# 15

## Analysis of the Prices of Futures Contracts

In the markets for grain, cotton, eggs, butter, and other agricultural products that lend themselves to objective grading, a system of trading in futures contracts (contracts calling for the delivery of specified kinds and amounts of the physical commodity at a specified time and place) has grown up along with the marketing system for the physical product.

These futures contracts call for delivery of physical grain at some future date, although in actuality less than 1 per cent of the contracts ever mature and involve delivery of cash grain. More than 99 per cent of the futures contracts are closed out by the exchange of offsetting contracts before the delivery date.

The volume of trading in futures contracts is large relative to the volume of the actual grain. In the case of wheat, it is more than ten times the volume of terminal market trading in the commodity itself. About 90 per cent of all the trading in grain futures in the United States is conducted on the trading floor of the Chicago Board of Trade.

The relations between the prices of these futures contracts and the prices of the physical commodity are matters of great concern to dealers and processors. Large profits and losses hinge upon the correct analysis and interpretation of these futures prices and cash price relationships. They constitute an interesting special case for price analysis.

### TWO OBJECTIVES IN FUTURES TRADING

Trading in futures contracts is conducted for two purposes. The one purpose is speculative; the trader's intention is to profit from

changes in the price of the futures contract. The other purpose is protective—just the opposite of speculative; the trader's intention in this case is to protect himself against the effects of changes in the price of the physical commodity.

Thus a speculative trader buys futures when he thinks prices are going up, hoping to sell later at a profit, but bears the risk that he will take a loss if the market goes against him. The protective trader, who is a buyer and seller of the physical commodity, enters into opposite sales and purchases of futures, hoping that a possible loss in the one will be offset by a gain in the other, so that he will neither lose nor profit from changes in prices.

It is assumed here that the reader has an introductory knowledge of speculation and hedging on the commodity exchanges. The purpose of this chapter is to explore further some of the more advanced and technical problems involved in these operations.[1]

## THE EXTENT OF THE PROTECTION AFFORDED BY HEDGING[2]

The violence of the changes in the prices of the principal grains over a period of ten years is shown by the continuous black lines in Figure 15.1. The price of corn, for example, nearly doubled within a few months from one crop year to the next in 1935. So did the price of oats. Wheat rose 50 per cent. Then within a year, all three prices declined to their previous levels, or lower. These were peace-time fluctuations. The fluctuations during the war and immediate postwar years are not shown, because of the abnormal forces at work then.

Fluctuations since 1950 have been moderate, partly due to the huge CCC stocks that were accumulated in the big crop years and released in short crop years. Since studies like the one summarized here were not extended into the postwar period, more recent data were not analyzed.

During the period 1924–25 to 1940–41, differences between the cash prices of grain in Chicago on Fridays separated by 8-week periods showed declines 47 per cent of the time for wheat prices, 49 per cent for corn, and 45 per cent for oats.

The declines averaged 9.4 cents per bushel for wheat, 7.8 cents for corn, and 4.5 cents for oats. The advances averaged 8.9, 8.2, and 4.3 cents per bushel, respectively.

In the long run, therefore, the declines and advances about

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[1] An introductory discussion of hedging and speculation is given in two chapters of G. S. Shepherd, *Marketing Farm Products,* 5th ed., Iowa State Univ. Press, 1969, Chap. 12, 13.

[2] This section is based upon L. D. Howell, *Analysis of Hedging and Other Operations in Grain Futures,* USDA Tech. Bul. 971, August, 1948.

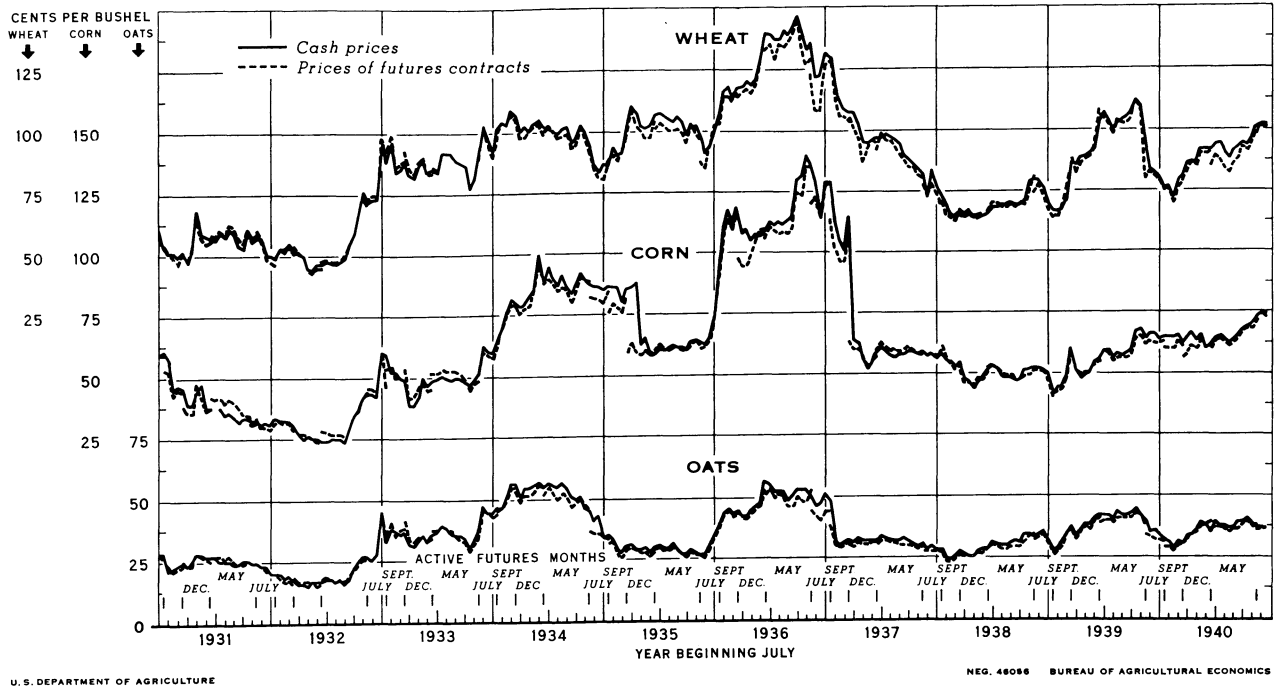


Fig. 15.1 — Cash prices for wheat, corn, and oats at Chicago and closing prices of Chicago futures contracts for the near-active months, semi-monthly, 1931–32 to 1940–41.

offset each other. But in some cases, the declines over 8-week periods amounted to as much as 42 cents per bushel for wheat, 60 cents for corn, and 34 cents for oats. The advances amounted to as much as 45, 50, and 19 cents per bushel, respectively. This indicates that gains and losses from changes in prices over relatively short periods may be many times greater than the profits normally expected from merchandising the commodities.

If the prices of the futures contracts for these grains varied correspondingly with the variations in the prices of the physical product, hedging would afford complete protection. The dashed lines in Figure 15.1, representing the prices of the futures contracts for the near active months, show that the futures prices do move similarly to the cash grain prices. But the correspondence is not exact. Figure 15.2 shows that the differences or spreads between the cash and futures prices vary widely from time to time.

In 1937, for example, the prices of Chicago wheat futures for delivery in September changed from 28 cents per bushel below the cash prices at Chicago on February 19, to only 1 cent per bushel below cash prices on July 16. The prices of Chicago corn futures for delivery in September changed from 30 cents per bushel below the cash prices at Chicago on May 7 to 4 cents below cash prices on September 3. And the prices of Chicago oat futures for delivery in September changed from 12 cents per bushel below cash prices at Chicago on June 18 to a figure even with cash prices on August 6. These changes in spread between cash prices and prices of new crop futures usually are greatest toward the end of the old crop year and near the beginning of the new.

Within the crop year, with abundant supplies of grain available in the markets, cash prices normally can be expected to advance in relation to prices of futures contracts by an amount approximately equal to the costs (such as storage, insurance, and interest) of carrying the cash commodity. Changes in the immediate and prospective supply and demand situation, however, sometimes cause irregular changes in the spread between cash prices and prices of futures contracts, so that the differences may not even approximate carrying charges.

For example, during the ten years 1931–32 to 1940–41, changes in spread between cash prices and prices of futures contracts from one part of the season to another varied irregularly. This was particularly true after 1933.

Risks from changes in the spread between cash prices and prices of futures contracts (usually referred to as changes in basis)

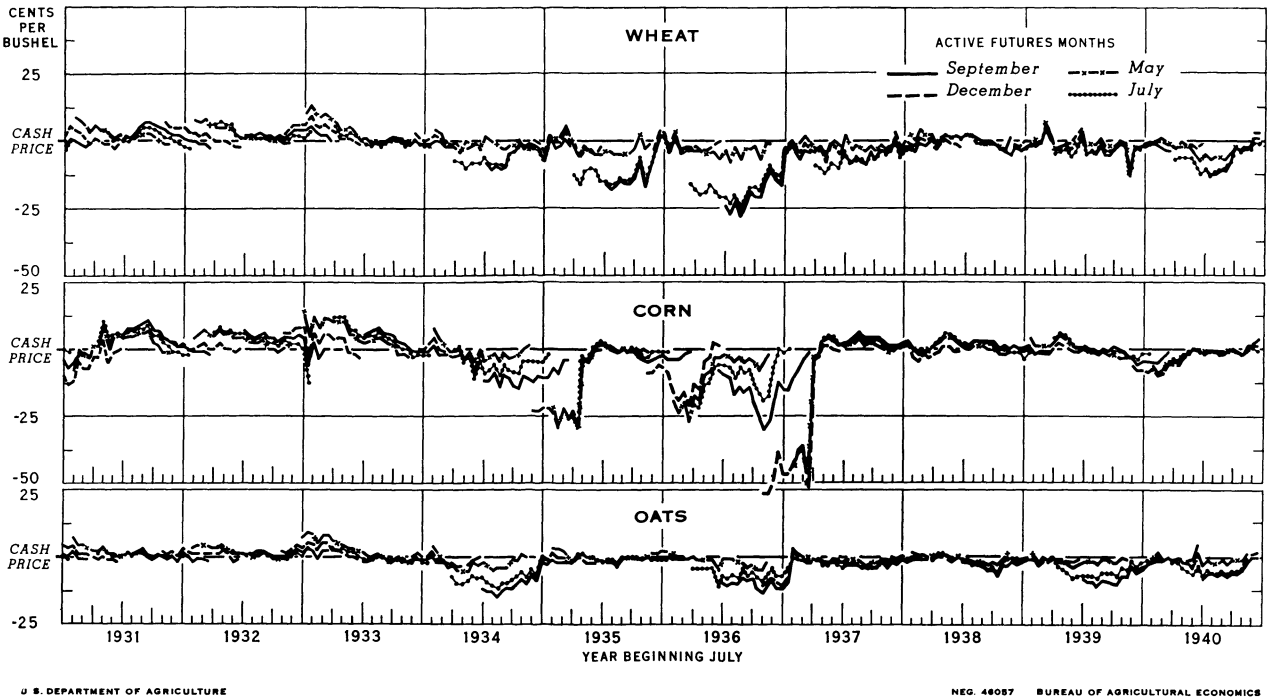


Fig. 15.2 — Variations in closing prices of Chicago futures contracts for wheat, corn, and oats from cash prices of these commodities, semi-monthly, 1931–32 to 1940–41.

are not offset by the normal hedging procedure. They may be responsible for substantial losses on the part of elevators, shippers, exporters, and millers, who may hedge invariably, but who fail to anticipate correctly the changes in basis. In appraising the usefulness of futures contracts as hedges against losses from changes in cash prices, then, it is important to learn how the risks from changes in cash prices compare with the risks from changes in basis.

### Price Risks Usually Greater Than Basis Risks

Examination of the data in Table 15.1 shows that the changes in cash prices of grain usually exceeded the corresponding changes in basis. This means that hedging usually would have reduced the gains and losses from changes in cash prices.

Data for 1924–25 to 1940–41 show that changes in basis for grain at Chicago, over 8-week periods, calculated from near-month Chicago futures contracts, averaged about 36 per cent of the corresponding changes in cash prices for wheat, 56 per cent for corn, and 51 per cent for oats.

The proportions by years ranged from less than 16 per cent in 1939 to almost 90 per cent in 1926 for wheat, from 39 per cent in 1930 to 97 per cent in 1931 for corn, and from 25 per cent in 1936 to 133 per cent in 1929 for oats. Although these proportions varied widely from year to year, the variations were not closely related to changes in price level and no very distinct trends were indicated. Figure 15.3 shows that declines and advances in cash prices over 8-week periods usually were substantially greater than the losses and gains on long-basis positions.

### Gains and Losses From Changes in Basis

Data on changes in basis at Chicago over 8-week periods, calculated from near-month Chicago futures contracts for the period 1924–25 to 1940–41, show gains on long-basis positions about 55 per cent of the time for wheat, 55 per cent for corn, and 53 per cent for oats, and losses about 34, 36, and 29 per cent, respectively, of the time. The gains averaged 3.0 cents per bushel for wheat, 3.5 cents for corn, and 2.1 cents for oats. The losses averaged 4.5 cents, 5.8 cents, and 3.1 cents per bushel, respectively. The proportion of the time during which changes in basis represented gains and losses and the average amounts of these gains and losses, vary noticeably from one year to another.

The average gains and losses on long-basis positions vary with the length of the interval and the futures contracts used in calcu-

TABLE 15.1

DISTRIBUTION OF CHANGES IN CASH PRICES OF WHEAT AT CHICAGO AND THE CORRESPONDING CHANGES IN BASIS CALCULATED FROM NEAR-MONTH CHICAGO FUTURES CONTRACTS, OVER 8-WEEK PERIODS, YEARS 1924–25 TO 1940–41

| Changes in Cash Prices (cents per bushel) | Changes in Basis (cents per bushel) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | −5 | −4 | −3 | −2 | −1 | 0 | 1 | 2 | 3 | 4 | 5 | Total |
| | (*No.*) | (*No.*) | (*No.*) | (*No.*) | (*No.*) | (*No.*) | (*No.*) | (*No.*) | (*No.*) | (*No.*) | (*No.*) | (*No.*) |
| −15 and under.. | 25 | 5 | 5 | 6 | 8 | 5 | 9 | 10 | 8 | 1 | 8 | 90 |
| −14..... | 2 | 1 | 2 | 1 | ..... | 1 | 1 | 1 | ..... | ..... | 2 | 11 |
| −13..... | ..... | ..... | 2 | ..... | ..... | ..... | 1 | ..... | 1 | ..... | 2 | 6 |
| −12..... | 4 | 1 | ..... | ..... | 1 | 4 | 2 | 1 | 3 | 3 | 3 | 22 |
| −11..... | 2 | 1 | 1 | 1 | 3 | 1 | 1 | 2 | ..... | 1 | 2 | 15 |
| −10..... | 2 | ..... | 1 | 1 | 3 | ..... | 2 | 4 | 1 | ..... | 2 | 16 |
| − 9..... | 1 | ..... | ..... | 4 | 5 | 2 | 3 | 3 | 2 | 1 | ..... | 24 |
| − 8..... | 2 | ..... | ..... | 2 | 2 | 1 | 1 | 2 | 1 | 4 | 1 | 16 |
| − 7..... | 1 | 1 | 1 | 2 | 3 | 1 | 2 | 3 | 5 | 2 | 3 | 24 |
| − 6..... | 3 | 1 | 1 | 1 | 4 | 3 | 2 | 4 | 1 | 2 | 4 | 26 |
| − 5..... | 7 | ..... | 2 | 5 | 4 | 1 | 3 | 3 | 4 | 1 | 1 | 31 |
| − 4..... | 1 | 1 | 1 | ..... | 2 | 6 | 4 | 3 | 6 | 7 | 1 | 32 |
| − 3..... | 1 | ..... | 2 | ..... | ..... | 3 | 5 | 5 | 4 | 2 | 9 | 31 |
| − 2..... | 4 | 1 | 2 | 3 | 2 | 7 | 7 | 2 | 3 | 7 | 5 | 43 |
| − 1..... | 3 | 3 | 1 | ..... | 5 | 1 | 4 | 3 | 4 | 4 | 4 | 32 |
| 0..... | 4 | ..... | ..... | 2 | 7 | 5 | 3 | 10 | 5 | 3 | 2 | 41 |
| 1..... | ..... | 2 | ..... | 2 | 4 | 4 | 5 | 7 | 7 | 3 | 4 | 38 |
| 2..... | 3 | 2 | 1 | 6 | 4 | 7 | 5 | 6 | 5 | 3 | 5 | 47 |
| 3..... | 2 | 2 | 1 | 1 | 5 | 5 | 4 | 6 | 4 | 2 | 1 | 33 |
| 4..... | 2 | 1 | 1 | 3 | 5 | 6 | 4 | 6 | 4 | 8 | 7 | 47 |
| 5..... | 3 | 1 | ..... | ..... | 4 | 3 | 9 | 1 | 2 | 2 | 1 | 26 |
| 6..... | 2 | ..... | 2 | ..... | 3 | 1 | 5 | 2 | 3 | 2 | 1 | 21 |
| 7..... | 1 | ..... | ..... | 2 | ..... | 4 | 4 | ..... | 3 | 4 | 3 | 21 |
| 8..... | 1 | 2 | 3 | 2 | 1 | 1 | 4 | 5 | 1 | 1 | 3 | 24 |
| 9..... | 2 | 1 | 2 | ..... | 1 | 3 | 3 | 1 | 3 | 1 | 1 | 18 |
| 10..... | 1 | ..... | ..... | ..... | ..... | 3 | 5 | 2 | 3 | 3 | 1 | 18 |
| 11..... | ..... | ..... | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 1 | ..... | 13 |
| 12..... | ..... | ..... | 1 | ..... | 2 | 1 | 2 | 2 | 1 | ..... | 1 | 10 |
| 13..... | 2 | ..... | ..... | 2 | 1 | 3 | 2 | 1 | ..... | 1 | 1 | 13 |
| 14..... | 1 | 1 | ..... | 1 | ..... | 2 | 3 | 1 | ..... | ..... | 1 | 10 |
| 15 and over... | 4 | 1 | 8 | 4 | 8 | 16 | 9 | 8 | 9 | 5 | 14 | 86 |
| Total..... | 86 | 28 | 41 | 52 | 89 | 101 | 116 | 106 | 96 | 74 | 93 | 882 |

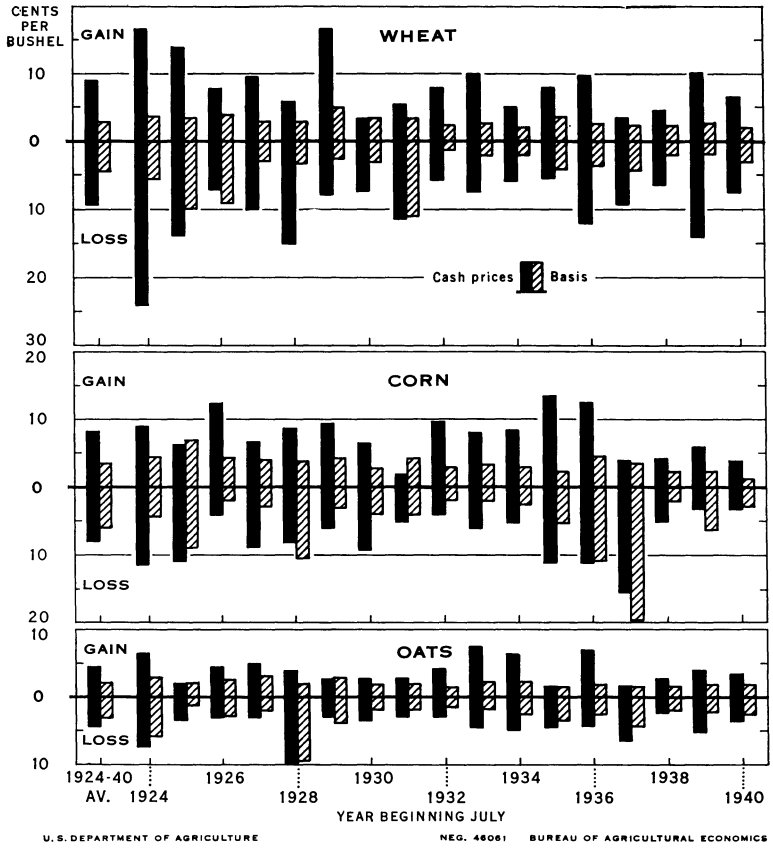


Fig. 15.3 — Average gains and losses from changes in cash prices and in basis for wheat, corn, and oats at Chicago over 8-week periods, by seasons, 1924–25 to 1940–41.

lating the changes. During the ten years 1931–32 to 1940–41, losses on long-basis positions from changes in basis for wheat, corn, and oats, at Chicago, calculated from near-month Chicago futures contracts, averaged about two-thirds as large over 4-week periods and about one and one-half as large over 16-week periods as for 8-week periods. The gains on long-basis positions averaged slightly more than two-thirds as large for 4-week periods and slightly less than one and one-half times as large for 16-week periods as for 8-week periods. These differences vary decidedly from year to year. Gains and losses on long-basis positions calculated from near-month futures contracts usually average somewhat less than those calculated from futures contracts for the more distant months.

Gains and losses on long-basis positions for wheat, corn, and oats at Chicago are fairly typical of those in other markets. During the ten years 1931–32 to 1940–41, gains and losses on long-basis positions over 8-week periods, calculated from near-month Chicago futures contracts for wheat at Chicago, averaged slightly less than at Kansas City, Minneapolis, and St. Louis, and somewhat more than those at Kansas City and Minneapolis, calculated from near-month Kansas City and Minneapolis futures contracts. For corn, the gains and losses from changes in basis at Chicago averaged about the same as at Kansas City and at Minneapolis but somewhat greater than at St. Louis. Similar comparisons for oats show that gains and losses at Chicago averaged slightly less than at Kansas City and St. Louis but slightly larger than at Minneapolis.

Gains and losses on long-basis positions varied considerably from one part of the season to another as well as from year to year. Usually they were greatest toward the end and at the beginning of a crop year. During the years 1931–32 to 1940–41, changes in basis over 8-week periods ended in July and August for wheat and oats and in September, October, and November for corn resulted in losses on long-basis positions that averaged about twice as much as those for periods ended in other months. They resulted in gains on long-basis positions that averaged considerably more than those for periods ended during other months.

The losses on long-basis positions in actual experience would be less than these simple average statistics indicate. From the end of one crop year to the beginning of the next, the cash price descends from its highest seasonal peak (for the old crop) to the lowest seasonal point (for the new crop). The cash price for the old crop usually is substantially higher than the level of the new-crop futures, and rapidly declines as the new crop comes on. Changes in basis then are large, and such as to cause losses on long-basis positions. Grain dealers therefore handle as little grain as they can during those periods. If the basis gains and losses were weighted by the volume of grain transactions at different times of the year, the actual losses would be smaller, and gains probably larger, than the simple averages shown above.

## DISCRETIONARY HEDGING [3]

The preceding section shows to what extent hedging reduces price risks. It is based on the generally held assumption that grain

[3] This section is based on part of an article by Holbrook Working, "Futures Trading and Hedging," *The American Economic Review*, Vol. 43, No. 3, June, 1953, pp. 320–26.

dealers hedge for the purpose of reducing those risks, so as to avoid speculation. This assumption is substantially valid as regards those who practice hedging uniformly. However, most hedgers are engaged in a business that requires them to keep informed on many aspects of the commodity situation, with the result that many hedgers often form quite definite opinions on price prospects. Except in firms that have a strict rule against taking hedgable risks, it is common for stocks to be carried unhedged at times when the responsible individual expects a price advance, and for stocks of the commodity to be hedged at other times. Some individuals and firms hedge stocks only when they are particularly fearful of price decline.

Such discretionary hedging, involving a firm in the practice of both hedging and speculation, seems to be especially prevalent among dealers and processors who handle commodities such as wool and coffee, that have relatively little public speculation in their futures markets. When hedge selling in such a futures market becomes heavy, the price may readily be depressd to a point where a good many dealers and processors are attracted by the possibilities of profit through speculative holding of the commodity. Even among handlers of commodities which attract broad public participation to their futures markets, such as wheat, discretionary hedging is not uncommon. Consequently the existence of futures trading in a commodity and widespread use of futures for hedging do not in fact mean that the responsibilities of price formation are shifted entirely, or even mainly, to people who deal only in the commodity futures.

A major source of mistaken notions of hedging is the conventional practice of illustrating hedging with a hypothetical example in which the price of the future bought or sold as a hedge is supposed to rise or fall by the same amount that the spot price rises or falls. Let us instead consider hedging realistically in terms of some actual prices. The prices to be used will be those for wheat at Kansas City on the first trading day of each month in which futures matured during the crop year 1951–52.

On the first business day of July, 1951, a merchant or processor considering the purchase of the cheapest quality No. 2 Hard Winter wheat (the quality represented by quotations on Kansas City wheat futures) found such spot wheat selling at 3 cents per bushel under the price of the September future. If he bought spot wheat, hedged it in the September future, and carried the

wheat until the first business day of September, the results, in cents per bushel, would have been as shown below:

| Quotation | Date and Price | | Gain or Loss |
|---|---|---|---|
| | July 2 | Sept. 4 | |
| Spot No. 2 Hard (low)... | 229¼ | 232½ | ..... |
| September future..... | 232¼ | 233½ | ..... |
| Spot premium..... | −3 | −1 | +2 (gain) |

The profit of 2 cents per bushel is calculated above, in what may seem an awkward way, from the change in spot premium (a negative premium, or discount, on each of these dates). It is awkward, however, only for those to whom it is unfamiliar. The hedger tends to calculate his profits in this way because he would buy the wheat on July 2 primarily for the reason that he could get it at discount of 3 cents per bushel under the price of the September future. In fact, the bargaining which preceded the purchase would normally proceed in terms of discount rather than of price, the price being ascertained by reference to the latest futures price quotation, after sale at a mutually satisfactory discount had been agreed on.

The fact that on September 4, No. 2 Hard Winter wheat sold at a discount under the September future, though it is the grade of wheat currently deliverable on the future, is accounted for by the fact that the spot price applies to wheat "on track," requiring additional expenditure to get it into a warehouse. Wheat was then moving into commercial storage on a large scale because of heavy marketing by producers.

On September 4, our grain merchant or processor would probably not have sold the wheat he bought earlier, but instead would have bought more wheat. If he did that, and held until December 1, the results, in cents per bushel, would have appeared as follows:

| Quotation | Date and Price | | Gain or Loss |
|---|---|---|---|
| | Sept. 4 | Dec. 1 | |
| Spot No. 2 Hard (low) .. | 232½ | 252 | ..... |
| December future..... | 238¼ | 252 | ..... |
| Spot premium..... | −5¾ | 0 | +5¾ (gain) |

In this case the spot price of the cheapest deliverable wheat came, on December 1, to exact equality with the price of the December future, and the gross return for storing the wheat was exactly what might have been expected, on September 4, from the fact that such wheat was then selling at a discount of 5¾ cents under the price of the December future.

In these calculations we have left out of account the possibility that a merchant who bought at a discount of 5¾ cents on September 4 might have got wheat of a little better than minimum No. 2 quality — wheat which might have been sold on September 4 at a discount of, say, 5½ cents, rather than 5¾ cents, if the seller had been willing to look farther for a buyer. And we have ignored the possibility that on December 1 the merchant might have sold at a premium of ½ cent over the December future by virtue of the slightly superior quality of the wheat, and by finding a buyer who did not choose to shop around enough to get the best bargain possible. In other words, we have left out of account sources of normal *merchandising* profits.

On December 1, a merchant or processor may seem to have had no incentive for longer holding of wheat for which he had no immediate need. The spot price then was on a par with the December future, and at a premium of 1 cent over the price of the May future. But let us suppose that he continued to hold, with a hedge in the May future, and see what would have happened if he held until May 1. Though we imagine that the wheat is already in storage, we may make the next calculation as though it concerned a new purchase:

| Quotation | Date and Price | | Gain or Loss |
|---|---|---|---|
| | Dec. 1 | May 1 | |
| Spot No. 2 Hard (low)... | 252 | 247¼ | ..... |
| May future..... | 251 | 238¼ | ..... |
| Spot premium..... | +1 | +9 | +8 (gain) |

This time a merchant would have gained a gross return of 8 cents per bushel from storage. It would have been in part a windfall profit, since he had no advance *assurance* of obtaining it; but he would have gained it on a quite conservative venture. He was well assured of not losing more than 1 cent per bushel (because the spot wheat that he held would surely sell at as high a price as

the May future at some time in May), and he could count with virtual certainty on spot wheat going to a substantial premium over the price of the May future at some time between December and May.

As of May 1, there remained no prospect of profit from continued storage of wheat during that crop year, unless perhaps for a few days more. Before the end of the month, the spot premium, based on the May future, would have to fall from 9 cents to near zero. Moreover, the spot price on May 1 was at a premium of 18 cents over the July future, and that premium should be expected to fall to zero or below by July 1. The outcome, if a merchant in fact held any wheat in storage from May 1 to July 1, was as follows:

| Quotation | Date and Price | | Gain or Loss |
|---|---|---|---|
| | May 1 | July 1 | |
| Spot No. 2 Hard (low)... | 247¼ | 218½ | ..... |
| July future..... | 229¼ | 225 | ..... |
| Spot premium..... | +18 | −6½ | −24½ (loss) |

Probably some merchants did store a little wheat from May 1 to July 1, hedged in the July future, and did take the loss per bushel indicated by the above calculation. Grain merchants, like operators of retail stores, must try to keep adequate stocks on their shelves to serve their customers. But a merchant who hedged would have seen clearly on May 1 that any wheat that he might continue to hold until July would involve a loss, as surely, though not so completely, as would Christmas trees held until December 26.

The foregoing examples of hedging tend in one respect to be a little misleading; spot premiums do not always follow so obviously logical a pattern through the course of a crop year as they did in 1951–52. If spot wheat in July, were regularly, in all years, at a moderate discount under the September future, and if spot wheat, in September, were always at a large discount under the December future, and spot wheat in May always at a large premium over the July future, merchants and processors would have less need than they do for futures markets. They would then have no need to watch spot-future price relations in order to judge when to accumulate stocks, and when to draw them low. But our purpose at the

moment is merely to see how hedgers use spot-futures price relations as a guide in inventory control, thereby earning a return for holding stocks that must be stored by someone.

We should now note three facts concerning hedging. First, contrary to a common impression, hedging of the sort here considered is not properly comparable with insurance. It is a sort of arbitrage. Most hedging is done in the expectation of a change in spot-future price relations, the change that is reasonably to be expected being often indicated quite clearly by the current spot-future price relation.

Secondly, hedging does not eliminate risks arising from price variability. Risk is less than on stocks held unhedged, but it still exists. When the commodity involved is of quite different quality from that which is represented by the future, or in a location remote from that to which the futures price relates, the risks assumed by hedgers tend to be much larger than is suggested by the examples given here.

And thirdly, hedging is not necessarily done for the sake of reducing risks. The role of risk avoidance in most commercial hedging has been greatly overemphasized in economic discussions. Most hedging is done largely, and may be done wholly, because the information on which the merchant or processor acts leads logically to hedging. He buys the spot commodity because the spot price is low *relative to* the futures price and he has reason to expect the spot premium to advance; therefore he buys spot *and* sells the future. Or in the case of a flour miller, he sells flour for forward delivery because he can get a price that is favorable *in relation to* the price of the appropriate wheat future; therefore he sells flour *and* buys wheat futures. (Here the arbitrage, it may be noted, is between two forward prices, that for flour and that for wheat.)

Incidentally, recognition of the fact that hedging may be done purely as a logical consequence of the reasoning on which the hedger acts (reasoning, for example, that the spot price is low relative to the future) rather than from any special desire to minimize risks, helps to explain why many dealers and processors sometimes hedge and sometimes do not. As we have remarked, merchants and processors, even though they hedge, have need to keep informed on conditions that affect the price of the commodity and they may often have opinions on prospective price changes.

If a merchant is accumulating stocks at a time when spot premiums are low — his most reliable basis for such action — and if at the same time he is fairly confident of an advance in futures prices as well as in spot premiums, why should he not carry the stocks unhedged, if he can afford to take some extra risk?

Perhaps the main reason that hedging, as commonly practiced on futures markets, has been so widely misunderstood and misrepresented is that economists have tried to deal with it in terms of a concept that seemed to cover all sorts of hedging. This would be desirable if it were feasible, but the general concept of hedging as taking offsetting risks wholly, or even primarily, for the sake of reducing net risk, serves so badly as applied to most hedging on futures markets that we need another concept for that most common sort of hedging. To put it briefly, we may say that hedging in commodity futures involves the *purchase or sale of futures in conjunction with another commitment, usually in the expectation of a favorable change in the relation between spot and futures prices.*

## EFFECTS OF DIFFERENT CLASSES OF TRADERS

There has been much conjecture as to the effect of different classes of traders on futures markets, and judgments as to these effects have been embodied in numerous proposals designed to encourage or discourage different types of trading. A number of studies have been made, in an effort to determine as accurately as possible the effects on the market, and on the marketing process, of various kinds of trading. For the most part these studies have been concerned with the effects of the operations of large-scale traders, particularly large-scale speculators.

The role of the small speculative trader in the futures market has been the subject of much discussion. On the one hand it has been held that such traders are a disturbing influence in the market, accentuating price swings, and on occasions contributing to wild and disastrous price fluctuations. On the other hand it has been maintained that such traders are a necessary element in the market since their presence makes it possible for the expert trader—who is presumed to exercise a beneficent influence on prices—to find traders to take the opposite side of his trades, and supply through their losses the income which is necessary to support the continued trading activity of the professional.

## THE COMMODITY EXCHANGE AUTHORITY[4]

The Commodity Exchange Authority has made an extensive analysis of the trading behavior of small speculators, which throws some light on their place in the futures market. Their study covers the trading of 9,000 speculators over the period from January 1, 1924, to December 31, 1932 (the period of rapid inflation that led to the market crash of 1929 and subsequent depression years). It confirms a number of commonly held opinions as to the results of speculative trading; it tends to disprove others which have also been widely accepted.

The first obvious conclusion from the analysis is that the great majority of small speculators lost money in the grain futures market. There were 6,598 speculators in the sample with net losses, compared with 2,184 with net profits, or three times as many loss traders as profit traders. Net losses of speculators were approximately six times net profits; there were nearly $12,000,000 of losses, compared with about $2,000,000 of profits. Speculative traders in the sample lost money in each of the four grains traded—wheat, corn, oats, and rye.

The small speculator's characteristic hesitation in closing out loss positions was primarily responsible for the high ratio of losses. An often-quoted maxim for speculative trading is "Cut your losses and let your profits run." Contrary to this advice, speculators in the sample showed a clear tendency to cut their profits and let their losses run. Futures positions or cycles resulting in losses were held open for consistently longer durations than profit cycles—average losses were larger than average profits—and long cycles were kept open for a greater number of days than short cycles. In wheat futures, for example, the average duration of profit cycles was only 10.5 days, compared with 16.3 days for loss cycles. The average duration of the profit trader in wheat futures was 114.8 days, compared with 182.5 days for the loss trader.

Speculators who did make profits on individual trades were inclined to cut them short. The tendency on individual cycles was to settle for profits which were much smaller on the average than the average loss on trades closed out unprofitably. With this situation, plus the shorter time duration of profit cycles, it is not surprising that there were actually more individual profit cycles than loss cycles.

In wheat futures, for example, there were 42,668 profit cycles

[4] The remainder of this chapter is based closely on the summary at the end of: Blair Stewart, "An Analysis of Speculative Trading in Grain Futures," Commodity Exchange Authority, USDA, Tech. Bul. 1,001, 1949.

compared with 34,373 loss cycles. But the average gain on the profitable cycles was only $212, while the average loss on those unprofitable was $501. Obviously, the outcome was a net loss, not only from the standpoint of the greatest number of traders, but also from the standpoint of aggregate profits and losses of the group as a whole. What happened, of course, was this: When profits on one trade were combined with losses on other trades, the end result was a net loss for the great majority of speculators.

The study confirms the commonly held impression that the amateur speculator is more likely to be long than short in the futures market. About half of the speculators in wheat and corn had positions only on one side of the market, and of this group, those on the long side only greatly exceeded the number with short positions only. However, the one-side-only traders did only a minor proportion of the total trading. The other half of the speculators who had both long and short cycles accounted for most of the trading in wheat and corn. From the standpoint of market activity, the preference for the long side was not as great as is sometimes supposed. In wheat futures approximately 63 per cent of the cycles were long and 37 per cent short, and in corn 58 per cent were long and 42 per cent short. The preference for the long side was more pronounced in oats and rye.

A great majority of speculators in the sample had relatively small profits and losses. The profits of 84 per cent of the profit traders were less than $1,000 each, and the profits of 39 per cent less than $100 each. The losses of 68 per cent of the loss traders were less than $1,000 each, and 16 per cent had losses of less than $100 each. Obviously, a very large percentage of the traders in the sample operated on a small scale, and many of them discontinued trading before realizing large profits or suffering losses.

Short positions of speculators tended to show profits more frequently than long positions. While a majority of the trades of consistent bulls resulted in losses, consistent bears in all gains had more profits cycles than loss cycles. Among traders who operated on both sides of the market, there was also a greater frequency of profits on short cycles than on long cycles. In spite of this, however, the total losses of short sellers exceeded their total profits—just as in the case of consistent longs.

The representation of large-scale traders in the sample was not broad enough to warrant positive conclusions as to the success of large speculators in grain futures, as compared with the profits and losses of small traders. There was no evidence, however, that the largest size classes included a higher proportion of successful

traders than the groups with smaller average positions. Generally speaking, the large and small traders alike were unsuccessful in their trading.

Among all the major occupational groups losses from speculative trading in grain futures greatly exceeded profits. Among managers of business concerns, for example, there were 840 profit traders, compared with 2,563 loss traders. The aggregate profits of this occupational group amounted to $1,076,300, against losses of $6,210,200. Persons with occupations "unknown" had the greatest proportion of profit traders—32.3 per cent. Farmers had the lowest proportion of profit traders—21.2 per cent. "Retired" persons made up the only group having a better-than-average proportion of profit traders in each of the four grains covered by the survey.

From the standpoint of aggregate profits and losses for occupational groups, managers in the grain business were somewhat more successful in speculative trading than other groups. But even with this class aggregate profits in dollars were only 28 per cent of aggregate losses. Semiprofessional workers showed the lowest profit ratio in aggregate dollar amounts—11 per cent. The profit ratio for farmers on this basis was 13 per cent. In general, the chances for success in grain futures trading did not differ greatly from one occupation to another. Special knowledge of the commodity traded seemed to have little effect on the outcome of speculative trading during the period studied.

The study clearly shows the tendency of long speculators to buy on days of price declines, and for shorts to sell on price rises. Analysis of 58,000 two-day cycles showed that almost 62 per cent of the two-day long cycles were initiated on days of decline in the price of the dominant future, and that 55 per cent of the two-day short cycles began on days of advancing prices. Futhermore, the greater the price decline on a given day the larger the number of long cycles initiated. Trading against the current movement of prices was the dominant pattern on both sides of the market, but was not nearly so definite for shorts as for longs.

The tendency of longs to buy on price declines and for shorts to sell on price rises indicates that traders in the sample were predominantly price-level traders. Longs tended to buy when prices fell below levels which they considered proper, and shorts sold when prices advanced above levels which they believed justified. The inclination to trade according to predetermined price opinions apparently was not disturbed by the long period of declining prices from 1929 to 1932. However perverse it may seem,

this period of declining prices stimulated speculative buying by small speculators, although the activity of short sellers was dampened slightly.

A final comment should be made involving a most important question. As already indicated, the losses of traders in the sample were much greater than their profits. If these results are representative of trading by small speculators generally, there must be other groups—large speculators, scalpers, spreaders, or hedgers—which make very large profits.

There is no known empirical study, however, which reveals other groups of traders with net profits sufficient to balance such large losses as those suffered by small speculators in the sample. Yet the nature of futures trading is such that all losses are balanced by profits. This raises the most important question left unanswered by this study. Was the sample in this respect not typical of small speculative traders? There is no apparent reason for pronounced bias in the direction of losses. If the sample is representative, is there another group of traders who consistently make profits large enough to balance the losses of small speculators? There is no convincing evidence that such large profits are made by any class of traders. These are questions which can be answered only by further studies of the results of futures trading.