Section II
Basic Pricing Tools

Chapter 9: Selling futures to hedge the value of grain before harvest

Learning objectives

- Understand how producers can sell futures to hedge the value of grain before harvest

Key terms

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

Short hedge: The sales of futures contracts against cash ownership, including inventory, expected production and/or forward purchases. The short hedge protects the hedger against falling prices.

Put on a hedge (aka place a hedge): Buying or selling futures contracts to establish a hedge position in the market. A cattle feeder concerned about lower cattle prices might call a broker and put on a hedge by selling June live cattle futures.

Lift a hedge: Buying or selling futures contracts to remove a hedge position in the market. A producer who sold November contracts to hedge the value of new crop soybeans might consider lifting the hedge if the outlook for higher prices improves (in this example, price risk is present again once the hedge is lifted – new crop cash bushels are again at risk).

Unwind a hedge: Making a purchase or sale in the cash market and, at the same time, lift 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, i.e. sell the corn out of storage and buy back the open futures position.

Hedging with futures is a tool used by producers, merchants, processors, and raw material buyers to reduce risk and guide storage decisions. Hedging grain purchases and sales is standard operating procedure for grain elevators, processors and exporters. Producers and end users (food and feed manufacturers) practice hedging in a more selective manner.

In simple terms, there are only two basic hedges used in the futures market; the short hedge and the long hedge. A 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. Short hedging is the topic for this segment. In particular, we will look at producers selling futures to hedge the value of grain before harvest.

A long hedge involves the purchase of futures contracts or to protect against rising input costs. The long hedge protects the hedger against rising prices. We will discuss long hedging in a different segment.

We want to explore producers selling futures to hedge the value of grain before harvest. In order to understand hedging and the motivation of the hedger, let's start with a simple statement of what hedging is not – hedging is not simply a ploy to avoid risk. Risk avoidance, in fact, is overemphasized as the sole motive for hedging. Let's look at an illustration of a pure risk avoidance hedge.

Pure Risk Avoidance Hedging Example by a Grain Elevator

Date	Cash	Futures	Basis
January	Buy 30,000 bushels of hard red spring wheat from a local producer.	Put on a hedge - Sell 6 contracts of Minneapolis March futures hedge against a price decline.	The basis is -$0.30, or 30 cents under the March contract.
	Cash price: $6.65/bu.	Futures price: $6.95	($6.65 cash - $6.95 futures)

This is a straightforward purchase (and hedge) of grain by a local elevator. Transactions of this sort occur every day. Let's jump ahead a few weeks and watch the elevator "unwind" the hedge by selling wheat and buying back the futures sale.

Date	Cash	Futures	Basis
January	*Buy 30,000 bushels of hard red spring wheat from a local producer.* *Cash price: $6.65/bu.*	*Put on a hedge - Sell 6 contracts of March futures hedge against a price decline.* *Futures price: $6.95*	*The basis is -$0.30, or 30 cents under the March contract.* *($6.65 cash - $6.95 futures)*
February	Sell 30,000 bushels of wheat to a flour mill. Cash price: $6.25/bu.	Lift the hedge - buy back March wheat futures. Futures price: $6.55	Basis remains at 30 cents under the March contract. ($6.25 cash - $6.55 futures)
Results	-$0.40/bu., or 40 cents/bu. loss	+$0.40/bu., or 40 cents/bu. gain	

How convenient! A 40 cent loss in the cash market was completely offset by a 40 cent gain in the futures market. This sort of "perfect hedge" can only occur if basis does not change (and basis, in this example, was unchanged at 30 cents under the March contract). However, basis does change, and smart hedgers try to profit from a changing basis.

We know from our study of basis that the basis in grain markets exhibits a seasonal pattern. We also know that basis is generally more predictable than prices. By using futures contracts to hedge, the hedger is moving away from an unknown risk (will wheat prices trend $1/bu. higher or lower in the next month?) to a risk they better understand (will the basis get stronger in the next month?). Hedgers are trying to manage (not avoid) risk, and profit from anticipating changes in the basis.

Now that we understand that hedging is more than avoiding risk, let's explore a producer selling futures contracts to hedge the value of grain before harvest. Note how the basis affects the final price received.

A note on Revenue Protection crop insurance: The use of crop revenue insurance products such as Revenue Protection (RP) can help to make sure that dollars are there in case the crop is pre-harvest sold, production in short and prices go higher. Make sure to understand the key relationship between pre-harvest sales and RP.

Hedging the value of grain before harvest

Date	Cash	Futures	Basis
March	Planting starts soon and with December futures above $5.50/bu., a producer has a chance to lock in a profitable price for 50,000 bu. corn at harvest.	Put on a hedge - Sell 10 contracts of December corn futures to lock in a profitable selling price at harvest. Futures price: $5.65	Expected harvest basis is -$0.40 Z, or 40 cents under the December contract. Expected harvest price is $5.25/bu.

There is a simple formula you can use to calculate the expected price at harvest...

_____ + _____ – ___ = _____

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

In this example, the producer sold December futures at $5.65/bu. and expected a basis of 40 cents under (-$0.40) at harvest. Let's do the math and ignore brokerage fees.

$5.65 + (-$0.40) = $5.25

futures price + expected basis = expected price

A note on trading terms: Grain traders often speak of buying or selling the basis, or being long or short the basis. Here is a rule for keeping your positions straight. Your basis position is the same as your cash position in the market. For example, the elevator who buys cash wheat and sells futures contracts to hedge is said to be "long the basis" (the elevator owns cash wheat, and "owns" the basis). The exporter who sells soybeans and buys futures contracts to hedge is said to be "short the basis" (the elevator sold soybeans, and "sold" the basis).

Trading basis is like any other trading. Think in terms of "buy low, sell high" – a grain merchandiser wants to buy cash grain at a low basis (a weak basis), and sell it at a high basis (a strong basis). Hedgers calculate their gross profit in a transaction by subtracting the buying basis from the selling basis.

Gross profit = selling basis - buying basis

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

Date	Cash	Futures	Basis
May	With December futures above $5.50/bu., a producer has a chance to lock in a profitable price for 50,000 bu. corn at harvest.	Sell 10 contracts of December corn futures to lock in a profitable selling price at harvest. Futures price: $5.65	Expected harvest basis is -$0.40 Z, or 40 cents under the December contract. Expected harvest price is $5.25/bu.

Scenario #1: The price of corn at harvest is $4.88/bu. and December futures are trading at $5.24/bu.

Date	Cash	Futures	Basis
Scenario #1 at harvest			
Results			

Scenario #2: The price of corn at harvest is $5.94/bu. and December futures are trading at $6.20/bu.

Date	Cash	Futures	Basis
Scenario #2 at harvest			
Results			

Scenario #3: The basis at harvest is -$0.37Z (37 cents under the December contract).

Date	Cash	Futures	Basis
Scenario #3 at harvest			
Results			

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 #9

In April, you decide to sell 5 contracts of November soybean futures to lock in a price for 25,000 bushels of soybeans to be delivered at harvest.

I want you to complete the transaction at harvest, under three different scenarios; higher futures prices, lower futures prices and steady futures prices. Fill in the blanks in the T-diagram, showing the price you received in $/bushel or in gross sales revenues (price * quantity). Ignore brokerage costs.

Scenario #1: *higher futures prices*

Date	Cash	Futures	Basis
April	Planting starts soon and with November futures above $12/bu., you have a chance to lock in a profitable price for soybeans at harvest.	Sell 5 contracts of November soybean futures to lock in a profitable selling price at harvest. Futures price: $12.10	Expected harvest basis is -$0.65X, or 65 cents under the November contract. Expected harvest price is $11.45/bu.
October (harvest)	Sell 25,000 bushels of soybeans to the local elevator for $12.35/bu.	Lift the hedge - buy back November soybean future at $13.10/bu.	What is the harvest basis? _____
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 soybeans? $/bu. _____ $total _____

Scenario #2: ***lower futures prices***

Date	Cash	Futures	Basis
April	You have a chance to lock in a profitable price for soybeans at harvest.	Sell 5 contracts of November soybean futures to lock in a profitable selling price at harvest. Futures price: $12.10	Expected harvest basis is -$0.65X, or 65 cents under the November contract. Expected harvest price is $11.45/bu.
October (harvest)	Sell 25,000 bushels of soybeans to the local elevator for $9.75/bu.	Lift the hedge - buy back November soybean future at $10.30/bu.	What is the harvest basis? _____
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 soybeans? $/bu. _____ $total _____

Scenario #3: *steady futures prices*

Date	Cash	Futures	Basis
April	You have a chance to lock in a profitable price for soybeans at harvest.	Sell 5 contracts of November soybean futures to lock in a profitable selling price at harvest. Futures price: $12.10	Expected harvest basis is -$0.65X, or 65 cents under the November contract. Expected harvest price is $11.45/bu.
October (harvest)	Sell 25,000 bushels of soybeans to the local elevator	Lift the hedge - buy back November soybean future	The basis at harvest is 58 cents under the November contract.
Results			What final price did you receive for your soybeans? $/bu. _____ $total _____