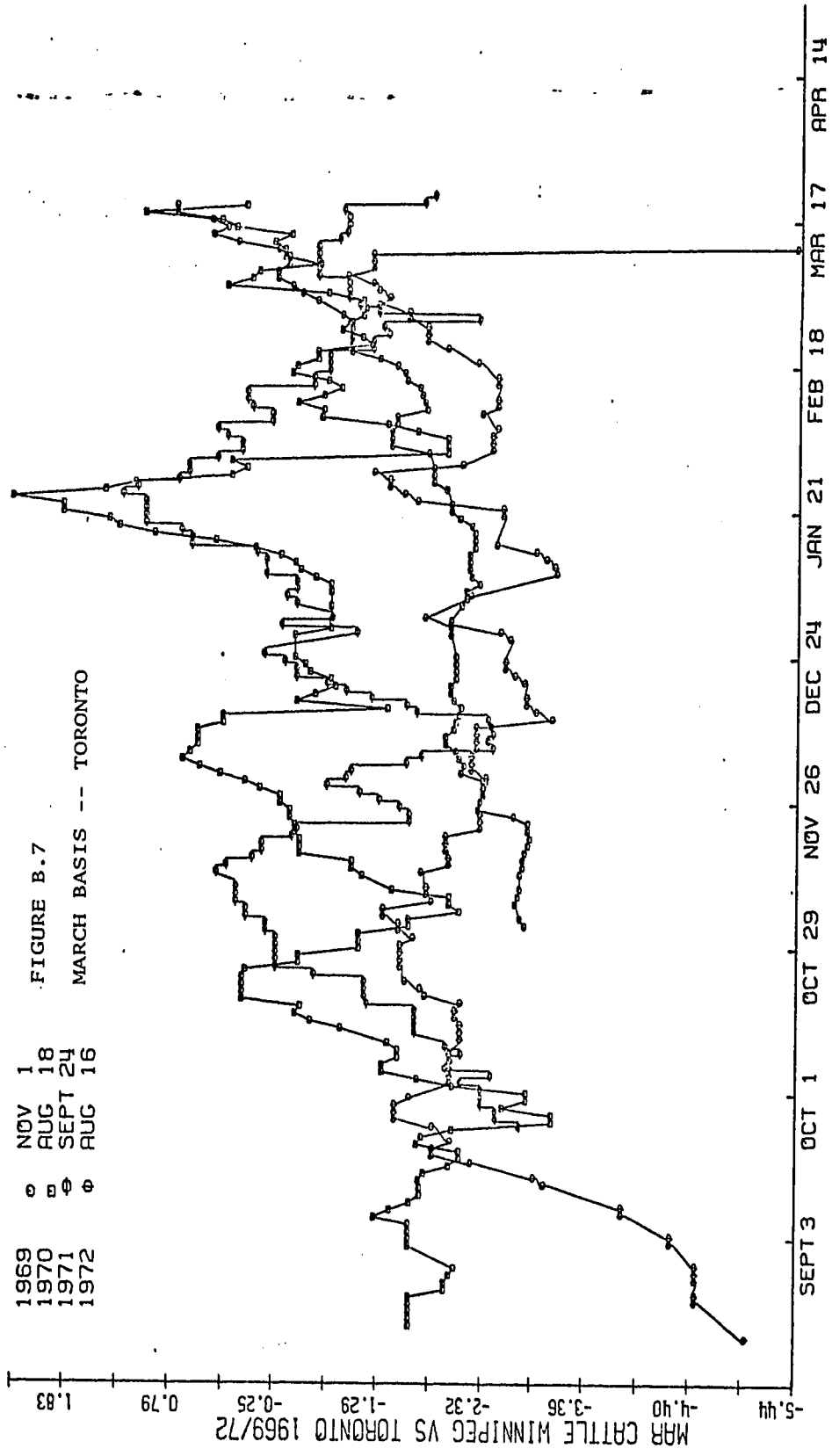


FIGURE B.7
MARCH BASIS -- TORONTO

FIGURE B.8

MARCH BASIS -- CALGARY

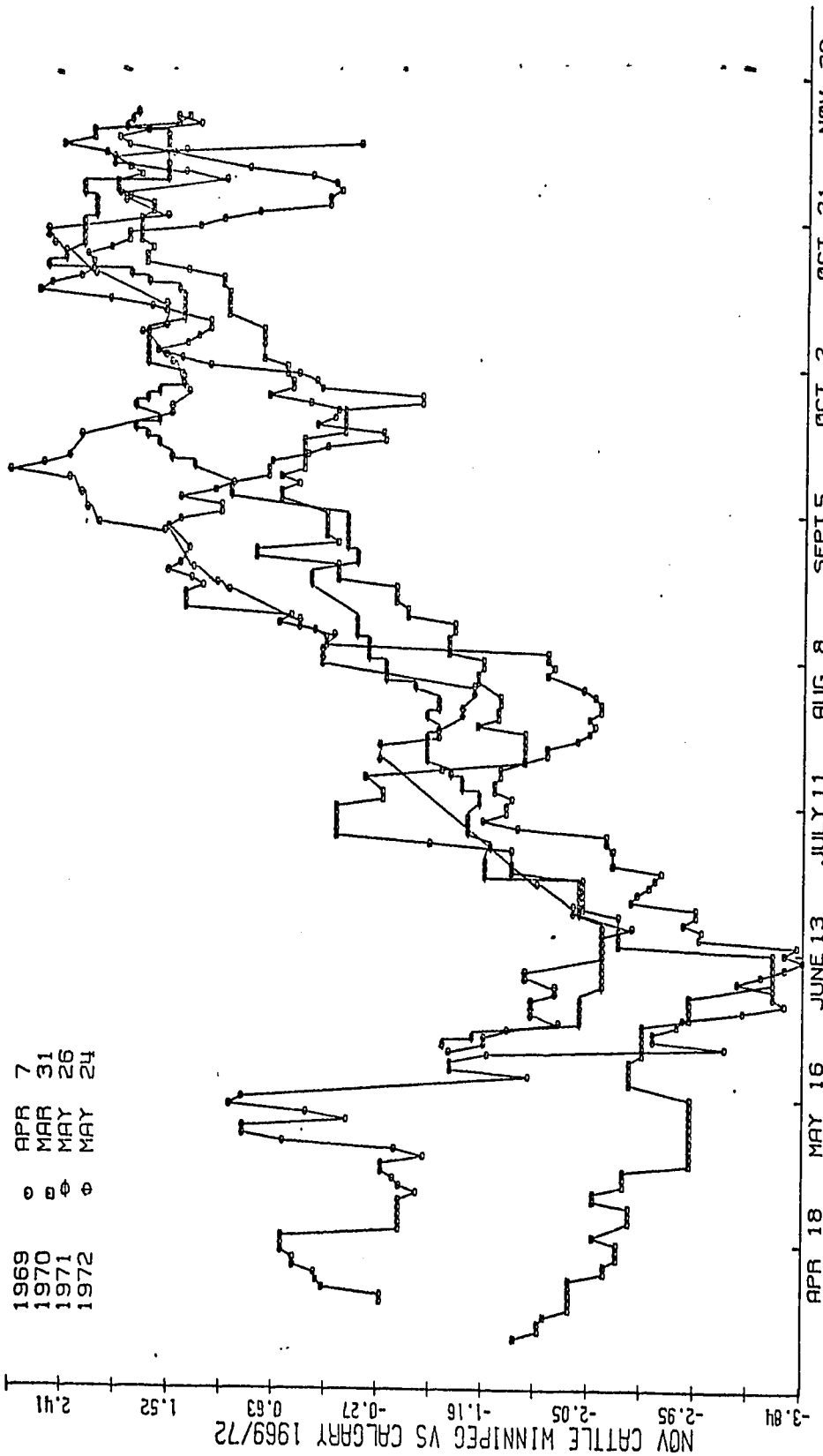
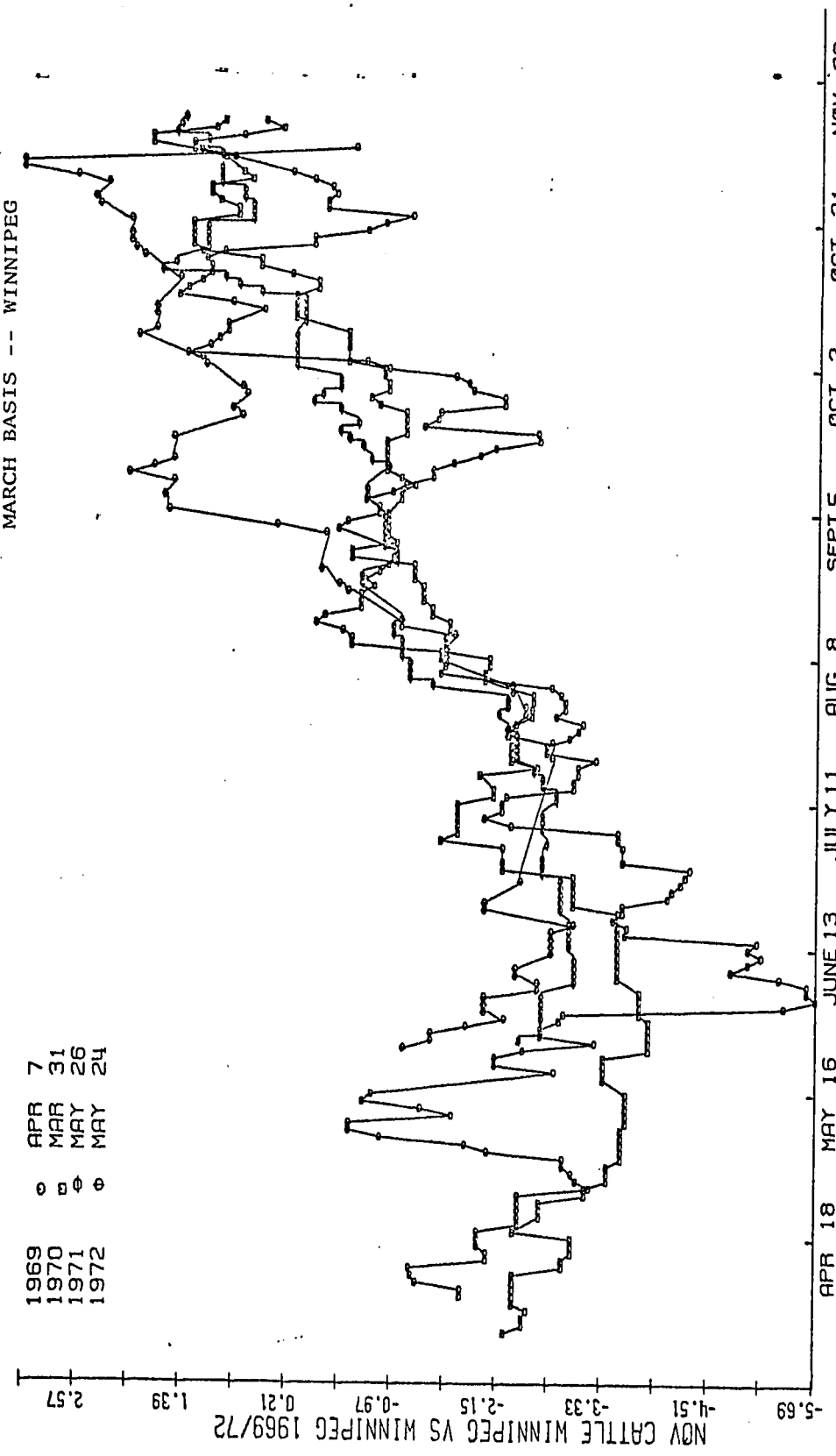


FIGURE B.9

MARCH BASIS -- WINNIPEG



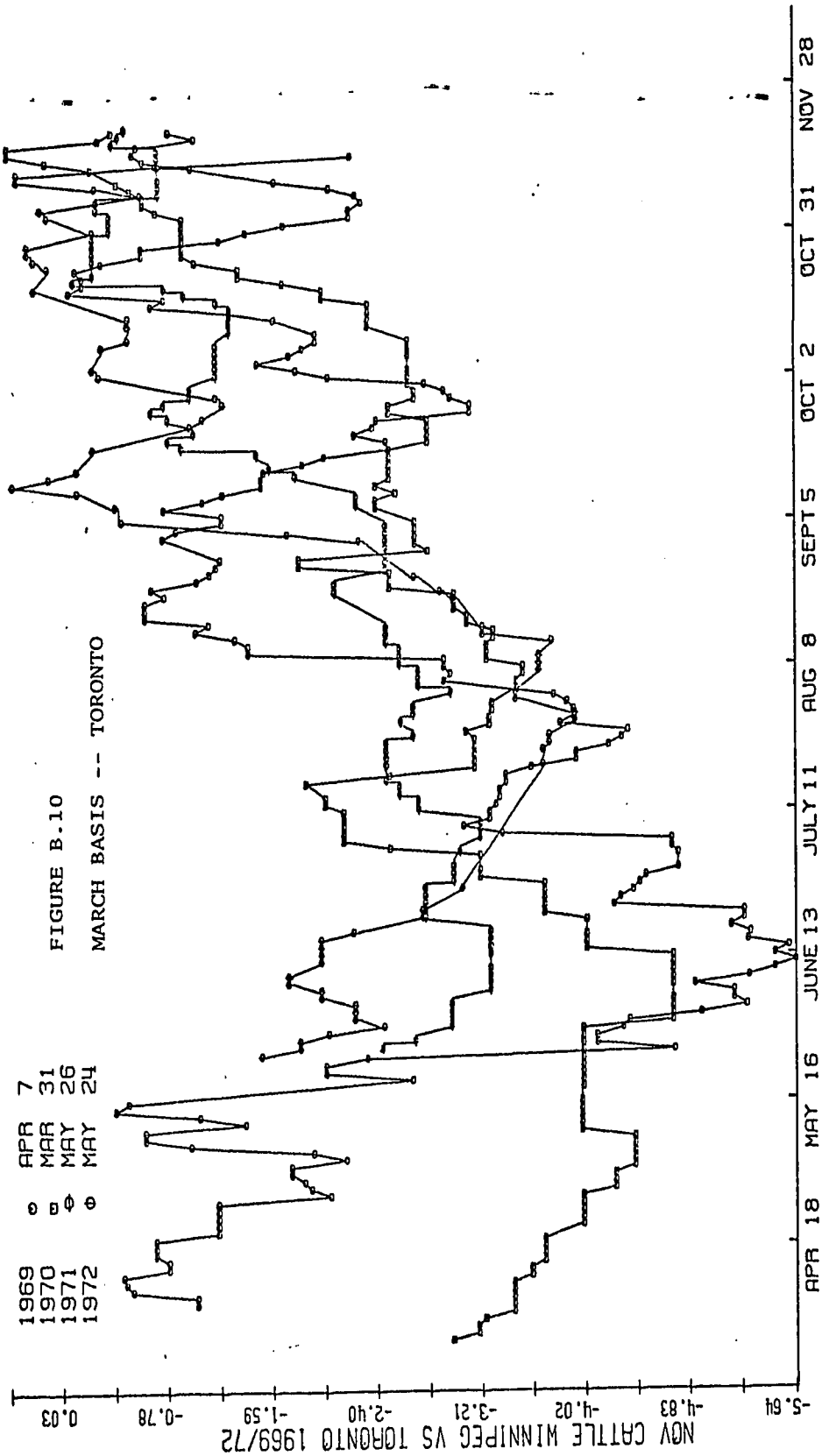


FIGURE B.10

MARCH BASIS -- TORONTO