Section II
Basic Pricing Tools

Chapter 10: Selling futures to hedge the value of grain held in storage

Learning objectives

- Hedging the value of grain held in storage by elevators and producers (aka a storage hedge)

Key terms

Unwinding a hedge: Making a purchase or sale in the cash market and, at the same time, lifting a corresponding hedge position in the market. A hedger who sold May futures against corn held in storage might unwind the hedge in the spring – sell the corn out of storage and buy back the open futures position.

Rolling a hedge: Buying or selling futures to remove a hedge position in one contract, and simultaneously buying or selling futures to re-establish the hedge position in a deferred contract. A hedger who sold May futures against corn held in storage might consider rolling the hedge forward in the spring, i.e. buy back the May futures position, and sell July futures.

Hedging defined: To buy or sell a futures contract on a commodity exchange as a temporary substitute for an intended later transaction in the cash market.

The short hedge involves the sales of futures against cash ownership. Cash ownership includes inventory, expected production and/or forward purchases. The short hedge protects the hedger against falling prices. In the previous segment, we looked at producers selling futures to hedge the value of grain before harvest. Here we look at the storage hedge - selling futures to hedge the value of grain held in storage.

Why would a producer want to sell futures against grain held in storage? One reason is that harvested grain is sometimes high in moisture and needs to be dried in storage. Selling futures allows the producer to hedge the value of the grain during the drying process. Another reason is that some producers like to store grain into the new year and defer income into a new tax year. Again, selling futures allows the producer to maintain the value of the grain while waiting for the new year. The most important reason, however, is the opportunity to profit from positive carrying charges and a changing basis.

The storage hedge works best when carrying charges are large and positive (i.e., deferred futures contracts are trading at prices higher than the nearby contract) and when the hedger expects the basis to increase. Sometimes called a storage hedge, it serves as a great illustration of the idea that hedging is more than simply avoiding risk. The storage hedge is a chance to make more money on stored grain through a combination of the carry in the market and a seasonal improvement in basis. Of course, it also protects against a decline in grain prices.

Basis in grains is often weak at harvest time and generally increases in the months after harvest (i.e. the difference between cash and futures price gets less negative or more positive). In many years, particularly in the corn market, carrying charges are often large and positive at harvest. The storage hedge is a strategy that takes advantage of large carrying charges and weak basis, and turns it into a profitable opportunity.

Selling futures contracts against grain held in storage

Date	Cash	Futures	Basis
October	Harvest 100,000 bushels of corn. Local elevator is bidding $4.85/ bu. The producer decides to hold grain in storage and sell July futures contracts.	With December futures trading at $5.25/bus, and July futures trading at $5.55/bu., the producer sell 20 contracts of July futures. Futures price: $5.55	Harvest basis is -$0.40Z, or 40 cents under the December contract and 70 cents under the July contract. The producer expects the basis to reach -$0.20N (20 under the July) by next April or May. Expected price is $5.35/bu. $5.55 + (-$0.20)

The following formula is used to estimate the expected price next spring...

_____ + _____ – ___ = _____

futures price (when sold) + expected basis – fees = expected price

In addition to receiving a higher total price ($5.35/bu. in the spring vs. $4.85 at harvest), the farmer was also protected against market prices moving lower (the 50 cent increase in price is not all profit - we must consider the cost of storing corn for 6-8 months). What is the downside of this strategy? Like any hedge with futures, protection against lower prices also prevents the hedger from profiting from higher prices.

Help this producer unwind the following hedge – placed at harvest - next spring (sell cash corn and buy back July futures) under each of the following scenarios. Can you calculate the producer's final price per bushel for corn? Ignore brokerage and storage costs.

Date	Cash	Futures	Basis
October	Harvest 100,000 bus. corn. Local elevator is bidding $4.85/ bu. The producer decides to hold grain in storage and sell July futures contracts.	With Dec at $5.25/bus, and July at $5.55/bu., the producer sells 20 contracts of July futures. Futures price: $5.55	Harvest basis is 40 cents under the Dec and 70 cents under the July. Expect the basis to reach 20 under the July by spring. Expected price is $5.35/bu. $5.55 + (-$0.20)

Scenario #1: The price of corn in the cash market is $4.8/bu. and July futures are trading at $4.92/bu.

Date	Cash	Futures	Basis
Scenario #1 in May			
Results			

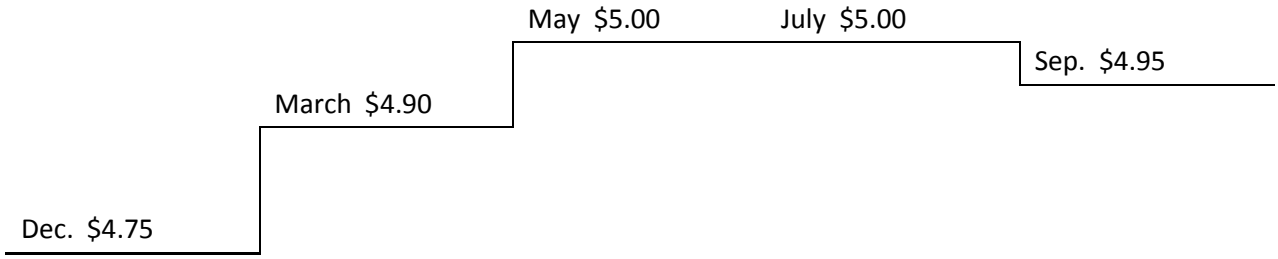
Scenario #2: The price of corn in the cash market is $5.68, and July futures are trading at $5.92/bu.

Date	Cash	Futures	Basis
Scenario #2 in May			
Results			

Scenario #3: The basis is -$0.24N (24 cents under the July contract).

Date	Cash	Futures	Basis
Scenario #3 in May			
Results			

Is there a best delivery month in which to hedge? In the previous example, the producer hedged stored corn in the July contract at harvest. But the real answer to this question is to hedge in the month that offers the greatest carrying charge (and the greatest return to storage). Consider this example of the corn futures market.



The carry from the December to March contracts is 15 cents per bushel, or 5 cents per month. The carry from the March to May contracts is also 5 cents per month. However, positive carry ends with the May contract – the July contract is trading at the same price and the September contract is 5 cents lower. Which month that offers the greatest carry? In this particular case, the May contract seems to be the best place to initiate the hedge (as long as the cost of ownership is less than 10 cents per bu.). As time goes on, the carrying charge from May to July may increase. If the carry increases, the producer can consider "rolling the hedge" forward – buy back the May contracts and simultaneously sell July contracts.

Further reading

Self-Study Guide to Hedging with Grain and Oilseed Futures and Options (handbook), CME Group, April 2012 http://www.cmegroup.com/trading/agricultural/self-study-guide-to-hedging-with-grain-and-oilseed-futures-and-options.html

Grain and Oilseed Futures and Options (brochure), CME Group, February 2012 http://www.cmegroup.com/trading/agricultural/grain-and-oilseed-futures-and-options-fact-card.html

Exercise #10

At harvest, you decide to sell 10 contracts of July corn futures to lock in a price and earn a return to storage on 50,000 bushels of corn. You are expecting to make final delivery of the corn next spring, when the corn basis reaches 15 cents under the July contract.

I want you to complete the transaction next spring, under three different scenarios. Fill in the blanks in the T-diagram, showing the price you received in $/bushel or in gross sales revenues (price * quantity). Ignore brokerage and ownership (storage) costs.

Scenario #1: higher futures prices

Date	Cash	Futures	Basis
October	Harvest 50,000 bushels of corn. Local elevator is bidding $5.15/ bu. The producer decides to hold grain in storage and sell July futures contracts.	With December futures trading at $5.52/bus, and July futures trading at $5.80/bu., the producer sells 10 contracts of July futures. Futures price: $5.80	Harvest basis is 37 cents under the December contract and 65 cents under the July contract. The producer expects the basis to reach -$0.15N (15 under the July) by next spring. Expected price is $5.65/bu. $5.80 + (-$0.15)
June	Sell 50,000 bushels of corn to the local elevator for $6.12/bu.	Lift the hedge - buy back July corn futures at $6.36/bu.	What is the basis in late May? _____
Results	What did you receive in the cash market? $/bu. _____ $total _____	What was your gain or loss in the futures market? $/bu. _____ $total _____	What final price did you receive for your corn? $/bu. _____ $total _____

Scenario #2: lower futures prices

Date	Cash	Futures	Basis
October	Harvest 50,000 bushels of corn. Local elevator is bidding $5.15/ bu.	Sell 10 contracts of July futures. Futures price: $5.80	The producer expects the basis to reach -$0.15N (15 under the July) by next spring. Expected price is $5.65/bu. $5.80 + (-$0.15)
June	Sell 50,000 bushels of corn to the local elevator for $4.48/bu.	Lift the hedge - buy back July corn futures at $4.59/bu.	What is the basis in late May? _____
Results	What did you receive in the cash market? $/bu. _____ $total _____	What was your gain or loss in the futures market? $/bu. _____ $total _____	What final price did you receive for your corn? $/bu. _____ $total _____

Scenario #3:

Date	Cash	Futures	Basis
October	Harvest 50,000 bushels of corn. Local elevator is bidding $5.15/ bu.	Sell 10 contracts of July futures. Futures price: $5.80	The producer expects the basis to reach -$0.15N (15 under the July) by next spring. Expected price is $5.65/bu. $5.80 + (-$0.15)
June	Sell 50,000 bushels of corn to the local elevator.	Lift the hedge - buy back July corn futures.	The basis in late May is 18 cents under the July contract.
Results			What final price did you receive for your corn? $/bu. _____ $total _____