

THE VALUE OF HEDGING WHEAT

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## INTRODUCTION

The question "Is hedging perfect and what is its value?" has been asked over and over again for as many years as the commodity exchanges have been in operation. Many say that hedging is a form of insurance, others say that it is a way of transferring risk and still others have no conception of the value or process of hedging. Many people believe hedging is a type of gambling and serves no useful purpose. Investigations indicate that there is much yet to be learned about hedging and that there is a definite possibility of gain (momentarily) from the study of the hedging process and its complications. The title of the thesis is not meant to imply that there is a monetary profit in the hedging operation itself but that there is a value in hedging wheat depending upon the use of the hedging transaction.

### Purpose

The purpose of this thesis is to present a clear, concise picture of the process of hedging wheat with its ramifications, and to determine whether it pays to hedge. An associated purpose is to determine whether it is more desirable to hedge in May or December futures.

## Procedure

In order to accomplish the purpose of the thesis, tables and graphs were prepared showing a trader's gain or loss from hedging in the May and December futures. All prices were taken from Chicago Board of Trade quotations (20, cover). Weekly prices were used in compiling data for the tables. This avoids the defects of monthly prices on the one hand, which fail to give sufficient detail, and of daily prices on the other hand, which are unnecessarily detailed and laborious to work with (20, cover). The period used in this study was August through December inclusive from 1909-1933 inclusive and exclusive of 1917-1920. Trading was interrupted during World War I and no data are available for either May or December futures during 1917-1920. Tables and graphs were prepared showing the spread between May and December futures, and the trader's gain or loss if no hedge was used. Tables and graphs also were prepared to present these data in such a form as to reveal relations between hedging in either May or December futures and the results if no hedging was used by grain dealers. The tendencies and relations revealed were then summarized.

## Basis for Study

To begin the study of the value of hedging it was necessary to discover a reliable source of sufficient information. There are a large number of publications on the problem of hedging and

a sufficient quantity of government statistics for reference. Among these writings and statistics are the publications of The Wheat Studies of the Food Research Institute, Stanford University, California. These publications are released monthly concerning the topic of wheat. Upon further investigation, it was found that Vol. XI, No. 3, November, 1934 of the Wheat Studies entitled "Prices of Cash Wheat and Futures at Chicago Since 1883" contained the most reliable and accurate data for accomplishing the problem at hand. The appendix of this publication contained the weekly prices of cash wheat and the four principal futures (May, July, September, and December) for the period 1883-1934 on the Chicago Board of Trade (20, p. 103-117). This collection of statistics makes available for the first time in convenient form a record of Chicago wheat prices by weeks (20, cover). Other publications and government bulletins were used as sources of important information necessary for the preparation of this paper.

#### Limitations of Study

This study was approached with the purpose of obtaining the most accurate information from the available data. Since reliable and comparable data were not obtainable for the period of 1934 to 1942 inclusive, the twenty-four year period (1909-1933) was used and is believed to be sufficiently long and typical for determination of the answer to the objective of the problem. This period includes the normal period (so-called) of 1909-1914, up to World

War I, recession in 1921, regaining to the high plateau of 1928, peak of 1929, and recession and depression through 1933.

The study is limited by the fact that only the months of August through December of each year were used and only the May and December futures were used. However, these limitations are not considered to be serious as the two most important futures were studied and a major proportion of wheat moves during the months of August to December. There were not as many regulations and as much regimentation of the grain exchanges during the period studied as at the present time.

#### Review of Literature

Since the establishment of the Chicago Board of Trade in 1848 and other commodity exchanges a few years later, there have been numerous publications on the subject of hedging of grain. However, no studies or publications were found that dealt specifically with the value of hedging in respect to gains or losses due to the hedging transactions. One of the earliest outstanding studies on hedging of grain was published by G. Wright Hoffman. This publication was his doctor's thesis entitled "Hedging by Dealing in the Grain Futures". Mr. Hoffman discussed the development of futures trading and the theory, practice, extent and limitations of hedging. This publication was followed by his book "Future Trading Upon the Organized Commodity Exchanges" published in 1932. A broader view of the process of futures trading not only in respect to the grain trading but also other

commodities such as cotton, coffee and sugar was presented in this book. Mr. Hoffman was employed as a consulting economist to the Grain Futures Administration of the United States Department of Agriculture at the time of writing this publication. This employment afforded him an opportunity for closer contact with the futures trading. In his publication, Technical Bulletin No. 747, United States Department of Agriculture, January 1941, Mr. Hoffman covered the relation of cash and futures prices, visible supply and hedging, the delivery problem connected with futures trading and the importance of large-scale speculators.

Another writer of the time of Hoffman's publication in 1925 was C. O. Hardy who wrote a book on Risks and Risk Bearings. Since there is the element of risk in futures trading, Mr. Hardy devoted two chapters of his book to the study of the risks involved in hedging and speculation.

In the early thirties the Wheat Studies of the Food Research Institute presented several publications on the topic of price relations between cash and futures. One of the Wheat Studies, Vol. XI, Nov. 1934 presents the prices of cash wheat and futures at Chicago since 1883 with an analysis of cash-future price relationships. It is from the appendix of this publication that figures were compiled and presented in table form for use in this thesis. Without the use of this publication, the task of presenting an accurate picture of the value of hedging would have been extremely difficult.

Due to the fact that commodity exchanges are closely regulated by the government, a great number of government bulletins and

circulars have been published on the subject of futures trading, hedging and commodity exchanges. J. M. Mehl, an administrator for the Commodity Exchange Authority, presented a concise summarization of futures trading since the passage of the Grain Futures Act in a government publication entitled "25 years of Future Trading under Federal Act". The number of writings published in periodicals that are important contributions to the study of hedging are relatively few and of little importance.

#### HEDGING WITH SPECIAL REFERENCE TO WHEAT

##### Definition, Illustration, Purpose, and Importance

Hedging frequently is confused with speculation and gambling. Some dealers may be under the impression that they are hedging their grain or transactions when actually they are speculating. Therefore, hedging should be clarified and defined. Hedging is the practice of buying and selling futures to counterbalance an existing position in the cash market and thus avoid the risk of unforeseen major movements in price (9, p. 382). The risk is avoided by shifting it to another person or group of persons. Hoffman says that hedging is not a coincident purchase and sale in two markets but that a hedge is one transaction, either a "hedge purchase" or a "hedge sale" depending on the existing trade operation to be protected (11, p. 35).

In the days of the early commodity exchanges most grain was hauled to market by wagon. A period of two or three weeks often

elapsed before a farmer could get his grain marketed. In the meantime, if a good harvest was in progress, wheat may have dropped 10 to 15 cents, or more, per bushel and the farmer would have to bear the total loss. Something or someone was needed to bear the risk from the time of production by the farmer until the time of marketing regardless of whether that period was one week or a year. The risk needed to be shifted from one of less knowledge to an expert. This was accomplished by means of a hedge. The best way to explain a hedge is by an illustration. Suppose Mr. A raises 1,000 bushels of No. 2 hard winter wheat but is unable to market the wheat for approximately 30 days. Let us assume that on July 1 he harvests the grain. In order to protect himself from a decline in the cash price of wheat, he may execute a hedging transaction. This can be accomplished by selling, on July 1, September futures. For illustration purposes it may be assumed that at this date the price of the September future was 98 cents per bushel and the price of cash wheat was \$1.00 per bushel. Suppose that in 30 days when Mr. A is ready to sell his wheat the cash price has declined to 90 cents per bushel. He will sell his wheat and at the same time buy back 1000 bushels of September futures at the prevailing price. Ordinarily, when the price of cash wheat declines, the futures price also declines. It is assumed in this illustration that the prevailing price for September futures is 88 cents. Mr. A lost 10 cents per bushel on the cash wheat because he was unable to market his grain at harvest. However, he made 10 cents per bushel on his simultaneous future transaction. Disregarding commissions and carrying costs,

Mr. A broke even by hedging his wheat, whereas had he not hedged, his loss would have been 10 cents per bushel. Mr. A was able to shift the risk from himself to the seller of the hedging contract that he had purchased. Buying or selling a future contract as a hedge is not only important to the farmer as a risk bearer but also to the country elevator operator, the miller, the processor and other individuals or companies handling considerable quantities of wheat.

Hedging is used by grain buyers mainly for the purpose of protecting them against losses due to declines in prices from the time of the purchase of grain until it is resold. Hedging by many is looked upon as a form of insurance. Hoffman says that insurance companies or people that insure do so for two reasons, namely 1. "to obtain superior insight into risks which they are carrying and thus through their superior knowledge as specialists, to be able to carry these risks on a narrower margin than the insured" and 2. "what uncertainty remains, after a more or less thorough attempt has been made to diagnose the risk, is expected to be met through the application of the law of large numbers" (11, p. 2). He states that hedging is a form of insurance and employs the same two methods of meeting uncertainty in the outcome of risks as other forms of insurance (11, p. 3). Mehl (15) states that the hedging possibilities of the futures market are well recognized as a source of protection to cover certain kinds of cash-grain risks. Some writers have gone so far as to classify hedging as a form of insurance (Hoffman, 11). The protection

purpose is apparent. The insurance form, however, is not so evident. It would, perhaps, be more nearly correct to classify insurance as a form of hedging (15, p. 19). Mehl (15) points out that insurance contracts undertake to spread the risks involved over a large number of people whereas hedging does not spread the risk because someone must assume the evident risk. The hedger, for instance, has one risk and his object is to protect himself. This he does by taking on another risk of equal but opposite in character of the original risk. Thus the hedger has two risks instead of one. Those who buy the contracts of a hedger are willing to assume the involved risk because they believe they have a superior insight and a more complete knowledge, thereby to profit by the risk assumption in the form of a futures contract. The value of hedging lies in its utility for stabilizing profits on individual transactions and in providing protection against unusual single losses.

#### Organization and Regulation of Futures Trading

During the early colonization of the United States mechanized industry was almost nonexistent. People were educated to be self-sufficient and such self-sufficiency and independent feeling greatly furthered the Revolutionary War and the establishment of the United States. As the early settlers pushed westward and opened new lands, the production of grain increased rapidly. Farmers had to haul their grain many miles by wagon to the markets and the process of

selling "to arrive" came into being. Farmers would sell their grain and state that delivery would be made later or at a specified time. From this beginning the need of futures markets arose. Wheat production increased and the United States became an exporter. The Chicago Board of Trade was organized in 1848 to handle the expanding grain trade. In 1849 the St. Louis Merchants Exchange was organized, followed by both the New York Produce Exchange and the Commercial Exchange of Philadelphia in 1850. During most of the first 75 years of future trading, there was little government regulation of the commodity exchanges. As a result there were incidents of extreme manipulation of prices in the futures markets. Probably one of the most famous was in 1888 when B. P. Hutchison obtained a wheat corner on the Chicago market. As the expiration of the September future approached, the price went to \$1.00 per bushel for the first time in five years (16, p. 2). In four days, Hutchison put the price up to \$2.00 a bushel, raising the price 25 cents a day. Many "shorts" were unable to buy back their futures contracts and incurred great losses. On September 21, 1922 the Grain Futures Act was passed and, after being tested before the United States Supreme Court for constitutionality, was placed into effect the following year. This law operated until 1936 when its name was changed to the Commodity Exchange Act. The purpose of the original act was to regulate the multi-billion dollar commodity exchange business (16, p. 6). The Commodity Exchange Act recommends margin requirements to the grain exchanges on speculative transactions to lessen the dangerous

fluctuations in grain prices. These margins, both as a means of stimulating or curbing trade, are recommended by the Commodity Exchange Act to be changed whenever the need becomes eminent. The Secretary of Agriculture has, from time to time, invoked upon the commodity exchanges the necessity of reporting large transactions with the belief that possible manipulation of grain prices was taking place. Studies (16) have shown that large speculators (dealing in up to 10 million bushels of grain) can and do affect the market by causing fluctuations in prices in accordance with their own buying and selling. A recent example of government action was that which followed the Cotton Market crash of 1946. Two speculators held such large accounts that they were washed out of the market. A forced liquidation of their accounts caused a collapse. Therefore, the Commodity Exchange Authority recommended lowering the limits of maximum speculative accounts to curb such a recurrence. Over the past few years penalties have been imposed on brokers and traders for such violations as price manipulation, attempted corners, false reports, bucketing, failure to register, and failure to properly account for customers funds (16, p. 5). By means of governmental influence and control the public is protected against unhealthy speculative tendencies.

#### Mechanics of Future Trading

Futures trading transactions actually are not a sale or a purchase of a specified commodity as commonly considered but are

agreements to buy and sell a certain quantity and quality of grain at a certain time and place at a specific price. Title usually does not pass until delivery is made and it is then that the transaction becomes a purchase or a sale. Delivery can be made on any business day of the delivery month during the hours of trading. However, only a minor proportion of futures contracts are settled by delivery. Over 99 percent of futures contracts are closed by offsetting contracts (10, p. 24). Each futures transaction must take place at a common meeting place which is the grain exchange. The function of the grain exchange is to furnish (a) a common meeting place for those who wish to trade and (b) establish rules of conduct designed to facilitate trade (15, p. 6). The grain exchanges have facilities for both cash and futures transactions and each exchange has its own group of members. The rules are subject to the approval of the Commodity Exchange Administration whose responsibility it is to see that the grain exchanges function properly.

Many times the mechanics of futures trading do not work as smoothly as they should. Because of a short crop, a freeze, a drouth, or a war, "squeezes" may develop in a futures market. Speculators in the market may try to take advantage of hedgers when they know an unusual condition exists, such as a crop shortage, and demand delivery of the amount of wheat called for in contracts. The hedger might be able to deliver the wheat at one point but if the futures market is a 1000 miles away, he may not have time to make the delivery and will have to pay a premium to be able to buy back his contract. Of the 11 futures markets designated as contract

markets for futures trading in grains, 5 have only one delivery point, 2 have two delivery points and only 4 have various delivery points (18, p. 4). Since the Chicago Board of Trade handles approximately 85 percent of the futures trading in grain in the United States and most of the grain hedged lies outside of Chicago (18, p. 6), the futures market would function more smoothly for hedging purposes if many delivery points were available. A "squeeze" could not become effective just because delivery could not be made quickly. The use of multiple delivery points would contribute to more efficient operation of the futures trading and would not give an unfair valuation to contracts as the end of a delivery month approaches.

#### Movement of Cash and Futures Prices

Hedging by dealing in grain futures is based on the fundamental concept that futures and cash prices move together. This factor more than any other determines whether a hedge is fully or only partially protective (15, p. 21). Price changes in either market (cash or future) is not the result of price movement in the other but is only occasioned by it, the real cause being some outside factor felt, more or less equally by both markets (11, p. 67). The question is raised "Why do not cash prices parallel futures". There are four broad types of factors to answer this question, namely (a) position or location (b) quality (c) element of time and (d) random causes (10, p. 29). As has been discussed earlier

in this thesis the main reason for position or location being an important factor is because futures prices are based on grain in one location or one central point. Spot cash prices, however, reflect local supply and demand conditions and therefore may vary considerably from the central market prices. The fact that futures prices are based on delivery at one central point gives rise to greater price fluctuations in the futures during and near the delivery month than earlier in the life of the future (18, p. 9). Outside delivery points for the futures market would have a tendency to reduce the fluctuations in the futures prices and facilitate the movement of cash and future prices together. These multiple delivery points would reduce the necessity of "shorts" to bid up the futures to buy back their contract rather than going to some outside point to obtain grain for delivery. In regard to the second factor, quality, future prices reflect only one grade of grain and normally this grade is the cheapest one of the deliverable grades. However, with cash or spot prices, all qualities and grades are reflected in the prices. Because of the ability of the central markets to improve grades by lowering moisture content, cleaning or conditioning, cash prices are given a much greater range which is not reflected in the future prices. Future prices reflect only one period of time, namely, the month of delivery, whereas cash or spot prices reflect day to day changes throughout the crop year as it advances. If there is not a counter-balancing factor, this forward change in time, involving costs of storage--interest, insurance, wages, overhead--will cause cash prices to advance as a crop year progresses (10, p. 29). Even though one assumes the

first three factors remaining constant with no effect on cash and futures prices, it is evident that random factors at times play a great part in affecting cash and futures prices unequally. The causes are mostly uncertain and nonrecurring and therefore are not considered in determining prices. Changes in demand for specific qualities desired in grains, trading psychology, world conditions, and the weather are some of the random causes for which the futures market reflects changes in prices but which can not be foreseen sufficiently in advance.

There is an established practice of basing cash prices upon futures prices. Cash offers for grain are made by adding or discounting from the futures because of the four factors previously mentioned and also the element of competition. Some infer from the above statement that futures prices determine the cash prices. This is not necessarily so because both future and cash prices are determined by the same body of underlying conditions, supplies, their location, quality and movement, demand, prices of other commodities and general business activity (10, p. 30). It can be stated however, that future price changes normally do proceed cash price changes. Traders in futures market (if in large which is normal) quickly gather and interpret the events of the day and future outlook and reflect these factors in bids and offers. Cash traders realize that the futures market is important and valuable as a guide and they can not afford to disregard its force in the formulation of prices (10, p. 30).

In studying the movement of cash and futures prices it is least objectionable to study them as a relationship of cash prices

to futures. In other words, cash prices are studied as rising or sometimes falling to meet the price of the future in the delivery month (20, p. 82). The spread normally is thought to be cash price below the futures price by the cost of storage and carrying charges. As has been pointed out earlier in this section, cash and futures are thought of as moving together. This is the basis of hedging. If these prices move together an individual who hedges is definitely protected against price changes and has a "perfect" hedge. A 10 cent a bushel loss on a cash wheat transaction would be exactly offset by a 10 cent a bushel gain on the futures transaction.

In order to have a perfect hedge there are certain assumptions which must be established. These assumptions are (a) no carry-over on June 30 (b) new crop delivered July 1 and is accessible, (c) no new wheat until July 1 of the next year, (d) storage costs remain the same, (e) those interested in wheat trade have full information concerning available supply, (f) all wheat consumed in the year and uniformly consumed, (g) everyone can be expected to act with pecuniary rationality (9, p. 228). It is obvious that a perfect hedge is an impossibility because there is a lack of uniformity in consumption, information is incomplete and incorrect, and there is a variation in the quantity of carry-over. Shephard says that sometimes the spread between cash and future prices may widen or narrow one or two cents and there is evidence of much greater spreads (20, p. 110). Under these conditions the hedge does not give perfect protection. The hedger may lose or gain by

the amount of change in the spread (19, p. 97). It might be added that the talked of "perfect" hedge does not exist for the simple reason that cash and futures do not move exactly the same amount in the same direction even a small percentage of the time.

### Use and Effect of Hedging

Hedging, as has been stated before, is not used for the purpose of making profit but is used to protect the individual or firm hedging from unusual or adverse changes in the market. Hoffman (9, p. 445) states that it is used for the purpose of substituting smaller, surer gains for larger more uncertain gains. In other words, it is used to protect the profits that a dealer has the definite possibility of earning. Many hedging transactions are made with the plan of making no delivery because the transaction is merely used to shift risks. There are a number of groups that deal in grain and grain products and use a hedge. Some of these groups are farmers, country elevators and mills, terminal elevators and mills, processors, bakers and retailers. Some of these groups make little use of the futures market as a means of hedging. Farmers and retailers do very little hedging while country elevators and mills hedge to a mild degree with some line companies being very consistent hedgers. However, the principal hedging groups are the large elevator, mill and processing companies in the leading grain centers (10, p. 33). These companies deal to a great extent in moving supplies and therefore must protect themselves as these supplies move either into home channels

or export trade. The main reasons that farmers do not hedge are because (a) grain is usually held until it is convenient to move, (b) grain is held in the belief that price will rise, thus defeating the hedging purpose, (c) the unit of trading, 1000-5000 bushels, is too large for many farmers, (d) few farmers know much of hedging, and (e) the distrust of organized commodity exchanges (11, p. 106). Fifty percent of the marketable supply of grain carried forward each year is carried by the farmers and remains unhedged (11, p. 112). The visible supply (stocks of grain at prominent grain centers) of grain is largely hedged as exporters and jobbers have virtually a 100 percent hedge while country mills and elevators hedge about fifty percent (11, p. 112). Hoffman (11) stated that a hedging pressure would result if hedging was done in large quantities and it would cause a reaction in futures prices. If large amounts of hedging purchases were made, a rise in futures prices would result because only a small part can be purchased at a time and thus each purchase forces prices higher (11, p. 90). If hedging purchases were large and then were liquidated quickly, a fall in futures prices would result.

As was stated earlier very few farmers hedge their wheat. Perhaps one of the main reasons for this is that farmers are actually speculators. They seem to take the optimistic view that prices will rise and they want to be the one who benefit from the price rise. Another reason for small country hedging is the lack of knowledge of the grain holders who are not in close contact with the futures market.

There are certain possible price effects of hedging which

should be considered. The following facts regarding the hedging of grain are fairly well established: (a) it is a practice centered mainly in the large elevator, merchandising and processing companies located at leading market centers, (b) while these companies hedge both their unsold supplies and their forward orders, taken as a group the former usually predominates, requiring a net-short futures position, (c) this net-short futures position is, as a rule, determined for the hedgers by the size of their commercial stocks of grain stored at leading centers and varies seasonally and from year to year as these stocks vary, (d) these hedgers are few in number but hold large futures positions, their positions changing gradually from day to day, (e) there are in actual practice important exceptions to this usual experience both from time to time and among the various hedgers. With the possible exception of the "hedge pressure", which is mentioned previously, it is generally thought that these various practices have little if any effect upon prices (10, p. 39). Hedging usually is not done in large enough quantity to cause prices to move with them. The main motive of a hedger may be to avoid losses from uncertain price changes but a hedger's main purpose is to make a profit by dealing in both futures and cash grain (10, p. 39). Another type of pressure "hedge position pressure" may develop when speculators are anxious to close their long positions and offer to sell at progressively lower prices which many times happens as the delivery month approaches.

As used in the grain market "spread" denotes price differences between different markets, grains, grades of grains or different futures of the same grain. Normally, however, spreading means to buy in one market and at the same time sell in another market with the object of profiting by an expected change in price differences in the two markets. Spreading serves a useful function as it tends to keep any future from getting too far out of line with another in the same futures market or different futures markets. If one future is too far out of line, there will be so much activity by spreaders in buying or selling as the case may be of that future to force it back in line to a correct relationship with other futures. The most important factors causing a change in spread between cash and futures prices are (a) the fact that there is a great difference between the cash grain market and the futures market. The futures market is highly centralized and highly competitive whereas the "spot" market is highly decentralized and may be only partially competitive. (b) The items of news may have no effect on cash and affect futures greatly or just the opposite (11, p. 75). In deciding to operate a spread, the spreader must determine whether he thinks a particular future in one market is too high or too low as compared with a particular future in the futures market where he may be located. Suppose the spreader feels that December wheat in Minneapolis is too high in comparison with December wheat in

Chicago. Therefore he would buy Chicago December wheat and sell Minneapolis December wheat. If his decision proved correct Minneapolis December would fall faster or rise less than Chicago December thereby narrowing the gap. As soon as the gap narrowed, he would buy back his Minneapolis December wheat and sell his Chicago December wheat and the amount of the narrowing of the difference between the two futures would be profit less, of course, his expenses. This same spread could be operative within the same market but with different futures. Most of the spreading is done by a specific class of speculators. The country elevators and mills are not as interested in spreading because it is speculative and they are interested mainly in the hedging end of the futures market.

### Speculation

The gambling (speculation) aspect of futures trading has long been recognized as one of the weaknesses of the organized commodity exchange systems (9, p. 441). Anyone bold enough to speak of speculation as an economic factor assumes the risk of being labelled as anti-social (14, p. 364). The above two statements point out that many people think of the organized exchanges as an unnecessary and evil part of our economy. However, because of the speculators, there is almost always someone to buy or sell the hedge of a grainman seeking the protection the organized commodity exchange offers him. The exchange itself does not make the prices but only records them. The organized exchanges offer certain protection through

hedging to farmers, merchants, warehousemen, and processors. Speculation does assist in protecting necessary commercial commitments and acts as a curb to avoid surplus marketing (15, p. 364). The organized exchanges have a trade of an annual value of over \$23 billion and that in itself indicates to a certain degree their value. If it were not for speculation and speculators, grain firms, mills, elevators and other merchandisers of grains would not be able to operate on as small a margin and thereby would be unable to supply these benefits to the public. It should be noted that the amount of purchases that represent purely hedging transactions is probably less than 5 percent (15, p. 20).

Although the following data are later than the study presented in the thesis, it may be of value. A study was made of open contracts on the Chicago Board of Trade in 1947 to determine the speculation and hedging accounts. It was found that on February 28, 1947, there were 2914 speculative accounts (93.1 percent of the total accounts) and 214 hedging accounts (3, p. 2). Fifty percent of the speculators held under 25,000 bushels but forty percent of the commitments were held by large speculators. This indicates that there are a large number of speculators and some with such large accounts that they could influence the market which is one of the harmful aspects of futures trading.

Under the Grain Futures Act (since 1936, the Commodity Exchange Act) there were certain reporting requirements for large trading in the futures market. This requirement has varied from

individual traders dealing in from 200,000 to 1,000,000 bushels. On March 2, 1933, the United States Senate passed a resolution for an investigation of the necessity of reinstating the reporting requirements as suspended by Secretary of Agriculture Arthur M. Hyde on October 22, 1932 (24). Wheat prices were dropping considerably at the time of the suspension of reports in October 1932 and it was believed that these reports had resulted in narrowing the market and lowering the prices of grain. It was the contention of the grain exchanges that suspension of this reporting would result in better prices to farmers. At the time of suspension the world prices were lower than ours and speculators saw the possibility of lower prices so sold short. This large amount of short selling forced prices still lower and speculators in taking advantage of the short selling made a profit off the small trader. Study showed that after prices dropped, the large traders bought back. Out of the 769 trading days studied from April 1, 1930 to October 22, 1932, big speculators as a group were short on 643 days, long on 125 days or a ratio of roughly six to one (24, p. 8). This does not prove that speculation is bad. It does point out that speculators are better informed on world conditions affecting the grain trade and act accordingly.

One of the earliest investigations of the futures market to determine the amount of speculation was the investigation of the New York Produce exchange in 1881. Since that time there have been numerous investigations called for by Congress and many regulations placed upon the exchanges to make certain they were serving the public properly. There had been 164 bills up to 1920

submitted to Congress to tax or regulate future trading by means of the interstate commerce clause (11, p. 5). In a study made by G. Wright Hoffman from the period of January 2 to April 18, 1925, it was found that 302 speculators traded in over 100,000 bushels volume. These traders represented 32.8 percent of all longs and 12.8 percent of all shorts. By means of a study of the trades and prices, it was shown that the largest eight speculators did influence the market trend and prices. From the study one must conclude that either the large speculators foresaw the change or that the volume of trade caused the change in prices (10, p. 42). The assumption can be made that market leaders can influence prices. The regulations of futures trading try to avoid this influence on market prices. Hoffman also found in a study of the period from April 30 to December 31, 1926 that the correlation between large-trader positions and prices was plus 0.72, whereas the same study of small traders showed an inverse correlation of negative 0.83 (10, p. 51).

Speculation is encouraged by the world outlook of wheat supplies and factors affecting this supply. In general, it can be said that the larger the world supplies of wheat, the smaller the annual volume of trading in wheat futures on the Chicago Board of Trade for the respective crop years (17, p. 1). In his study, Paul Mehl found that the greatest volume of speculation occurred when world supplies were below normal as the speculators expected a later increase in price. There were only three general exceptions to this over a period of 12 years (1922-23 to 1933-34) and those years were 1922-23, 1923-24, and 1929-30. The volume

of trading in wheat on the Chicago Board of Trade during the period of Paul Mehl's study varied from two to five times the total wheat supplies of the world (ex-Russia) (17, p. 2).

Speculation is, therefore, advantageous at times and also a necessary evil. It does provide a means for country mills and elevators and processors to hedge their grains, but on the other hand non-regulated large speculators can turn the market and be accused of manipulating the prices. Large speculators spend much time and money in developing their ability in market outlook and take advantage of it while the poorly informed are unable to do so.

Speculation has another evil which is seldom considered or discussed. Futures trading (and it is the speculators who use this operation) is used at times for the purpose of tax evasion. A study was made in 1947 to determine the use being made of futures trading for the purpose of tax evasion. The use of futures trading for this purpose leaves a black mark on the commodity exchange organizations. It was found in the study of 97 commission merchants that out of 13,500 accounts, 646 accounts had used offsets for the purpose of tax evasion (5, p. 1). These accounts had equally long and short positions in the same future. The use of this type of trading for income tax evasion is by one of the following methods: (a) to shift profits from the taxable year in which they are earned to some subsequent year, (b) to convert profits from short-term fully taxable items into long-term capital net gain, and (c) to convert an actually realized profit into the

appearance of a net loss for tax purposes.

"Wash tradings" are transactions in commodities to give the appearance of sales and purchases without resulting in any change in market positions. These tradings are illegal as declared by the Commodity Exchange Administration but were found being used to evade income tax.

### Costs Involved in Hedging

If prices of cash and futures move together in the grain trade producing a somewhat perfect hedge, it must be remembered that there are other costs involved in hedging. If an elevator operator has hedged and cash wheat prices drop 5 cents and the futures also drop 5 cents he may lose money on the operation. The elevator operator has the expenses of commission fees to brokers which are usually  $1/8$  cents per bushel on each transaction (both buying and selling) if dealing in lots of 5000 bushels or more. The elevator operator is required to put up money equal to a percentage of the value of the hedge which is called a margin. The cost involved is either the interest on the money borrowed for the necessary margin or the loss of interest by using personal funds. Carrying charges constitute another cost to most operators who hedge the grain in their elevators or mills. Carrying charges usually amount to about one cent per bushel per month of storage. Another cost usually carried concurrently with the carrying charge is the insurance on the stored grain. Even though it can not be

figured in monetary terms, another cost in hedging is the risk involved. The major risk is whether the spread between cash and futures will widen, narrow, or remain relatively the same.

## VALUE IN HEDGING WHEAT

### Determination of the Value of Hedging

When any problem in the field of economics is undertaken for study with the goal in mind of presenting a new theory, a different interpretation of an old theory, a new problem or interpretation of pertinent economic data, there are always necessary assumptions which must be considered. Without these assumptions, an economic problem presents little contribution to what is already known. The purpose of the assumptions is to hold constant or as constant as possible, the factors affecting the problem in order that the concluding decision as the fruit of the problem is worth something to the reader and to the field of economics as a whole.

Necessary Assumptions. In the problem at hand, it must be assumed that the grain buyer sells a future in the organized commodity exchange at the same time that he purchases the cash grain. Since futures purchases or sales can be transacted between distant points and Chicago in a matter of seconds (15, p. 11), this assumption is not unrealistic. It is further assumed that there will be a period of two weeks from the time of the cash purchase of the grain by the elevator operator before the cash sale is made in the Chicago market. As soon as the cash grain is

sold on the Chicago market by delivery, it is assumed that the local dealer will immediately buy back his future at the market price. In the problem studied all transactions, both cash and futures, are with No. 2 hard, winter wheat based on the Chicago market.

Study of Gain or Loss--No Hedge. Table 1 presents data of the gain or loss by grain dealers if a hedging transaction is not used. Figure 1 presents these data in graphic form. It should be noted that in the 21 years actually studied there was a great fluctuation of loss or gain without the use of a hedge, due to market price fluctuations. The range was from a possible profit of 24 cents per bushel by not hedging at a particular time in 1914 to a possible loss of 24 1/2 cents per bushel by not hedging at a particular time in 1916. Nine years out of the 21 years studied showed a fluctuation of over 10 cents per bushel both as to possible profit and possible loss without the use of a hedging transaction. In 1914 the range was from a plus 24 cents per bushel to a minus 12 1/2 cents per bushel, in 1915 a range of plus 14 1/2 cents to a negative 11 cents per bushel, 1916 had a range of plus 16 cents to a minus 24 1/2, 1921, plus 12 cents to a minus 13 1/2 cents, 1924 had a plus 16 1/2 cents with the possible loss only 8 1/2 cents, 1925 had a plus 15 cents and a negative 17 1/2 cents, 1929 plus 12 cents and a negative 13 1/2 cents, 1931, a plus 12 cents and a minus 11 1/2 cents per bushel. Therefore, Figure 1 and Table 1 present a picture of the vast fluctuations that occur within a period of a few weeks or months and the extreme

risk involved for the occasional dealer in grains without the benefit of a hedging transaction. If an elevator operator bought cash grain from a farmer or another elevator operator on the third Friday in August, 1914, and then sold two weeks later as has been assumed in this study, the elevator operator would have shown a profit of  $24 \frac{3}{8}$  cents per bushel. However, if he had not purchased the grain until two weeks later or on the first Friday in September, he would have sold at a loss of  $12 \frac{3}{8}$  cents per bushel on the third Friday in September. Suppose that in 1916, the grain dealer had bought cash grain on the first Friday in December and sold on the third Friday in December, he would have lost a total of  $24 \frac{1}{2}$  cents per bushel without the use of a hedging transaction. However, had he purchased wheat on the third Friday in December and sold on the last Friday in December he would have made a profit of  $18 \frac{1}{2}$  cents per bushel. From those figures it can be shown that a wait of two weeks would have made a difference in the value of his product of 43 cents a bushel. Such a risk as this even on a very small scale is too much of a risk for any elevator operator or dealer in grains to assume. Therefore, if the grain dealer was planning to deal intermittently in the markets, it appears that he should hedge his transactions because he could not afford to take the risk of absorbing the possible losses.

Study of Gain or Loss--Hedging in the May Future. Table 3 presents data of the gain or loss by grain dealers if their transactions had been hedged by selling May futures on the Chicago Board of Trade assuming a 14 day period or interval for marketing. The

lower graph in Fig. 2 presents these data in graphic form. It should be noted that had the grain dealers hedged their grains, the fluctuations of gain or loss each year would have been considerably less than if purchases or sales of grain had not been protected by hedging. In only one year, 1915, did the price fluctuate enough to cause either a gain or loss of ten cents per bushel if a hedge had been used. There were only 5 years, 1915, 1916, 1921, 1923, and 1925 when the fluctuations were greater than 5 cents either as a gain or loss. The widest range during the period studied was in 1915 when the price fluctuated sufficiently to cause a profit of 7 1/2 cents per bushel and a loss of 10 cents per bushel or a range of 17 1/2 cents per bushel. It should be noted that the widest range in price fluctuation had the grain not been hedged would have amounted to 43 cents per bushel.

In the 21 years studied, only 5 years showed fluctuations of as much as 5 cents profit or 5 cents loss per bushel had the grain dealer hedged his transactions whereas during those same 21 years had the grain dealers transactions not been hedged, 19 years showed fluctuations of at least 5 cents profit or 5 cents loss sometime during the part of the year studied. It should also be noted that the average fluctuations of all years studied in which no hedging had been done approximated a profit of 1/2 (.45) cent per bushel. The average profit by hedging on the Chicago Board of Trade in the May future for the 21 years studied amounted to 3/8 cent per bushel. The average gain or loss per year had no hedging transactions been involved ranged from 4 cents per

bushel profit to  $1\frac{1}{4}$  cents per bushel loss whereas the average gain or loss per year had grain dealers hedged in the May future would have been a much smaller range of  $1\frac{3}{8}$  cents per bushel profit to  $\frac{1}{4}$  cent per bushel loss.

Study of Gain or Loss--Hedging in the December Future. Table 2 presents data of the gain or loss by grain dealers if their transactions had been hedged by selling December futures on the Chicago Board of Trade assuming a 14 days interval for marketing. The upper graph in Fig. 2 presents these data in graphic form. A study of the comparison of gain or loss by hedging in the May and December future shows that there is little to gain by hedging in one of the futures instead of the other on the average. The average gain over the total period studied by hedging in the December future was  $\frac{1}{2}$  cent per bushel which was slightly more than the gain by hedging in the May future. It should be noted that the fluctuations in the December future were not as great as the fluctuations in the May future. Only 3 years of the 21 years studied, 1915, 1921, and 1923 showed fluctuations of gain or loss of greater than 5 cents per bushel with 1915 showing the greatest fluctuation of from a positive 6 cents per bushel to a negative  $10\frac{3}{4}$  cents per bushel. The range of average fluctuation for all of the years for the December future was from a positive  $1\frac{5}{8}$  cents per bushel to a negative  $\frac{1}{2}$  cent per bushel which was a slightly greater range than was found in the May future. From the results of the study of both the December and May futures, it may be assumed that by constant hedging in any wheat future a profit, though quite small, would result.

Study of Spread with Gain or Loss in May and December

Futures. A study of Tables 4 and 5 in conjunction with Table 6 reveals, by inspection, that a close correlation exists between the amount of spread and the gain or loss by the use of a hedging transaction. Figure 3 presents these data in graphic form. When the future price is higher than the cash price resulting in a negative spread, there is almost always a profit made by the use of a hedging transaction. (In this thesis a negative spread shall be termed to mean future price above cash price and a positive spread shall be termed to mean cash price above future price). If the cash price is higher than the future price (i. e., a positive spread), a loss by use of a hedging transaction will most likely occur. However, the loss might be greater if the hedge is not used. In the comparison of the spread between the December future and cash with the gain or loss by use of a hedging transaction dealing in the December future, it will be noted that when the future price was over the cash price (i. e., negative spread) by 2 cents or more the profit range by the use of a hedge was from  $1/2$  cent to  $1\ 5/8$  cents per bushel. When the future price was over the cash price by less than 2 cents the profit range was from  $1/8$  cent to  $5/8$  cent per bushel. When the cash price was more than the future price a profit by the use of a hedging transaction resulted in only two years, 1923 and 1931, and then of  $1/2$  cent each. The loss by hedging with a positive spread ranged from  $1/8$  cent to  $1/2$  cent average per year.

In the study of the May future, the profit range when hedging

with a negative spread was from 0 to 1 3/8 cents per bushel. There were three years, 1909, 1922, and 1925, in which hedging with a positive spread resulted in a profit of 1/4 to 5/8 cents per bushel. There was a loss in only one year, 1915, when hedging with a positive spread and that loss amounted to only 1/4 cent per bushel.

#### Determination of Most Effective Future in which to Hedge

In the business of hedging, it is of primary importance to select those futures that bear the closest relationship to and reflect most nearly the value of the particular kind of grain sought to be hedged (15, p. 22). Hedging should normally be done in the nearest future if practical because the nearest future usually has a closer relationship with cash grain prices. There are not so many factors to consider when comparing a near future instead of a distant future with the cash grain price. There are several items of extreme importance to consider when selecting the best future in which to hedge. If hedging is for the purpose of gaining protection in a specific grade of cash grain and this quality of deliverable grain is very scarce at that particular time, it might be well to hedge in a later future as there may be more grain of this quality ready to be delivered and the futures would probably bear a closer relationship to the cash grain. The other important item to be considered in hedging is the quality of grain. If a quantity of the deliverable grain is large or sufficient to cause no abnormal relationship between

cash and future prices, the state of the quality of this grain may make a great difference. Suppose the grain in a terminal elevator has a high moisture content. The grain may go out of condition at any time and the seller of a hedge may decide to give delivery by means of a warehouse receipt on the grain about to go out of condition. The buyer will have to take delivery and also move the grain within a short time at considerable expense to himself. Usually grain of this type shows an abnormal relationship with the future resulting in a later future selling a great deal higher than a near-by future.

Two other important factors in determining the best future in which to hedge are the rigidity of the spread between cash and futures and the profitability of hedging. As has been brought out earlier in this thesis, there is a speculative element in hedging, but the primary purpose of hedging is for protection. However, in gaining this protection the grain dealer should have sufficient knowledge in order that he can hedge to his best advantage. It has been noted before that a thorough knowledge of the spread is important to the grain dealer. In the majority of instances a negative spread has been closely associated with possible profit through the process of hedging while a positive spread would more likely indicate a possible loss through hedging.

The average of the average grain dealer's gain or loss through hedging in the May and December future for each week studied over the 24 year period are almost the same, 1/2 cent profit per bushel. However, for some weeks the May future and

for other weeks the December future showed a definite superiority in profitability. The period of the last two weeks in August and the first two weeks in September showed a superiority of the December future over the May future in profitability by an average of over  $1/8$  cent per bushel. For the remainder of September and all of October the May future averaged more than  $1/4$  cent per bushel better than the December future. The reverse situation was true for the month of November while during December the May future was again more profitable than the December future by approximately  $1/8$  cent per bushel.

#### CONCLUSIONS AND INTERPRETATIONS

In the final analysis to determine the value of hedging, one must study the relation of the spread between futures and cash grain prices. The best future in which to hedge at any particular time must be given expert attention. Last but certainly not least a close study of the average profit made with and without a hedge in different futures should be accomplished. The facts uncovered from the above three studies will help determine to a great extent the desirability of hedging and the most profitable time to hedge.

As was pointed out earlier on page 28 under the heading "Study of gain or loss--no hedge" there are fluctuations of considerable magnitude when no hedge is used by the grain dealer. He may make a profit of approximately 25 cents per bushel or he may lose near-

ly the same amount during any one particular year. However, under the same conditions had the grain dealer hedged he would have found his fluctuations of a much lesser degree. The widest range of profit if wheat was hedged in the May future was from a possible profit of  $7 \frac{1}{2}$  cents to a possible loss of 10 cents per bushel, a  $17 \frac{1}{2}$  cent range, while the December future showed a range of from a possible profit of 6 cents per bushel to a possible loss of 11 cents per bushel or a 17 cent range.

It should be noted that the average profit by hedging in the May future was approximately  $\frac{3}{8}$  cents per bushel with the average profit by hedging in the December future slightly more than  $\frac{1}{2}$  cent per bushel. The average profit when the grain dealer did not hedge was between the May and December future averages and was .45 cents per bushel. The question now arises on the basis of this information alone "what is the desirability of hedging?" Actually the little difference between the amount of profit gained by hedging or by not hedging is almost insignificant. One might state that since the profit is greater when grain is unhedged it would pay not to hedge. This argument can be backed up by the fact that in all hedging transactions there are certain expenses involved. Those expenses consist of brokerage or commission expense of buying and selling the hedging contract which usually amounts to  $\frac{1}{8}$  cent a bushel for each transaction in lots of 5000 bushels or more and in smaller lots may run approximately  $\frac{1}{4}$  cent per bushel, insurance and the interest lost on the money invested. These expenses may well run the possible

profit by hedging into a small loss whereas the possible profit by no hedge remains the same. In performing any hedging transaction there is always the matter of the time of the grain dealer to be considered. If hedging is to be done, it should be expertly planned. A grain dealer must spend considerable time in studying the spreads and best future in which to hedge before committing his funds.

There are also advantages to hedging. As was pointed out earlier, there are great fluctuations in the prices of wheat which may cause either a quick unexpected profit to the grain dealer or likewise a severe unexpected loss. If the grain dealer is dealing irregularly in quite large quantities of grain it would be imperative that he should protect himself by hedging his purchase or sale as the case may be. It would certainly be pleasing to him to take advantage of an unexpected profit but more likely he would be unable to absorb the losses which would be certain to occur. Therefore, if he were in and out of the market dealing in a considerable quantity of wheat, hedging would give partial protection to his funds.

If the grain dealer was dealing in about the same quantity of grain constantly, there would be no advantage to hedging as he could insure himself by not hedging of approximately 1/2 cent per bushel profit which would be about the same as the average by hedging of the two futures studied. Also he would have none of the hedging expenses to reduce his possible profit. Such a grain dealer would be rare indeed and thus this assumption would

be of little meaning in the actual situation as it exists.

The average grain dealer, since he usually does not deal with equal consistency all of the time, should probably hedge his grain and thus insure himself against great fluctuations of prices and have the possibility of making a relatively small profit (disregarding expenses of the hedge).

Suppose the grain dealer is undecided as to hedging his grain. He is then beset with the problem of studying the spread between cash and the futures both in an effort to find the answer as to which is the best future in which to hedge or whether because of the spread, a hedging operation is impractical. The grain dealer actually needs to be a marketing specialist to determine the best answer to the above problem. Actually, as previously pointed out, the selection of the best future in which to hedge is very difficult. During one month, one future may be more profitable than the other and just the opposite may be true the following month. Due to the cost involved the frequent transferring of hedges from one month to another is impractical. Thus the future which seems to be the most advantageous when the hedging operation is planned should be used.

The grain dealer should be particularly observant and give careful study to the spread between cash and futures. As was found by study and presented in Table 6, there is a very close correlation between the spread and the future price. If the grain dealer finds the spread to be negative in the December future by 2 cents or more he is virtually guaranteed of a profit of from  $1/2$  cent to  $1\ 1/2$  cent per bushel. However, if the spread should

be positive, a loss is also virtually guaranteed and the grain dealer must decide whether the small loss is a lesser or greater risk than by no hedge at all. It should be noted that over the period of time studied the positive spreads were few, thus resulting in few times when a hedge would not result in a profit (hedging expenses disregarded).

As was pointed out early in the thesis those grain dealers with very small quantities of grain failed to hedge their grain while those that handled large quantities hedged a great percentage of their grain. The little fellow felt that he could absorb the loss and was willing to speculate for the profit whereas the large grain dealer knows that he must protect himself by hedging even to the extent of cutting down on his possible profit by not hedging.

As the pros and cons for hedging are summed up one might use an army expression "It depends upon the situation and the terrain" to explain the necessary or best action. In other words, the conclusion as whether to hedge or not depends on the need or situation of each grain dealer, as to the quantity of grain handling and knowledge of hedging. The terrain is the price situation, spreads, and the best future in which to hedge at that particular time. From personal knowledge, the writer feels that some country elevators could well hedge to their advantage over short periods of time (during wheat harvest especially if a boxcar shortage exists) and even large farmers dealing through country elevator operators could do the same. Instilled within all is the element of human nature and the human nature

of many farmers and grain dealers is to speculate. They want to make certain that they gain the advantage of a price rise and they turn their backs and close their eyes to the possibility of wide market fluctuations causing a large loss. If such a loss results they attempt to write it off as bad luck and something that could not be avoided.

### ACKNOWLEDGMENT

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**APPENDIX**

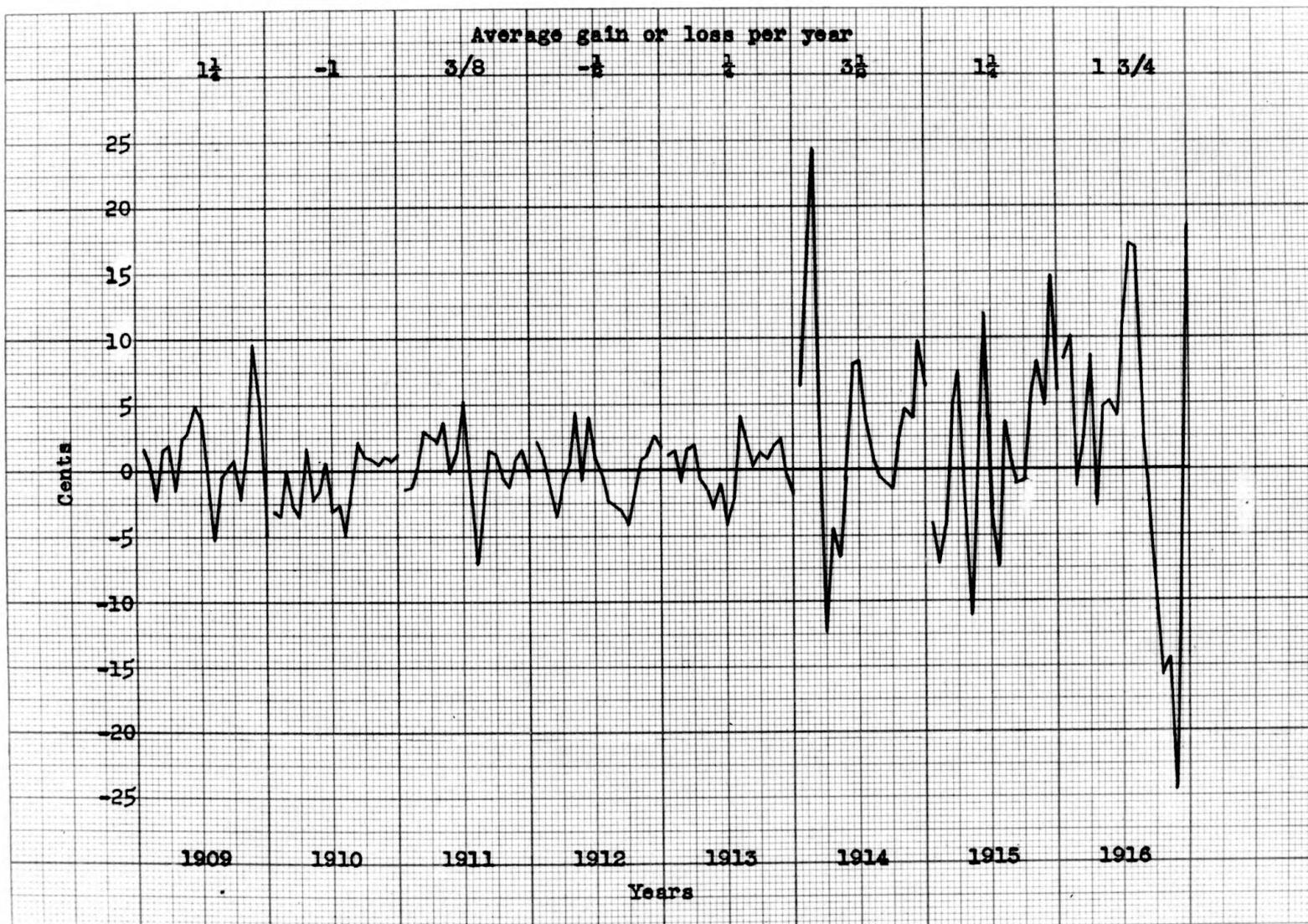


Fig. 1. Gain or loss without use of a hedging transaction 1909-1933 (excluding 1917-1920).  
 Two week interval allowed from time of purchase until cash sale in terminal market.

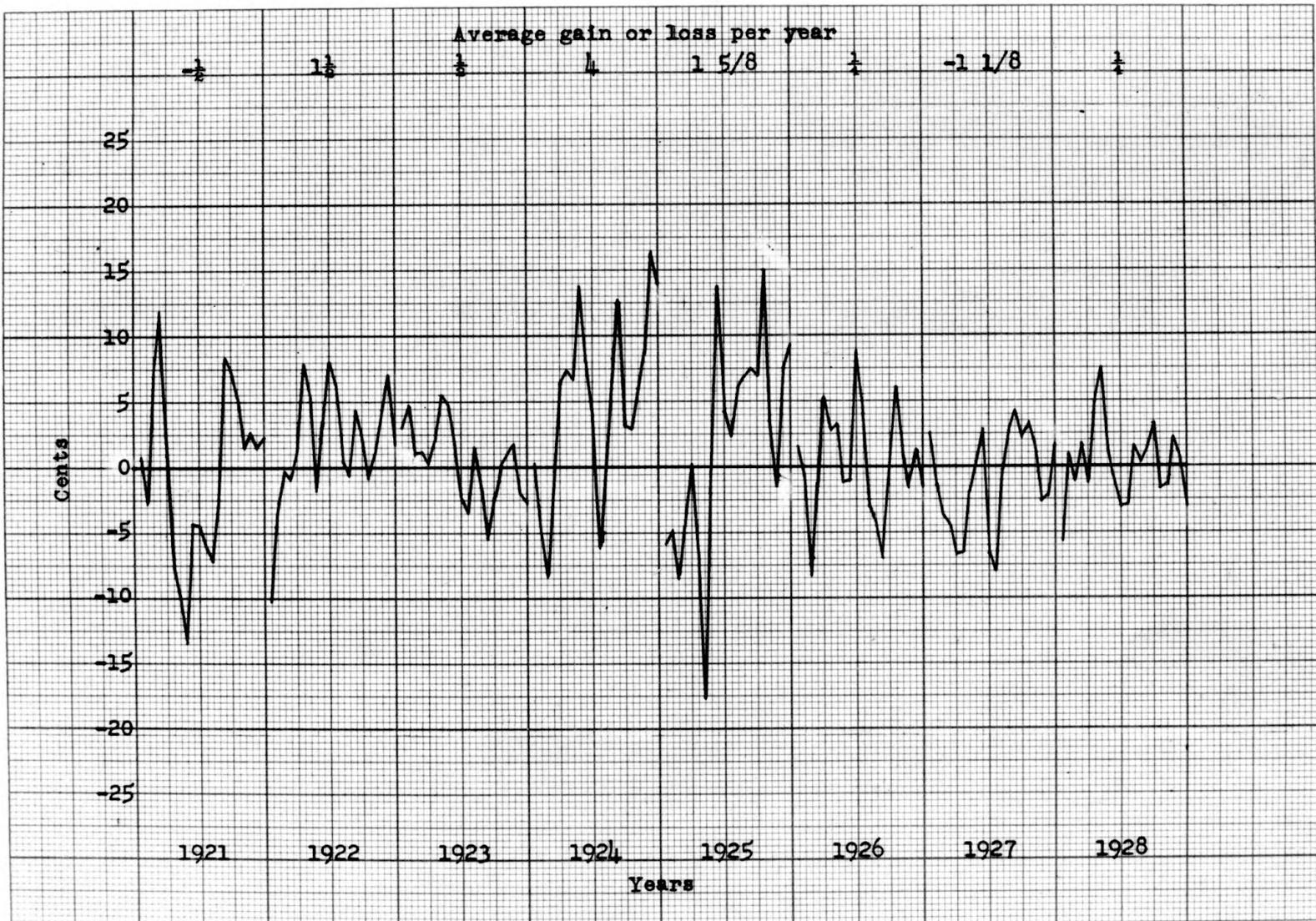


Fig. 1. (Cont.).

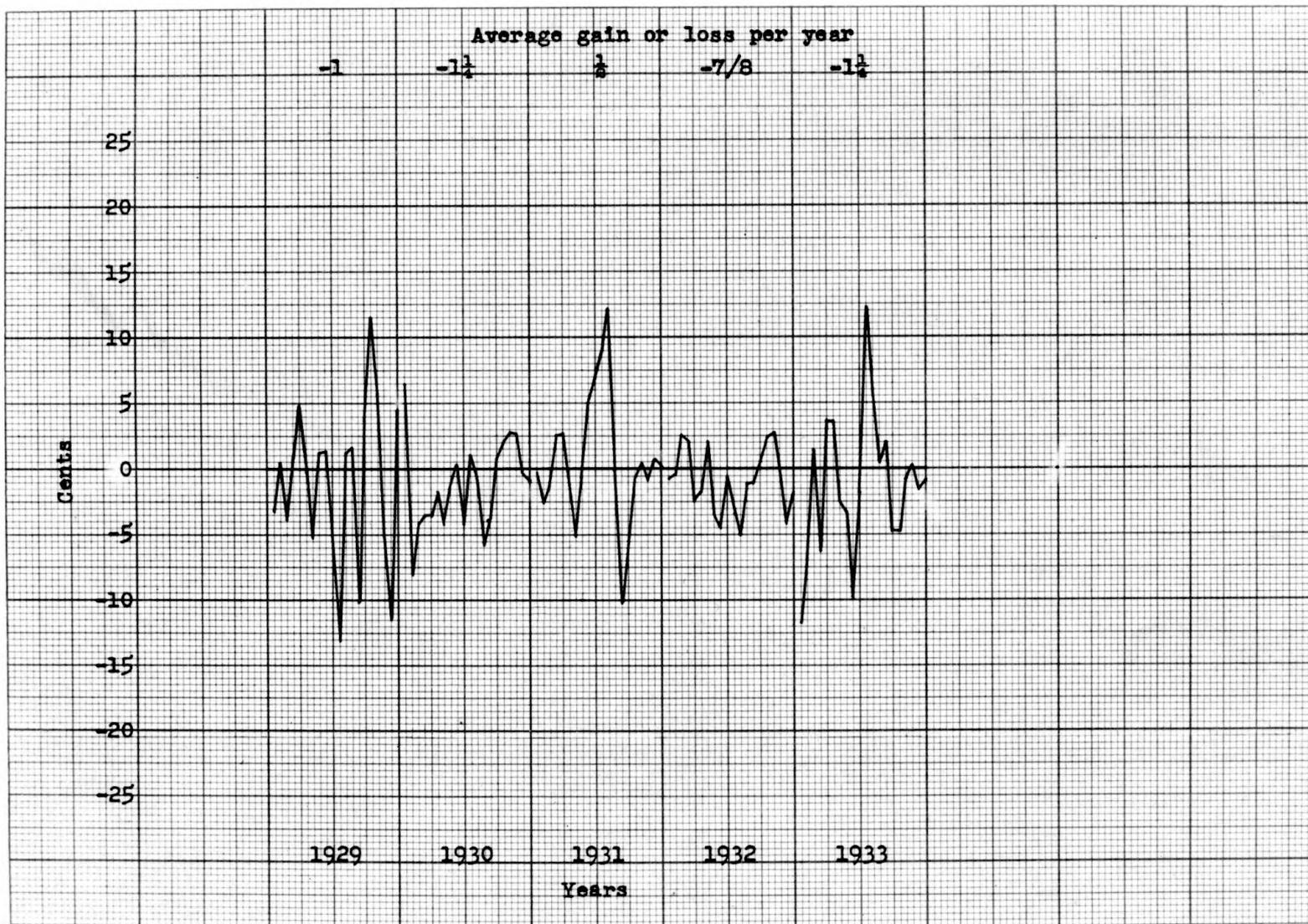


Fig. 1. (Concl.).

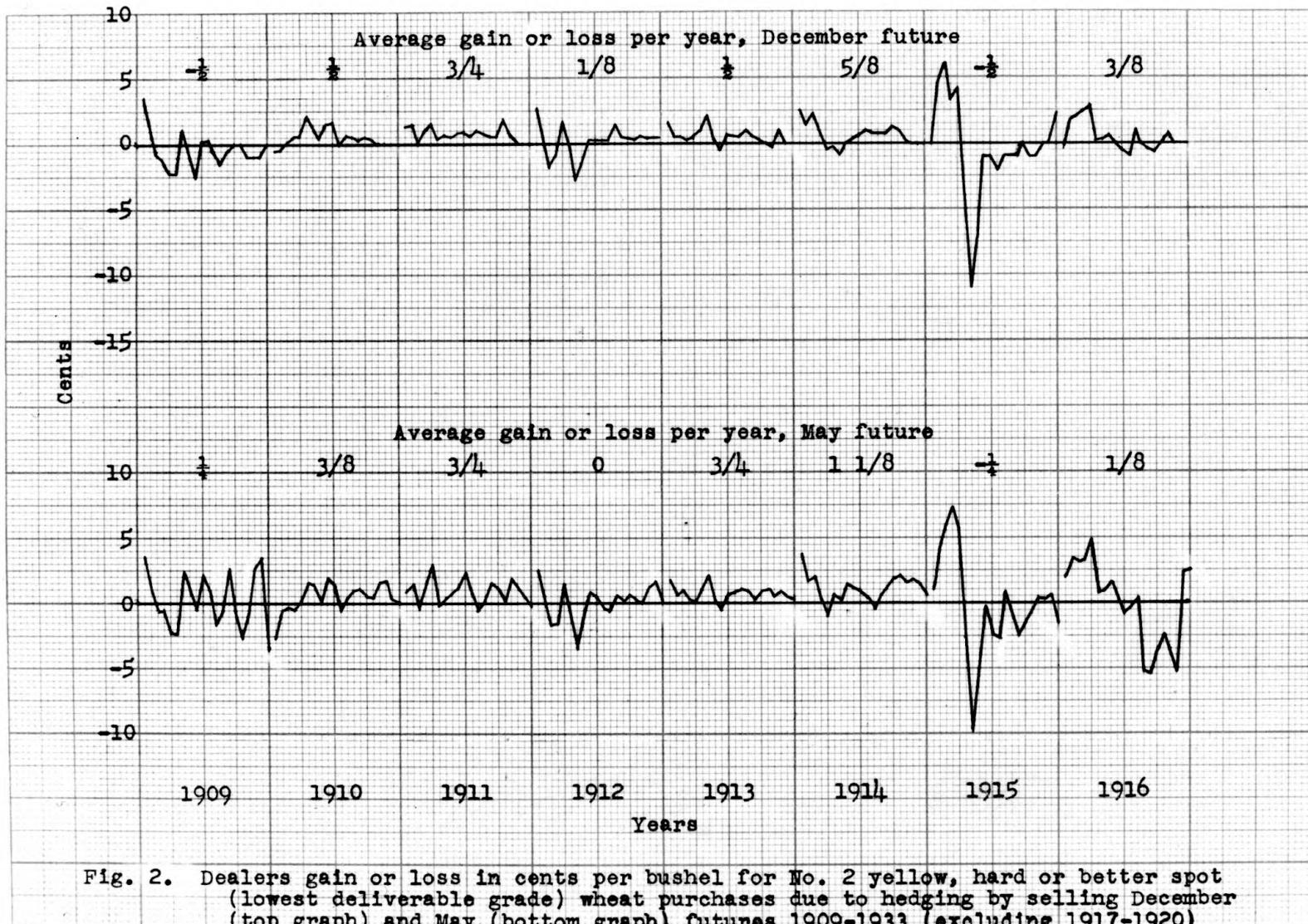


Fig. 2. Dealers gain or loss in cents per bushel for No. 2 yellow, hard or better spot (lowest deliverable grade) wheat purchases due to hedging by selling December (top graph) and May (bottom graph) futures 1909-1933 (excluding 1917-1920) on the Chicago Board of Trade assuming a 14 day interval allowed for marketing.

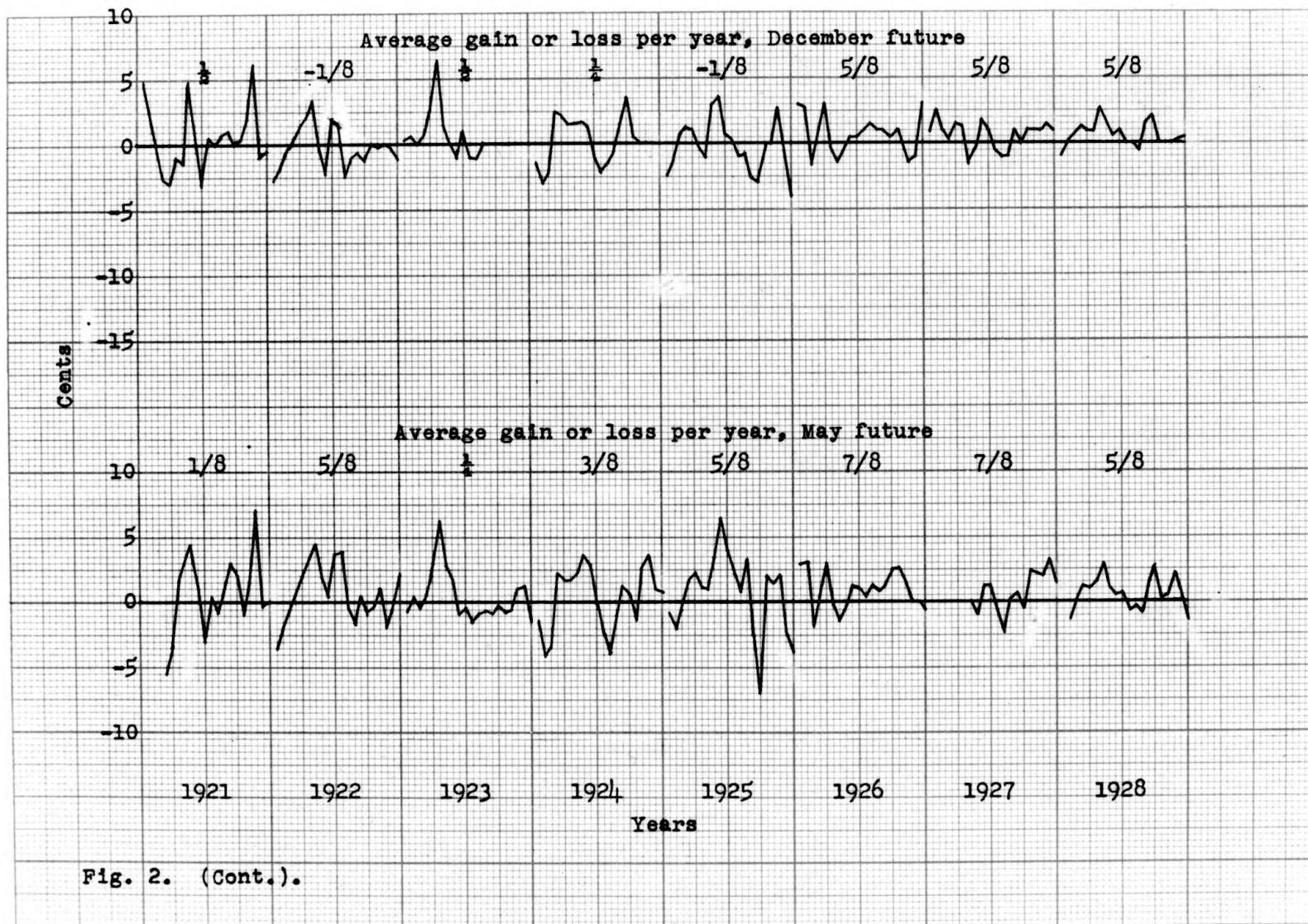


Fig. 2. (Cont.).

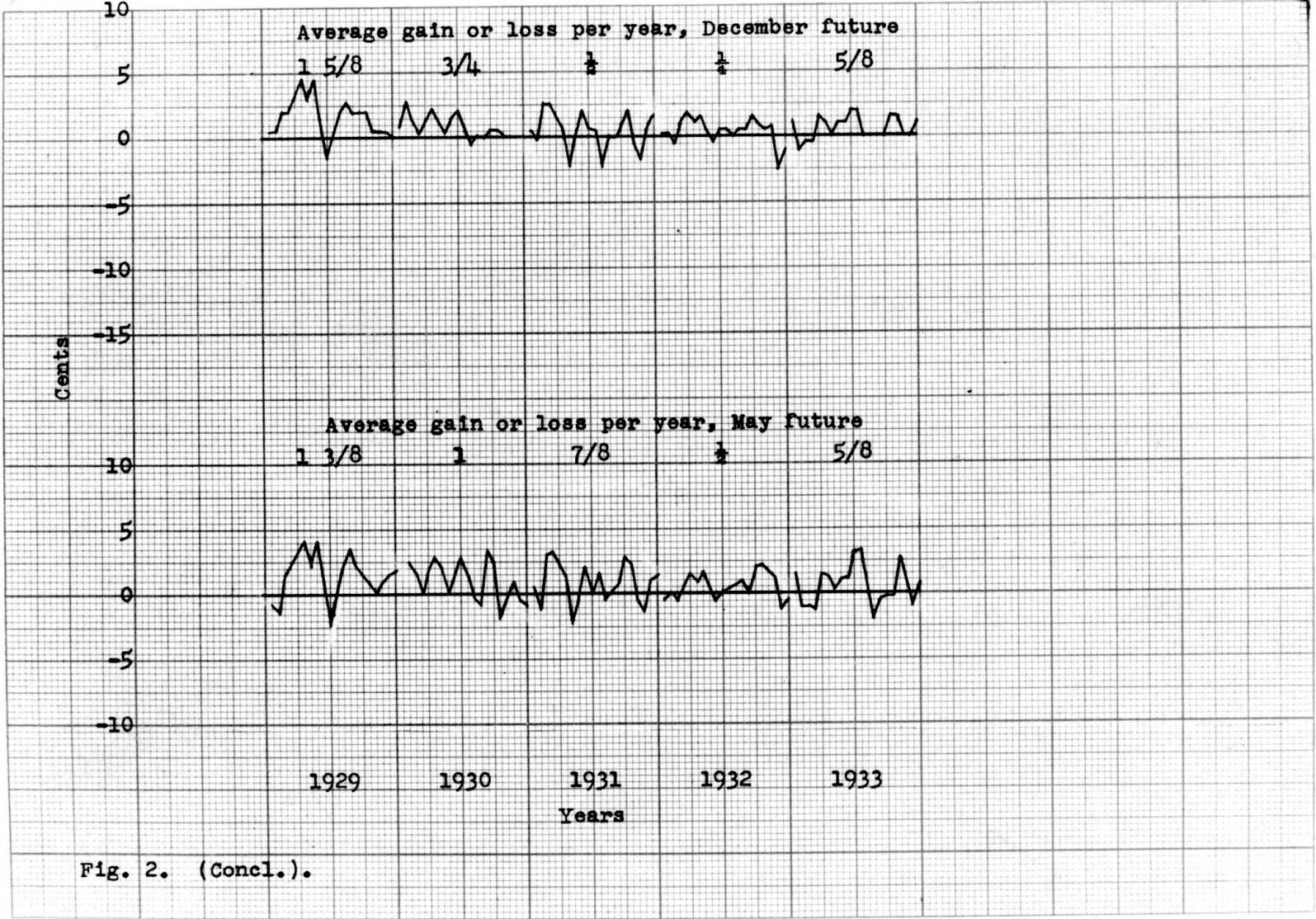


Fig. 2. (Concl.).

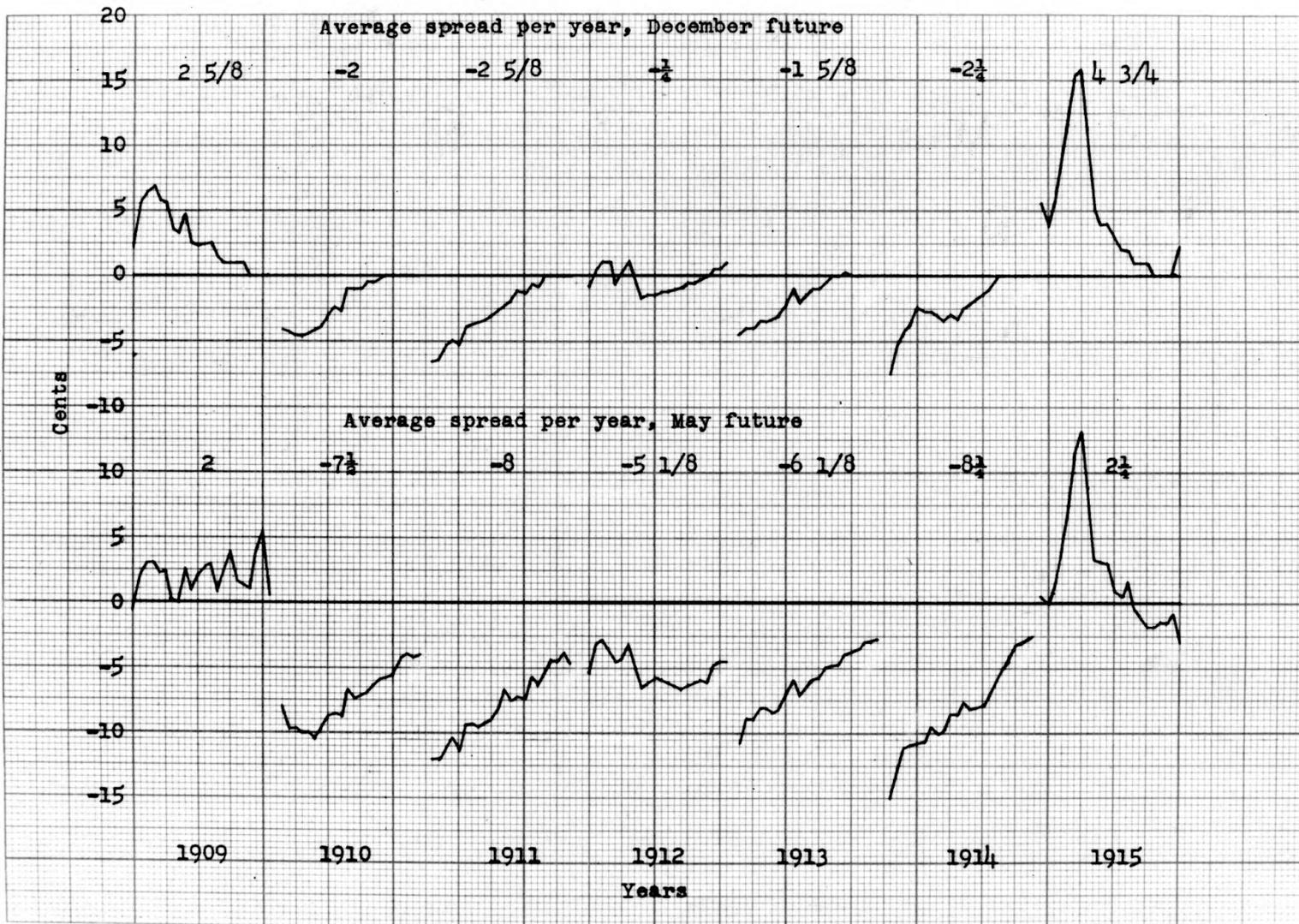


Fig. 3. Spread between No. 2 yellow, hard, or better spot (lowest deliverable grade) cash and December (top graph) and May (bottom graph) futures on the Chicago Board of Trade 1909-1933 (excluding 1917-1920).

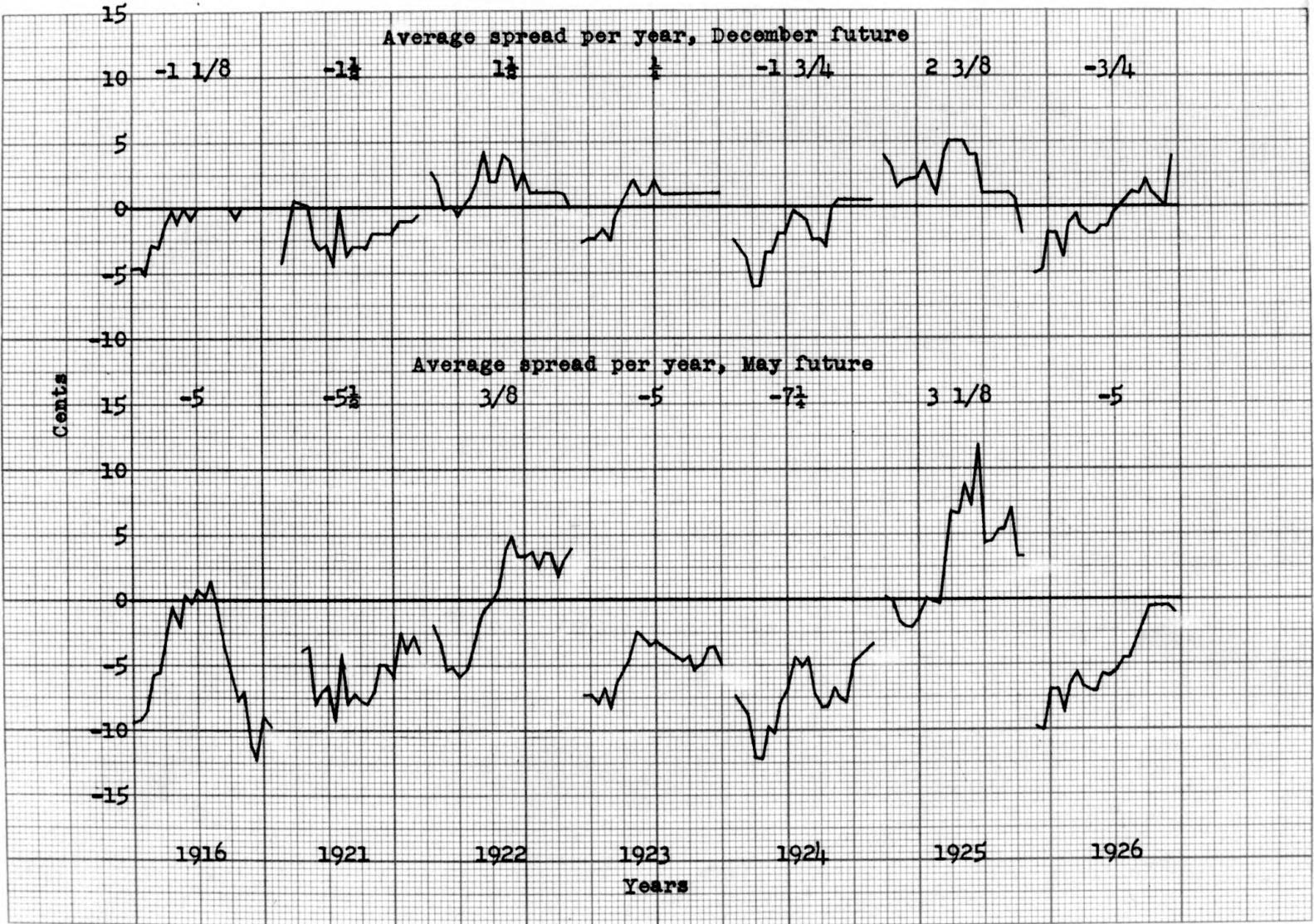


Fig. 3. (Cont.).

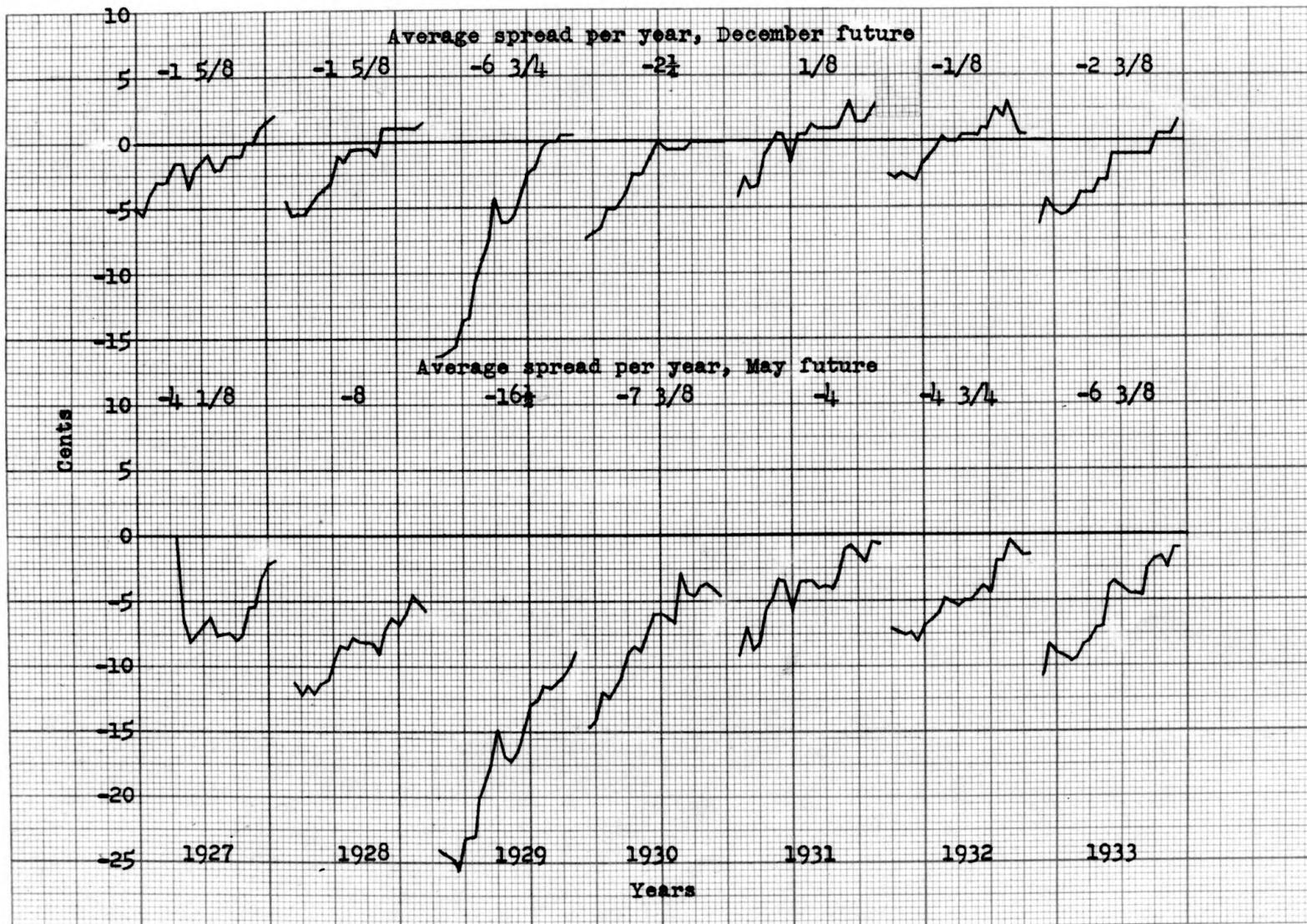


Fig. 3. (Concl.).

Table 1. Gain or loss without use of a hedging transaction 1909-1933 (excluding 1917-1920). Two week interval allowed from time of purchase until cash sale in terminal market (20, p. 110-117).

Weekly Fri Studied	Years Studied																				
	1909	1910	1911	1912	1913	1914	1915	1916	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
3rd Fri Aug	1 5/8	-3 1/8	-1 3/8	2 1/8	1 1/8	6 3/8	-4 1/8	8 1/2	3/4	-10	3 1/2	1/8	-5 7/8	1 1/2	2 1/2	-5 5/8	-3 1/8	6 1/2	-1/4	-3/4	-11 3/4
4th " "	1/2	-3 3/8	-1 1/4	1	1 5/8	14 1/8	-7 1/8	10	-2 3/4	-3 3/8	4 3/4	-5	-4 7/8	-1/2	-1 1/2	7/8	3/8	-7 1/8	-2 1/2	-3/8	-5 7/8
1st " Sept	-2 1/4	0	1/8	-1	-3/4	24 3/8	-4 3/8	-1 1/8	7 1/8	-1/8	1	-8 3/8	-8 1/2	-8 1/4	-3 1/2	-1	-3 7/8	-4 1/4	-1 1/4	2 1/2	1 5/8
2nd " "	1 1/8	-2 3/4	3	-3 1/2	1 5/8	6	4 3/4	2 1/2	11 7/8	-3/4	1 1/8	-1/4	-4 1/2	-1 1/4	-4 3/8	1 5/8	1	-3 5/8	2 1/2	2 1/8	-6 1/4
3rd " "	1 7/8	-3 1/2	2 5/8	-1 1/4	1 7/8	-12 3/8	7 1/4	8 5/8	3/4	1 1/4	3/8	6 3/8	1/8	5 1/4	-6 3/4	-1 1/4	4 7/8	-3 1/2	2 5/8	-2 1/2	3 5/8
4th " "	-1 1/2	1 5/8	2 1/4	1/2	-5/8	-4 1/2	-2 3/4	-2 3/4	-7 3/4	7 7/8	2 1/4	7 3/8	-7	3 1/8	-6 5/8	4 7/8	-1/8	-1 3/4	-1 1/4	-1 3/4	3 5/8
5th " "	2 3/8	-2 1/4	3 5/8	-4 3/8	-1 5/8	-6 5/8	-11	4 3/4	-9 7/8	5 1/2	5 1/2	6 5/8	-17 5/8	3 1/4	-2	7 3/8	-5 1/8	-4 1/4	-5	2	-2 1/8
1st " Oct	2 7/8	-1 5/8	-1/8	-3/4	-2 3/4	-5/8	-1/4	5 1/8	-13 3/8	-1 3/4	4 7/8	13 3/4	-2	-1 1/8	1/4	1 1/8	1 1/8	-1 3/8	-1/2	-3 3/8	-3 1/4
2nd " "	4 3/4	1/2	1 3/8	4	-1	8	11 3/4	4 1/8	-4 3/8	3 1/4	1 3/4	8 1/8	13 5/8	-1	2 3/4	-3/4	1 1/4	1/8	5 1/4	-4 1/2	-9 7/8
3rd " "	3 3/4	-3	5 1/8	3/4	-4 1/8	8 1/4	-2 7/8	11 1/8	-4 1/2	8	-2 1/8	4 3/8	4 1/8	8 3/4	-6 5/8	-3	-5 1/2	-4 1/8	6 7/8	-5/8	-1 5/8
4th " "	-1	-2 3/4	-3/8	-1/4	-2 1/4	3 5/8	-7 1/4	17 1/8	-5 1/4	6 3/8	-3 1/4	-6	2 1/2	4	-8	-2 7/8	-13	1	9	-3 3/8	12 1/4
1st " Nov	-5 1/4	-4 7/8	-7	-2 1/4	4 1/8	7/8	3 5/8	16 3/4	-7 1/8	3/8	1 1/2	-10 5/8	6	-2 7/8	-1/8	1 1/2	1 1/8	-3/4	12 1/8	-5	5 5/8
2nd " "	-1/2	-1 1/4	-3 1/4	-2 5/8	2 1/4	-1/2	1/2	2 3/8	-2 3/4	-1/2	-1 3/4	8 1/4	-6 7/8	-4 3/8	2 5/8	1/4	1 1/2	-5 5/8	0	-1 1/8	5/8
3rd " "	6 5/8	2 1/8	1 1/2	-3	1/4	-1	-1	-2 3/8	8 1/4	4 3/8	-5 1/4	12 5/8	7 3/8	-7	4 1/4	1 3/8	-10 1/8	-3 3/4	-10	-1	2
4th " "	5/8	1	1 1/4	-4 1/8	1 1/4	-1 1/2	-3/4	-10 5/8	8 1/4	2 1/8	-2 1/4	3 1/8	7	1/4	2 1/4	3 1/4	3 5/8	3/4	-5 1/2	1/2	-4 5/8
1st " Dec	-2 1/4	3/4	-5/8	-1 3/4	7/8	2	5 3/4	-15 3/4	3 1/8	-7/8	1/8	3	15	6	3 1/8	-1 5/8	11 3/8	2	-7/8	2 3/8	-4 3/4
2nd " "	1 5/8	3/8	-1 1/4	3/4	1 3/4	4 1/2	8 1/8	-14 1/2	1 1/2	1	7/8	6	3 3/4	3/4	1 3/4	-1 3/8	5 5/8	2 5/8	1/4	2 5/8	-3/4
3rd " "	9 5/8	1	5/8	1	2 1/4	4	5	-24 1/2	2 5/8	4 3/8	1 3/4	8 7/8	-1 1/2	-1 5/8	-2 4/8	2 1/8	-5 1/8	2 5/8	-3/4	1/8	1/8
4th " "	5 1/2	3/4	1 1/2	2 1/2	0	9 3/4	14 5/8	-4 5/8	1 1/2	7	-1 7/8	16 1/4	7 1/2	1 1/4	-2 1/8	5/8	-11 1/8	-1/8	5/8	-4 1/8	-1 1/2
5th " "	-4 7/8	1 1/8	-3/8	1 3/4	-1 5/8	6 1/2	6	18 1/2	2 1/4	1 5/8	-2 5/8	14	9 1/4	-1 3/8	1 5/8	-2 7/8	4 1/2	-7/8	1/8	-1 7/8	-7/8
Average	1 1/4	-1	3/8	-1/2	1/4	3 1/2	1 1/4	1 3/4	-1/2	1 1/2	1/2	4	1 5/8	1/4	-1 1/8	1/4	-1	-1 1/4	1/2	-7/8	-1 1/4

Table 2. Dealers gain or loss in cents per bushel for No. 2 Yellow hard or better spot (lowest deliverable grade) wheat purchases due to hedging by selling December futures on Chicago Board of Trade assuming a 14 day interval allowed for marketing. (20, P. 110-117).

Weekly Period	Years Studied																				AV.	
	1909	1910	1911	1912	1913	1914	1915	1916	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932		1933
3rd Fri Aug	3 1/2	- 1/2	1 1/4	2 5/8	1 1/2	2 1/2	1/8	- 3/8	4 3/4	-2 3/4	1/4	-1 3/8	-2 3/8	3	7/8	- 7/8	1/2	7/8	1/2	1/8	1 1/8	7/8
4th " "	1 1/4	- 5/8	1 3/8	5/8	1/2	1 1/2	4 5/8	1 3/4	1 3/4	-1 3/4	5/8	-2 7/8	-1 1/4	2 3/4	2 1/2	1/8	5/8	2 3/4	- 1/8	1/8	-1 1/8	1/2
1st " Sept	- 5/8	1/8	0	-1 3/4	1/2	2 1/4	6	2 1/8	- 3/8	- 3/8	0	-2 1/4	3/4	-1 5/8	1	5/8	2 1/8	1 3/8	2 5/8	- 1/2	- 3/8	1/2
2nd " "	-1 1/4	1/2	1	- 7/8	1/4	1	3 1/4	1 3/8	-2 5/8	1/4	7/8	2 1/2	1 3/8	3/4	1/8	1 1/4	2 1/8	3/8	2 5/8	1	- 3/8	3/4
3rd " "	-2 1/8	5/8	1 1/8	1 3/4	3/8	1/4	4 1/8	2 7/8	-3	1 3/8	2 5/8	2 1/4	1 1/8	3	1 1/2	1	3 1/4	1 1/4	1 5/8	1 3/4	1 1/2	1 1/4
4th " "	-2 1/4	2 1/8	1/4	- 1/4	1	- 1/4	- 4	1/8	-1	2 1/8	6 3/8	1 1/2	- 1/4	- 1/4	1 1/4	7/8	4 1/2	2 1/4	3/4	1 1/4	1	3/4
1st " Oct	1 1/8	1 3/8	5/8	-2 3/4	2 1/8	- 3/4	-10 3/4	1/4	-1 3/8	3 3/8	1 1/2	1 5/8	-1	-1 3/8	-1 5/8	2 5/8	3	1 3/8	-2 1/8	1 5/8	0	- 1/8
2nd " "	- 3/4	3/8	1/2	-1 1/2	1/4	0	- 7 1/4	5/8	4 7/8	- 1/4	0	1 3/4	3	- 1/2	- 3/8	1 3/4	4 1/2	1/2	0	1/2	1	1/4
3rd " "	-2 1/2	1 1/2	3/4	1/8	- 1/2	1/4	- 1	0	1	-2 1/4	-1	1 3/8	3 5/8	1/2	1 3/4	5/8	1 1/2	1 1/2	2	- 3/8	1	1/2
4th " "	1/8	1 5/8	7/8	1/4	5/8	1/2	- 1	- 1/2	-3	2	1	- 3/4	3/4	1/2	1	1	-1 1/2	2	3/4	1/2	2	3/8
5th " "	1/4	0	5/8	1/4	1/2	1	- 2	- 7/8	1/2	1 1/2	-1	-2	1/8	1	- 1/2	0	1/2	1/2	1/2	1/2	2	1/8
1st " Nov	- 7/8	5/8	1	1/4	1/2	3/4	- 1	1	0	-2 1/2	-1	-1 1/2	- 7/8	1 1/2	-1	0	2	- 1/2	-2 1/4	0	0	3/8
2nd " "	-1 1/2	1/2	3/4	1 3/8	1	3/4	- 1	0	3/4	-1	0	- 1/2	- 5/8	1	-1	- 1/2	2 3/4	0	0	1/2	0	1/8
3rd " "	- 1/2	1/4	5/8	1/2	1/2	3/4	- 1	3/8	1	- 1/2	0	1 1/2	-2 1/2	1	1	1 1/2	2	0	0	1/2	0	1/4
4th " "	0	1/2	1/2	3/8	1/4	1 1/4	0	- 3/4	0	-1 1/4	0	3 1/2	-2 7/8	1/2	0	2	2	5/8	1	1 1/2	0	1/2
1st " Dec	0	1/4	1 7/8	1/4	0	1	- 1	0	3/8	1/8	0	1/2	0	1	1	0	2	1 1/2	2	1	1 5/8	5/8
2nd " "	-1	0	3/4	1/2	- 1/4	1/4	- 1	3/4	2	- 1/8	0	0	0	0	1	0	1/2	0	- 1/2	1/2	1 1/2	1/8
3rd " "	-1	0	0	3/8	1	0	0	0	6 1/8	0	0	0	0	2 3/4	-1 1/2	1	0	1/2	0	-1 1/2	3/4	1/2
4th " "	-1	0	0	1/2	0	0	0	0	-1	- 1/8	0	0	0	-1	1 1/2	1/8	1/2	0	1/2	-2 1/2	0	1/8
5th " "	0	0	0	1/2	0	0	2 1/4	0	- 1/2	-1	0	0	-4	3 1/8	1	1/2	0	0	1 1/2	-1	1 1/8	1/8
Average	- 1/8	1/2	3/4	1/8	1/2	5/8	- 1/2	3/8	1/2	- 1/8	1/2	1/4	- 1/8	5/8	5/8	5/8	1 5/8	3/4	1/2	1/4	5/8	

Table 3. Dealers gain or loss in cents per bushel for No. 2 yellow hard or better spot (lowest deliverable grade) wheat purchases due to hedging by selling May futures on Chicago Board of Trade assuming a 14 day period allowed for marketing (20, p. 110-117).

Weekly Fri Studied	Years Studied																			Av.		
	1909	1910	1911	1912	1913	1914	1915	1916	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931		1932	1933
3rd Fri Aug	3 1/2	-2 5/8	7/8	2 1/2	1 3/4	3 3/4	1 1/8	2	--	-3 5/8	- 5/8	-1 3/8	- 3/4	2 7/8	--	--	- 5/8	--	1/2	- 3/8	1 1/2	1/2
4th " "	1 1/8	- 5/8	1 3/8	1/2	3/4	1 3/4	4 1/4	3 3/8	--	-2	3/8	-3 7/8	-1 7/8	3	--	-1 1/4	-1 1/4	2 1/2	-1 1/8	0	- 7/8	1/4
1st " Sept	- 1/2	- 1/4	- 3/8	-1 5/8	7/8	2	5 7/8	3 1/8	--	- 5/8	- 3/8	-3 3/8	- 1/2	-1 3/4	--	0	1 1/2	1 3/4	3	- 1/2	- 7/8	3/8
2nd " "	- 5/8	- 1/2	1 1/8	-1 1/2	1/4	1/4	7 1/4	3 1/4	-5 1/2	0	5/8	2 1/4	1 5/8	3/8	--	1 1/8	2 1/2	3/8	3 1/4	1/2	-1 1/8	5/8
3rd " "	-2 1/4	1/8	2 7/8	1 3/8	1/8	- 7/8	5 5/8	4 7/8	-3 1/4	2	3	1 3/4	2 1/4	3	--	1	3 1/4	1 3/4	2 1/4	1 1/2	1 1/2	1 1/2
4th " "	-2 3/8	1 1/2	- 1/8	- 3/4	1	5/8	-2 5/8	7/8	1 5/8	3 3/8	6 1/4	1 3/4	1 1/4	- 1/8	--	1 1/2	4	2 3/4	1 3/8	1	1 1/4	1 1/4
1st " Oct	2 3/8	1 1/4	3/8	-3 3/8	2	1/4	-9 3/4	7/8	-4 1/4	4 1/2	2 3/4	2 1/4	1	-1 1/4	--	2 7/8	2 1/2	2 1/8	-2 1/4	1 5/8	1/4	1/4
2nd " "	7/8	0	5/8	-1 1/4	0	1 3/8	-5 5/8	1 1/2	4 3/8	1 7/8	1 3/4	3 5/8	3 1/2	- 1/4	- 7/8	1 1/4	4 1/8	1/4	- 1/8	1/2	1	7/8
3rd " "	- 1/2	1 7/8	1 1/8	3/4	- 1/8	1 1/8	- 1/4	1/2	1 1/4	3/8	- 7/8	2 7/8	6 1/2	1 1/4	1 1/4	1/2	3/4	1 1/8	2	- 1/2	1 1/8	5/8
4th " "	2	1 3/8	2 1/4	3/8	5/8	7/8	-2 3/8	- 7/8	-3	3 3/4	- 3/8	0	4	1 1/8	1 1/4	5/8	-2 1/4	2 3/4	1/8	1/8	3 1/8	3/8
5th " "	7/8	- 1/2	5/8	- 3/8	3/4	3/8	-2 5/8	- 1/4	3/8	3 7/8	-1 1/4	-2 1/4	2 1/8	3/8	- 5/8	- 1/2	1/8	1 1/2	1 1/2	3/8	3 3/8	3/8
1st " Nov	-1 5/8	3/8	- 1/2	- 1/2	1	- 3/8	3/4	3/8	- 3/4	- 3/8	- 3/4	-3 7/8	7/8	1 3/8	-2 1/4	- 1/4	2 3/8	- 1/4	- 3/8	5/8	0	- 1/8
2nd " "	- 1/2	7/8	1/8	1/2	7/8	3/8	- 3/4	-5 1/4	3/4	-1 1/2	- 5/8	- 7/8	3 1/4	7/8	1/8	- 3/4	3 3/8	- 3/4	1/8	1	-1 7/8	0
3rd " "	2 7/8	1	1 1/2	1/8	1/8	1	-2 1/2	-5 3/8	3	3/8	- 3/4	1 1/4	-2 1/2	1 1/4	5/8	1 1/8	2 1/4	3 3/8	3/4	0	- 1/2	1/2
4th " "	- 5/8	1/2	1 1/8	1/2	7/8	1 7/8	-1 1/2	-3 3/4	3	- 7/8	- 1/8	5/8	-7	2 1/2	- 1/4	2 3/4	1 1/2	2 1/2	2 7/8	2	- 1/8	3/8
1st " Dec	-2 5/8	3/8	1/8	1/4	1	2 1/8	- 3/4	-2 1/2	- 7/8	- 1/8	- 5/8	-1	2	2 5/8	2 3/8	1/4	1	-1 3/4	2 3/8	2 1/4	- 1/8	1/8
2nd " "	- 3/4	1 1/2	1 7/8	0	1/2	1 1/2	3/8	-3 5/8	1 1/2	1	- 1/2	2 5/8	1 1/2	1 5/8	2 1/4	3/8	1/8	- 1/8	- 3/8	1 5/8	2 3/4	5/8
3rd " "	2 5/8	1 5/8	1 1/8	1 1/4	7/8	1 3/4	1/4	-5 1/4	7 1/8	-1 3/4	1	3 5/8	2 1/8	1/8	2	2 1/8	7/8	7/8	-1 1/4	1 1/8	1	3/4
4th " "	3 3/8	1/4	1/2	1 5/8	1/2	1 1/2	1/2	3 1/4	- 1/4	- 3/8	1 1/4	1	-2 1/4	0	3 1/4	7/8	1 1/2	- 1/4	1	-1 1/8	- 3/4	1/4
5th " "	-3 3/8	0	1/8	1/4	1/4	5/8	-1 1/2	2 1/2	0	2 1/8	-1 1/8	7/8	-3 5/8	- 1/2	1 5/8	-1 1/8	1 7/8	- 7/8	1 3/8	- 3/8	3/4	0
Average	1/4	3/8	3/4	0	3/4	1 1/8	- 1/4	- 1/8	1/8	5/8	1/4	3/8	5/8	7/8	7/8	5/8	1 3/8	1	7/8	1/2	5/8	

Table 4. Spread between No. 2 yellow, hard or better spot cash and December future (lowest deliverable grade) on the Chicago Board of Trade (20, p.110-117).

Weekly Fri Studied	Years Studied																				
	1909	1910	1911	1912	1913	1914	1915	1916	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
1st Fri Aug	2 1/8	-4 1/8	-6 1/2	- 3/4	-4 1/2	-7 1/4	5 1/2	-4 3/4	-4 1/4	2 5/8	-2 5/8	-2 1/2	3 7/8	-5	-5	-4 1/2	-16 3/8	-7 3/8	-4 1/8	-2 5/8	-6 1/4
2nd " "	5 1/2	4 3/8	-6 3/8	1/2	-4	-5 1/4	4 3/8	-4 5/8	-1 1/2	1 3/4	-2 3/8	-3 1/8	3 1/4	-4 3/4	-5 1/2	-5 1/2	-16 1/4	-6 7/8	-2 3/4	-2 7/8	-4 1/2
3rd " "	6 3/8	-4 5/8	-5 1/4	1 1/8	-4	-4 1/4	5 5/8	-5 1/8	1/2	- 1/8	-2 3/8	-3 7/8	1 1/2	-2	-4 1/8	-5 3/8	-15 7/8	-6 1/2	-3 5/8	-2 1/2	-3 1/8
4th " "	6 3/4	-4 3/4	-5	1 1/8	-3 1/2	-3 3/4	9	-2 7/8	1/4	0	-1 3/4	-6	2	-2	-3	-5 3/8	-15 5/8	-5 1/8	-2 7/8	-2 3/4	-5 5/8
1st " Sept	5 3/4	-4 1/2	-5 1/4	- 5/8	-3 1/2	-2 1/2	11 5/8	-3	1/8	- 1/2	-2 3/8	-6 1/8	2 1/4	-3 5/8	-3 1/8	-4 3/4	-13 3/4	-5 1/8	-1	-3	-5 1/2
2nd " "	5 1/2	-4 1/4	-4	1/4	-3 1/4	-2 3/4	13 1/4	-1 1/2	-2 3/8	1/8	- 7/8	-3 1/2	2 3/8	-1 1/4	-2 7/8	-4 1/8	-13 1/2	-4 3/4	- 1/4	-1 3/4	-5
3rd " "	3 5/8	-3 7/8	-3 3/4	1 1/8	-3 1/8	-2 3/4	15 3/4	- 1/4	-3 1/8	7/8	1/4	-3 5/8	3 3/8	- 5/8	-1 5/8	-3 3/4	-10 1/2	-3 7/8	5/8	-1 1/4	-4
4th " "	3 1/4	-3 1/8	-3 5/8	- 1/4	-2 1/4	-3	11 1/4	-1 3/8	-2 7/8	2 1/4	1	-2	2 1/8	-1 1/2	-1 5/8	-3 1/4	- 9	-2 1/2	1/2	- 1/2	-4
1st " Oct	4 3/4	-2 1/2	-3 3/8	-1 5/8	-1	-3 1/2	5	0	-4 1/2	4 1/4	2	-2	1	-2	-3 1/4	-1 1/8	- 7 1/2	-2 1/2	-1 1/2	3/8	-4
2nd " "	2 1/2	-2 3/4	-3 1/8	-1 1/2	-2	-3	4	- 3/4	0	2	1	- 1/4	4	-2	-2	-1 1/2	- 4 1/2	-2	1/2	0	-3
3rd " "	2 1/4	-1	-2 5/8	-1 1/2	-1 1/2	-3 1/4	4	0	-3 1/2	2	1	- 1/2	5	-1 1/2	-1 1/2	- 1/2	- 6	-1	1/2	0	-3
4th " "	2 3/8	-1 1/8	-2 1/4	-1 1/4	-1	-2 1/2	3	0	-3	4	2	-1	5	-1 1/2	-1	- 1/2	- 6	0	1 1/4	1/2	-1
5th " "	2 1/2	-1	-2	-1 1/4	-1	-2 1/4	2	0	-3	3 1/2	1	-2 1/2	5	- 1/2	-2	- 1/2	- 5 1/2	- 1/2	1	1/2	-1
1st " Nov	1 1/2	- 1/2	-1 1/4	-1	-1 1/2	-1 3/4	2	0	-3	1 1/2	1	-2 1/2	4	0	-2	- 1/2	- 4	- 1/2	1	1/2	-1
2nd " "	1	- 1/2	-1 1/4	- 7/8	0	-1 1/2	1	0	-2	2 1/2	1	-3	4	1/2	-1	-1	- 2 1/2	- 1/2	1	1	-1
3rd " "	1	- 1/4	- 5/8	- 1/2	0	-1	1	0	-2	1	1	0	1	1	-1	1	- 2	- 1/2	1	1	-1
4th " "	1	0	- 3/4	- 1/2	1/4	- 1/4	1	- 3/4	-2	1 1/4	1	1/2	1	1	-1	1	- 1/2	0	2	2 1/2	-1
1st " Dec	1	0	0	- 1/4	0	0	0	0	-2 1/8	1 1/8	1	1/2	1	2	0	1	0	0	3	2	1/2
2nd " "	0	0	0	0	0	0	0	0	1	1 1/8	1	1/2	1	1	0	1	0	0	1 1/2	3	1/2
3rd " "	0	0	0	1/2	0	0	0	0	1	1 1/8	1	1/2	1	1/2	1	1	1/2	0	1 1/2	1 1/2	1/2
4th " "	0	0	0	1/2	0	0	0	0	1	1	1	1/2	1/2	0	1 1/2	1	1/2	0	2	1/2	1/2
5th " "	0	0	0	1	0	0	2 1/4	0	1/2	1/8	1	1/2	-2	3 7/8	2	1 1/2	1/2	0	3	1/2	1 5/8
Average	2 5/8	-2	-2 5/8	- 1/4	-1 5/8	-2 1/4	4 3/4	-1 1/8	-1 1/2	1 1/2	1/4	-1 3/4	2 3/8	- 3/4	-1 5/8	-1 5/8	- 6 3/4	-2 1/4	1/8	- 1/8	-2 3/8

Table 5. Spread between No. 2 yellow, hard or better spot cash and May future (lowest deliverable grade) on the Chicago Board of Trade. (20, p. 110-117).

Weekly Fri Studied	Years Studied																				
	1909	1910	1911	1912	1913	1914	1915	1916	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
1st Fri Aug	- 5/8	-8 1/8	-12	-5 3/8	-10 3/4	-14 7/8	1/2	-9 1/2	--	-1 7/8	-7 1/4	- 7 3/8	1/8	- 9 7/8	--	--	-24 1/8	--	-9 1/8	-7 1/8	-10 1/2
2nd " "	1 7/8	-9 3/4	12	-3 1/4	- 9	-12 5/8	0	-9 1/4	--	-3 1/8	-7 1/4	- 8 1/8	- 1/8	-10	--	-11 1/4	-24 3/8	-14 5/8	-7	-7 3/8	- 8 3/8
3rd " "	2 7/8	-9 3/4	-11 3/8	-2 7/8	- 9	-11 1/8	1 5/8	-8 1/2	--	-5 1/4	-7 7/8	- 8 3/4	- 1 5/8	- 7	--	-12 1/8	-24 3/4	-14 1/8	-8 5/8	-7 1/2	- 9
4th " "	3	-10	-10 3/8	-3 1/2	- 8 1/4	-10 7/8	4 1/4	-5 7/8	- 3 7/8	-6 1/8	-6 7/8	-12	- 2	- 7	--	-11 1/2	-25 5/8	-12 1/8	-8 1/8	-7 3/8	- 9 1/4
1st " Sept	2 3/8	-10	-11 1/4	-4 1/2	- 8 1/8	- 9 1/8	7 1/2	-5 5/8	- 3 5/8	-5 7/8	-8 1/4	-12 1/8	- 2 1/8	- 8 3/4	--	-12 1/8	-23 1/4	-12 3/8	-5 5/8	-8	- 9 5/8
2nd " "	2 3/8	-10 1/2	- 9 1/2	-4 1/4	- 8 1/2	-10 5/8	11 1/2	-2 5/8	- 8 1/8	-5 1/4	-6 1/4	- 9 3/4	- 1 3/8	- 6 5/8	--	-11 3/8	-23 1/8	-11 3/4	-4 7/8	-6 7/8	- 9 3/8
3rd " "	1/8	- 9 7/8	- 9 3/8	-3 1/8	- 8 1/4	- 9 5/8	13 1/8	- 5/8	- 7 1/8	-3 7/8	-5 1/4	-10 1/8	1/8	- 5 3/4	--	-11 1/8	-20	-10 5/8	-3 3/8	-6 1/2	- 8 3/8
4th " "	0	- 8 3/4	- 9 5/8	-5	- 7	-10	8 7/8	-1 3/4	- 6 5/8	-1 7/8	-4 1/2	- 8	- 1/8	- 6 3/4	-6 5/8	- 9 7/8	-19 1/8	- 9	-3 1/2	-5 7/8	- 8 1/8
1st " Oct	2 1/2	- 8 7/8	- 9 1/4	-6 1/2	- 6	- 9 3/4	3 3/8	1/4	- 9 3/8	5/8	-2 1/2	- 6 7/8	- 1/4	- 7	-8 1/8	- 8 1/2	-17 1/2	- 8 1/2	-5 5/8	-4 7/8	- 8 1/8
2nd " "	7/8	- 8 3/4	- 9	-6 1/4	- 7	- 8 5/8	3 1/4	- 1/4	- 4 1/4	0	-2 3/4	- 4 3/8	3	- 7	-7 1/2	- 8 5/8	-15	- 8 3/4	-3 5/8	-5 1/8	- 7 1/8
3rd " "	2	- 6 3/4	- 8 1/8	-5 3/4	- 6 1/2	- 8 5/8	3 1/8	3/4	- 8 1/8	1	-3 3/8	- 5	6 3/4	- 5 3/4	-6 7/8	- 7 3/4	-16 3/4	- 7 3/8	-3 5/8	-5 3/8	- 7
4th " "	2 5/8	- 7 3/8	-6 3/4	-5 7/8	- 6	- 7 3/4	7/8	1/8	- 7 1/4	3 3/4	-3 1/8	- 4 3/8	6 5/8	- 5 7/8	-6 1/4	- 8	-17 1/4	- 6	-3 1/2	-5	- 4
5th " "	2 7/8	- 7 1/4	-7 1/2	-6 1/8	- 5 3/4	- 8 1/4	1/2	1 3/8	- 7 3/4	4 7/8	-3 5/8	- 7 1/4	8 7/8	- 5 3/8	-7 1/2	- 8 1/4	-16 5/8	- 5 7/8	-4 1/8	-5	- 3 5/8
1st " Nov	1	- 7	-7 1/4	-6 3/8	- 5	- 8 1/8	1 5/8	- 1/2	- 8	3 3/8	-3 7/8	- 8 1/8	7 1/4	- 4 1/2	-7 1/2	- 8 1/4	14 7/8	- 6 1/4	-3 7/8	-4 3/8	- 4
2nd " "	2 3/8	- 6 3/8	-7 3/8	-6 5/8	- 4 7/8	-7 7/8	- 1/4	-3 3/8	- 7	3 3/8	-4 1/2	- 8 1/8	11 3/4	- 4 1/2	-7 3/8	- 9	-13	- 6 5/8	-4	-4	- 4 1/2
3rd " "	3 7/8	- 6	-5 3/4	-6 1/4	- 4 7/8	- 7 1/8	- 7/8	-5 1/2	- 5	3 3/4	-4 5/8	- 6 7/8	4 1/4	- 3 1/4	-7 7/8	- 7 1/8	-12 5/8	- 2 7/8	-3 1/8	-4 3/8	- 4 1/2
4th " "	1 3/4	- 5 7/8	-6 1/4	-6 1/8	- 4	- 6	- 1 3/4	-7 5/8	- 5	2 1/2	-4 3/8	- 7 1/2	4 1/2	- 2	-7 5/8	- 6 1/4	-11 1/2	- 4 1/4	-1 1/8	-2	- 4 5/8
1st " Dec	1 1/4	- 5 5/8	-5 5/8	-6	- 3 7/8	- 5	- 1 3/4	-7	- 5 7/8	3 5/8	-5 1/2	- 7 7/8	5 1/4	- 5/8	-5 1/2	- 6 5/8	-11 5/8	- 4 5/8	- 3/4	-2 1/8	- 2 3/4
2nd " "	1	- 4 3/8	-4 3/8	-6 1/8	- 3 1/2	-4 1/2	- 1 3/8	-11 1/4	- 2 1/2	3 1/2	-4 7/8	- 4 7/8	5 1/2	- 3/8	-5 3/8	- 5 7/8	-11 3/8	- 4	-1 1/2	- 3/8	- 1 7/8
3rd " "	3 7/8	- 4	-4 1/2	-4 3/4	- 3	- 3 1/4	- 1 1/2	-12 1/4	- 4	1 7/8	-3 3/4	- 4 1/4	7	- 1/2	-3 1/2	- 4 1/2	-10 3/4	- 3 3/4	-2	-1	- 1 3/4
4th " "	5 3/8	- 4 1/8	-3 7/8	-4 1/8	- 3	- 3	- 7/8	-9	- 2 3/4	3 1/8	-3 5/8	- 3 7/8	3 1/4	- 3/8	-2 1/8	- 5	- 9 7/8	- 4 1/4	- 1/2	-1 1/2	- 2 1/2
5th " "	1/2	- 4	-4 5/8	-4 1/2	- 2 3/4	- 2 5/8	- 3	-9 3/4	- 4	4	-4 3/4	- 3 3/8	3 1/4	- 1	-1 7/8	- 5 5/8	- 8 7/8	- 4 5/8	- 5/8	-1 3/8	- 1
Average	2	- 7 1/2	-8	-5 1/8	- 6 1/8	8 1/4	2 1/4	-5	- 5 1/2	3/8	-5	- 7 1/4	3 1/8	- 5	-4 1/8	- 8	-16 1/2	- 7 3/8	-4	-4 3/4	- 6 3/8

Table 6. Top line of figures for each future represents average spread per year between cash and futures prices as compiled from Tables 4 and 5. Bottom line of figures for each future represents average gain or loss per year by grain dealers if a hedge was used as compiled from Tables 2 and 3.

Years Studied										
1909	1910	1911	1912	1913	1914	1915	1916	1921	1922	1923
December future										
2 5/8	-2	-2 5/8	- 1/4	-1 5/8	-2 1/4	4 3/4	-1 1/8	-1 1/2	1 1/2	1/4
- 1/2	1/2	3/4	1/8	1/2	5/8	- 1/2	3/8	1/2	- 1/8	1/2
May future										
2	-7 1/2	-8	-5 1/8	-6 1/8	-8 1/4	2 1/4	-5	-5 1/2	3/8	-5
1/4	3/8	3/4	0	3/4	1 1/8	- 1/4	1/8	1/8	5/8	1/4
Years Studied										
1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	
December future										
-1 3/4	2 3/8	- 3/4	-1 5/8	-1 5/8	-6 3/4	-2 1/4	1/8	- 1/8	-2 3/8	
1/4	- 1/8	5/8	5/8	5/8	1 5/8	3/4	1/2	1/4	5/8	
May future										
-7 1/4	3 1/8	-5	-4 1/8	-8	-16 1/2	-7 3/8	-4	-4 3/4	-6 3/8	
3/8	5/8	7/8	7/8	1 3/8	1 3/8	1	7/8	1/2	5/8	