

# **LIVESTOCK HEDGING USING FUTURES OR OPTIONS**

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## ***Livestock Futures and Options***

Commodity options and futures are two of the tools producers can use to reduce the price risks they face in agricultural markets. Whereas futures markets are familiar to many livestock producers, options require some explanation. This paper will introduce options trading by describing the advantages and disadvantages of this marketing tool compared to those of hedging with futures. First, futures trading is described briefly. Then, options on futures are discussed and their use as a hedging tool is illustrated. Finally, the processes of hedging with futures and options are compared.

## ***Hedging With Futures***

Hedging normally refers to holding positions in both cash and futures markets simultaneously. The goal of a hedger is partly to reduce the risk of holding a cash inventory by "locking in" the price to be received or paid. For a livestock producer, hedging usually involves locking in the value of animals to be sold in the cash market some time in the future by selling futures contracts in the present. The hedging process is illustrated later in this paper in an example.

Trading futures contracts is simple with the assistance of a broker. To place a hedge, a livestock producer must only

make one telephone call to the broker handling his account. The quantity of cattle, delivery date and location are standardized on each futures contract, thus making trading easy. The producer tells the broker how many pounds of live beef is to be sold and the month in which they are to be delivered and the broker relays that information on to the futures exchanges in the form of a trade order. Live cattle futures contracts, for example, are available with delivery dates in February, April, June, August, October, and December of each year. Each contract covers a standardized quantity of 40,000 pounds and specifies quality requirements. Standardized delivery locations are specified also, however, none of those locations are in California, thus hedgers here must close their futures market positions by making an equal and offsetting trade. For example, if a producer established a hedge by selling a December 1996 live cattle futures contract, he must *buy* a December 1996 live cattle contract to close his futures hedge position. The hedge's net effect would be to add to (or subtract from) the cash market receipts, making the final value of the inventory approximately equal to what it was at the time the hedge was placed, thus reducing the risk of decreases in that inventory value.

## ***What is an Option?***

An option is a contract that gives the buyer the right, but not the obligation, to buy or to sell a futures contract at a specific time period. The right to sell at a fixed price is a "put" option and the right to buy at a fixed price is a "call" option. The price at which the underlying futures contract may be bought or sold is the "exercise" or "strike price".

Although most option positions are closed when the buyer makes an

offsetting trade, option contracts can be *exercised*. For example, assume that the right to sell one February live-cattle futures contract at 80 cents/lb is available from an option seller for 5 cents/lb. Such an option would be a put option (the right to sell) with an 80-cent *strike price* and a premium of \$2,000 (5 cents/lb times 40,000 lbs). A cattleman who purchased such a put option could exercise the right to sell at 80 cents any time up to the expiration date.

Assume February live-cattle futures are 72 cents/lb during December and the rancher exercises the put option. The broker is so instructed and the commodity exchange assigns the rancher one short (sell) position in February live-cattle futures at the strike price. To complete the transaction, the rancher immediately buys back the futures contract at the current market price of 72 cents, making an 8-cent/lb gross profit (3-cent net profit after subtracting the 5-cent price of the option).

On the other hand, if February live-cattle futures rise above 80 cents/lb at marketing time, the rancher will not exercise the option since the market price is higher than the option exercise price. In this situation, the rancher lets the option expire. In either situation, the seller of the option keeps the premium.

Similarly, a cattle buyer could pay \$2,000 for a call option—the right to *buy* February live-cattle futures at a price of 80 cents/lb at any time between the purchase and expiration date of the option. The buyer would let the option expire if cash prices stayed below the strike price until February because cattle could be purchased cheaper in the cash market. However, if cattle futures prices are more than 80 cents/lb at the time of the desired purchase, the buyer would exercise the option to purchase cattle futures at 80 cents/lb, thus saving the difference between the available cash price and the lower option price (minus the premium).

## **Comparing Options and Futures**

The two illustrations above point out the major differences between options and futures contracts.

- A *put* option establishes a minimum selling price but does not eliminate the opportunity to receive higher market prices.
- A *call* option establishes a maximum buying price but does not eliminate the opportunity to pay lower market prices.
- A *futures* contract sets a relatively fixed net cash price since futures market gains or losses are approximately offset by cash market losses or gains.

Options, therefore, permit producers to establish desired selling prices without sacrificing their potential to benefit if market prices increase after the put option is purchased. If prices rise, the option is not exercised and the user loses only the premium. If prices fall, the user can exercise the put option and obtain a price higher than what the market is offering. Thus, with a put option, a user eliminates most downside market risk while retaining the opportunity to benefit from higher prices.

With a call option, a user eliminates price risk above the exercise price while retaining the opportunity to buy at lower market prices. Therefore, options provide ranchers and other users with insurance against undesirable price changes while allowing them to benefit from favorable price changes.

The degree to which ranchers and other agribusiness people will use options depends largely upon the cost of the option (the premium). As in any

other “insurance policy,” agricultural commodity options offer a possible benefit at a definite cost. If potential users do not feel the value of the possible benefit exceeds the cost, they will not buy the insurance.

### ***Mechanics of Options Trading***

Options trading is permitted only at exchanges approved by the Commodity Futures Trading Commission (CFTC). As in the futures market, trading in options is conducted in a pit by open outcry and hand signals. Trading is observed and regulated by the exchanges and the CFTC. All trades are reported to and cleared by a clearing corporation, which makes sure each option contract has a buyer and a seller at the same price and that all margin requirements are met. This process guarantees performance on all contracts.

For options *buyers*, the premium payment is the largest amount that can be lost, regardless of the price movement of the underlying futures contract. Hence, buyers of commodity options do not receive margin calls. The option *seller* (also called the *writer*) must deposit a margin and may receive margin calls because he or she has the potential liability to provide a futures contract to the option buyer should the buyer elect to exercise the option.

This margin procedure assures the buyer that the seller will always have sufficient funds on deposit with the clearing corporation to pay the difference between the option strike price and current market price should the buyer exercise the option. If the option price never increases, the option writer will receive no margin calls and the option will expire worthless. If the option expires “out of the money,” the buyer will lose the premium and the option writer will keep it as payment for providing the buyer with price insurance.

In addition to the premium, option buyers and sellers pay small commissions to their brokers. There is great variability in the level and manner in which commissions are charged: some brokers charge a separate commission for each purchase and sale; they may establish commissions as a fixed rate or a percentage of the price with a minimum fee; some may assess an additional charge when an option is exercised.

American options can be bought and sold on any business day. Therefore, an option holder can always trade out of (offset) an options position before the option expires. Due to this feature, an option buyer does not need to exercise the option in order to realize a profit. The trader can simply liquidate the option position by making an offsetting trade, without having to become involved in trading the underlying futures contract. The ability to trade in and out of options on a daily basis means that users can buy and sell price insurance as they deem it desirable.

The decision to exercise an option lies with the buyer. If, for example, a cattle rancher decides to exercise a put option rather than to offset the position in the options market, the following should happen. For a put, the clearing corporation assigns the buyer a “short” (sell) position in the futures market at the strike price. Simultaneously, the writer of the option is assigned a “long” (buy) position in the futures market using that day’s futures settlement price. At this point, the option contract has been terminated and both parties are free to trade their futures positions as they see fit.

### ***Hedging Examples: Options vs. Futures***

The following example illustrates how option pricing strategies work and how their results compare with those of hedging with futures. For ease of

exposition, the put option contract is exercised rather than sold at the time of cash market delivery. In practice, most options will be sold rather than exercised, thus yielding larger returns.

### Selling Futures Contracts

In December a feedlot operator takes delivery of a lot of feeder cattle to go on feed until April, at which time the total weight of the animals is expected to be 40,000 pounds. The cattleman, expecting the cash price to be 75 cents/lb in April, can sell one April live-cattle futures contract at 75 cents/lb to lock in that cash price.<sup>1</sup>

If futures and cash prices fall to 65 cents/lb between December and April, the futures gain of 10 cents/lb will compensate for the lower cash price received, resulting in a net price received of 75 cents/lb. The same net price would have been received if cash and futures prices had both risen 10 cents/lb over the same period. In this latter case, a futures loss of 10 cents/lb would have reduced the cash price of 85 cents/lb to give the same net price. Subtracting an estimated \$50 for commission on the futures contract leaves a total net revenue of \$29,950 for the sale of the cattle.

### Buying Put Options

Now assume the cattleman buys one April put option with a strike price of 75 cents/lb instead of hedging with futures.

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<sup>1</sup> This assumes that the cash and futures market prices will come together at the time of the futures contract's maturity — that there is a “basis” (defined as the difference between futures and cash prices) of zero. In most locations, such as California, this is not likely to happen; there is usually some transportation cost between the local market and the nearest delivery point for the futures contract, as reflected in a positive basis.

Assume that the price of this option is 5 cents/lb for a premium of \$2,000. With a 0 (zero) basis, the minimum cash price assured to the cattleman is 75 cents/lb. However, if prices increase, the cattleman can let the option expire and sell at the higher cash market price (85-75=10 cents/lb = \$4,000 gross increase, minus the premium and commissions, leaves a net return of \$31,950). If prices fall at least 5 cents/lb, the option would be exercised, giving the minimum net return of \$27,900, no matter how far prices fall.

As this comparison shows, three factors will influence the relative attractiveness of options over futures: (1) the size of the premium, (2) the probabilities of a price rise or decline, and (3) the magnitude of price changes over time. The minimum return in the example is lower for options than it is for futures by an amount equaling the premium and commission. This will be true generally. Therefore, the desirability of options strategies depends greatly on premium levels.

Also, the net returns from a futures hedge will always be greater than those from options strategies if the price falls during the trading period. This means that the higher the probability of price decline, the more desirable are futures and the less desirable are options. Finally, the buyer will consider the magnitudes of potential price increases and decreases. If over a number of years the magnitude of price increases is substantially larger than the price declines, then option strategies will be more profitable than futures strategies.

Even if the average returns are lower for the option strategy in a particular case, some livestock producers may prefer it because it involves no margin calls, while futures strategies may involve margin calls. The possibility of margin calls requires that hedgers have a credit reserve or an arrangement with a lender for financing margin calls. Some livestock producers may feel that the

potential costs involved in meeting margin calls more than offset the larger returns from futures.

**One final note:** The example assumes that the option contract is held until it is exercised or expires worthless. In fact, the original options position can be offset on any business day until the expiration date, thus recapturing part of the premium cost.

The decision to offset an options position will depend on expectations concerning the price level of the underlying futures contract. The added flexibility of being able to trade options any time means that users may be able to have price protection when they need it without losing the entire premium, hence reducing the cost of the option strategy.

### ***Advantages and Disadvantages: Options vs. Futures***

In summary, the basic advantages and disadvantages of options vs. futures are:

#### *Buying Put Options*

Advantages:

- Permits establishing a minimum selling price while retaining the opportunity to benefit from higher cash prices.
- Option buyers does not receive margin calls.
- Maximum loss is equivalent to original premium cost.

Disadvantages:

- Option premiums may be relatively expensive.
- In most years, the option will expire worthless.

#### *Selling Call Options*

Advantages:

- Cash market returns can be increased by the amount of the premium received.

Disadvantages:

- The call option seller does not have price insurance against falling prices.
- Maximum return is equivalent to the option premium. Losses can be virtually unlimited if prices go up.
- Options sellers receive margin calls if premiums increase after the option is written (sold).

#### *Selling Futures*

Advantages:

- Establishes a selling price within a narrow range bounded by basis change.
- Commissions are relatively inexpensive compared to premium for options.

Disadvantages:

- Eliminates the opportunity to participate in higher cash market prices.
- Requires a margin deposit, and margin calls may occur if prices move higher.

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