

## DEPARTMENT OF AGRICULTURAL ECONOMICS

# Using Options to Hedge Farm & Ranch Inputs

**David Anderson**

Assistant Professor and Extension Economist  
The Texas A&M University System

**Dean McCorkle**

Extension Economist - Risk Management  
The Texas A&M University System

**Bud Schwart**

Professor and Extension Economist  
The Texas A&M University System

**Dan O'Brien**

Extension Agricultural Economist  
Kansas State University

Call options provide producers with a pricing tool that has considerable flexibility in managing price risks associated with farm and ranch inputs. The main advantages to a call option are protection against higher prices, limited liability with no margin deposits and the potential to benefit from lower cash prices. Futures contracts alone cannot provide this combination of upside price insurance and downside potential. The call provides leverage in obtaining credit, assists in procurement decisions, and has a formal set of contract provisions and known procedures for settling disputes. The option premium cost is paid at the time of purchase and basis risk remains until fixed, or the commodity is sold. Each option represents a standardized quantity linked to a futures contract, and trades must go through a commodity broker.

This publication examines hedging the costs of inputs with options. The reader should understand the basics of futures, options and basis prior to reading this publication. This information can be found in the following publications in this series: *Introduction to Options, Factors Affecting Option Premium Values, Selling Hedge with Futures, Buying Hedge with Futures, Knowing and Managing Grain Basis, and Hedging with a Put Option*.

## Using Call Options for Price Protection

Buyers of call options can hedge their upside price risk for a period of time and still benefit from potential price declines if the market should fall. Options are much like an insurance policy. The purchaser pays a premium to protect against a possible loss. Once the

premium is paid, the call buyer has no further obligation.

The strike price versus market price relationship can be in-the-money, at-the-money, or out-of-the money. Call options are in-the-money when the futures price exceeds the strike price. A call option is

out-of-the money when the futures price is below the strike price. When the strike price equals the current market price of the underlying futures, it is at-the-money.

Depending on price movements, you can either accept or leave the guaranteed price. That is, if the futures price moves lower after you buy the option, you can walk away and forget about the option. But, if the market goes up, you have the price protection with the call option at the selected strike price. Figure 1 illustrates how the price ceiling is derived.

**Figure 1. Price Ceiling With a Call Option**

Strike Price

+ Call premium paid  
+ Local basis (may be negative)  
+ Brokerage fee/transaction costs

**= Price Ceiling**

After the buyer has initially purchased an option from the option seller (writer), the option contract may be handled by any of three alternatives:

**Let the Call Expire.** The buyer of a call may opt to allow the option to expire if the futures price has decreased, and the option value has completely eroded. In other words, do nothing if the option has no value at its expiration date. Thus, the option premium paid

becomes another production/marketing expense. However, the option provided the buyer protection against rising prices for a period of time. The option seller keeps the premium.

**Offset the Call Option.** The call option buyer may decide to make an offsetting transaction in the options market if the option has increased in value or part of the premium can be salvaged. The offset transaction is accomplished by the buyer selling the call option on the exchange. Profit or loss depends on the current market price (premium) of the option compared to the original price paid. The buyer can offset the option at the current market premium at anytime until the expiration date.

**Exercise the Call Option.** The call buyer may exercise the right under the option contract, on or before the expiration date, to take a buy (long) position on the futures market at the strike price associated with the options contract. The option seller is required to take the short side and keeps the premium the buyer paid. The option buyer acquires the futures position and becomes subject to margin requirements. Producers would rarely exercise an option except under certain favorable market conditions.

### Call Option Delivery Months

When buying call options (or put options), you select the appropriate delivery month. While options have the same delivery months as the underlying futures contract, the option usually expires in the latter part of the month preceding the delivery month. For example, corn options delivery months are December, March, May, July and September. Cotton delivery months are December, March, May, July and October. Chicago Mercantile Exchange (CME) Live Cattle and Live Hog options expire in the month prior to the corresponding futures delivery month. Feeder Cattle options expire on the same day as their corresponding futures contract.

### Protecting Input Prices with a Call Option

To illustrate the use of a call option, assume a dairy producer is thinking about buying a call option on corn to protect his feed costs for next spring. His corn usage is approximately 200,000 pounds per month and he would like to hedge enough corn to cover both February and March, 400,000 pounds, or 7,142 bushels. It is August now and the CBT March Corn futures contract is trading at \$2.38 per bushel. Feeling there is a good

chance that corn futures will rise between now and next spring, he buys one at-the-money call option with a strike price of \$2.40. The premium costs \$0.18 and the 3-year average March corn basis in his area is -\$0.10. The purchase of a call option establishes a price ceiling, subject to basis risk, of \$2.48 (\$2.40 strike + \$.18 premium - \$0.10 basis) for corn purchased next February which is just above his price goal of \$2.45. The producer feels that the slightly higher hedged price (price ceiling) with the call option outweighs the risk of being unhedged with the possibility of prices increasing in the future. Remember that the basis is not locked in (in this example) and it could end up being lower (weaker) than the -\$0.10.

Table 1 illustrates the range of possible net prices (cash price + gain/loss on the option) the dairy producer could pay depending on what futures prices do between the date the call option was bought and when the hedge is lifted in February (at expiration).

**Table 1. Sensitivity Table for the Call Option Hedge**

Futures Price	Gain/Loss on Call	Net Price Paid <sup>1</sup>
\$2.10	-\$0.18	\$2.18
\$2.20	-\$0.18	\$2.28
\$2.30	-\$0.18	\$2.38
\$2.40	-\$0.18	\$2.48
\$2.50	-\$0.08	\$2.48
\$2.60	+\$0.02	\$2.48

<sup>1</sup> Includes -\$0.10 basis. Does not include brokerage fees or interest.

From Table 1 the \$2.48 price ceiling is evident for all futures prices above the \$2.40 strike price. For futures prices above the strike, a gain is realized on the call option and is equal to the futures price - strike price - premium.

For any futures price equal to or below the strike price, the dairy producer lets the option expire having no value. The call option is worthless because it has a loss built into it equal to the difference between the futures price and the strike price. Consider a closing futures price of \$2.10. It stands to reason that no one is going to pay for the right to buy a futures contract at a higher price (\$2.40) and have an immediate loss in the position. As a result, the out-of-the-money option is worthless after expiration. In this case, the option

expires having no value and you forfeit the premium you initially paid for the option.

One of the keys to hedging is knowing your basis. Historical basis data for your area is vital to implementing a hedge that meets your needs. Basis does fluctuate, but usually follows a seasonal trend throughout the year. It is advisable to allow room in your prehedge analysis for the actual basis to deviate some from your estimate.

**Figure 2. Creating a Window to Reduce Premium Cost**

#### Price Ceiling

$$\begin{aligned} \text{Call Strike Price} \\ + \text{Call Option Premium} \\ - \text{Put Option Premium} \\ + \text{Local Basis (may be negative)} \\ = \text{Window Price Ceiling} \end{aligned}$$

#### Floor Price

$$\begin{aligned} \text{Put Strike Price} \\ + \text{Call Option Premium} \\ - \text{Put Option Premium} \\ + \text{Local Basis (may be negative)} \\ = \text{Window Floor Price} \end{aligned}$$

A problem that often arises with buying a call option is that the option premium is higher than you can justify. One hedging strategy that sets a price ceiling and allows for limited downside price potential while also reducing option premium costs is referred to as a window (or fence).

A window strategy for protecting the cost of farm and ranch inputs is comprised of simultaneously buying a call option and selling a put option. Because you can choose whichever strike prices you desire (from among the strikes offered), the window strategy can be customized to best fit your situation. For example, you can choose strike prices so that the premium received from the put option totally offsets the cost of the call option, establishes a price ceiling that at least allows you to have a positive cash flow, or any other possible objective you may want to achieve with your window strategy. The window, or the range between the price ceiling and the floor price, is determined by these two strike prices. The price ceiling and floor price for a window strategy are detailed in Figure 2.

#### Margin Money for Writing Put Options

A word of caution is needed at this point. The writing of a put option requires a margin account be maintained because the option writer (seller) must maintain equity in his/her position. Option premiums fluctuate based on market conditions. Margin calls are based on the change in the value of the call option premium. For example, assume you sell (write) an out-of-the money feeder cattle put option with a \$66 strike price for \$0.85 (the premium). A few weeks later, the futures price declines from \$70 to \$69 resulting in the option premium increasing to \$1.30. In this case, you would be required to make a margin call to cover the market move against your position. For more information on margin accounts related to writing call options, please refer to *Introduction to Options*.

Call option sellers should also be aware of the possibility of being exercised upon. If the futures price is below the put strike price at expiration, the buyer of the put option has incentive to exercise the put option. If the option holder (the buyer) chooses to do so, the option seller (you in this case) could be placed in a long position at the strike price which would likely result in a loss for the put option seller.

Keep in mind that any loss on the put option, which is paid through margin calls, will be roughly offset later by a lower cash price paid when the commodity is bought. But, a short-term cash flow problem could arise.

#### Window Strategy Illustration

Using the same example as above, the dairy producer feels the \$0.18 call option premium is too expensive for the protection afforded and is considering simultaneously selling (writing) a put option to offset a portion of the call premium. After reviewing the put and call option strike prices, current premiums and analyzing the various floor and ceiling prices associated with several different combinations of strike prices, he decides to purchase a \$2.40 March call option for \$0.18 and sell a \$2.20 March put option for \$0.06. This creates a price ceiling of \$2.42 and a floor price of \$2.22 (Table 2).

**Table 2. Window Strategy Ceiling and Floor Price****Price Ceiling**

Call Strike Price	\$2.40
Call Option Premium	+\$0.18
Put Option Premium	-\$0.06
Local Basis	-\$0.10
<b>Price Ceiling</b>	<b>\$2.42</b>

**Floor Price**

Put Strike Price	\$2.20
Call Option Premium	+\$0.18
Put Option Premium	-\$0.06
Local Basis	-\$0.10
<b>Floor Price</b>	<b>\$2.22</b>

Table 3 illustrates the net price paid for the corn at various futures prices on the options' expiration date, the day the hedge is lifted. The \$2.22 floor price is attained when the futures price is equal to or above the put strike

**Table 3. Estimated Results of Window Strategy for Farm/Ranch Inputs**

Buy \$2.40 call for \$0.18, Sell \$2.20 put for \$0.06

Futures Price	Cash Price	Call Gain/Loss	Put Gain/Loss	Net Price <sup>1</sup>
\$2.00	\$1.90	(\$0.18)	(\$0.14)	\$2.22
\$2.10	\$2.00	(\$0.18)	(\$0.04)	\$2.22
\$2.20	\$2.10	(\$0.18)	\$0.06	\$2.22
\$2.30	\$2.20	(\$0.18)	\$0.06	\$2.32
\$2.40	\$2.30	(\$0.18)	\$0.06	\$2.42
\$2.50	\$2.40	(\$0.08)	\$0.06	\$2.42
\$2.60	\$2.50	\$0.02	\$0.06	\$2.42

<sup>1</sup> Includes -\$0.10 basis. Does not include brokerage fees or interest.

price. When the futures price is equal to or below the call strike price the net price paid is equal to the price ceiling. When the futures price is equal to or above the put strike price, you keep the entire amount received from selling the put option.

The primary advantages and disadvantages to the window strategy are:

**Window Advantages**

- Upside price protection provided by the call option is less costly because income received from selling the put option partially offsets the cost of the call option. With the dairy producer's window, the net cost of the call option is \$.12 (\$.18 - \$.06) as long as the futures price remains higher than the put strike price.

**Window Disadvantages**

- Selling a put can cause the floor price to be a little higher.
- Selling a put option requires that a margin account be established.

Before utilizing a window strategy, make sure you feel comfortable with your knowledge level of futures, options and margin requirements. A window strategy is one of many tools using futures and options to manage upside price risk. And like all of these marketing tools, a window strategy can be useful if you know how to use it and know the advantages and disadvantages.

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