

Risk Management

# Using Options to Hedge Farm and Ranch Inputs

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Call options are a pricing tool that gives producers considerable flexibility in managing the price risks associated with farm and ranch inputs. The main advantages of 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 acquired. Each option represents a standardized quantity linked to a futures contract, and trades must go through a commodity broker.

This publication describes 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* (E-499), *Factors Affecting Option Premium Values* (E-577), *Selling Hedge with Futures* (E-497), *Buying Hedge with Futures* (E-498), *Knowing and Managing Grain Basis* (E-575), and *Hedging with a Put Option* (L-5250).

## 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 price declines if the market should fall. An option is 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/market price relationship can be in-the-money, at-the-money, or out-of-the-money. A call option is in-the-money when the futures price exceeds the strike price. It 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.

Strike price	
+ Call premium paid	
+ Local basis (may be negative)	
+ Brokerage fee/transaction costs	
<hr/>	
=	Price ceiling

Figure 1. Price ceiling with a call option.

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

**Let the call expire.** The buyer of a call may let the option expire if the futures price has decreased and the option value has completely eroded. In other words, he may 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 protected the buyer 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 any time 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 a call option (or put option), you select the appropriate delivery month. While an option has the same delivery month as the underlying futures contract, the option usually expires in the latter part of the month preceding the delivery month. For example, the December corn option expires in late November, March corn options expire in February, and so on. Chicago Mercantile Exchange (CME) Live Cattle and Live Hog options expire in the month prior to the corresponding futures delivery month. However, 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. He uses about 200,000 pounds of corn per month and would like to hedge enough corn to cover both February and March (400,000 pounds or 7,142 bushels). His corn price objective is \$5.20 or less. It is August now, and the CBT March Corn futures contract is trading at \$4.87 per bushel. Believing that corn futures will rise between now and next spring, he buys one at-the-money call option with a strike price of \$4.90. The premium costs \$0.45 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 \$5.25 ( $\$4.90$  strike +  $\$0.45$  premium +  $-\$0.10$  basis) for corn purchased next February. This is just above his price goal of \$5.20. The producer feels that the slightly higher hedged price (price ceiling) with the call option is more desirable than the risk of being unhedged when prices might increase in the future. Remember that the basis is not locked in (in this example) and it could end up being weaker or stronger 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 for corn, depending on what futures prices do between the date the call option was bought and the date the hedge is lifted in February (at expiration).

**Table 1. Sensitivity table for the \$4.90 call option hedge.**

Futures price	Cash price <sup>1</sup>	Gain/(loss) on call	Net price paid <sup>2</sup>
\$4.60	\$4.50	(\$0.45)	\$4.95
\$4.70	\$4.60	(\$0.45)	\$5.05
\$4.80	\$4.70	(\$0.45)	\$5.15
\$4.90	\$4.80	(\$0.45)	\$5.25
\$5.00	\$4.90	(\$0.35)	\$5.25
\$5.10	\$5.00	(\$0.25)	\$5.25

<sup>1</sup>-\$0.10 basis

<sup>2</sup>Does not include brokerage fees or interest

From Table 1 the \$5.25 price ceiling is evident for all futures prices above the \$4.90 strike price. For futures prices above the strike price, higher cash prices are offset by gains in the value of the call option.

For any futures price equal to or lower than 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 \$4.80. It stands to reason that no one is going to pay for the right to buy a futures contract at a higher price (\$4.90) and have an immediate loss in the position. As a result, the out-of-the-money option is worthless at expiration. In this case, the option expires having no value and the buyer forfeits the premium 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 pre-hedge analysis for the actual basis to deviate from your estimate.

### Creating a Window to Reduce Premium Cost

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 involves 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.

#### Price ceiling

$$\begin{aligned} & \text{Call strike price} \\ & + \text{Call option premium} \\ & - \text{Put option premium} \\ & + \text{Local basis (may be negative)} \\ \hline & = \text{Window price ceiling} \end{aligned}$$

#### Floor price

$$\begin{aligned} & \text{Put strike price} \\ & + \text{Call option premium} \\ & - \text{Put option premium} \\ & + \text{Local basis (may be negative)} \\ \hline & = \text{Window floor price} \end{aligned}$$

Figure 2. Price ceiling and floor price with a window.

### Margin Money for Writing Put Options

A word of caution is needed at this point. The writing (selling) of a put option requires that 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) the out-of-the-money corn put option above: futures are trading at \$4.90, you sell a \$4.70 put at \$0.38. A few weeks later, the price of corn drops to \$4.70, causing the option premium value to increase to \$0.50. The value of your margin account is reduced by \$0.12 per bushel. A margin call is issued if this loss puts your account balance below the maintenance margin level. For more information on margin accounts related to writing call options, please refer to *Introduction to Options* (E-499).

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 \$0.45 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 and current premiums, and analyzing the various floor and ceiling prices associated with several different combinations of strike prices, he decides to purchase a \$4.90 March call option for \$0.45 and sell a \$4.70 March put option for \$0.38. This creates a price ceiling of \$4.87 and a floor price of \$4.67 (Table 2).

**Table 2. Window strategy ceiling and floor price.**

<b>Price ceiling</b>	
Call strike price	\$4.90
Call option premium	+\$0.45
Put option premium	-\$0.38
Local basis	-\$0.10
<b>Price ceiling</b>	<b>\$4.87</b>
<b>Floor price</b>	
Put strike price	\$4.70
Call option premium	+\$0.45
Put option premium	-\$0.38
Local basis	-\$0.10
<b>Floor price</b>	<b>\$4.67</b>

Table 3 illustrates the net price paid for the corn at various futures prices on the option's expiration date, the day the hedge is lifted. The \$4.67 floor price is attained when the futures price is equal to or below the put strike price. When the futures price is equal to or higher than the call strike price, the net price paid is equal to the price ceiling. When the futures price is between the put strike price and the call strike price, the net price of corn is increased or decreased by the amount of the net premium paid. When the futures price is equal to or higher than the put strike price, you keep the entire amount received from selling the put option.

**Table 3. Estimated results of window strategy for farm/ranch inputs.**

Buy a \$4.90 call for \$0.45—Sell a \$4.70 put for \$0.38

Futures price	Cash price <sup>1</sup>	Call gain/ (loss)	Put gain/ (loss)	Net price <sup>2</sup>
\$4.50	\$4.40	(\$0.45)	\$0.18	\$4.67
\$4.60	\$4.50	(\$0.45)	\$0.28	\$4.67
\$4.70	\$4.60	(\$0.45)	\$0.38	\$4.67
\$4.80	\$4.70	(\$0.45)	\$0.38	\$4.77
\$4.90	\$4.80	(\$0.45)	\$0.38	\$4.87
\$5.00	\$4.90	(\$0.35)	\$0.38	\$4.87
\$5.10	\$5.00	(\$0.25)	\$0.38	\$4.87

<sup>1</sup>Includes -\$0.10 basis

<sup>2</sup>Does not include brokerage fees or interest

The primary advantages and disadvantages of 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 offsets some or all of the cost of the call option. With the dairy producer's window, the net cost of the call option is \$0.07 (\$0.45 - \$0.38) as long as the futures price remains higher than the put strike price.

#### Window Disadvantages

The final purchase price of the input commodity may be higher with a window strategy than when buying only a call. This is because the window strategy imposes both a maximum purchase price and a minimum purchase price.

Selling a put option requires that a margin account be established.

Before using a window strategy, make sure you feel comfortable with your knowledge of futures, options, and margin requirements. A window strategy is one of many ways to use futures and options to manage upside price risk. And like all 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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