



Managing for Today's Cattle Market and Beyond

March 2002

Hedging Using Livestock Futures

By

James D. Sartwelle, III, Texas A&M University

James Mintert, Kansas State University

Livestock producers are sometimes faced with advantageous pricing opportunities prior to the time grain or livestock will be bought or sold in the cash market. In these situations producers can forward contract in the cash market to establish sale or purchase prices. However, forward contracts require that delivery of the exact quantity and grade contracted be made during the specified time frame to satisfy the contract.

Given the uncertainty associated with agricultural production, a more flexible alternative to forward contracting is sometimes desired. One alternative is to use futures markets to establish an expected sale or purchase price. A short hedge, where the sale of a futures contract is substituted for sale of the cash commodity, can be used to protect against a price decline. Conversely, a long hedge, where the purchase of a futures contract is substituted for the purchase of the cash commodity, can protect input purchasers from the risk that prices will increase prior to purchase of the input in the cash market.

What Is a Hedge?

Hedging is the use of the futures market as a temporary substitute for an intended cash market transaction, which will take place, in the cash market, at a later date. For example, a cattle feeder interested in establishing an expected sale price on a pen of slaughter cattle would initiate a short hedge

by selling live cattle futures. The live cattle futures sale serves as a temporary substitute for the cash market sale, which will take place when the cattle are ready for slaughter. Later, after the cattle have been sold in the cash market (and the cattle feeder no longer needs a temporary substitute for the cash market transaction), the initial sale of the live cattle futures contract is offset by issuing an order to buy the exact same futures contract. The clearinghouse at the futures exchange recognizes that the initial sale has been "offset" by the subsequent futures contract purchase, resulting in the cattle feeders' exit from the live cattle futures market. To determine the *Actual Sale Price* for the cattle, the cattle feeder should take the revenue received from the cash market sale and add the gain, or subtract the loss, that occurred on the futures transaction.

Five steps are key to implementing a hedge that will likely meet your pricing objectives.

1. Understand basis and develop a basis forecast. Basis is the difference (cash price minus futures price) between the local cash price and the futures contract's price. Prior to initiating a hedge, it's important to develop a basis forecast for the approximate date when the cash market transaction will occur. Historical basis data for the time of year and the cash market where the transaction will take place can be used to generate a basis forecast. Once a basis forecast has been generated, it's possible to calculate your *Expected Sale Price* or *Expected Purchase*

Price by adding the basis forecast value to the futures price at which the hedge is initiated. Calculating your expected price is important because it allows you to anticipate what you will receive (or pay), net of any gain or loss in the futures market. Failure to account for basis and basis risk mean you will have difficulty meeting your pricing goals. A more complete discussion of basis is provided in another article in this series.

2. Be sure you have correctly identified the number of contracts required for your hedge. For example, assume a cattle feeder has 101 head of steers on feed that have a projected sale weight of 1200 lbs. and an expected death loss of 1 percent. The number of head on feed, times one minus the death loss, times the projected sale weight per head, yields the expected total pounds of slaughter cattle that will be produced. Divide this total by the Chicago Mercantile Exchange (CME) Live Cattle contract weight specification (40,000 pounds/contract) to obtain the number of contracts necessary to fully hedge the pen. In this example, $101 \text{ head} \times (1 - .01) \times 1200 \text{ lbs/head}$ divided by 40,000 lbs/contract equals 3 contracts. Note that when performing this calculation, the result will rarely be an exact integer and the hedger will have to decide whether to be somewhat over or under-hedged.
3. Select the proper futures contract month. Project the date of the anticipated cash market transaction and select the first futures contract month that is scheduled to expire after your expected cash market transaction. Using the futures contract that is closest to expiration when you make your cash market transaction will, generally, allow you to forecast basis (the difference between cash and futures prices) more reliably. For example, an expected December feeder cattle sale would be hedged using January CME feeder cattle futures, since the January contract is the contract closest to expiration during December, when the cash market transaction will take place.
4. Offset your hedge when the cash market transaction takes place. A hedge is a temporary substitute for an intended cash market transaction. As a result, hedges should be offset when the intended cash market transaction has occurred. In the case of a short hedge, the

futures position would be offset by issuing an order to buy the exact same futures contract that was originally sold at the outset of the hedge. Conversely, in the case of a long hedge, the futures position would be offset by issuing an order to sell the exact same futures contract that was originally purchased at the outset of the hedge. Keeping futures positions open after the cash market transaction has taken place is speculating, not hedging, since the futures position is no longer being used as a temporary substitute for an intended cash market transaction. Finally, after a hedge position is initiated in the futures market, the futures position should not be offset prior to the cash market transaction without careful consideration of the resulting risk exposure.

5. Develop your own guidelines to help you determine when to eliminate some of your price risk exposure by hedging and when to remain exposed to price risk by not hedging or forward pricing. Deciding when and at what price level to initiate a hedge is the most difficult aspect of hedging for many people. There are no hard and fast rules that will enable you to routinely identify the best time and price level to place a hedge. One recommendation is to consider how much price risk you can safely absorb, continually monitor price and potential profit levels, and place a hedge when you decide the potential risk of adverse price movement outweighs the potential gain associated with a favorable price change. Finally, don't fall into the trap of always holding out for what you have identified as an "acceptable profit". In fact, it's important to recognize that, in some market situations, protecting an acceptable profit may not be possible. Prudent managers also consider using a hedge to limit losses when market conditions dictate.

How Does a Short Hedge Work?

Since the short hedger is using the futures market as a temporary substitute for an intended cash market sale, he will initiate a short hedge by selling one or more futures contracts. If futures and cash prices decrease while the short hedge is in place, the lower cash price the producer receives for his production is offset by a gain from the futures market transaction. Conversely, if prices increase

following initiation of the short hedge, losses incurred on the futures market trade will offset the cash price increase.

An accurate basis forecast is vital. If projected basis and actual basis are the same, then the *Expected Sale Price* that was calculated when the hedge was initiated will equal the *Actual Sale Price* (i.e., cash price net of any gains or losses in the futures market) at the hedge's conclusion. In reality, projected and actual basis levels will rarely be exactly equal, but successful hedging requires that you be able to forecast basis reliably. The scenarios addressed in the example will further illustrate the mechanics of this price risk management tool.

Case Example: Short Hedge for Feeder Cattle

Bill grazes steers on winter wheat pasture in the southern Great Plains. For the coming winter, he plans on turning 165 head of 420 lb steers out on November 1 and grazing them until March 1 (four months). For the past ten years, his steers have

gained an average of 1.5 lbs per day and his death loss has averaged 1 percent. Bill anticipates his cattle will weigh approximately 600 lbs when he pulls them off wheat and sells them. Further, he projects a breakeven sale price of \$78/cwt for the steers.

In early November, Bill notices the March CME feeder cattle futures contract is trading at \$85/cwt. Further, Bill knows the historical basis for feeder cattle in his area is -\$1/cwt relative to futures in early March (i.e., cash price is generally \$1/cwt below the March feeder cattle futures price). Based upon his basis forecast, he determines that if he initiated a short hedge at \$85/cwt his *Expected Sale Price* on March 1 would be \$84/cwt (\$85 - \$1), which is acceptable to him. Because Bill fears a possible price decline while the calves are grazing wheat, he elects to initiate a short hedge in November to price the steers he plans on selling in March. Since each feeder cattle futures contracts is for 50,000 lbs, Bill opts to sell 2 contracts to cover his expected cash market sale of 98,010 pounds (165 X (1-.01) X 600).

	Cash Market	Futures Market	Basis
November 5	Objective: to realize a sale price of \$84/cwt for his feeder steers	Sells 2 CME March feeder cattle contracts at \$85/cwt	Projected at -\$1/cwt
March 3	Sells 164 head of 600 lb feeder steers for \$79/cwt	Buys 2 CME March feeder cattle contracts at \$80/cwt	Actual basis, -\$1/cwt (\$79 - \$80)
Gain or loss in Futures =		Gain of \$5/cwt (\$85 - \$80) Times 1000 cwt. = \$5,000	

Results:

Cash Receipts 164 X 600/100 X \$79.00 = \$77,736
 Futures Market Loss + _____ \$ 5,000
 Net Receipts \$82,736*

Actual Sale Price =
 \$82,736 / (164 X 600/100) = \$84.08/cwt*

* Excluding brokerage commissions and interest.

How Did the Feeder Cattle Short Hedge Work?

Bill projected an early March sale price of \$84/cwt on November 5. On March 3, he sold 164 (death loss was 1 head or 0.6%) head of feeder steers for \$79/cwt in his local cash market and liquidated his futures position. The decrease in steer prices he had feared occurred, and the cash price he received for his calves was less than his projection. However, Bill realized a profit of approximately \$5/cwt profit from the decrease in the CME March feeder cattle futures price. Adding this gain to his cash market receipts, resulted in Bill's *Actual Sale Price* equaling \$84.08/cwt., virtually identical to the \$84/cwt. he projected.

The *Expected Sale Price* and *Actual Sale Price* were virtually identical because Bill's basis forecast was accurate. A favorable basis move (i.e., a more positive basis) would have resulted in a higher *Actual Sale Price*, whereas an unfavorable basis move (i.e. a more negative basis than expected) would have resulted in a lower *Actual Sale Price*. This serves to highlight the fact that, once the initial futures position has been established, the hedger is no longer exposed to the risk that futures prices will

go up or down since the hedger has effectively "locked in" the futures prices. However, hedgers are still exposed to basis risk since basis is not established until the cash market transaction takes place.

What If Bill's Price Outlook Was Incorrect?

Let's examine the effects of a price increase on the performance of Bill's feeder cattle short hedge.

	Cash Market	Futures Market	Basis
November 5	Objective: to realize a sale price of \$84/cwt for his feeder steers	Sells 2 CME March feeder cattle contracts at \$85/cwt	Projected at -\$1/cwt
March 3	Sells 164 head of 600 lb feeder steers for \$89/cwt	Buys 2 CME March feeder cattle contracts at \$90/cwt	Actual basis, -\$1/cwt (\$89 - \$90)
	Gain or loss in Futures =	Loss of \$5/cwt (\$85 - \$90) Times 1000 cwt. = \$5,000	

Results:

Cash Receipts 164 X 600/100 X \$89.00 = \$87,576
 Futures Market Loss + _____ \$ 5,000
 Net Receipts \$82,576*

Actual Sale Price =
 \$82,576 / (164 X 600/100) = \$83.92/cwt*

* Without commission and interest.

Bill's pricing objective of \$84/cwt was essentially achieved for the feeder steers that he hedged in November. The difference between the *Expected Sale Price* of \$84 and the *Actual Sale Price* of \$83.92/cwt is attributable to the fact that he was slightly over hedged (i.e., his futures market position of 100,000 pounds was slightly larger than his actual cash market position of 98,400 pounds). Note that futures prices rising or falling after Bill initiated his hedge had no significant impact on his *Actual Sale Price* since he effectively "locked in" the futures price once he sold the March feeder cattle futures contracts in November.

Advantages and Disadvantages of a Short Futures Hedge

Advantages	Disadvantages
1. Protects against risk of price declines	1. Do not participate in gains from future price increases
2. Could make it easier to obtain credit	2. Success dependent on ability to accurately forecast basis
3. Easier to implement and cancel than a forward contract arrangement	3. Futures contract quantity is standardized and may not match cash market quantity
	4. Futures position requires a margin deposit and margin calls are possible