

Options Tool to Enhance Price

File A2-68

Price options for crops, when used in conjunction with cash sales, provide a set of marketing tools for farmers. One of these is the opportunity for price enhancement. This tool leaves you vulnerable to price declines and limits your upside potential, but it does add a fixed amount to your price.

For a review of options read the following Ag Decision Maker Information Files:

- [Crop Price Options Basics](https://extension.iastate.edu/agdm/crops/pdf/a2-66.pdf), extension.iastate.edu/agdm/crops/pdf/a2-66.pdf
- [Options Tool to Reduce Price Risk](https://extension.iastate.edu/agdm/crops/pdf/a2-67.pdf), extension.iastate.edu/agdm/crops/pdf/a2-67.pdf
- [Crop Price Options Fence](https://extension.iastate.edu/agdm/crops/pdf/a2-69.pdf), extension.iastate.edu/agdm/crops/pdf/a2-69.pdf

To use this tool, you must coordinate the use of options with cash sales of the crop.

Writing or (selling) call options allows you to enhance your crop sale price by receiving the option premium in addition to the sale of your crop. However, this tool will establish a maximum or ceiling price for your crop while leaving you vulnerable to lower prices. Your decision is whether the options premium you receive is worth more than the risk of income given up if prices rise above the ceiling price.

Using the Call Option to Enhance Price

The basic tool for enhancing your selling price is to hold your crop unpriced and sell (write) call options. The discussion below shows how writing (selling) call options establishes a maximum or ceiling price for your crop.

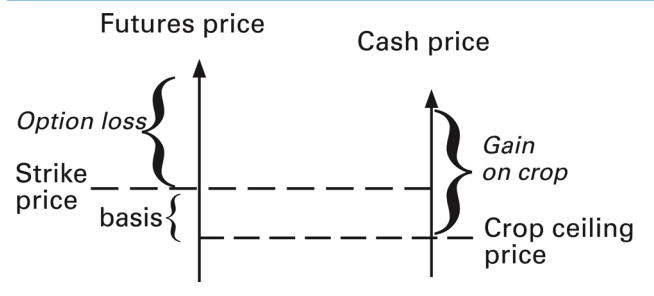
If you write a call option, you will lose money if the futures price rises above the strike price because the exercise value increases the value of the premium. More specifically, when the futures price rises above the strike price, the option buyer may exercise the option. If the buyer exercises the option, you must sell futures to the buyer at the strike price. To get out of the market you must buy futures at the current futures price to offset your position. By doing this you will incur a loss.

If the buyer does not exercise the option but you still want to get out of the market, you can buy an option to offset the one you previously sold. However, if you buy back the option before the option expiration date, the option premium will be larger than its exercise value (the option will contain time value). So, the loss from the option may be larger if you buy the option back than if the option is exercised.

As shown in Figure 1, the farther the futures price rises above the strike price, the more the call option premium increases in value (exercise value). However, as the futures price increases, the cash price also increases. As the call option loss increases due to the increase in futures price, the value of the crop increases due to the increase in cash price. A ceiling or maximum price is established because the loss on the option offsets the increase in the value of the cash crop.

The strike price is the ceiling or maximum price because this is the point at which the option begins to accrue a loss (exercise value) which offsets the increased value of the cash crop. To compute an equivalent ceiling price for the cash crop you must estimate what the cash price will be when the futures price reaches the strike price. Do this by subtracting the expected basis from the strike price. This is the basis you expect to exist when you close out the position by buying the option back and selling the cash crop.

Figure 1.



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To implement this strategy you write (sell) the call option now. Later, when you are ready to sell the crop, you buy the option back or let it expire. If the price has increased above the strike price, as shown in Figure 2, you buy the option back. What you lose on the option will be offset by what you make on the cash crop assuming there is no time value remaining on the option premium. If the price has declined, as shown in Figure 3, the option will expire and you sell the crop at the lower price, and you get to keep the premium you received from selling the call option.

Figure 2. Hold crop and write call (rising market)

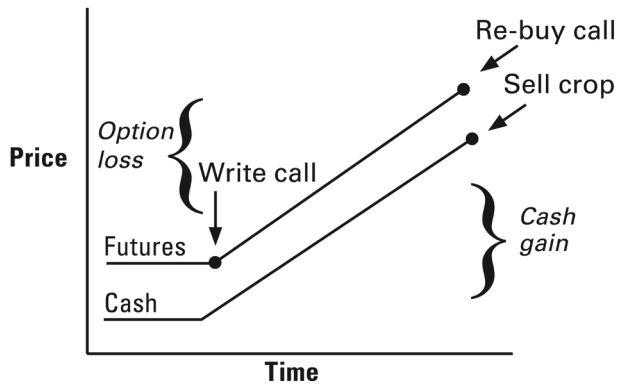
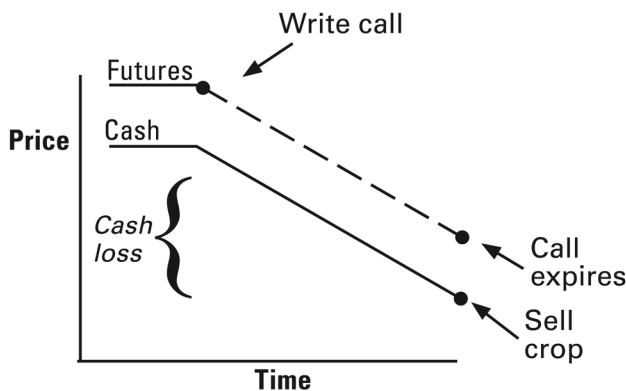


Figure 3. Hold crop and write call (declining market)



If the futures price is above the strike price, a maximum or ceiling price is established.

As shown in Example 1, whenever the futures price is at or above the strike price, the ceiling price is \$6.90. However, if the basis is different than expected, the ceiling price will also change.

Example 1.

Assume a \$7.00 strike price call option is sold for a premium of \$.40. Subsequently, the futures price increases to \$8.00, (\$1.00 above the \$7.00 strike price) and the cash price increases to \$7.50 (\$-.50 basis).

\$8.00	futures price
7.00	strike price
.40	premium
7.50	cash price

The net price is the \$7.50 cash price, less the \$1 option loss (\$7.00 – \$8.00), plus the \$.40 premium, for a total of \$6.90 (not including the trading cost).

\$7.50	cash price
- 1.00	option loss
+ .40	premium
\$6.90	net price

Next assume the futures price increases to \$9.00 or \$2.00 above the strike price. The cash price increases to \$8.50 (\$-.50 basis). The cash price of \$8.50, less the option loss of \$2.00, plus the premium of \$.40 results in a price of \$6.90.

\$8.50	cash price
- 2.00	option loss
+ .40	premium
\$6.90	net price

In Example 2, the net price is \$.10 lower than expected because the basis is \$.10 wider than expected. If the basis is wider, the ceiling price will be lower.

Example 2.

Assume the futures price increases to \$9.00 or \$2.00 above the strike price. The cash price is \$8.40 (\$-.60 basis).

The cash price of \$8.40, less the option loss of \$2.00, plus the premium of \$.40, results in a net price of \$6.80.

\$8.40	cash price
- 2.00	option loss
+ .40	premium
\$6.80	net price

Also, if there is time value (extrinsic value) remaining in the option premium when you buy the option back, the ceiling price will be lower. This will occur if you liquidate your option position before expiration.

Example 3.

Assume the futures prices increases to \$8.00 or \$1.00 above the strike price. The cash price is \$7.50 (\$-.50 basis). The option premium is \$1.15.

\$7.00	strike price
.40	beginning premium
8.00	futures price
1.15	ending premium
7.50	cash price

The net price is the \$7.50 cash price, plus the \$.40 beginning premium, less the \$1.15 ending premium for a total of \$6.75 (not including trading costs).

\$7.50	cash price
+ .40	beginning premium
-1.15	ending premium
\$6.75	net price

If the futures price is below the strike price, the cash crop is sold for the lower price and the option is allowed to expire (unless there is time value left on the option.)

Example 4.

Assume the futures price declines to \$6.00 and the cash price to \$5.50 (\$-.50 basis.)

\$7.00	strike price
.40	premium
6.00	futures price
5.50	cash price

The cash price of \$5.50, plus the premium of \$.40, results in a net price of \$5.90. The option expires worthless.

\$5.50	cash price
+ .40	premium
\$5.90	net price

Estimating the Ceiling Price

An estimate of the maximum price or ceiling price can be made in advance. It can be computed by adding the premium and subtracting the expected basis and trading cost from the strike price.

Example 5.

Assume the strike price is \$7.00, the premium is \$.40, and the estimated basis is \$-.50 (assume no trading cost). The estimated ceiling price is \$6.90.

\$7.00	strike price
+ .40	premium
+ -.50	estimate basis
\$6.90	estimated ceiling price

The accuracy of the ceiling price estimate will depend on how closely the estimated basis approximates the actual basis and whether the option premium has any time value remaining when you buy back your position.

One of the complaints of using options to enhance price is the low ceiling price that it establishes on your crop. One way to increase the ceiling price is to write **out-of-the-money** call options. **Out-of-the-money** options will increase the ceiling price but will reduce the size of the premium you receive.

Example 6.

Assume the futures price is \$7.00 and the basis is \$ -.30.

Call strike prices ranging from \$7.00 (**at-the-money**) to \$7.75 (**\$.75 out-of-the-money**) and their respective premiums are shown below.

Strike price	\$7.00	\$7.25	\$7.50	\$7.75
Premium	.40	.30	.25	.22

The maximum selling price is \$7.10 for the **at-the-money** option and rises to \$7.67 for the **\$.75 out-of-the-money** option.

Maximum price

Strike price	\$7.00	\$7.25	\$7.50	\$7.75
Expected basis	+-.30	+-.30	+-.30	+-.30
Premium	<u>+.40</u>	<u>+.30</u>	<u>+.25</u>	<u>+.22</u>
Net price	\$7.10	\$7.25	\$7.45	\$7.67

However, the net price decreases from \$6.10 for the **at-the-money** option to \$5.92 for the **\$.75 out-of-the-money** option if the futures price decreases to \$6.00.

Price decline (\$6.00 futures price)

Futures price	\$6.00	\$6.00	\$6.00	\$6.00
Expected basis	+-.30	+-.30	+-.30	+-.30
Premium	<u>+.40</u>	<u>+.30</u>	<u>+.25</u>	<u>+.22</u>
Net price	\$6.10	\$6.00	\$5.95	\$5.92

So, **out-of-the-money** options result in a higher ceiling price but a lower enhanced price if prices decline.

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Reviewed by Kelvin Leibold, farm management field specialist, kleibold@iastate.edu

Original author Don Hofstrand, retired agricultural business specialist, agdm@iastate.edu
www.extension.iastate.edu/agdm