

Crop Price Options Fence

File A2-69

During periods of high prices, farmers are often interested in forward pricing crops. However, many are concerned about using forward cash contracts, hedge-to-arrive contracts, or hedging for fear that prices may go even higher. Buying put options would relieve these worries. But premiums to buy puts rise sharply as prices become more volatile.

Building a Fence

Building a fence by using options is an alternative you might want to consider. By building a fence around your net price, you set a minimum price under which the price cannot fall and a maximum price over which the net price cannot rise. To build a fence you buy a put option with a strike price just below the current future price and sell (write) a call option with a strike price above the current futures price. The put option establishes a floor price for your grain. The call option establishes a ceiling price. For information on how to use options refer to the following Ag Decision Maker Information Files:

- [Crop Price Options Basics](http://extension.iastate.edu/agdm/crops/pdf/a2-66.pdf), extension.iastate.edu/agdm/crops/pdf/a2-66.pdf
- [Options Tool to Reduce Price Risk](http://extension.iastate.edu/agdm/crops/pdf/a2-67.pdf), extension.iastate.edu/agdm/crops/pdf/a2-67.pdf
- [Options Tools to Enhance Price](http://extension.iastate.edu/agdm/crops/pdf/a2-68.pdf), extension.iastate.edu/agdm/crops/pdf/a2-68.pdf

The cost of the fence is the put option premium plus option trading costs. There may also be interest on margin money for the call option if price rises. However a portion of this cost is offset by the premium you receive from writing the call option.

Example 1.

Assume the November soybean futures price is \$14.00 per bushel. The strike prices and option premiums are:

Strike Price	Premiums	
	Calls	Puts
\$13.75	\$1.15	\$.77
14.00	.98	.88
14.25	.89	1.05
14.50	.78	1.21
14.75	.72	
15.00	.67	

By selling a \$14.50 strike price **call**, you receive \$.78 in premium. Then, buying a **put** with a \$14.00 strike price, you pay \$.88. The net premium cost is \$-.10 per bushel ($$.78 - $.88 = $-.10$).

Minimum Selling Price

The minimum selling price from the fence is the strike price of the put option, less the net premium cost, less the options trading costs, less the basis.

In Example 2, the minimum price from the fence is the \$14.00 put strike price, plus the \$.78 call premium, less the \$.88 put premium, minus \$.05 for trading costs, plus a \$-.50 basis, or \$13.35.

Example 2.

Assume the expected basis is \$-.50 and the trading cost is \$.05.

Put strike price	\$ 14.00
Call premium	+ .78
Put premium	- .88
Trading cost	- .05
Expected basis	± - .50
Net price	\$ 13.35

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Assume November soybean price drops to \$11.00 at harvest and the actual basis is \$-.45. You exercise the put option which places you in the futures market at \$14.00. You buy back that position at \$11.00 for a \$3.00 futures gain. At the same time, you sell your cash beans for \$10.55 (actual basis is \$-.45 under November futures). Add the \$3.00 futures gain, and the \$.78 call premium to the \$10.55 cash price. Then subtract the \$.88 put premium and the \$.05 trading cost. The net price is \$13.40. The net price is \$.05 higher than expected price (\$13.35) because the basis is \$.05 narrower than expected.

Example 3.**Price decline — \$11.00 November futures**

Put strike price	\$14.00
Nov. futures	<u>-11.00</u>
Futures gain	\$3.00
Cash sale	\$10.55
Futures gain	+ 3.00
Call premium	+ .78
Put premium	- .88
Trading cost	<u>-.05</u>
Net price	\$13.40

The results would be about the same if you sold your put option to someone else rather than exercising it. The call option will expire worthless.

Maximum Selling Price

The maximum selling price from the fence is the strike price of the call, plus the call premium, less the put premium and trading costs, plus the basis.

Example 4.**Maximum Selling Price**

Call strike price	\$14.50
Call premium	+ .78
Put premium	- .88
Trading cost	- .05
Basis	<u>± -.50</u>
Net price	\$13.85

Assume at harvest November soybean futures price is \$16.50. Cash beans rise to \$15.90. The actual basis is \$-.60 under November. The \$14.50 strike price call option, that you sold (wrote), is now worth \$2.00 (premium) to the call option buyer. So, the option may be exercised by the call option buyer. If so, you have to sell the buyer November futures for \$14.50 and buy back the position for \$16.50 for a \$2.00 loss. The results would be about the same if you bought the call option back for a loss.

Example 5.**Price rise — \$16.50 November futures**

Call strike price	\$14.50
Nov. futures	<u>-16.50</u>
Loss	\$-2.00
Cash sale	\$15.90
Loss	- 2.00
Call premium	+ .78
Put premium	- .88
Trading cost	<u>-.05</u>
Net price	\$13.75

You sell your cash beans for \$15.90. After making the adjustments, the net price is \$13.75. That's \$.10 less than the maximum expected selling price because basis is \$.10 wider than projected. The put option expires worthless.

Example 6 shows minimum and maximum selling prices at various put and call strike prices.

Example 6. Options fence at different strike prices

Minimum selling price

	Alt 1	Alt 2	Alt 3
Put strike price	\$ 14.00	\$ 13.75	\$ 14.00
Call premium	+ .89	+ .89	+ .67
Put premium	- .88	- .77	- .88
Trading cost	- .05	- .05	- .05
Basis	<u>+ - .50</u>	<u>+ - .50</u>	<u>+ - .50</u>
Net price	\$ 13.46	\$ 13.32	\$ 13.24

Maximum selling price

Call strike price	\$ 14.25	\$ 14.25	\$ 15.00
Call premium	+ .89	+ .89	+ .67
Put premium	- .88	- .77	- .88
Trading cost	- .05	- .05	- .05
Basis	<u>+ - .50</u>	<u>+ - .50</u>	<u>+ - .50</u>
Net price	\$ 13.71	\$ 13.82	\$ 14.24

Keep in mind, if you are writing call options and the market goes up, you have margin calls. The increased value of the crop offsets the margin calls. However, you need to pay the margin calls before you receive cash from the sale of the grain. So you need to make arrangements with your lender to cover margin calls. Any interest costs associated with margin calls will reduce your net price.

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