

MARKETING & UTILIZATION
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Principles of Hedging with Futures

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The business of a grain producer is to raise and market a product at a profitable price. As with any business, some years provide favorable profits and some years do not. Profit uncertainty for corn and soybean producers arises from both variance in cost of production per bushel (especially from yield variability) and uncertainty of prices and LDPs.

Many techniques are used by producers to reduce risk from production loss. These may include adequate size of machinery, rotating crops, diversification of enterprises, planting several different hybrids, crop yield or revenue insurance, and many others.

Grain producers also have marketing techniques which can reduce the financial risk from changing prices. Rising crop prices generally are financially beneficial to producers, and falling prices are generally harmful. However, it is never known with certainty whether prices will rise or fall. Futures hedging (sales of futures contracts) can help establish grain prices either before or after harvest. By establishing a price, the producer protects against subsequent declines in price, but also generally

eliminates any potential gain if subsequent prices rise. Thus, through hedging with futures, producers can greatly reduce the financial impact of changing prices.

Hedging is only one of a number of marketing alternatives. Each has its advantages and disadvantages, and, when properly used, each can be a tool in profitable marketing. *However, misuse of any marketing tool may result in unfavorable results. For this reason, it is important to develop a sound understanding of how to use hedging in a corn marketing program.*

How Prices Are Established

Prices of corn are established in two separate but related markets. The futures market trades contracts for future delivery. These futures contracts are traded at a commodity exchange and are for a specific time (contract delivery month), places (Designated Illinois River elevators), grade (#2 yellow shelled corn), and quantity (5,000 or 1,000 bushel contract sizes). The cash market is where the physical grain is handled by firms such as country elevators, processors, and

terminals.

The term "basis" refers to the price difference between the local cash corn price and the price of a specific futures contract delivery month. The basis is different at various marketing locations. Thus, for effective marketing it is important to be aware of the local basis at country elevators, as well as at nearby processors, feeding operations, or terminals. In most states, the Cooperative Extension Service has information on historic basis patterns at various locations.

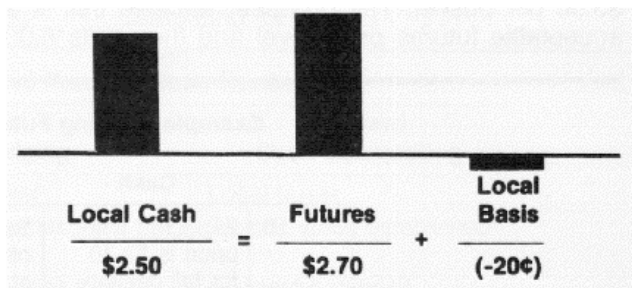


Figure 1. Components of Local Cash Corn Prices

Local cash prices thus reflect two components: the futures price and the local basis. Figure 1 helps illustrate this point. As an example, a local cash bid of \$2.50 per bushel may be derived from a futures price of \$2.70 and a local basis of -20 cents. It is helpful to think of local cash prices in terms of the futures component and the basis component when examining marketing alternatives.

The Hedging Concept

Producer hedging involves *selling* the futures contracts as a temporary substitute for selling corn in the local cash market. Hedging is a temporary substitute, since the corn will eventually be sold in the cash market. **Hedging is defined as taking equal but opposite positions in the cash and futures market.** For example, a producer who has 10,000 bushels of corn in a grain bin and who has sold 10,000 bushels of corn futures is in a hedged position. In this example, the position is long (owns) 10,000 bushels of cash corn and short (sold) 10,000 bushels of futures corn. Since the producer has sold the futures, price has been established on the major component of the local cash price. This can be seen

in Figure 1, which illustrates that the futures component is the most substantial portion of the local cash price. Selling the futures in a hedge leaves the local basis unpriced. Thus, the final value of the corn is still subject to fluctuations in local basis. However, basis risk in cents per bushel usually is much less than cash price risk. By selling futures, the producer has eliminated the financial loss that would occur on the cash grain from a futures price decline.

The hedge position is removed, or lifted, when the producer sells the corn in the cash market. It is lifted in a simultaneous two-step process. The producer sells 10,000 bushels of corn to the local grain elevator and immediately buys back the futures position. The purchase of futures "off-sets" the original short (sold) position in futures, and selling the cash grain converts the position to the cash market.

Using Hedging in a Corn Marketing Program

There are three general ways to use hedging as a corn marketing tool: 1) establishing the price before harvest, 2) establishing price after harvest, and 3) earning a storage return.

Establishing Price Before Harvest

The existence of the futures market allows the grain industry to establish prices for as much as two years before harvest. Example 1 provides an illustration of how the futures price can be established several months before harvest. On May 10, the new crop December futures are trading at \$2.50 per bushel. The producer decides this is an acceptable futures price level and thus sells 5,000 bushels of December futures at \$2.50. This is a hedged position, since at least 5,000 bushels of corn are expected to be produced in the fall, and 5,000 bushels of futures were sold as a substitute for selling the 5,000 bushels to the local elevator. The expected basis is 30 cents under the December futures contract, yielding an expected final price of \$2.20 per bushel for fall delivery.

On October 20, the corn is delivered to the elevator and the hedge is converted to a cash sale (see Example 1). The conversion is made by the two-

step process of selling 5,000 bushels of cash corn to the local elevator at \$2.00 and then buying 5,000 bushels of December futures at \$2.30. This action offsets the futures sale and converts it to a cash sale. In this example, both the cash price and the futures price move down 20 cents per bushel after the hedge is placed on May 10. The loss of 20 cents in the cash market is compensated by the 20 cent profit in the futures market.

Since the objective was to price corn, a pricing summary is included in Example 1. In this example, the producer priced 5,000 bushels of futures at \$2.50 and established the basis at 30 cents under for a final price of \$2.20 per bushel. The hedging summary shows that the corn was actually sold to the elevator at \$2.00, with a 20 cent gain in futures. The futures gain resulted from selling futures at \$2.50 and buying them back at \$2.30.

Hedging "locks-in" the futures price component of the local corn price. Thus, only changes in the expected local basis will influence the final price received for the hedged corn. Example 2 illustrates

what happens when futures prices rise and the basis goes to a greater than expected discount to futures. Assume the same hedging occurs on May 10 as in Example 1. By October 20, however, futures have risen to \$2.70 and the basis widens to 35 cents under. The pricing summary shows futures established at \$2.50, with a 35 cents under basis yields a net price of \$2.15 per bushel. The hedging summary shows that the cash grain was sold to the elevator for \$2.35 per bushel, but 20 cents was lost in the futures (sold at \$2.50 and purchased at \$2.70 per bushel). You will note that while hedging protects against declines in futures prices, it also eliminates potential financial gains from futures price increases. In this hedge example, the final price is 5 cents lower than in Example 1. This is because the basis was 35 cents rather than 30 cents under the December futures. In both examples, the futures price was "locked-in" at \$2.50, but the basis is not priced until the cash grain is sold. Thus, corn hedgers still face the risk of basis change, and the final price will not be known for sure until the final basis is known.

Example 1. Using Futures to Price Before Harvest*

	Cash	Futures	Basis
May 10	Expected final price is \$2.20 for fall delivery	Sells 5,000 bushels of December futures at \$2.50	Expected basis is 30¢ under the December futures
Oct. 20	Sells 5,000 bushels of cash corn at \$2.00	Buys 5,000 bushels of December futures at \$2.30	Basis is 30¢ under the December futures

Pricing Summary:

Futures Price	\$2.50
Local Basis	<u>-.30</u>
Final Price	\$2.20

Hedging Summary:

Cash Selling Price	\$2.00
Gain in Futures	<u>+.20</u>
Final Price	\$2.20

*(Hedging cost of about 0.5 - 2 ¢ per bushel not included)

In pre-harvest hedging, it is essential that a producer assess his/her production risk and consider how to manage it. Where the ultimate goal is to

protect an acceptable level of income, the other key variable in gross income is yield. Alternatives for managing yield risk include various types of crop insurance. Types well suited for pre-harvest hedging

are Crop Revenue Coverage (CRC) or Revenue Assurance (RA) with a fall price alternative. These two types of insurance replace lost bushels at the harvest price, and hence can maintain a long physical inventory up to the insured level, even if the producer's own crop is severely reduced by weather and he/she ends up in an over-sold position on a hedge or forward contract. The resulting long physical commodity position will offset the short futures position.

Establishing Price After Harvest

The same hedging concepts apply to pricing corn that is in storage but is not yet priced. For example, a producer with 15,000 bushels of corn in storage in January may want to establish the futures price for early March delivery. This hedging situation is shown in Example 3. On January 10, the March corn futures price is \$2.50 per bushel. The expected basis for March 1 delivery is 15 cents under the March futures. Thus, when the hedge is placed in January, by selling March futures, a \$2.35 final price is expected.

On March 1 the hedge is lifted by selling the 15,000 bushels in the cash market and buying back the futures. The final price received is \$2.38 per bushel, which resulted from selling futures at \$2.50 and converting the hedge to a cash sale at a 12 cents under basis. The price is 3 cents higher than the \$2.35 expected on January 10 because the final basis was 12 cents under instead of the expected 15 cents under.

Earning a Storage Return

Hedging is regularly used by grain elevators to "lock-in" a carrying charge or storage return in the futures market. A carrying charge market exists when the futures price for each subsequent contract delivery month is higher than the previous contract. In this situation the December contract will be the lowest priced, March will be a higher price than the December, May will be higher priced than the March, etc.

The use of the storage hedge is illustrated in Example 4. At harvest time (October 20) the December futures price is \$2.25, the basis for immediate delivery is 40 cents under, and the cash

bid price is \$1.85. On the same day, the July futures price is \$2.42. The expected basis for early May delivery is 25 cents under the July futures. Thus, the expected gross storage return is the expected \$2.17 May hedging price less the \$1.85 harvest price, or 32 cents per bushel.

The storage hedge is initiated by selling the July futures at \$2.40 on October 20. The market position in this example is then long (owns) 10,000 bushels of corn in storage and short (sold) 10,000 bushels of July futures. In the example, the hedge is converted to a cash sale on May 5. The basis level on that date is 27 cents under the July futures.

The pricing summary shows a futures price established in October at \$2.42 with a final basis of 27 cents under, giving a final price of \$2.15 per bushel. The hedging summary shows that the cash corn was sold to the elevator at \$2.35 but a loss of 20 cents was taken in the futures, providing the \$2.15 final price.

The gross returns to hedged storage (before deducting storage costs) were 28 cents per bushel. This is shown in the gross storage return summary. Selling the July futures "locked-in" the 17 cents December to July carrying charge (also called the spread). The basis appreciated from 40 cents under at harvest to 27 cents under in May for a gain of 13 cents. While the expected basis appreciation back in October was 15 cents, it actually gained 13 cents.

This helps illustrate that in the storage hedge, as in a pricing hedge, local basis changes will influence the final price and the gross storage return.

The gross return to storage for this hedge was 30 cents per bushel. This must be compared with the cost of storing corn from October 20 to May 5 to determine if storage was profitable.

Selecting the Appropriate Futures Contract Delivery Month for Hedging

Commodity exchanges have established five corn delivery months in each crop year. These are December, March, May, July, and September. The contract month which is closest to the time a producer plans to deliver the corn should usually be selected. If storage is not available and corn must be sold at harvest, the December contract typically has

Example 2. Pricing Before Harvest--with Widening Basis.*

May 10	Expected final price is \$2.20	Sells 5,000 bushels of December futures at \$2.50	Expected basis is 30¢ under the December futures
Oct. 20	Sells 5,000 bushels of cash corn at \$2.35	Buys 5,000 bushels of December futures at \$2.70	Basis is 35¢ under the December futures

Pricing Summary:

Futures Price	\$2.50
Local Basis	<u>-.35</u>
Final Price	\$2.15

Hedging Summary:

Cash Selling Price	\$2.35
Gain in Futures	<u>-.20</u>
Final Price	\$2.15

* (Hedging cost of about 0.5-2 cents per bushel not included)

Example 3. Establishing Price After Harvest*

	Cash	Futures	Basis
Jan. 10	Expected final price is \$2.35 for early April delivery	Sells 15,000 bushels of May futures at \$2.50	Expected basis for April 1 delivery is 15¢ under the May futures
April 1	Sells 15,000 bushels of cash corn at \$2.23	Buys 15,000 bushels of May futures at \$2.35	Basis is 12¢ under the May futures

Pricing Summary:

Futures Price	\$2.50
Local Basis	<u>-.12</u>
Final Price	\$2.38

Hedging Summary:

Cash Selling Price	\$2.23
Gain in Futures	<u>+.15</u>
Final Price	\$2.38

* (Hedging cost of about 0.5-2 cents per bushel not included)

been used in the past to price new crop corn. The November contract was added in January of 2000, and is expected to provide a hedging contract for corn harvested before the end of October. ***A rule of thumb in the grain trade is to plan to lift the hedge before the***

calendar gets to the delivery month of the futures contract. For corn delivered from storage in late February, the March contract would normally be sold, etc.

For a storage hedge, the short futures position usually should be placed in the

contract delivery month that provides maximum net storage returns. Net storage returns are the gross storage returns less storage costs such as interest and storage fees. ***Expected gross storage returns are composed of the futures carrying charge and the expected basis gain.*** Hedging can "lock-in" the futures carrying charge, as seen in Example 4. For example, if the expected gross storage return from March to May is greater than the cost of storage for March to May, additional net storage earnings can likely be earned by placing the hedge in the May contract. If the expected gross storage returns do not cover the March to May storage cost, the hedge should generally be placed in the March contract. Factors such as (1) concern over maintenance of quality, (2) availability of labor and equipment to move corn, (3) need to use storage facilities for other crops, (4) cash flow needs, and (5) outlook for changes in the basis or spreads may all influence which contract month should be used for hedging.

Mechanics of Placing a Hedge

Once hedging principles are understood, a key step in the hedging process is selecting the right commodity broker. A corn producer should expect the broker to accurately and quickly execute orders and serve as a source of market information. Most brokerage firms have weekly market reports as well as periodic in-depth research reports on the market outlook which may be useful in formulating a marketing strategy. Also, a commodity brokerage firm that is familiar with local cash market opportunities has some distinct advantages.

It is extremely important that a broker understand how hedging and price risk management fit into the producer's production and marketing program. The producer and the broker must realize that hedging is a tool to reduce price risk. However, producers

sometime use futures markets to speculate on price changes and thus are exposed to increased price risk. Generally, speculation and hedging should be done in two separate accounts. Inexperienced hedgers should seek a broker willing to help them increase their understanding of market mechanics.

After selecting a broker, formulating a marketing plan, and opening a hedge account, the producer is ready to place trading orders. The broker can supply information on the types of orders to place. Once the broker receives the order, it will be phoned, wired, or electronically transmitted to the floor of the commodity exchange. The order is relayed to a pit broker who will execute it in the trading pit, provided it is within the current market range. A confirmation of the executed order is then phoned or wired back to the local broker. Many brokerage firms can execute the order while the client waits on the phone for the confirmation price.

To maintain a position in the futures market, producers must deposit margin money with the brokerage firm. Initial margin requirements provide financial security to insure performance on the futures commitment. If the corn producer sells a contract in the futures market and the futures price subsequently rises, this represents a loss of equity in the futures position. These higher prices may require additional margin money and may thus result in a margin call. The producer must then supply these additional funds to maintain the hedge position. If the futures price moves down, the producer who is short futures will have futures profits credited to his/her account. The producer can call for this excess margin to be paid to him/her. In the futures market, the margin position is updated each day. Margin calls should not be viewed as a loss but rather as a part of the cost of insuring against a major price decline. In a hedged position, losses on

Example 4. Storage Hedge.*

	Cash	Futures	Basis
Oct. 20	Cash bid for immediate delivery \$1.85	December futures price is \$2.25	Basis for immediate delivery is 40¢ under the December futures
Oct. 20	Expected final price is \$2.17 for early May	Sell 10,000 bushels of July futures at \$2.42	Expected early May basis is 25¢ under the July futures
May 5	Sell 10,000 bushels of cash corn at \$2.35	Buy 10,000 bushels of July futures at \$2.62	Basis is 27¢ under the July futures

Pricing Summary:

Futures Price \$2.62
Local Basis -0.27

Final Price \$2.35

Hedging Summary:

Cash Selling Price \$2.35
Futures Loss -.20

Final Price \$2.15

Gross Storage

Return Summary:

December-May futures gain \$.17
December-May basis gain \$.13
Total Gross Storage Return \$.30

*(Hedging cost of about 0.5 – 2¢ per bushel not included)

Table 1. Comparison of Hedging and Forward Cash Contracting.

	Hedging	Forward Cash Contracting
Contact person	Commodity broker	Local buyer
Price	Realized price varies as basis changes	Specific price established
Funds required	Initial margin deposit and additional margin if necessary	No margin deposit
Contract term	Standardized	May be slightly different among buyers
Delivery Flexibility	Optional Hedge can be lifted at any time	Required May not be cancelable
Contract size	Only two sizes	Variable
Knowledge required	Need to understand futures trading	Understand contract specifications
Inform your lender	Yes	Not required

Source: T.E. Nichols, North Carolina State University

futures contracts are offset by the increasing value of the physical grain inventory.

A final step is the closing out of the futures transaction. This is generally done by offsetting the futures commitment through an offsetting purchase of futures contracts in the same contract delivery month, as in the earlier examples. Once the position is closed out, the producer no longer must maintain a margin account (for that transaction). Thus, the producer can receive his/her margin deposits, plus (minus) futures profits (losses), less brokerage fees. Delivery is an alternative way of settling futures contracts, and the threat of delivery is important in insuring that the futures contract price closely reflects the cash price at the delivery location or area. However, less than two percent of the grain futures contracts normally are held for delivery, and delivery procedures are complex. If profitable delivery opportunities exist, grain firms typically are in a better position to take advantage of them than producers.

Hedging vs. Forward Cash Contracting

Corn producers will want to compare hedging in the futures market with forward contracting in the cash market. Forward cash contracting involves a commitment to deliver corn to a grain buyer at some future time. Both alternatives can be used to: price before or after harvest; establish a return for storage; and reduce price risk. Thus, deciding which alternative to use depends upon weighing hedging advantages and disadvantages in relation to forward cash contracting. The sections below discuss the advantages and disadvantages of hedging in comparison to forward cash contracting, and Table 1 presents the characteristics of the two strategies in table form.

Hedging Advantages vs. Forward Cash Contracting

- * Hedging allows flexibility to later select the appropriate physical delivery point. This may be important for producers with several buyers competing for the grain or oilseed.
- * Hedging provides the flexibility to reverse a market position because of changes in crop growing conditions, changes in the condition of

stored grain, or changes in price outlook. Once a forward cash contract commitment is made, it may be difficult to cancel or to alter. A position in the futures market can be terminated by offsetting the position. Financial compensation, of course, must be made for any adverse price change occurring while the futures position was held.

- * Hedging allows the producer to speculate on a basis improvement. As shown in earlier examples, if the basis appreciates more than expected, the final price will be higher than originally anticipated.
- * Hedging generally lengthens the potential pricing period for a crop to 20 to 24 months, including about one year before harvest and one year after harvest. This may be a longer period than for forward cash contracting.

Hedging Disadvantages vs. Forward Cash Contracting

- * In hedging, the final cash price initially is not known for certain because the final basis is not known until the hedge is converted to a cash sale.
- * Hedging is more complex than forward cash contracting. To hedge successfully, producers must understand futures markets, cash markets, and basis relationships. They must trade in the futures market and will have to involve more people such as a commodity broker and a lender in their market decision making.
- * Margin money is required to maintain a position in the futures market. A forward cash contract typically does not require margin deposits.
- * Hedging involves extra marketing cost, including brokerage commissions and interest on margin money. These extra costs may average 0.5 to 2 cents per bushel.
- * Since hedging involves using futures contracts, corn can only be sold in 5,000 bushel lots (Chicago Board of Trade) or in 1,000 bushel lots (Mid-American Commodity Exchange, also in Chicago). The 1,000 bushel futures contracts are often referred to as "mini-contracts."
- * Basis levels may not gain as expected. A basis level weaker than anticipated will provide a

lower final price than expected.

The Lender's Role in Hedging

Agricultural lenders play a potentially important role in grain producer hedging. Many lenders are willing to finance margin accounts for bonafide hedgers, since hedging reduces the exposure to price risk. Some will also lend a larger percentage of the value of stored grain if it is hedged rather than held unpriced. Lending 90% of the hedged value of stored corn is a common practice. Lenders also may help farm clients evaluate how various hedging opportunities will influence the farm's financial condition and help them determine an acceptable level of price risk.

Some agricultural lenders utilize three-way hedging agreements between producer, broker, and lender. In this arrangement, the brokerage house sends any margin calls to the lending institution. The lender then automatically lends the producer the amount needed to cover margin requirements and sends the margin deposit to the brokerage firm. In this way, the corn producer is assured that funds will be available for the margin account. In case of profits in the futures position, these are automatically sent to the lending institution to be invested in an interest-earning account for the producer. Three-way agreements also tend to reduce the psychological stress a producer may face when receiving margin calls. The producer receives

copies of all transactions.

Hedging Summary

Hedging can greatly reduce the exposure to price risk. It is an important marketing tool for establishing price while retaining considerable marketing flexibility. However, hedging does not guarantee a profit. The hedging decision must still take into account production costs and market outlook. For many producers, deciding when to hedge is one of the most difficult aspects of grain marketing. Pricing indecision often leads to a "do-nothing-until-forced-to-sell strategy," with the crop sometimes sold at low prices. An understanding of market alternatives such as hedging can help avoid such problems and lead to a more successful grain marketing program.

Additional literature on hedging for corn producers can be obtained from:

- * Chicago Board of Trade
141 West Jackson Blvd.
Chicago, Illinois 60604
- * The Cooperative Extension Service at your land grant university
- * Commodity brokerage firms

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