Long Hedge Example With Options

This guide describes how to place an input (long) hedge in the options market to reduce the price risk associated with buying an input used in your business. A long hedge in the options market is accomplished by purchasing a call option. Futures are the financial instrument or derivative contract underlying an option contract. Therefore, it is important to understand futures contracts and determine which futures contract month is appropriate to achieve the price and timing objective of the hedge.

For example, assume that Heidi, a swine producer, knows she will be buying a pen of feeder pigs two months from now. To feed the pigs, she will need 5,000 bushels of corn (one full contract at the Chicago Board of Trade) during the next four months to use for feed. Corn is an input into the production of swine. Currently, the local cash price for corn is $3.70 per bushel, but Heidi believes that the price may rise during the next few months. By knowing her cost of production for the hogs, Heidi knows that $3.70 per bushel will allow her to make a profit. What can she do to protect against an increase in the price of corn? Heidi could purchase the grain now, but she would have to pay to store it for the next few months, increasing the price above $3.85 per bushel, or she could buy in the cash market later. Alternatively, Heidi could wait to buy grain, enter the options market, and partially offset any loss in value (increase in price) with a gain in the option's value.

How to place a hedge

First, knowing your cost of production helps you know when to place a hedge. To place a hedge, you need to contact a broker. Most large communities have a broker who will take your order for a set fee (as is common when placing any order in the futures/options market). The broker can help you understand how to place and exit your hedging position. The broker has a stake — a commission — in making sure you have a positive experience with hedging.

After you have placed the order, the broker will contact a brokerage house at the commodity exchange and relay the order. The market forces of supply and demand are generally determined in the futures market. Option trades (orders) are filled at an exchange usually on an electronic trading platform. If you want to place a long hedge using options (call option), there will always be someone willing to write a call option, provided you are willing to pay the market price. This process is known as arbitrage. You must also know the strike price at which you would like to enter the options market. For more information, see MU Extension G603, *Introduction to Hedging Agricultural Commodities With Options*.

Options in, out of and at the money

The price paid for the option is referred to as the premium. The amount of the premium paid is related to the strike price, which comes from a predetermined range of values that is different for each commodity. A call option is said to be in the money if the strike price is below the underlying futures price, at the money if the strike price is equal to the underlying futures price, or out of the money 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 be the cheapest.

Option premium

The option premium is the value the hedger pays for the right to take a futures position later. The premium is based on the intrinsic value (difference between the strike price and the futures price for an in-the-money call option) and time value (time remaining until expiration of the contract). Thus, changes in the value of the option are due to changes in the futures market price (intrinsic value) and the number of days until expiration

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(time value). If the futures market increases, a call option theoretically increases in value, but not always.

How a long hedge works

Any of three scenarios can arise between the cash and option value. Even though a loss may be shown from taking a position in the options market, the final price must be compared with purchasing the grain in advance and paying storage costs, or waiting to buy in the cash market. Basis is held constant for the examples below.

Cash price and futures price both increase

Based on the example above, assume that Heidi decides to purchase a $3.90 per bushel out-of-the-money call option for $0.15 per bushel (Table 1). Later, when Heidi is ready to purchase the hogs and purchase corn to make feed, the cash and futures prices have increased to $3.95 per bushel and $4.05 per bushel, respectively (no change in basis). The futures price has increased such that the call option is now in the money. Therefore, Heidi purchases the corn for $3.95 per bushel and sells her call option for $0.25 per bushel, a $0.10 per bushel gain in value. By purchasing a call option, Heidi has decreased her cost of purchasing the grain from $3.95 per bushel to $3.86 per bushel ($3.95 per bushel plus $0.01 per bushel commission less $0.10 per bushel gain in option value).

Table 1. Long hedge with options as cash and futures prices increase (basis is held constant).

Cash and futures	Options price	
Today: Cash at $3.70/bu Futures at $3.80/bu	Purchase $3.90/bu call at $0.15/bu (pay $750 plus commission)	
Later: Buy local corn at $3.95/bu Futures at $4.05/bu	Sell $3.90/bu call at $0.25/bu (receive ($1,250 less commission)	
Results:	Cash price paid	$3.95/bu
	Plus commission	$0.01/bu
	Minus option premium gain	$0.10/bu
	Net buying price	**$3.86/bu**

bu = bushel

Cash price and futures price both decrease

In this example, after Heidi has purchased her out-of-the-money option, the cash and futures prices for corn decrease to $3.50 per bushel and $3.60 per bushel, respectively (no change in basis). The futures price has decreased such that the call option is now even more out of the money. Therefore, Heidi purchases the corn for $3.50 per bushel and sells her call option for $0.02 per bushel, an $0.13 per bushel loss (Table 2). In this case, Heidi has increased the cost of purchasing the grain from $3.50 per bushel to $3.64 per bushel ($3.50 per bushel plus $0.01 per bushel commission plus $0.13 per bushel loss in option value). However, Heidi had the potential for unlimited gains (Table 1 scenario) with limited losses.

Table 2. Long hedge with options as cash and futures prices decrease (basis is held constant).

Cash and futures	Options price	
Today: Cash at $3.70/bu Futures at $3.80/bu	Purchase $3.90/bu call at $0.15/bu (pay $750 plus commission)	
Later: Buy local corn at $3.50/bu Futures at $3.60/bu	Sell $3.90/bu call at $0.02/bu (receive ($100 less commission)	
Results:	Cash price paid	$3.50/bu
	Plus commission	$0.01/bu
	Plus option premium loss	$0.13/bu
	Net buying price	**$3.64/bu**

bu = bushel

Cash price stable, options value expires

With the same initial conditions as in the previous examples, assume that the cash and futures prices for corn have changed minimally (no change in basis) and the contract month expiration date is tomorrow (Table 3).

Therefore, Heidi purchases the corn for $3.69 per bushel and allows her call option to expire worthless (and Heidi does not pay commission costs for allowing the option to expire). In this case, Heidi has increased the cost of purchasing the grain from $3.69 per bushel to $3.845 per bushel ($3.69 per bushel plus $0.005 per bushel commission plus $0.15 per bushel loss in option value). However, Heidi had the potential for unlimited gains (Table 1 scenario) with limited losses.

Table 3. Long hedge with options as cash and futures prices do not change (basis is held constant).

Cash and futures	Options price	
Today: Cash at $3.70/bu Futures at $3.80/bu	Purchase $3.90/bu call at $0.15/bu (pay $750 plus commission)	
Later: Buy local corn at $3.69/bu Futures at $3.79/bu	Sell $3.90/bu call expires at $0/bu (receive ($0)	
Results:	Cash price paid	$3.69/bu
	Plus commission	$0.005/bu
	Plus option premium loss	$0.15/bu
	Net buying price	**$3.845/bu**

bu = bushel

Exercise a call option

Table 4 outlines an example similar to the one described in Table 1. However, in this case, the futures price increases substantially and the option premium realizes only a modest increase. In this case, Heidi might want to exercise the call option. That is, Heidi would use her right to buy a futures contract at a later date at $3.90 per bushel and sell back in the futures market at the current price of $4.30 per bushel. Therefore, Heidi would pay only $3.96 per bushel instead of the current cash price of $4.20 per bushel. Furthermore, if Heidi had sold her call option, she would have paid $4.01 per bushel because the call option increased in value by only $0.20 per bushel compared to a net gain of $.25 per bushel by exercising the option rather than selling it back.

Table 4. Long hedge with options as cash and futures prices increase (basis is held constant).

Cash and futures	Options price	
Today: Cash at $3.70/bu Futures at $3.80/bu	Purchase $3.90/bu call at $0.15/bu (pay $750 plus commission)	
Later: Buy local corn at $4.20/bu Futures at $4.30/bu	Option value is $0.35/bu. Therefore, exercise option at $3.90/bu and offset in the futures market at $4.30 for an increase in value of $0.40/bu (receive $2000 less commission).	
Results:	Cash price paid	$4.20/bu
	Plus commission	$0.01/bu
	Plus initial call premium	$0.15/bu
	Minus option exercise gain	$0.40/bu
	Net buying price	**$3.96/bu**

bu = bushel

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