

Introduction to Hedging Agricultural Commodities With Options

Producers of agricultural commodities regularly face price and production risks. Furthermore, increased global free trade and changes in domestic agricultural policy have increased these risks. As the variability of price increases the variability of revenue, producers are realizing the importance of risk management as a component of their management strategies.

One means of reducing these risks is through the use of the commodity options exchange markets. Like using car insurance to hedge the potential costs of an accident, agricultural producers can use the commodity options markets to hedge the potential costs of commodity price volatility. As when gains from a car insurance claim might not exceed the cost of the cumulative sum of premiums, the gains from hedging agricultural commodities might not cover the costs of hedging. The primary objective of hedging is not to make money but to minimize price volatility. This guide provides an overview of hedging to aid producers in evaluating hedging opportunities.

The options market is sometimes referred to as insurance. By hedging through the options market, an individual locks in the costs of hedging and then can lose at most only the cost of the option premium while having unlimited profit potential.

Commodity trading: Operations of a commodity exchange

Arbitrage is the process whereby a commodity is simultaneously bought and sold in two separate markets to take advantage of a price discrepancy between the two markets. A commodity futures exchange acts as a marketplace for persons interested in trading. The factors driving arbitrage are the real or perceived differences in the equilibrium price determined by supply and demand at various locations. For instance, suppose North Carolina has a shortage of corn to feed



Figure 1. Commodity options provide a way to minimize price volatility and risk for agricultural producers.

livestock. If I believe that I can profit from buying corn in Missouri, paying shipping costs, and selling corn in North Carolina, I will continue to do so until the supply and demand for corn are equal in North Carolina. At that point, the Missouri corn price plus the shipping costs will equal the North Carolina corn price.

For the options market, the arbitrage activities are carried out through the exchange of paper promissory notes to sell or buy a commodity at an agreed-upon price at a later date. A promissory note gives an individual the right to either buy or sell at a later date; it carries no obligation to buy or sell as with futures hedging. As new information enters the market (exchange), perceptions change and the process of arbitrage begins again. Option premiums change in value as supply-and-demand perceptions change, indicating to traders where the market price will go in the future.

Where trading occurs

The two main exchanges where trading occurs for agricultural commodities are located in Chicago. The Chicago Board of Trade (CBOT) is where corn, soybean, soybean oil, soybean meal, wheat and rough rice futures are traded. The Chicago Mercantile

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Exchange (CME) is where futures in lean hogs, live cattle, feeder cattle and stocker cattle are traded. Both exchanges are now part of the CME group. In addition, cotton futures are traded at the Intercontinental Exchange (ICE Futures U.S.) in New York.

Options terminology

The options market has some specialized terminology. A put option gives an individual the right to sell a futures contract at a later date. A call option gives an individual the right to buy a futures contract at a later date. The price at which the futures market can be entered at a later date is referred to as the strike price. The premium paid is in relation to the strike price. The strike price is a predetermined range of values that is different for each commodity. A put option is said to be in the money if the strike price is above the underlying futures price. Conversely, a call option is in the money if the strike price is below the future price. Both put and call options are said to be at the money if the strike price is equal to the underlying futures price. A put option is said to out of the money if the strike price is below, and a call option if the strike price is above, the underlying futures price. At any given time, the range of strike prices quoted will cover values in the money, at the money and out of the money. Thus, a hedger or speculator has the option of purchasing an option at any of these three levels. Typically, options in the money will have the highest premium, followed by options at the money. Options out of the money will have the lowest premiums.

The value of the option has two components: intrinsic value and time value (see Table 1). Both of these values are implicit values, not observed but theoretically present. Intrinsic value is the value of the option relative to the underlying futures price.

Using data from Table 2, a feeder cattle put option with a strike price of \$138 has an intrinsic value of \$1.675 ($\$138 - 136.325$) per hundredweight if the underlying futures price is \$136.325 per hundredweight. This is because the put option could be exercised (the

Table 1. Key option terminology.

Term	Definition
Option premium	Intrinsic value plus time value
Intrinsic value	0 (if strike price is out-of-the money) or Futures minus strike price (if strike price is in-the-money)
Time value	Option premium minus intrinsic value

process of exercising an option refers to selling a futures contract, in this case at \$138, and buying it back at the futures price, of \$136.325 in this case). Typically, the change in intrinsic value of the option is determined by the change in futures price. The change in option premium is typically not as large for options out-of-the-money or at-the-money.

The time value of an option is based on the length of time between the option premium quote and the contract's expiration: The longer the time between the two, the better the chance that the option premium will increase in value. From Table 2, the time value for a \$138 strike price put option is \$4.625 (premium of \$6.30 less intrinsic value of \$1.675).

Example

Bill believes the domestic fall production of corn has been publicly underestimated in midsummer, and Tom believes the domestic fall production of corn has been publicly overestimated in midsummer. Using the commodity exchange as a marketplace, Bill purchases the right to sell a futures contract (put), at a predetermined strike price, at a later date because he believes corn prices are destined to go lower. Tom purchases the right to buy a futures contract (call), at a predetermined strike price, at a later date because he believes the price is going to go higher. In contrast to the futures market, Bill's and Tom's positions do not offset each other. In the options market, writers of options are like an insurance agency. Writers of options

Table 2. Feeder cattle options with an underlying feeder cattle futures price of \$136.325 per hundredweight.

Strike price	Put premium	Put terminology	Call premium	Call terminology
\$132	3.725	2 strikes out-of-the-money	8.050	2 strikes in-the-money
\$134	4.450	1 strike out-of-the-money	6.775	1 strike in-the-money
\$136	5.325	At-the-money	5.650	At-the-money
\$138	6.300	1 strike in-the-money	4.625	1 strike out-of-the-money
\$140	7.400	2 strikes in-the-money	3.725	2 strikes out-of-the-money

are willing to take a set premium per unit of commodity in exchange for the risk that the commodity price may move against them.

Suppose Bill purchases the right to sell (put option) a future contract for corn at a later date at a strike price of \$4.40 per bushel for a premium of \$0.20 per bushel, and suppose the futures price is at \$4.50 per bushel that day. Then Bill would initially pay the commodity broker \$1,000 (5,000 bushels multiplied by \$0.20) plus commissions. The \$1,000 would go to the writer of the option. Anyone can write options. Why would anyone write an option? Because if the price does not decline or the price rises, the premium would decline over time and the option writer would profit \$1,000. However, the futures market price could have decreased to \$4.20 per bushel and the premium increased to \$0.40 per bushel. Note that a one-to-one relationship does not usually exist between a change in the futures market price and option premium due to less risk in the options market. Thus, Bill could now either sell the option for \$0.40 per bushel and profit \$0.20 per bushel (\$1,000)

or exercise the option. Exercising an option should be done only if you are concerned about liquidity in filling an order to sell the option premium or if the option premium doesn't reflect the full intrinsic value of the option.

When to hedge

By knowing his cost of production, Joe can determine the price at which he might consider forward pricing a portion of his production. Thus, producers must know their cost of production when hedging a commodity. For instance, if Sue knows her cost of production on 400-pound feeder calves is \$130 per hundredweight, then she might consider forward pricing a portion of her calf crop through the options market. Producers need to determine a target profit margin, because the natural tendency is to price high at the market.

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