ACE 427
Spring 2009

Lecture 6

Forecasting Crop Prices with Futures Prices

by
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Required Reading:

Malcolm, S., and M. Aillery . "Growing Crops for Biofuels Has Spillover Effects." *Amber Waves*, Volume 7, Issue 1, March 2009, pp. 10-15 (427 class website)

Peters, M., S. Langley, and P. Westcott. "Agricultural Commodity Price Spikes in the 1970s and 1990s: Valuable Lessons for Today." *Amber Waves*, Volume 7, Issue 1, March 2009, pp. 16-23 (427 class website)

Optional Reading:

Schwager, J.D. "Ch. 2: For Beginners Only." *Schwager on Futures: Fundamental Analysis*, New York, NY: John Wiley and Sons, 1995. (427 class website)

Hoffman, L.A. "Forecasting the Counter-Cyclical Payment Rate for U.S. Corn An Application of the Futures Price Forecasting Model." Electronic Outlook Report from the Economic Research Service. (ONLY the futures price model section)
http://www.ers.usda.gov/publications/FDS/JAN05/fds05a01/fds05a01.pdf

Fundamental Analysis

Goal: Estimate _____ and compare to _____

- Bullish: Value > Price

- Bearish: Value < Price

We now have our estimate of the fundamental value of corn for the 2009/10 marketing year

Ending Stocks Model: $4.25/bu.

Where do we obtain the 2009/10 market price for comparison?

The most readily available and widely-used source for market prices is the _____ for corn

Review of Marketing Instruments

There are four main _____ in any commodity marketing _____:

- Pricing
- Delivery
- Title transfer
- Payment

Cash transactions

The simplest transaction is a _____, where a producer delivers the commodity to a buyer, usually a local elevator merchant, and takes _____ _____

- The price for the transaction is the prevailing price in the _____ on the date of the transaction

- Cash market sales can be made at or after harvest (assuming storage facilities are available).

Forward contract transactions

Forward contract sales are closely related to cash market sales

- The only difference is that the contract price is agreed to in _____ of delivery, title transfer and payment
- For example, a producer could sign a forward contract with a local elevator merchant during the spring (when the crop is planted)
- This _____ the price for the commodity at the ____ contract is signed (often an oral contract)
- Then the commodity is delivered _____ at harvest and _____ received
- Forward contract sales can be made before, at or after harvest

Futures contract transactions

Futures contracts are _____ forms of forward contracts _____ on organized exchanges

- The largest futures exchange for agricultural commodities is the Chicago Board of Trade (CBOT), where _____ are traded
- Livestock futures contracts are traded at the Chicago Mercantile Exchange
- Dozens of other commodities are traded at futures exchanges around the world

_____ for futures contracts are standardized as follows:

- Month (corn: Sep, Dec, Mar, May, Jly)
- Location (corn: Illinois River delivery terminals)
- Quality (corn: #2 yellow corn)

Futures contracts provides similar price protection as a forward contract, but the mechanics and pricing effects differ

- _____ futures prior to delivery establishes the _____ at which the commodity will be sold

- At delivery, an offsetting _____ of the same contract is made and the physical commodity is sold in the _____

  - If prices _____ after the futures position was initiated, the contract will be bought back for _____ than the selling price

  - The _____ is added to the lower price received in the cash market

  - On the other hand, if prices _____, _____ on the futures contract will offset _____ in the cash market

  - Hence, the term _____

Hedging Examples

Date	Cash	Dec Futures	Basis
2/21/2008		$ 5.42	
10/1/2008	$ 3.50	$ 4.00	$ (0.50)

Cash Price	$ 3.50
Futures +/-	$ 1.42
Net Price	$ 4.92

Date	Cash	Dec Futures	Basis
2/21/2008		$ 5.42	
10/1/2008	$ 5.50	$ 6.00	$ (0.50)

Cash Price	$ 5.50
Futures +/-	$ (0.58)
Net Price	$ 4.92

If you would like to know more about hedging, the CBOT website has an excellent guide at: http://www.cbot.com/cbot/pub/page1/1,3248,1060,00.html

Futures prices

One of the principal functions of a futures market is to _____ the market price for delivery (or purchase) of a commodity in the _____

- Until recently, futures prices for commodities were only determined within a trading "pit" during predetermined trading hours
- _____ for contracts signaled by voice and hand signals
- In the last couple of years, electronic trading of futures contracts has come to dominate pit trading

On any given day, we can observe the _____ offered (bid) for future purchase (sale) of a commodity:

Quotes | Settlement | Daily Vol | Time & Sales | Volatility | Historical Data | Spreads

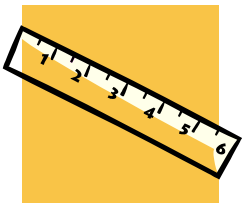
Open Auction | Electronic | Combinations | Real-Time Quotes

Exp	Last 1 Last 2	Net Chg	Open	High	Low	Close	Settle	Prev Settle	Hi/Lo Limit
09Mar	872'6 13:39	+10'2	875'0	878'2	861'4		872'6	862'4	
09May Ω	876'0 13:39	+12'6	874'4	881'0	865'0		876'0	863'2	
09Jul Ω	882'2 13:39	+13'0	883'0	886'0	871'4		882'2	869'2	
09Aug	875'0 13:39	+11'4	876'0	876'0	872'0		875'0	863'4	
09Sep	851'4 13:39	+10'4	855'0	855'0	848'0		851'4	841'0	
09Nov Ω	840'0 13:39	+9'4	841'0	841'0	833'0		840'0	830'4	
10Jan	849'2 13:39	+9'2	852'0	853'0	842'0		849'2	840'0	
10Mar	858'4 13:39	+9'4	852'0	858'4	852'0		858'4	849'0	
10May	865'0 13:39	+10'0	0'0	865'0	855'0		865'0	855'0	
10Jul	873'6 13:39	+9'6	0'0	873'6	864'0		873'6	864'0	
10Aug	873'0 13:39	+13'0	0'0	873'0	860'0		873'0	860'0	
10Sep	873'0 13:39	+13'0	0'0	873'0	860'0		873'0	860'0	
10Nov	870'0 13:39	+10'0	0'0	870'0	860'0		870'0	860'0	
11Jan	873'0 13:39	+10'0	0'0	873'0	863'0		873'0	863'0	

Table generated February 23, 2009 13:52 CST = Chart Ω = Option

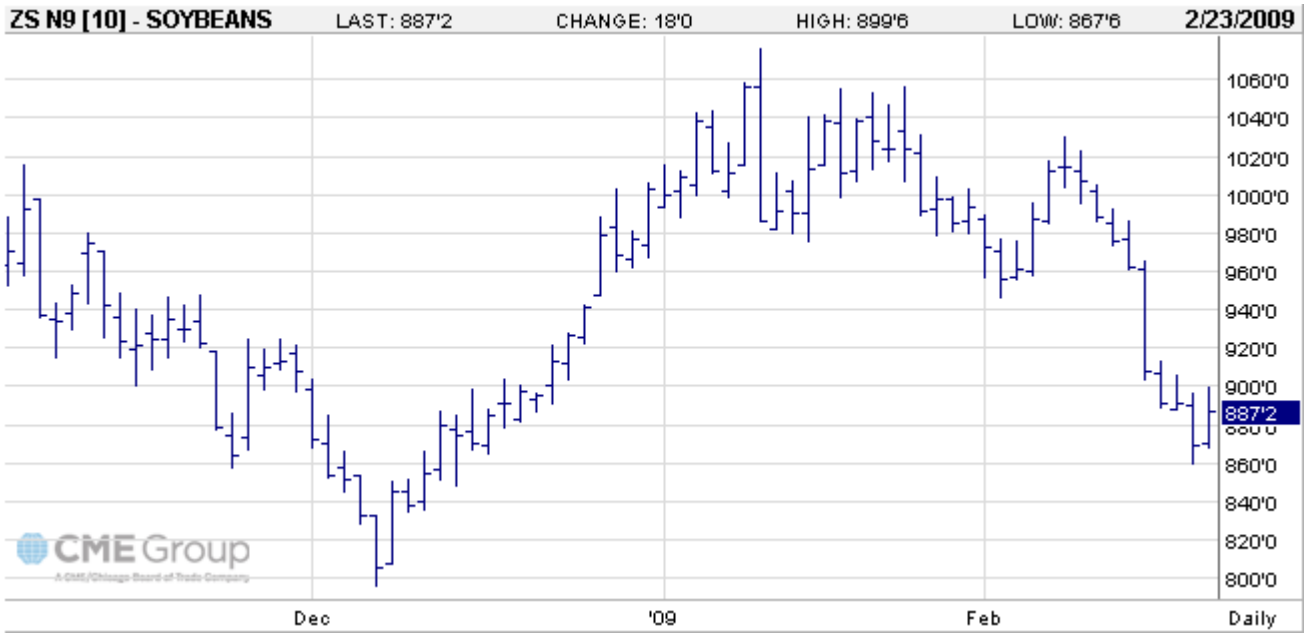
These prices can be thought of as the _____ of market prices in the _____ given available information

We will use these prices to generate a _____ _____ for comparison to our price forecast



Please note that the futures price for a particular delivery month can change _____ as _____ changes

So, we can literally update our market benchmark prices each moment the futures market is open!

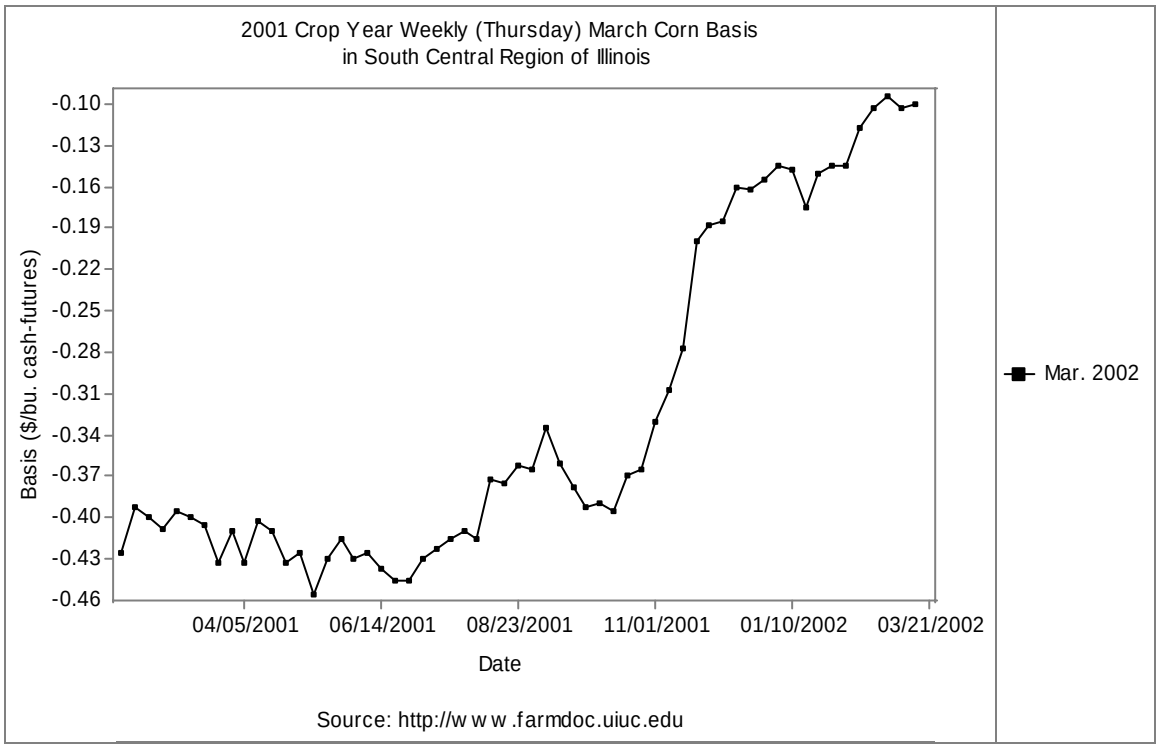


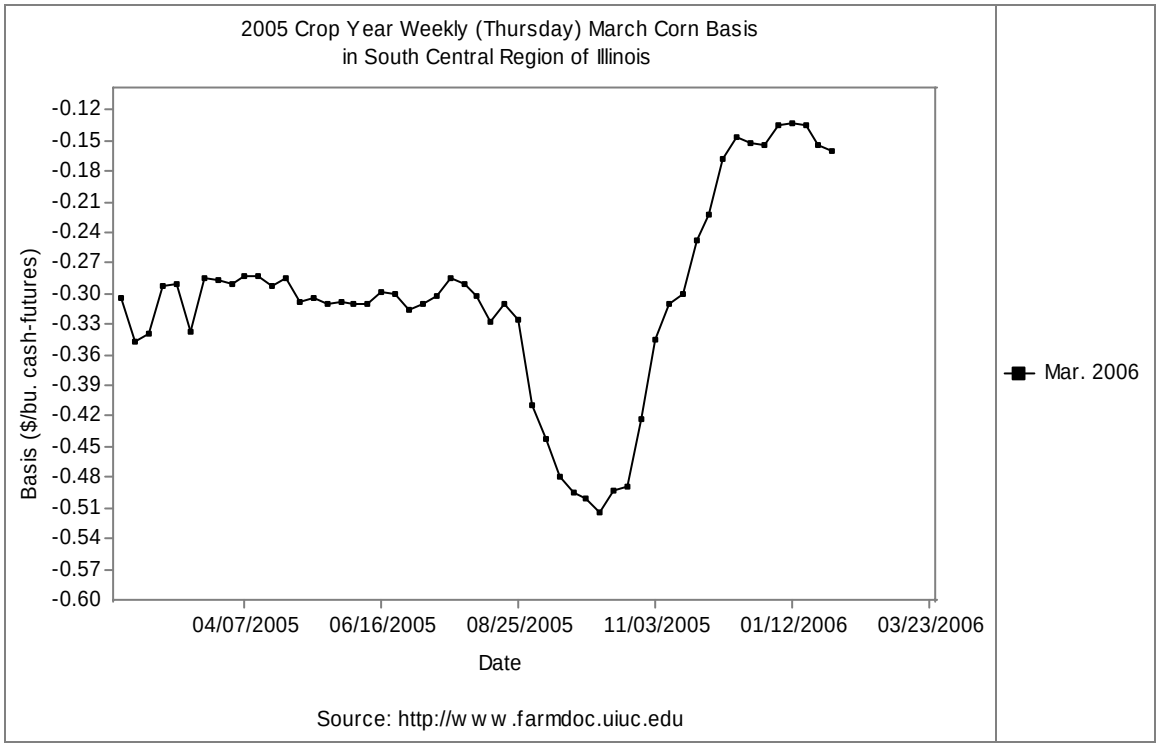
Month	Code
January	F
February	G
March	H
April	J
May	K
June	M
July	N
August	Q
September	U
October	V
November	X
December	Z

Basis

Since futures contracts have _____, the _____ is the same for all contracts

- This means futures prices will reflect the expected price at the _____
- _____ for non-delivery points will differ from futures prices due to transportation costs associated with shipping the commodity from the non-delivery location to the delivery location
- This difference is termed _____


2001 Crop Year Weekly (Thursday) March Corn Basis
in South Central Region of Illinois
Basis ($/bu. cash-futures)
-0.10
-0.13
-0.16
-0.19
-0.22
-0.25
-0.28
-0.31
-0.34
-0.37
-0.40
-0.43
-0.46
04/05/2001
06/14/2001
08/23/2001
11/01/2001
01/10/2002
03/21/2002
Date
Source: http://w w w .farmdoc.uiuc.edu
Mar. 2002


2005 Crop Year Weekly (Thursday) March Corn Basis
in South Central Region of Illinois
Basis ($/bu. cash-futures)
-0.12
-0.15
-0.18
-0.21
-0.24
-0.27
-0.30
-0.33
-0.36
-0.39
-0.42
-0.45
-0.48
-0.51
-0.54
-0.57
-0.60
04/07/2005
06/16/2005
08/25/2005
11/03/2005
01/12/2006
03/23/2006
Date
Source: http://w w w .farmdoc.uiuc.edu
Mar. 2006

Futures Forecast Model

We need to _____ the array of futures prices to an _____ that can be compared to our _____ price forecast

To do this, we must first understand the nature of the forecast price

All WASDE balance sheets forecast the _____ _____

Computation process:

- Each month, the USDA surveys firms that purchase grain from farmers
- Collect data on the _____ (1) and _____ (2)
- Average price received by farmers for the month is simply (1) / (2)
- At the end of the marketing year, the number of _____ by farmers is known for each month of the marketing year (Sep-Aug)

- _____ are computed as number of bushels marketed in a month divided by the total bushels marketed during a marketing year

- Final season average price is computed as the _____ of the _____ average prices received by farmers, where the weights are the marketing weights computed above

Computation of the 2005/06 U.S. Average Farm Price Received for Corn

Month	Monthly Average Farm Price Received ($/bu.)	Monthly Marketing Weight (%)	Weighted Price
September, 2005	1.90	7.4	0.14
October, 2005	1.82	11.3	0.21
November, 2005	1.77	8.9	0.16
December, 2005	1.92	7.9	0.15
January, 2006	2.00	15.4	0.31
February, 2006	2.02	8.2	0.17
March, 2006	2.06	6.8	0.14
April, 2006	2.11	6.4	0.14
May, 2006	2.17	6.4	0.14
June, 2006	2.14	6.9	0.15
July, 2006	2.14	7.5	0.16
August, 2006	2.09	6.9	0.14
Marketing Year Average Farm Price ($/bu.)			2.00

Source: USDA

Example

Convert the array of corn futures prices on _____ _____ into a single price that is comparable to our 2009/10 season average "fundamental" price forecast of ____

Quotes | Settlement | Daily Vol | Time & Sales | Volatility | Historical Data | Spreads

Open Auction | Electronic | Combinations | Real-Time Quotes

Exp	Last 1 Last 2	Net Chg	Open	High	Low	Close	Settle	Prev Settle	Hi/Lo Limit
09Mar	352'0 13:24	+1'6	356'0	357'0	349'6			350'2	
09May	361'2 13:23	+2'2	365'0	366'4	358'4			359'0	
09Jul	370'6 13:22	+2'2	376'4	376'4	369'0			368'4	
09Sep	379'0 13:14	+1'2	383'4	383'4	379'0	379'0		377'6	
09Dec	391'4 13:22	+1'6	396'4	399'2	390'0			389'6	
10Mar	403'2 13:14	+0'4	408'2	408'2	403'2	403'2		402'6	
10May	409'6 13:16	+0'2	409'6	409'6	409'6	409'6		409'4	
10Jul	416'4 13:16	+1'0	416'4	416'4	416'4	416'4		415'4	
10Sep	412'4 13:14	Unch	0'0	412'4	412'4	412'4		412'4	
10Dec	409'4 13:16	+1'0	410'4	410'4	409'4	409'4		408'4	
11Jul	428'4 13:14	Unch	0'0	428'4	428'4	428'4		428'4	
11Dec	420'0 13:16	+5'0	420'0	420'0	420'0			415'0	

Table generated February 23, 2009 13:42 CST = Chart Ω = Option

Issue #1: Futures prices are _____ for every calendar month and contracts _____ around mid-month

Solution: For each month in the marketing year, the _____ futures contract price is used except when the contract expires in that month, in which case the ____ nearby contract is used.

Issue #2: Futures prices reflect a specific _____ location

Solution: The monthly futures price is adjusted by a _____ (typically derived from a 5-year moving average of the difference between the monthly farm price and the average monthly futures price) to compute the U.S. monthly farm price forecast

Issue #3: Marketing weights will not be _____ until the end the 2009/10 marketing year

Solution: An average of marketing weights for each month over the previous _____ is used to project marketing weights

The above assumptions are built into a spreadsheet tool located at the ERS/USDA website:

http://www.ers.usda.gov/Data/PriceForecast/

- The tool was developed by an agricultural economist, Linwood Hoffman, to imply price forecasts for the current marketing season (2008/09)
- However, you can use it to forecast 2009/10 prices by simply typing 2009/10 futures prices into the tab listed as "2008/09"
- Site also contains spreadsheets for implying soybean and wheat season average prices from futures prices

Computing the U.S. Average Farm Price Forecast Implied by the Corn Futures Market

Calendar Month	Corn Futures Contract	02/23/2009 Corn Futures Prices	US 5-Yr. Avg. Basis Adjustment	US Average Cash Price Implied by Futures	US 5 Yr. Avg. Marketing Weight	Price Weight
		-- $/bu. --	-- $/bu. --	-- $/bu. --	-- % --	
Sep-09	Dec-09	3.92	-0.17	3.74	7.4	0.28
Oct-09	Dec-09	3.92	-0.20	3.71	13.4	0.50
Nov-09	Dec-09	3.92	-0.27	3.65	11.6	0.42
Dec-09	Mar-10	4.04	-0.33	3.71	8.4	0.31
Jan-10	Mar-10	4.04	-0.41	3.63	15.3	0.55
Feb-10	Mar-10	4.04	-0.36	3.68	7.4	0.27
Mar-10	May-10	4.11	-0.43	3.68	7.4	0.27
Apr-10	May-10	4.11	-0.32	3.79	5.6	0.21
May-10	Jul-10	4.17	-0.32	3.85	5.0	0.19
Jun-10	Jul-10	4.17	-0.46	3.71	6.4	0.24
Jul-10	Jul-10	4.17	-0.34	3.83	6.5	0.25
Aug-10	Sep-10	4.15	-0.12	4.03	5.6	0.23
US Average Farm Price Forecast from Futures						3.73
US Average Farm Price from Ending Stocks Model						4.25

Summary

At the present time (late February), we are _____ on the 2009/10 price of corn because:

- Fundamental Value > Price
- $4.25/bu. > $3.73/bu.

Marketing Implications:

- Farmer?
- Ethanol Processor?
- Futures Trader?

Final Points:

We can combine our pricing model and implied futures price to infer or _____ the market's current forecast of the ending/stocks/use ratio for 2009/10

With further assumptions we can even infer the ____ _____and _____ that the market is anticipating for 2009/10!