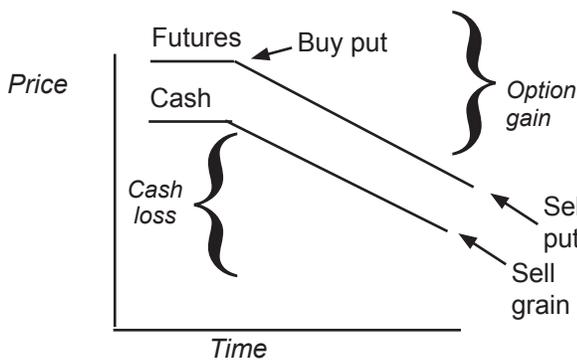


The net cash floor price is the floor cash price less the put premium and trading costs.

Implementation

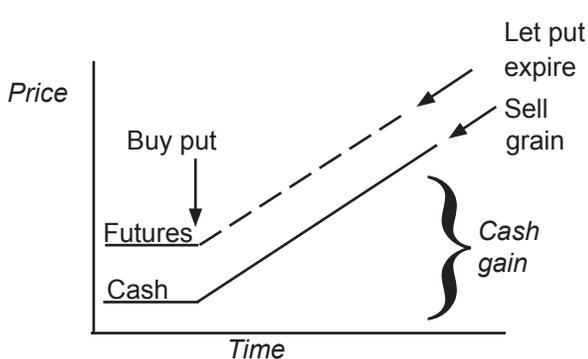
To implement this strategy, purchase the put option now. Later, when the grain is sold, also sell the option. If the price declines, as shown in Figure 2, the money made on the option will offset the loss on the cash grain. If the price rises, the option expires and the cash grain is sold for the higher price, as shown in Figure 3.

Figure 2. Hold grain and buy put (declining market).



Key: _____ = in the market - - - = out of the market

Figure 3. Hold grain and buy put (rising market).



Key: _____ = in the market - - - = out of the market

Example.

In the example below a \$7.00 strike price put option is purchased for a premium of 40 cents. Subsequently the futures price declines \$1 below the \$7.00 strike price to \$6.00. The cash grain price decreases to \$5.50 (50¢ basis).

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

The net price is the \$5.50 cash price, plus the \$1 option gain, less the 40 cent premium, for a total of \$6.10 (not including trading costs).

\$5.50	cash price
+1.00	option gain
- .40	premium
\$6.10	net floor price

Next assume the futures price declines to \$5.00 or \$2 below the strike price. The cash price declines to \$4.50 (50¢ basis). The net cash price is the \$4.50 cash price, plus the option gain of \$2, less the 40 cent premium, for a total of \$6.10. The same as above.

\$4.50	cash price
+2.00	option gain
- .40	premium
\$6.10	net price

As shown in these examples, whenever the futures price is at or below the strike price, the net price is \$6.10.

The actual floor price will differ only due to changes in basis, not changes in futures price.

Example.

Assume the futures price declines to \$5 but the cash price declines \$4.60 (40 cent basis). The cash price of \$4.60 plus the options gain of \$2 results in a net cash price of \$6.20 (not including trading cost).

\$4.60	cash price
+2.00	option gain
- .40	premium
\$6.20	net price

Because the basis is 10 cents narrower, the cash price is 10 cents higher, resulting in a 10 cents higher price than the previous example. The opposite is true if the basis is wider.

If the futures price is above the strike price, the cash grain is sold for the higher price and the option is allowed to expire.

Example.

Assume the futures price increases to \$8.00 and the cash price to \$7.50 (.50 cent basis.)

The cash price of \$7.50, less the premium of 40 cents, results in a net price of \$7.10 (not including trading cost). The option expires worthless.

\$7.50	cash price
- .40	premium
\$7.10	net price

Estimating the floor price

An estimate of the minimum net price or floor price can be made in advance. It can be computed by subtracting the premium, expected basis, and trading cost from the strike price.

Example.

Assume the strike price is \$7.00, the premium is 40 cents, and the estimated basis is 50 cents. The estimated floor price is \$6.10 (not including trading cost).

\$7.00	strike price
- .40	premium
- .50	estimated basis
\$6.10	estimated floor price

Second best

Using options for price protection turns out to be the second-best alternative regardless of whether price rises or falls. If price rises, the alternative of *doing nothing* and waiting for the higher price results in the best alternative. If price declines the best alternative is to sell *now* before the price declines.

Example.

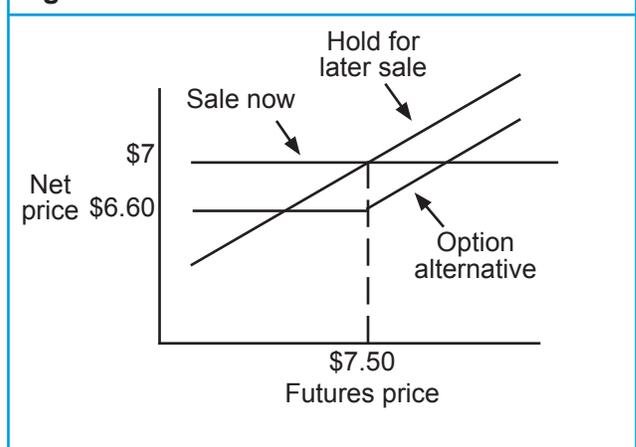
In the example below the futures price is \$7.50 and cash price is \$7.00 (50 cent basis). A put option with a strike price of \$7.50 sells for a premium of 40 cents.

\$7.50	futures price
\$7.00	cash price
\$7.50	put options strike price
.40	premium

If the grain is sold now, the net price is \$7.00 regardless of whether price goes up or down. If the grain is held for later sale, the net price depends on whether the price goes up or down. If the option tool is used, the net price is \$6.60 (\$7.00 - .40 = \$6.60) if the price goes down. If the price goes up, the net price is the cash price less the 40 cent premium.

As shown in Figure 4, if the price declines, the best alternative is to sell now for \$7.00. If price increases, the best alternative is to hold for later sale. If the price stays the same, both the sale now and the hold for later sale alternatives are preferred to the option alternative. In none of the situations did the options alternative result in the highest price.

Figure 4.



Reducing the cost

One of the complaints of using put options to reduce price risk is the high cost of the option premium. One way to reduce the cost is to buy *out-of-the-money* options. The premiums for these options are less than *at-the-money* options. Because of the smaller premium, *out-of-the-money* put options result in a higher net price if price increases. However, *out-of-the-money* put options result in a lower minimum or floor price.

Example.

In the example below the futures price is \$7.00 and basis is 30 cents.

Strike prices ranging from \$7.00 (*at-the-money*) to \$6.25 (75 cents *out-of-the-money*), and their respective premiums are shown below.

Strike price	\$7.00	\$6.75	\$6.50	\$6.25
Premium	.40	.30	.25	.22

The minimum selling price is \$6.30 for the *at-the-money* option and declines to \$5.73 for the 75 cent *out-of-the-money* option.

Minimum Price

Strike price	\$7.00	\$6.75	\$6.50	\$6.25
Expected basis	-.30	-.30	-.30	-.30
Premium	-.40	-.30	-.25	-.22
Net price	\$6.30	\$6.15	\$5.95	\$5.73

However, the net price increases from \$7.30 for the *at-the-money* option to \$7.48 for the 75 cent *out-of-the-money* option if the futures price increases to \$8.00.

Rally price (\$8.00 futures)

Futures price	\$8.00	\$8.00	\$8.00	\$8.00
Expected basis	-.30	-.30	-.30	-.30
Premium	-.40	-.30	-.25	-.22
Net price	\$7.30	\$7.40	\$7.45	\$7.48

So, *out-of-the-money* options result in a lower floor price but a higher net price if price rises.

Using call options for price protection

The discussion below shows how purchasing a call option establishes a floor price for grain.

The strategy involves selling or establishing a price for your grain and buying a call option. If price rises, you benefit because the call option increases in value similar to what the grain would have increased in value. Your net price is the sale value of the grain, plus the gain on the call option, less the call option premium and trading cost.

Implementation

To implement this strategy you sell or establish a price for your grain and buy a call option. Later when you normally would have sold your grain, you sell your call option. If the price has increased above the strike price as shown in Figure 5, you sell your option at the higher price and add it to the sale price of the cash grain. If the price has declined below the strike price as shown in Figure 6, you let the option expire worthless.

Figure 5. Sell grain and buy call (rising market).

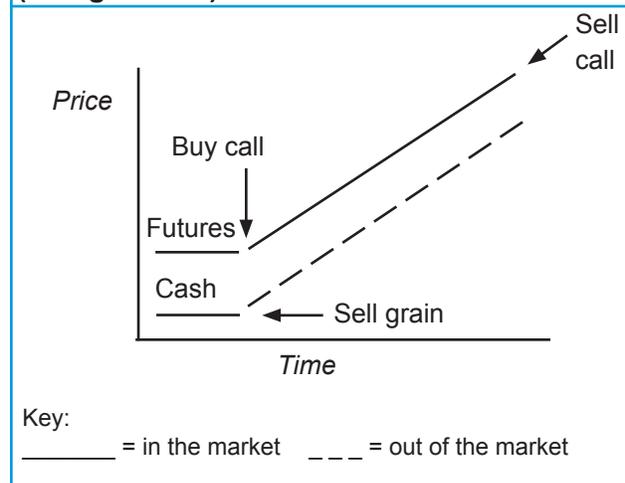
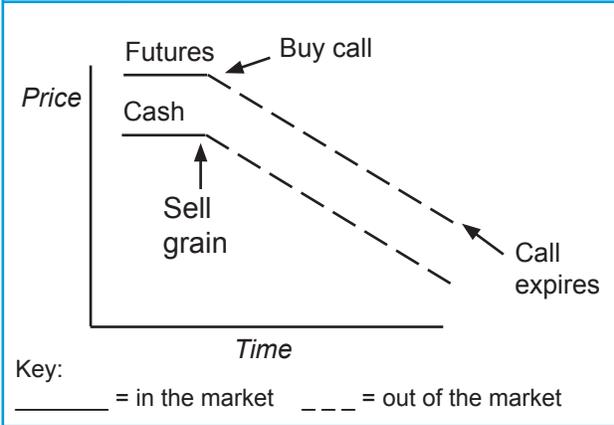


Figure 6. Sell grain and buy call (declining market).



Example.

In the example below the grain is sold for \$6.50 and a \$7.00 strike price call option is purchased for a premium of 40 cents. The futures price subsequently declines \$1.00 below the strike price to \$6.00.

\$6.50	cash price
7.00	strike price
.40	premium
6.00	futures price

The net floor price is the \$6.50 cash price less the 40 cent premium or \$6.10 (not including trading cost). The call option expires worthless.

\$ 6.50	cash price
- .40	premium
\$ 6.10	floor price

Next assume the futures price drops further to \$5.00. The option still expires worthless. The net floor price is still \$6.10.

\$ 6.50	cash price
- .40	premium
\$ 6.10	floor price

As shown in these examples, whenever the futures price is at or below the strike price, the net floor price is \$6.10 (not including transaction costs).

If the futures price is above the strike price, the call option is sold and its value is added to the cash sale price.

Example.

Assume the futures price increases \$1 above the strike price to \$8.00. The cash price is \$6.50 and the premium is 40 cents.

\$6.50	cash price
- .40	premium
+1.00	option gain
\$7.10	net price

As the futures price rises above the strike price, the option increases in value resulting in a higher net price.

Calculating the floor price

The floor price or minimum price can be figured in advance. It can be computed by subtracting the option premium from the cash sale price. If the futures price drops below the strike price the option will expire worthless.

Example.

Assume the cash price is \$6.50 and the premium is 40 cents.

\$6.50	cash price
- .40	premium
\$6.10	floor price

If the price drops and the options expires worthless, the net price is \$6.10.

Reducing the cost

One way of reducing the cost of the option is to buy *out-of-the-money* options. The premiums for these options are less than *at-the-money* options.

Out-of-the-money call options result in a higher floor price. However, *out-of-the-money* call options result in a lower net selling price if price increases.

Example.

In the example below the futures price is \$7.00 and the cash price is \$6.60.

Strike prices ranging from \$7 (*at-the-money*) to \$7.75 (75 cents *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 minimum selling price is \$6.20 for the *at-the-money* option and increases to \$6.38 for the 75 cent *out-of-the-money* option.

Minimum Price

Cash price	\$6.60	\$6.60	\$6.60	\$6.60
Premium	<u>-.40</u>	<u>-.30</u>	<u>-.25</u>	<u>-.22</u>
Minimum price	\$6.20	\$6.30	\$6.35	\$6.38

However, the net price decreases from \$7.20 for the *at-the-money* option to \$6.63 for the 75 cent *out-of-the-money* option if futures price increases to \$8.

Rally Price (\$8.00 futures)

Futures price	\$8.00	\$8.00	\$8.00	\$8.00
Strike price	<u>-7.00</u>	<u>-7.25</u>	<u>-7.50</u>	<u>-7.75</u>
Option gain	\$1.00	\$.75	\$.50	\$.25
Cash price	6.60	6.60	6.60	6.60
Premium	<u>-.40</u>	<u>-.30</u>	<u>-.25</u>	<u>-.22</u>
Net Price	\$7.20	\$7.05	\$6.85	\$6.63

So, *out-of-the-money* options result in a higher floor price but a lower net price if prices rise.