

Introduction to Futures & Options Markets

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Marketing Your Crop

■ Marketing: knowing “when” and “how” to price your crop.

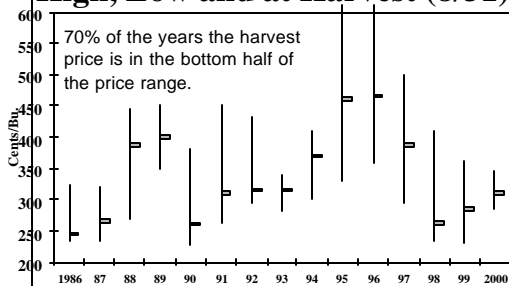
“When”

- Planting
- Pre-Harvest
- Harvest
- Post-Harvest

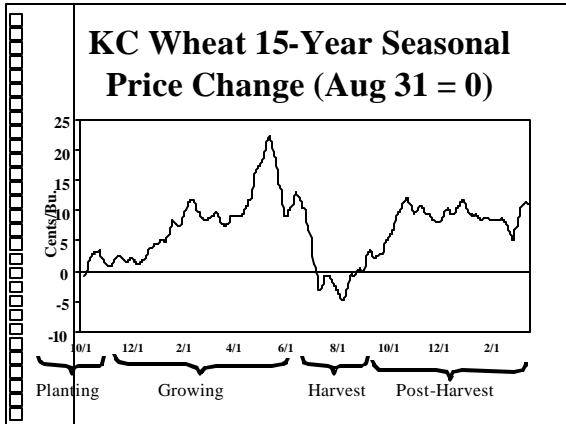
“How”

- Cash Sale
- Forward Contract
- Futures Contract
- Basis Contract
- Put Option
- Call Option
- LDP

KC Wheat Futures Price: High, Low and at Harvest (8/31)



In the last 15 years, the harvest-time wheat price averaged the bottom 40% of the annual price range. If you achieved 50% of the range, you increased your price by 20 cents per bushel on average each year.



Grain Futures Markets: *What Are They?*

- Auction Market for *Standardized* Forward Contracts (called *Futures Contracts*)
- Central Price Discovery Mechanism
- Commercial Users Manage Price Risk
- Speculators Invest with Hope of Profit

FORWARD CONTRACTS

A legally binding agreement between the seller (farmer) and the buyer (elevator). The seller will deliver a specified **quantity** and **quality** of grain to the buyer at a designated **place** and **date** for a pre-determined **price**.

- Contract must be settled through delivery.
- Contract quantity can be small (1,000 bushels) allowing for 'spreading' sales throughout the season.
- Easy to initiate and little or no costs to sign a contract.
- Guarantees a fixed price--for better or worse.



FUTURES CONTRACTS

A legally binding agreement between a buyer and seller to exchange a commodity at a later **date** for a particular **price, quantity, quality, and location**

- Futures contracts are publicly traded at a futures exchange
- The only term of the contract negotiated is the **price**.
- When the contract entered, neither the physical commodity nor money is exchanged between buyer and seller. **Both must post margin funds, however.**
- Contract settlement can occur by **delivery** or by **offsetting** the contract.



FUTURES CONTRACT: Hard Red Winter Wheat

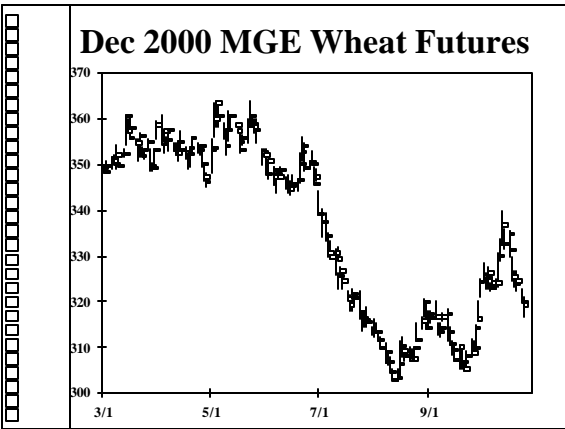
- Exchange: **Kansas City Board of Trade**
- Quantity: **5,000 bushels**
- Quality: **No. 2 at Par; No. 1 at 1.5-cent premium; No. 3 at 3-cent discount.**
- Contract Months: **Mar, May, Jul, Sep, Dec**
- Delivery Location: **Kansas City, MO; Hutchinson, KS**



FUTURES CONTRACT: Hard Red Spring Wheat

- Exchange: **Minneapolis Grain Exchange**
- Quantity: **5,000 bushels**
- Quality: **No. 2 or better Northern Spring Wheat with 13.5% protein.**
- Contract Months: **Mar, May, Jul, Sep, Dec**
- Delivery Location: **Minneapolis, Red Wing and Duluth.**

WHEAT FUTURES PRICES		
October 24, 2000		
<u>CONTRACT</u>	<u>KCBT</u>	<u>MGEX</u>
	---- Cents/Bu.----	
Dec-00	306	320
Mar-01	320	334
May-01	326	342
Jul-01	331	348
Sep-01	na	na
Dec-01	341	na



FUTURES TERMINOLOGY

- Every contract has a buyer and seller
- The **buyer** is said to be **LONG** a contract
- The **seller** is said to be **SHORT** a contract
- The **LONG** (or buyer) has agreed to purchase the commodity (at the negotiated price) in the delivery month.
- The **SHORT** (or seller) has agreed to deliver the commodity (for the negotiated price) in the delivery month.

Margins & Marking-to-Market

Sell 1 Dec MGE Wheat futures contract at \$3.20. Initial margin=\$500 and maintenance margin=\$400

Day	Settlement Price	Profit	Margin Balance
1	\$3.20	0	\$500
2	\$3.15	+\$250	\$750
3	\$3.21	-\$300	\$450
4	\$3.24	-\$150	\$300

=> Margin Call on Day 4 of \$200 to bring margin balance to initial margin of \$500.

Using Futures to Price 2001 Winter Wheat

November 2000

- Sep 2001 Wheat (KCBT) Futures = 335
- Sell futures contract today, post \$500/contract in margin and pay \$50/contract in brokers fees.

August 2001

- Sell Wheat in Cash Market
- Buy back Sep 2001 Wheat Futures
- Margin funds are returned to you.

Consider two cases for prices at harvest...

Calculating the Net Price

Lower Prices in August 2001

Sep. Futures Price in August = 275

Local Cash Price in August = 230

$$\begin{aligned}\text{Net Price} &= \text{Cash Price} + \text{Profit on Futures.} \\ &= \text{Cash Price} + (\text{Fut Price Sold} - \text{Fut Price Bought}) \\ &= 230 + (335 - 275) \\ &= 230 + 60 \\ &= \mathbf{290}\end{aligned}$$

Calculating the Net Price

Higher Prices in August 2001
 Sep. Futures Price in August = 380
 Local Cash Price in August = 335

Net Price = Cash Price + Profit on Futures.
 = Cash Price + (Fut Price Sold - Fut Price Bought)
 = 335 + (335 - 380)
 = 335 + (-45)*
 = **290**

*45-cent loss is paid out over time through margin calls.

FUTURES HEDGE:

The Formula

The Expected Net Price is...

**Current Futures Price +
 Expected Basis on Sale Date**

For our Example:
 ENP = Current Sept Fut. Price + September Basis
 in August
 = 335 + (-45) = **290**

- Does not matter whether the price level is higher or lower.
- Net Price only changes if the Basis is different than what was expected.

**Using Futures to
 Price Stored Winter Wheat**

November 2000

- Cash Price = 275
- Dec-00 Futures = 306
- Mar-01 Futures = 320
- Expected Basis in February = -27

Expected Net-Price:
 Current Mar-01 Futures +
 Expected Basis
 = 320 + (-27) = 293

Consider two cases for prices in February...

Calculating the Net Price in February		
	Lower Prices	Higher Prices
Cash Price in Feb	240	355
Mar Futures in Feb	260	385
Basis in Feb	-20	-30
Mar Futures in Nov	320	320
Net-Price	300	290
(Mar Futures in Nov + Basis in Feb)		

Option Contracts

Option contracts give the buyer the right (but not the obligation) to take a futures position at a set price.

There are two types of options:

(1) **Call Options** give the buyer the right to go long (buy) a futures contract.

(2) **Put Options** give the buyer the right to go short (sell) a futures contract.

OPTION TERMINOLOGY

- **Premium**--the amount the option buyer pays the option seller for the option.
- **Strike Price**--the price at which the buyer may obtain a short futures position (put) or long futures position (call).
- **Expiration Date**--the month when the option expires. Wheat options expire one month ahead of the futures contract.
- **Exercise**--when the option buyer converts the option to a futures position at the strike price. Can occur anytime prior to the option expiration date.

**KCBT Wheat Option Premiums on
October 24, 2000**

Strike Price	Dec -00		Mar-01		May-01	
	Call	Put	Call	Put	Call	Put
280	25.75	0.25	na	1.50	na	na
290	17.25	2.00	na	3.50	na	na
300	10.00	4.50	25.00	6.50	33.50	8.25
310	5.00	10.00	19.25	10.50	27.50	12.25
320	2.75	17.00	14.75	15.75	22.50	16.75
330	1.25	26.00	11.50	22.25	18.25	22.25

Prices and premiums are reported in cents per bushel

**Options Contracts:
Rights vs. Obligations**

Buyer: 320 Mar-01 Put Option	Seller: 320 Mar-01 Put Option
<ul style="list-style-type: none"> ■ Pays premium of 15.75 cents to seller. ■ Has right to go short (sell) Mar-01 futures at 320. ■ No margin, maximum loss is premium. ■ Right expires around Feb 20, 2001. 	<ul style="list-style-type: none"> ■ Collects premium of 15.75 cents from buyer. ■ Has obligation to go long (buy) Mar-01 futures at 320 to deliver short to buyer. ■ Margin required, unlimited loss, maximum profit of premium. ■ Obligation expires around Feb 20, 2001.

The Option Premium at Expiration

At expiration, an option will be worth the cash (intrinsic) value.

Cash Value for a Put Option
 Strike Price – Current Futures Price (if positive)
 Zero (otherwise)

Cash Value for a Call Option
 Current Futures Price – Strike Price (if positive)
 Zero (otherwise)

KCBT Dec Wheat Option Premiums and Cash Value				
Dec-00 Futures = 305.5				
Strike Price	Call	Cash Val.	Put	Cash Val.
280	25.75	25.50	0.25	0.00
290	17.25	15.50	2.00	0.00
300	10.00	5.50	4.50	0.00
310	5.00	0.00	10.00	4.50
320	2.75	0.00	17.00	14.50
330	1.25	0.00	26.00	24.50

Prices and premiums are reported in cents per bushel

Put Options and Insurance

- Put Options **insure** you against low prices.
- Like insurance, put options require a **premium** to the insurance provider.
- If the bad event occurs (lower prices), then you receive a payment from your put option increasing in value
- If the bad event doesn't occur, you receive no payment and lose the premium.

USING A PUT OPTION...

- A Put option sets a PRICE FLOOR or a MINIMUM net price
- The net price can be higher than the Price Floor if prices increase.

The Formula:
Price Floor = Strike Price + Basis - Premium
Net-Price = Cash Price + Option Profit

Example: Price Floor on Stored Wheat to be Sold in February

November 2000

- Cash Price = 275
- Mar-01 Futures = 320
- Mar-01 320 Put Option = 16
- Expected Basis in February = -27

Price Floor:

Strike Price + Expected Basis - Premium
 = $320 + (-27) - 16 = 277$

Consider two cases for prices in February...

Calculating the Net Price

Lower Prices in February 2001

Mar. Futures Price in Feb = 267
 Local Cash Price in Feb = 240
 320 Put Option Premium = 53 (320-267)

Net Price = Cash Price + Profit on Put Option
 = Cash Price + (Premium Sold - Premium Bought)
 = $240 + (53 - 16)$
 = $240 + 37$
 = 277

Calculating the Net Price

Higher Prices in February 2001

Mar. Futures Price in Feb = 382
 Local Cash Price in Feb = 355
 320 Put Option Premium = 0 (Fut > Strike)

Net Price = Cash Price + Profit on Put Option
 = Cash Price + (Premium Sold - Premium Bought)
 = $355 + (0 - 16)$
 = $355 - 16$
 = 339

Example: Price Floor on Stored Wheat to be Sold in February

November 2000

- Cash Price = 275
- Mar-01 Futures = 320
- Mar-01 300 Put Option = 7
- Expected Basis in February = -27

Price Floor:

Strike Price + Expected Basis - Premium
 = $300 + (-27) - 7 = 266$

Consider two cases for prices in February...

Calculating the Net Price

Lower Prices in February 2001

Mar. Futures Price in Feb = 267
 Local Cash Price in Feb = 240
 300 Put Option Premium = 33 (300-267)

Net Price = Cash Price + Profit on Put Option
 = Cash Price + (Premium Sold - Premium Bought)
 = $240 + (33 - 7)$
 = $240 + 26$
 = 266

Calculating the Net Price

Higher Prices in February 2001

Mar. Futures Price in Feb = 382
 Local Cash Price in Feb = 355
 300 Put Option Premium = 0 (Fut > Strike)

Net Price = Cash Price + Profit on Put Option
 = Cash Price + (Premium Sold - Premium Bought)
 = $355 + (0 - 7)$
 = $355 - 7$
 = 348

Put Option Comparison

- Higher Strike Price ■ Lower Strike Price
- ◆ Better “Insurance” ◆ Worse “Insurance”
- ◆ Higher Price Floor ◆ Lower Price Floor
- ◆ More Premium ◆ Lower Premium
- ◆ Use when Lower ◆ Use when Higher
Prices Expected Prices Expected

Using a Forward Contract and a Call Option

- Forward Contract Guarantees a Fixed Cash Price
- Call Option Rewards You For Higher Prices
- Very Similar to a Put Option

November 2000
 Forward Contract Wheat at 293 (Feb Delivery)
 Buy 330 Call Option at 12
 Price Floor = Forward Price - Premium
 = 293 - 12
 = **281**

Consider Two Cases for Prices at Harvest...

Calculating the Net Price

Lower Prices in February 2001
 Mar. Futures Price in Feb = 267
 Local Cash Price in Feb = 240
 330 Call Option Premium = 0 (Fut < Strike)
 Net Price = Forward Price + Profit on Call Option
 = Forward Price + (Premium Sold - Premium Bought)
 = 293 + (0 - 12)
 = 293 - 12
 = **281**
