Introduction to Futures and Options

UK Grain Marketing Series
December 8, 2015

Todd D. Davis
Assistant Extension Professor
Outline

• Overview of hedging with futures

• Overview of using options to create a price floor

• Commodity Challenge
Information Sources

- Presentation draws upon Extension Bulletins developed by Iowa State University & Texas A&M University that will be posted on the Butler/Simpson County Extension Website
  - E-496: Introduction to Futures Markets
  - A2-60: Grain Price Hedging Basics
  - A2-61: Using Hedging in a Marketing Program
  - E-499: Introduction to Options
  - A2-66: Grain Price Options Basics
  - A2-67 Options Tools to Reduce Price Risk
  - CME Self-Study Guide to Hedging with Futures & Options
  - Commodity Challenge Manual
An Introduction to Commodity Futures

Kenny Burdine
UK Agricultural Economics
What is the Futures’ Market?
- A market where prices are established for commodities to be delivered at a later date.

What is a Futures’ Contract?
- A legally binding agreement to deliver a specifically defined commodity at a later date
- Everything except the price is fixed
CME© Corn Contracts

- 5,000 bushels
- #2 yellow
- March, May, July, September, December
- Last trading day: business day prior to 15th of contract month
- Initial trading limit: $0.25 per bushel
- Settlement: Delivery
  - General rule: be out of contract by first of contract month to avoid delivery
CME© Soybean Contracts

- 5,000 bushels
- #2 yellow
- January, March, May, July, August, September, November
- Last trading day: business day prior to 15th of contract month
- Initial trading limit: $0.60 per bushel
- Settlement: Delivery
  - General rule: be out of contract by first of contract month to avoid delivery
CME© Wheat Contracts

- 5,000 bushels
- #2 soft red winter
- March, May, July, September, December
- Last trading day: business day prior to 15th of contract month
- Initial trading limit: $0.35 per bushel
- Settlement: Delivery
  - General rule: be out of contract by first of contract month to avoid delivery
Who uses Futures Markets?

- **Hedgers** – use futures markets to manage and lower price risk

- **Speculators** – attempt to make money by trading futures contracts

- **Observers** – use futures markets to predict and understand prices
Selling a Futures Contract

- Called a “short” position
- Agree to deliver (or cash settle) commodity at a later date
- Closed by buying the same contract at a later date

The Straight Hedge

Kenny Burdine
UK Agricultural Economics
Why do futures allow us to manage price risk?

- Two markets moving in the same general direction – cash market and futures market
- By taking opposite positions, a gain in one market can offset a loss in the other
- Think of two pots of money – one at your brokers office and in the field
- We want a gain in one to offset a loss in the other
How Hedging Works

Cash Price

Hedge

Futures Price

And vice versa!
The short hedge

- Sell (short) a futures contract when you have commodity to sell at later date
- Sell the contract month in which you expect to actually sell the commodity
  - Or closest one after
- When you sell commodity – offset your short position in the futures market
- Declining prices – bad on cash side, but good on futures side
Locking in a Fall Corn Price

March

- You decide to “lock in” a price for corn for fall delivery
- You sell December corn futures at $4 per bu
- You estimate basis to be $0.20 under
- You have “locked in” an expected price of $3.80 per bu
Corn prices are as expected

In the fall
- Corn futures are still trading at $4 per bu
- You deliver your corn locally for $3.80 per bu
- You close your short futures position for no gain or loss
- Net price for your corn => $3.80 per bu

(Note: We’ll ignore commission, but likely would be about 1-2 cents per bu)
Corn prices fall

In the fall
- Corn futures move from $4 per bu to $3.50 per bu
- You deliver your corn locally for $3.30 per bu
- You close your short futures position for a $0.50 gain per bu
- Net price for your corn => $3.80 per bu

(Note: We’ll ignore commission, but likely would be about 1-2 cents per bu)
Corn prices rise

In the fall
- Corn futures have moved from $4 per bu to $4.50 per bu
- You deliver your corn locally for $4.30 per bu
- You close your short futures position for a $0.50 loss per bu
- Net price for your corn => $3.80 per bu

(Note: We’ll ignore commission, but likely would be about 1-2 cents per bu)
Reviewing the Straight Hedge

- Sell futures when you have commodity to sell in the future
- Sell contract month nearest when you intend to deliver or the next one after
- Offset futures position when you sell commodity
- If prices fall, we gain on futures
- If prices rise, we gain in cash market
Reviewing the Straight Hedge

- Straight hedge provides protection against falling prices
- No chance to capitalize on rising prices
- Subject to margin calls
- “Locked” price is subject to predicting the basis
- What if you over or underestimate basis?
  - Stronger basis = higher price
  - Weaker basis = lower price
## Review of Hedging with Futures

<table>
<thead>
<tr>
<th>Date</th>
<th>Cash</th>
<th>Futures</th>
<th>Basis</th>
<th>Hedged Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 3</td>
<td>$4.00</td>
<td>$4.10</td>
<td>-$0.10</td>
<td>$4.00</td>
</tr>
<tr>
<td>Nov. 3</td>
<td>$3.70</td>
<td>$3.80</td>
<td>-$0.10</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

- **Expected**
  - Sell 1 Dec Futures contract (5,000 bu.) at $4.10
  - Buy 1 Dec Futures contract (5,000 bu.) at $3.80
  - Sell 5,000 bushels of corn in cash market

- **Actual**
  - Change in Price: -$0.30  

- **Cash Price**: $3.70
- **Hedging Gain/Loss**: $+0.30
- **Hedged Price**: $4.00
# Review of Hedging with Futures

<table>
<thead>
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<tbody>
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<td>Expected</td>
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<td>Sell 1 Dec Futures contract (5,000 bu.) at $4.10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nov. 3</td>
<td>$4.40</td>
<td>$4.50</td>
<td>-$0.10</td>
<td>Actual</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>Sell 5,000 bushels of corn in cash market</td>
<td></td>
<td></td>
<td></td>
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</table>

| Change in Price | +$0.40 | -$0.40 |
| Cash Price     | $4.40  |
| Hedging Gain/Loss | -$0.40 |
| Hedged Price   | $4.00  |
Setting Price Floors with Put Options

Kenny Burdine
UK Agricultural Economics
What is a put option

Put Option

- Gives the buyer the “right to sell” a contract at a predetermined strike price

You only “sell” if the market moves down and it benefits you to do so

I.e: buy the right to sell Dec Corn futures at $3.60

If the market moves down, your put becomes more valuable

You pay some premium for this flexibility
Option Logic

Dec 2016 Corn futures trading at $4.00

- Put (RTS) option with $4.20 strike price
- Put (RTS) option with $3.80 strike price
- Put (RTS) option with $3.40 strike price

Options are tied to a specific contract month and year for varying strike prices
Option Terminology

**Strike Price** – price at which the option holder may sell a futures contract

**Premium** – market price of an option (what the buyer must pay, seller receives)

**Exercise** – when buyer chooses to sell futures at the strike price

**In the Money** – option has value if exercised right now

**Out of the Money** – option has no value if exercised right now
Option Premiums

- Are determined by the market – buyers and sellers negotiating the premium
- If the option is in-the-money, premium is higher to reflect value of the option
- Premiums decline as approaches expiration date
Getting out of an Option Position

- **Exercise** – take the associated position in the futures market
- **Sell back** – option should have some value
- **Let Expire** – do nothing, it will remain unexercised

Note: Options expire the month prior to the expiration of the underlying futures contract. DEC Corn options expire in November.
Options to set a price floor

- Buy a put option when you have commodity to sell in future
- Underlying futures’ contract should be the month you plan to sell the commodity
  - Or the nearest after
- When you sell commodity
  - Sell put back if it has value
  - Let expire
How a Put Option Works

- $4.00 DEC 2016 Corn Put costs $0.342

Option has value when Futures below $4
Positive value below $3.66
Setting a Fall Corn Price Floor

March
- You decide to “set a price floor” for corn for fall delivery
- Dec corn futures are trading at $4.00 per bu
- You estimate basis to be $0.20 under
- You purchase a $3.70 put for $0.30 per bu
- You have “locked in” an price floor of $3.20 per bu ($3.70-$0.30-$0.20 = $3.20)
In the fall
- You deliver your corn locally for $3.80 per bu
- Dec futures are still trading at $4.00
  - Your Dec $3.70 put has no value (it cost you $0.30) so you let it expire
- Net price for your corn => $3.50
  ($3.80 cash - $0.30 premium)
In the fall
- You deliver your corn locally for $4.80 per cwt.
- Dec corn futures have moved up from $4.00 to $5.00
  – Your Dec $3.70 put has no value (it cost you $0.30) so you let it expire
- Net price for your corn => $4.50
In the fall
- You deliver your corn locally for $2.80 per bu
- Dec corn futures have fallen from $4.00 to $3.00
- Your $3.70 put has value (it cost you $0.30)
- You sell back the put and make an additional $0.70
- Net price for your corn => $3.20
Using Put Options to Create a Price Floor

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</tr>
<tr>
<td>Nov. 3</td>
<td>$3.50</td>
<td>$3.60</td>
<td>-$0.10</td>
</tr>
</tbody>
</table>

Expected
Buy 1 Dec Futures Put contract (5,000 bu.) at $4.10 at cost of $0.25
Cash Price Floor = $4.10 Strike - $0.25 Premium - $0.10 Basis = $3.75

Actual
Sell 5,000 bushels of corn in cash market

<table>
<thead>
<tr>
<th>Change in Price</th>
<th>Value of Put</th>
</tr>
</thead>
<tbody>
<tr>
<td>-$0.50</td>
<td>+$0.50</td>
</tr>
</tbody>
</table>

Cash Price       $3.50  
Value Put Option  +$0.50  
Cost of Put Option -$0.25  
Hedged Price      $3.75
## Using Put Options to Create a Price Floor

<table>
<thead>
<tr>
<th>Date</th>
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<th>Expected/Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mar. 3</td>
<td>$4.00</td>
<td>$4.10</td>
<td>-$0.10</td>
<td>Expected</td>
</tr>
</tbody>
</table>

- Buy 1 Dec Futures Put contract (5,000 bu.) at $4.10 at cost of $0.25
- Cash Price Floor = Strike - Premium - Basis = $3.75

| Nov. 3 | $4.80| $4.90   | -$0.10| Actual          |

- Sell 5,000 bushels of corn in cash market

### Value of Put

<table>
<thead>
<tr>
<th>Change in Price</th>
<th>Value of Put</th>
<th>Cost of Put Option</th>
<th>Hedged Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>+$0.80</td>
<td>+$0.00</td>
<td>-$0.25</td>
<td>$4.55</td>
</tr>
</tbody>
</table>
Put Option Philosophy

Put options are like insurance

- You pay a premium
- Options will pay you when things get bad

You don’t run the risk of “locking in” a lower price

You can still capitalize on upward market movements

Think about appropriate risk level when selecting strike price
What price floors can you set

Strike Price
- Premium
- Basis

Price Floor

Futures price for contract month in which you plan to sell
Cost of the option
Local basis for the month in which you plan to sell
Put Options vs. Straight Hedge

Straight hedge
- No premium, only commission
- Accept current price – no upside or downside
- Subject to margin calls

Put Option
- Pay premium regardless, still pay commission
- Sets a lower price floor than straight hedge
- Retain some upside potential

Fear of margin call vs. expensive puts
Building Understanding...

If you have 3 choices, 
1) do nothing, 2) straight hedge, 3) put option

What would be the best strategy if you knew for a fact that …

- The market was heading down
- The market was heading up
- What about the rest of the time?
Graphically

Put Option

Straight Hedge

No Protection

Overall Market

$ / bu

3.80

3.20

3.20

3.80
Kenny’s last 2¢

Greed is often the enemy

Futures is not about speculation, it’s about risk management!

There’s nothing wrong with simple

- Don’t do anything you don’t understand
Kenny’s last 2¢

How much can you self insure?
- More leveraged = take less risk

Don’t try to speculate your way out of a futures position

If you aren’t leaving some money on the table occasionally…
Commodity Challenge Overview

www.commoditychallenge.com
Overview

• Registration is open for the game
  – Kentucky 2016 New Crop Open
  – 100,000 bushels of corn
  – 30,000 bushels of soybeans

• Corn – Cash Market is Perdue in Allensville

• Soybean – Cash Market is Hopkinsville Elevator
  – Harvest Dates are October 2016
  – Can’t do cash sales as this is a pre-harvest game
4 Types of Transactions

1. Cash sales – not allowed as this is a pre-harvest game.

2. Forward Contract
   - Select commodity, delivery date (defined for you), quantity (no commas) and price
   - At-the-market = latest futures less basis.
     - Orders filled quickly
   - Set price = name your price. Order open until filled or cancelled.
     - Set price at $6/bushel for corn and this contract filled only when cash forward bid is at $6.
3. Short hedging with Futures

• Initiate hedge by selling

• Choose contract: DEC 2016 Corn / NOV 2016 soybeans

• Indicate Number of contracts (remember contract is 5,000 bu.)

• At-the-market vs. set-price
Transaction Types (Continued)

4. Put Options – Set Minimum Price

• Buy a Put
• Contract Defined: DEC 16 Corn / NOV 16 Soybeans
• Choose your strike price
• Number of 5,000 bushel contracts
• At-the-market vs. set-price for premium
  – Set price orders open until cancelled or filled
LEADERBOARD

<table>
<thead>
<tr>
<th>Player</th>
<th>Balance</th>
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</thead>
<tbody>
<tr>
<td>Kris</td>
<td>$619,137.50</td>
</tr>
<tr>
<td>Kyle A.</td>
<td>$617,375.00</td>
</tr>
<tr>
<td>Jason P.</td>
<td>$617,375.00</td>
</tr>
<tr>
<td>Kim R.</td>
<td>$617,375.00</td>
</tr>
<tr>
<td>Todd D.</td>
<td>$617,375.00</td>
</tr>
</tbody>
</table>

Last Updated: 12/7/2015 at 3:03 PM Central

KENTUCKY 2016 NEW CROP OPEN

OPTIONS

Commodity: Soybeans (10/1/2016)
Call/Put: Put
Action to Take: Buy
Select Contract: Nov '16
Strike Price: $9.00 (Premium: $0.55)
Number of Contracts: 2
Premium: At the Market

Last Updated: 12/7/2015 at 2:30 PM Central
Summary Pages

• Game tracks bushels priced and unpriced
• Tracks Net price
• Futures profits
• Options Profits
• Also tracks positions
  – Important for futures and options to eventually be off-set
• Summary also tracks open orders.
<table>
<thead>
<tr>
<th>Futures</th>
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</thead>
<tbody>
<tr>
<td><strong>Last</strong></td>
<td><strong>Change</strong></td>
</tr>
<tr>
<td>Mar ’16</td>
<td><strong>Corn</strong></td>
</tr>
<tr>
<td>Dec ’16</td>
<td><strong>Corn</strong></td>
</tr>
<tr>
<td>Jan ’16</td>
<td><strong>Soybeans</strong></td>
</tr>
<tr>
<td>Nov ’16</td>
<td><strong>Soybeans</strong></td>
</tr>
</tbody>
</table>

**Summary**

<table>
<thead>
<tr>
<th>Soybeans</th>
<th>Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Production</strong></td>
<td>30,000 bu.</td>
</tr>
<tr>
<td><strong>Quantity Sold in Cash Market</strong></td>
<td>0 bu.</td>
</tr>
<tr>
<td><strong>Value of Cash Sales</strong></td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Quantity Unsold</strong></td>
<td>30,000</td>
</tr>
<tr>
<td><strong>Value Of Unsold</strong></td>
<td>$256,800.00</td>
</tr>
<tr>
<td><strong>Total Cash Value</strong></td>
<td>$256,800.00</td>
</tr>
<tr>
<td><strong>Futures Profits</strong></td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Options Profits</strong></td>
<td>$0.00</td>
</tr>
<tr>
<td><strong>Futures And Options Profits</strong></td>
<td>$0.00</td>
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<tr>
<td><strong>Net Value</strong></td>
<td>$256,875.00</td>
</tr>
<tr>
<td><strong>Net Unit Price</strong></td>
<td>$8.56/bu.</td>
</tr>
</tbody>
</table>

**Last Updated: 12/7/2015 at 4:14 PM Central**
Thank you! Any questions?

todd.davis@uky.edu