Fundamental Analysis for Grain
By Dr. Robert Wisner
University Professor Emeritus
Iowa State University

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- The process of analyzing supply and demand, developing price forecasts
Objectives

• Illustrate some key tools of grain price forecasting

• Explain the role of fundamental analysis in marketing

• Show our current outlook for corn, soybeans, & wheat – 2009 & 2010 crops

• Some longer-term developments
Marketing Plan Fundamentals

• Start early
• Know *your* cash-flow costs & *risk bearing* ability
• You can’t go broke taking a profit
• Very often, the best corn & SB pricing opportunities are during Jan.-May before harvest. Consider puts @ planting time
• Use revenue insurance as companion to pre-harvest pricing, not substitute
• Be cautious with complicated new contracts
• Understand basis & storage costs
• *Use fundamental analysis as mktg. guide*
Today’s Risk Environment

- Global Biofuels – large new Demand
- Low World Grain Reserves
- Newer Risk-Management Tools
- Uncertain Govt. Payments
- Insurance: a companion tool for mktg.
- World Competition, esp. wheat
Topics to Be Discussed

- Processes for Grain Supply-Demand Analysis
  - Old-crop & new-crop
- U.S. Ethanol Trends & Effects on Global Feed Supply-Demand
- USDA & other information sources
- Key Players in World Grain & Feed Trade
- Emerging Developments in China’s Grain
- The Future: Potential Areas for increased Crops
  - South America
  - Former Soviet Republics
  - China Corn?
Fundamental Analysis

- A Key Concept – Balance Sheets
- Analyzing Export Demand
- Analyzing Domestic Demand
- Analyzing Potential Supply
- S-D, Carryover & price relationships
- Seasonality
- Some Key Web Sites
- Current Examples
Why Forecast?

Market Risks are large

Business Decisions: based on committed & expected future costs & returns

- Crop acreage mix depends on prices
- How much N to put on corn
- Sell @ harvest, store into summer?
- Contract for harvest or later delivery?

Base decisions on hunch or best available information?
Role of Fundamental Analysis

• Shows what to watch
• Gives guide to market sensitivity
• Helps quantify new market impacts
• Provides a benchmark price for plans
• Guiding principle: Price *influenced* by *expected* supply and demand
Fundamental vs. Technical Analysis

- **Technical**: road map and driving rules for traders as they follow market reaction to Supply-Demand

- *In the short run, markets over re-act & deviate from fundamentals, but supply & demand ultimately rule the market*
Objectives in This Session

– Not to make you expert forecasters
– Understand how good forecasts are made
– Understand limitations of forecasts
– Identify good information sources
– Provide guides to help anticipate market reactions
– Update on grain outlook for 2009-11 and how outlook was developed
Forecasting Rules

- Search for the big picture
- New-crop futures markets are not good forecasters
- Never say always or never
- If you forecast, forecast often
- Have a good historical perspective
- Be a contrarian: majority of traders is often wrong
- Respect market trends
- Inflation seldom increases corn & bean prices (but may via oil & $)
81% of U.S. corn & 85% of soybeans are grown outside Iowa.

Look @ *big picture* on crop size, not just Your own area.
Some Principles

• The market guides production
• Demand has two dimensions: quantity & price
• Supply is two dimensional: quantity & price
• Market equilibrium: price where quantity demanded equals quantity supplied
• If quantity supplied exceeds quantity demanded, price declines
FORECASTING CONSIDERATIONS: GRAIN

- Price influenced by supply, demand, & competing products S-D
- Prices influenced by current & expected future conditions
- Grain is a global Market
- Weather: a major supply factor
- Government policy: U.S. & foreign
Demand: Two dimensions

Price

Quantity
Price Elasticity of Demand

- How quantity demanded changes with price

- Mathematical expression:
  
  \[ \% \text{ change in Quantity with a 1\% change in price} \]

- Price flexibility: \( 1/\text{elasticity} \)
  
  (price impact with supply change)
Inelastic Demand

Examples?

Price

Quantity
Elastic & Inelastic Demand

Which will cause greatest price sensitivity?

D

D-1

Price

Quantity
Inelastic Demand

Is elasticity of D for corn changing?
Elasticity of Demand

- Percent change in Quantity demanded with one percent change in Price
- Corn: formerly -.5% (this may now be -.2)
- Soybeans: -.4% (this may now be -.25)
- Or 1% chg. in corn S = 5% chg. In price
- 1% chg. In SB S = 4% chg. in price
- With all other market factors unchanged
Demand for U.S. Corn for ethanol With Mandates

- Corn Price, $/bu.

- Mil. Bu. Corn Processed into Ethanol

Mandated level of ethanol blending

Demand

5,360 (2015 mandate)
GHG Emissions Also a Big Issue

2007 U.S. Energy Act Biofuels Mandates

Bil. Gallons/Yr.

- Biodiesel
- Other advanced biofuels
- Cellulose ethanol
- Corn-ethanol

One gallon = 3.87 liters
The Blending Wall: Ethanol Mandates in Billion Gallons Beyond the E-10 Market

Current U.S. Ethanol Markets: E-10 & E-85
Three Grain Price Forecasting Methods

1. Carryover percent of total use
2. Computer forecasting model
3. Price flexibility based on elasticity of demand
### Corn Balance Sheet - R. Wisner

<table>
<thead>
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</thead>
<tbody>
<tr>
<td><strong>Yield (bu. per acre)</strong></td>
<td>149.1</td>
<td>150.7</td>
<td>153.9</td>
<td>165.2</td>
<td>150.0</td>
<td>159.0</td>
<td>164.0</td>
<td>152.0</td>
<td>161.0</td>
<td>168.0</td>
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<td><strong>Long-term Historical Yield Probability:</strong></td>
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<tr>
<td><strong>Supplies:</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Planted acres (million)</td>
<td>78.3</td>
<td>93.5</td>
<td>86.0</td>
<td><strong>86.5</strong></td>
<td>88.5</td>
<td><strong>88.5</strong></td>
<td>88.5</td>
<td>88.5</td>
<td><strong>88.5</strong></td>
<td>88.5</td>
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<tr>
<td>Harvested acres (million)</td>
<td>70.6</td>
<td>86.5</td>
<td>78.6</td>
<td>79.6</td>
<td>80.9</td>
<td>81.5</td>
<td>81.5</td>
<td>80.9</td>
<td>81.5</td>
<td>81.5</td>
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<tr>
<td>Production (mil. bu.)</td>
<td>10,535</td>
<td>13,038</td>
<td>12,101</td>
<td>13,151</td>
<td>12,135</td>
<td>12,959</td>
<td>13,366</td>
<td>12,297</td>
<td>13,122</td>
<td>13,692</td>
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<tr>
<td>Beginning carryover (mil. bu.)</td>
<td>1,967</td>
<td>1,304</td>
<td>1,624</td>
<td>1,674</td>
<td>1,634</td>
<td>1,634</td>
<td>1,634</td>
<td>1,634</td>
<td>1,634</td>
<td>1,634</td>
</tr>
<tr>
<td>Total Supply (incl. imports)</td>
<td>12,514</td>
<td>14,362</td>
<td>13,739</td>
<td>14,834</td>
<td>13,784</td>
<td>14,605</td>
<td>15,013</td>
<td>13,946</td>
<td>14,768</td>
<td>15,339</td>
</tr>
<tr>
<td><strong>Total Usage: (mil. bu.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed &amp; residual</td>
<td>5,598</td>
<td>5,913</td>
<td>5,254</td>
<td>5,580</td>
<td>5,050</td>
<td>5,250</td>
<td>5,275</td>
<td>5,075</td>
<td>5,250</td>
<td>5,275</td>
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<tr>
<td>Ethanol</td>
<td>2,117</td>
<td>3,049</td>
<td>3,677</td>
<td>4,275</td>
<td>4,450</td>
<td>4,650</td>
<td>4,700</td>
<td>4,675</td>
<td>4,900</td>
<td>4,925</td>
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<td>Food, ind. &amp; seed</td>
<td>1,371</td>
<td>1,338</td>
<td>1,276</td>
<td>1,270</td>
<td>1,270</td>
<td>1,280</td>
<td>1,285</td>
<td>1,270</td>
<td>1,275</td>
<td>1,280</td>
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<tr>
<td>Exports</td>
<td>2,125</td>
<td>2,437</td>
<td>1,858</td>
<td>2,075</td>
<td>1,890</td>
<td>1,975</td>
<td>1,980</td>
<td>1,890</td>
<td>2,000</td>
<td>2,025</td>
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<tr>
<td>Total Usage</td>
<td>11,210</td>
<td>12,737</td>
<td>12,065</td>
<td>13,200</td>
<td>12,660</td>
<td>13,155</td>
<td>13,240</td>
<td>12,910</td>
<td>13,425</td>
<td>13,505</td>
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<tr>
<td>Ending Carryover: (mil. bu.)</td>
<td>1,304</td>
<td>1,624</td>
<td>1,674</td>
<td>1,634</td>
<td>1,124</td>
<td>1,450</td>
<td>1,773</td>
<td>1,036</td>
<td>1,343</td>
<td>1,834</td>
</tr>
<tr>
<td>Carryover, weeks of total use</td>
<td>6.0</td>
<td>6.6</td>
<td>7.2</td>
<td>6.4</td>
<td>4.6</td>
<td>5.7</td>
<td>7.0</td>
<td>4.2</td>
<td>5.2</td>
<td>7.1</td>
</tr>
<tr>
<td><strong>Prices:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>U.S. weighted avg. farm price</td>
<td>$3.04</td>
<td>$4.20</td>
<td>$4.06</td>
<td><strong>$3.75</strong></td>
<td>$4.80</td>
<td><strong>$3.85</strong></td>
<td>$3.70</td>
<td>$5.15</td>
<td><strong>$3.90</strong></td>
<td>$3.70</td>
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<tr>
<td>Iowa weighted avg. farm price</td>
<td>$2.99</td>
<td>$4.15</td>
<td>$4.01</td>
<td><strong>$3.70</strong></td>
<td>$4.75</td>
<td><strong>$3.80</strong></td>
<td>$3.65</td>
<td>$5.10</td>
<td><strong>$3.85</strong></td>
<td>$3.65</td>
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<tr>
<td>Counter-cyclical pmt.</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Harvest price (central Iowa)</td>
<td>$2.80</td>
<td>$3.30</td>
<td>$3.50</td>
<td><strong>$3.70</strong></td>
<td>$4.45</td>
<td><strong>$3.40</strong></td>
<td>$3.25</td>
<td>$4.60</td>
<td><strong>$3.50</strong></td>
<td>$3.30</td>
</tr>
<tr>
<td>Dec. futures price (harvest avg.)</td>
<td>$3.15</td>
<td>$3.80</td>
<td>$3.85</td>
<td><strong>$4.05</strong></td>
<td>$5.10</td>
<td><strong>$3.95</strong></td>
<td>$3.80</td>
<td>$5.25</td>
<td><strong>$4.05</strong></td>
<td>$3.85</td>
</tr>
</tbody>
</table>

*Updated: 1/18/2009*
U.S. Annual Average Corn Price, 1908-2005

- **1908-1942**: 35 years, Avg $0.78
- **1942-1972**: 30 years, Avg $1.26
- **1973-2005**: 33 years, Avg $2.37

Source: USDA/NASS
Actual and Forecast Corn Prices, RW Models, Based on 1980-81 to 2007-08 Data

- Actual Corn Price
- Model IIIR Forecast
- Model IV Forecast

Wisner Projections 1/12/09
Key Forecasting Variables

- Exports/total supply
- Ethanol/total use
- Corn Price lagged one year
- 0/1 weather variable for drought/flood years
- Wheat price lagged one year (Model IIIIR)
- Current wheat price (Model IV)

- $R^2$ Model IIIIR = .9044: All Var. Significant @ <6% probability except lagged wheat price
- $R^2$ Model IV = .9244: All Var. Significant @ <6%. Least significant is lagged corn price (All others significant at <1%)
Forecasting with price flexibilities

- Percent change in ’09-10 supply vs. Y/A
- Adjustment for demand growth
  - Feed use
  - Processing
  - Exports
- Forecast: Price flexibility x adjusted supply change x previous year’s price
- Adjustment for unusual developments
Forecasting with corn price flexibility (Price Elasticity -.2)

- 2009-10 corn supply + 866 mil. bu.
- Adjustment for demand growth
  - Feed & residual use +246 mil. bu.
  - Processing +602 mil. bu.
  - Exports +242
- Adjusted supply chg. -93 mil. Bu. or -.0677%
- Forecast:.0677% x 5 = +3.38% price impact
- Price forecast: $4.06 x 1.0338 = $4.20 U.S. avg./bu. (’09-10 mkt. yr.)
- Forecast lowered, reflecting heavy forward contracting in spring-summer 2008 & weak economy + lower gas price
Forecasting with corn price flexibility (Price Elasticity -.2)

Impact: USDA 1/12/10 Season Final crop est.:

- 2009-10 corn supply chg. Vs. December report: +229 mil. bu. (+1.57%)

- Forecast of price change from the report: 0.0157% x 5 = -7.85% price impact or -$0.32 on $4.12 futures

After adjusting for demand changes:

- Domestic use +140 mil. bu.: net supply chg. = +89 mil. Bu. or 0.006%. Price impact: $0.126

- Caution: 20% or 2.6 bil. bu. of corn were still unharvested when USDA final survey was taken. Bad weather likely has caused field losses
5 to 5.5 weeks supply: price influenced by ethanol price
Percent Change in U.S. Corn Price & Corn Processing for Ethanol, 1981-2008

Nearly Inelastic Demand?
**ETHANOL GROSS MARGIN**

*Gross Margin: Inputs:* nearby corn futures/basis and nearby natural gas futures + 45 outputs: DDGS (75% of cash corn) and ethanol nearby swaps with the western corn belt @ 12 under Chicago and eastern corn belt @ Chicago price.
Percent Change in U.S. Corn Price & % Deviation of Domestic Corn Feeding from Trend, 1981-2008

17% rise in price to get 5% cut in feeding

Implied price elasticity @ mean, 1995-06 = -.29

Elasticity, 1981-1994 @ mean = -.69
Figure 3. US Ethanol Plants

Total 11,693 mil. Bu.

<table>
<thead>
<tr>
<th>Status</th>
<th>MGY</th>
<th>Mil Bu</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Operation</td>
<td>5,432</td>
<td>1,940.1</td>
</tr>
<tr>
<td>Under Expansion</td>
<td>263</td>
<td>93.9</td>
</tr>
<tr>
<td>Under Construction</td>
<td>4,872</td>
<td>1,740.0</td>
</tr>
<tr>
<td>Ground Broken</td>
<td>2,463</td>
<td>879.6</td>
</tr>
<tr>
<td>Planned</td>
<td>19,710</td>
<td>7,039.3</td>
</tr>
</tbody>
</table>

Plants "Under Construction" have broken ground and have poured concrete. Plants that have "broken ground" have begun site work but no actual construction. Plants that are "planned" have been talked about or announced in the news.
Changing corn market

Relative Shares of Major Uses of U.S. Corn in 1980-01

Big swing factor in markets was export demand
Changing corn market

Relative Shares of Major Uses of U.S. Corn in 2004-05

- Feed & Residual
- Exports
- Food, Industrial & Seed
Changing corn market

Relative Shares of Major Uses of U.S. Corn in 2008-09

- Exports
- Food, Industrial & Seed
- Feed & Residual
Changing corn market

Relative Shares of Major Uses of U.S. Corn in Projected 2010-11

What’s ahead in next 5 years?
Cap & trade, GHG, animal agriculture, weather?
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<tr>
<th></th>
<th>1/5/2010</th>
<th>$/Bu.</th>
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<tbody>
<tr>
<td>March 2010</td>
<td></td>
<td>4.18</td>
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<tr>
<td>May</td>
<td></td>
<td>4.27</td>
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<tr>
<td>July</td>
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<td>4.36</td>
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<td>Sept.</td>
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<td>4.40</td>
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<tr>
<td>Dec.</td>
<td></td>
<td>4.44</td>
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<tr>
<td>March 2011</td>
<td></td>
<td>4.52</td>
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<tr>
<td>May</td>
<td></td>
<td>4.59</td>
</tr>
<tr>
<td>July</td>
<td></td>
<td>4.65</td>
</tr>
<tr>
<td>Sept.</td>
<td></td>
<td>4.56</td>
</tr>
<tr>
<td>Dec.</td>
<td></td>
<td>4.48</td>
</tr>
</tbody>
</table>

.18 cent carry to July 2010

R.W. normal weather forecasts

4.05

3.95
Error in USDA May Corn Forecasts for next season, Mid-Point of Prices

Forecast too high 45% of years, exact 7% of years, too low 48%, Avg. Error $0.02

Above zero = forecast too high

Error in USDA Nov. Corn Price Forecasts for next season, Mid-Point of Prices

Forecast too low 28% of time, too high 44% of years, Exact 28% of years. Avg. Error -$0.02 (too low)

Above zero = forecast too high
Forecasting the New Crop Size

Key information sources

• USDA late March planting intentions report
• Weekly crop progress & condition reports
• Weather forecasts, weekly, monthly & other
• Monthly USDA crop forecasts – wheat: May to Sept., corn, milo, SB Aug. – Nov.
• Private forecasting reports
• Trend yields
Percent Change in U.S. Corn Plantings from Intentions Survey to Next January, 1965-2008

Avg. Chg. 1996-08: +0.3%
Figure 6. U.S. Corn Yield, Percent Deviation From Trend, 1866-2005

Yields > 8% above trend: 26% of years
Yields < 8% below trend: 15% of years
U.S. Soybean Yield, Deviation From Trend, 1924-2003

Yields 5% or more above trend = 29% of years

Yields 10% or more above trend = 8% of years

Yields 5% or more below trend = 28% of years

Yields 10% or more below trend = 11% of years
USDA Corn Yield Forecasts, Percent Change from September to Season Final Estimate

Avg. Change, All Years except major weather-stress years: +2.3%

Estimates increased in 71% of the years

* Major weather stress years
Seasonal Indices of Iowa corn prices with Normal, Short Crop, Short Crop Less 1995 Crop Year, and All Years

1978-9 to 2002-03

- Price gain, Oct.-Jan. normal crops +5.2%
- Price gain, Oct.-Jan. short crops +13%
- Price gain, Jan.-May normal crops +7.7%
- Price gain, Jan.-May short crops +3.2%
Biofuels have dramatically changed the level but not seasonality since 2005.
Risk Premium in Dec. Corn futures
Mid-May vs. early Nov.

Past results are no guarantee of future performance
Biofuels have dramatically changed the level but not seasonality since 2005.
Figure 4. Change in Nov. Soy Futures, Mid-Feb. After Short U.S. Crops & Early April or Mid-May After Normal Crops vs. Mid-Oct., 1975-2005

Prices Rose 32% of Years, **Declined 68%**. Avg. Decline, all years, = $0.26/Bu. (April) & $0.25 (May)

*Past results are no guarantee of future performance*
Forecasting U.S. Corn Yields

• Yield: The biggest uncertainty in the Supply-Demand equation
• Corn Yield: 10% below trend for 2010 would cut production 1.47 bil. Bu. below expected use
• 10% above trend would put crop 1.12 bil. bu. Above expected use
• Price implications: Very Large & w/low yld., Explosive for all grains
Wisner Corn yield forecasting model, Key variables

• Weekly crop % good-to-excellent, major states
• Percent of the crop planted, major states—by 3rd week of May
• Weather variable: 0-1
• Time trend to reflect new technology
• Best results: late July & August
Key Web Sites

- [http://www.nws.noaa.gov/](http://www.nws.noaa.gov/) National Weather Service weather reports, current, 6-10 days up to monthly and season outlook
- [http://www.econ.iastate.edu/faculty/wisner/grainbidlinks.doc](http://www.econ.iastate.edu/faculty/wisner/grainbidlinks.doc) Futures Prices & cash prices at various locations
Example information
Iowa Crop Progress as of July 5, 2009

<table>
<thead>
<tr>
<th>Crop</th>
<th>Districts</th>
<th>State</th>
<th>Last Week</th>
<th>Last Year</th>
<th>Normal</th>
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<tbody>
<tr>
<td>Corn, tallest height, &quot;</td>
<td>NW</td>
<td>NC</td>
<td>NE</td>
<td>WC</td>
<td>C</td>
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<tr>
<td>Corn, avg. height, &quot;</td>
<td>54</td>
<td>44</td>
<td>48</td>
<td>58</td>
<td>54</td>
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<tr>
<td>Corn stand, % of Norm.</td>
<td>99</td>
<td>98</td>
<td>96</td>
<td>98</td>
<td>94</td>
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<td>Soybeans % blooming</td>
<td>29</td>
<td>17</td>
<td>48</td>
<td>21</td>
<td>22</td>
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Illinois has similar information
# Corn Crop Condition

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<td>75</td>
<td>-3</td>
<td>-19</td>
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<tr>
<td>IL</td>
<td>57</td>
<td>-1</td>
<td>-26</td>
</tr>
<tr>
<td>IN</td>
<td>64</td>
<td>2</td>
<td>-10</td>
</tr>
<tr>
<td>IA</td>
<td>82</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>KS</td>
<td>68</td>
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<td>1</td>
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<td>KY</td>
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<td>62</td>
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# 2004 yield: +11% vs. trend

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<td>Prev Wk.</td>
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<tr>
<td><strong>18 Sts.</strong></td>
<td><strong>74</strong></td>
<td><strong>57</strong></td>
<td><strong>84</strong></td>
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</tbody>
</table>
Brazil Soil Moisture
11/20/09

Major Northern Areas Improving,
South ok

% of Normal
Red = 0-10%
Orange = 10-20%
Green = 80-90%
Blue = 90-100%
What to Look For in Sources of Outlook Information

- Good detail on international conditions
- Use of sensitivity analysis & probabilities
- Up-to-date S-D
- Advisable to use several sources + USDA
- Technical analysis can supplement fundamental analysis
- Keys for 2009-10: U.S. crops, China, S. Am. crops, E-15
Wheat: world competition is strong

-- Large U.S. Carryover expected, world – more modest

-- Need weather concerns for price strength

-- Soft red acres likely down for 2009-10

-- Uncertain areas: Argentine frost damage, 2010 world production
<table>
<thead>
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<th></th>
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<tbody>
<tr>
<td><strong>Area (Mil. A.)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Planted</td>
<td>60.5</td>
<td>63.2</td>
<td>59.1</td>
<td>59.1</td>
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<tr>
<td>Harvested</td>
<td>51</td>
<td>55.7</td>
<td>49.9</td>
<td>49.9</td>
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<td>Yield, Bu./A.</td>
<td>40.2</td>
<td>44.9</td>
<td>44.4</td>
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<td>Production, Mil. Bu.</td>
<td>2,051</td>
<td>2,499</td>
<td>2,216</td>
<td>2,216</td>
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<td>Beginning stocks</td>
<td>456</td>
<td>306</td>
<td>657</td>
<td>657</td>
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<td>Imports</td>
<td>113</td>
<td>127</td>
<td>110</td>
<td>110</td>
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<td>Supply, total</td>
<td>2,620</td>
<td>2,932</td>
<td>2,983</td>
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<td><strong>Food</strong></td>
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<td></td>
<td>948</td>
<td>927</td>
<td>955</td>
<td>940</td>
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<td><strong>Seed</strong></td>
<td>88</td>
<td>75</td>
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<td><strong>Feed and residual</strong></td>
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<td>258</td>
<td>190</td>
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<td><strong>Domestic, total</strong></td>
<td>1,051</td>
<td>1,260</td>
<td>1,223</td>
<td>1,208</td>
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<td><strong>Exports</strong></td>
<td>1,263</td>
<td>1,015</td>
<td>875</td>
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<td><strong>Use, total</strong></td>
<td>2,314</td>
<td>2,275</td>
<td>2,098</td>
<td>2,083</td>
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<td><strong>Ending stocks</strong></td>
<td>306</td>
<td>657</td>
<td>885</td>
<td>900</td>
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<td><strong>Weeks Supply</strong></td>
<td>6.9</td>
<td>15.0</td>
<td>21.9</td>
<td>22.5</td>
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<td><strong>Stocks/use</strong></td>
<td>13.2%</td>
<td><strong>28.9%</strong></td>
<td><strong>42.2%</strong></td>
<td><strong>43.2%</strong></td>
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<tr>
<td><strong>Avg. farm price ($/bu)</strong></td>
<td>$6.48</td>
<td>$6.78</td>
<td>$4.85</td>
<td>$4.85</td>
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</table>
Historical Proj. 2010-11

Price held up by corn, ethanol, $ weakness
’09-Crop Export Sales Through 12/31/09

• **Soybeans**: 1,161 mil. Bu. + 55% from yr.ago.
  – 87% of *USDA projected mkt. yr. exports*
  – USDA October proj. expts. Low 7 of 10 yrs.
  – China purchases up 69%

• **Corn**: 985 mil. bu. +19% from yr. ago

• **Wheat**, at 58% through mktg. yr.:
  – SRW: -51% vs. yr. ago
  – HRW: -42%
  – HRS: -10%
Do pre-harvest new-crop wheat prices have a risk premium?

- OSU & KSU research says no
- U. of Minn. Studies hint at a possible small one

- **Wheat: fundamentally different than corn & SB**
  - Harvesting nearly year around globally
  - U.S. much smaller share of global production than corn & SB
  - Somewhat more weather resistant than corn & SB
World Wheat & Coarse Grain Area: Another 1996?

- Coarse Grains
- Wheat

1996-97
### Table 3. South America Crop Prospects

1/12/10 USDA

Next Update: Feb. 10, 2010

<table>
<thead>
<tr>
<th>Country</th>
<th>Crop Type</th>
<th>Change Mil. Bu.</th>
<th>Change Proj.</th>
<th>Spring '09 Vs. '08</th>
<th>Spring 2010</th>
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<tr>
<td>Argentina</td>
<td>corn</td>
<td>-370</td>
<td>+95</td>
<td>-</td>
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<tr>
<td>Argentine</td>
<td>SB</td>
<td>-523</td>
<td>+773</td>
<td>-</td>
<td>+</td>
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<tr>
<td>Brazil</td>
<td>corn</td>
<td>-299</td>
<td>+0.0</td>
<td>-</td>
<td>+</td>
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<tr>
<td>Brazil</td>
<td>SB</td>
<td>-147</td>
<td>+294</td>
<td>-</td>
<td>+</td>
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<tr>
<td>Paraguay</td>
<td>SB</td>
<td>-110</td>
<td>+103</td>
<td>-</td>
<td>+</td>
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</tbody>
</table>

- Total corn change: -669, +95
- Total SB change: -780, +1,170

Next update: Feb. 10, 2010
SB product export sales 12/31/09

- SBM: +86% vs. yr. ago
- SBO: +279%

Soy crush margin 12/31/09, Decatur, IL

- $1.21/bu. vs. $0.51 a year ago, meal yield -0.7% vs. y/a
- Oct. crush +6.4% vs. yr. earlier, Nov. +17.6%
<table>
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<tr>
<th>SB Balance Sheet - R. Wisner</th>
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<tbody>
<tr>
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<tr>
<td><strong>Yield (bu. per acre)</strong></td>
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<tr>
<td><strong>Long-term historical yield probability:</strong></td>
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<tr>
<td><strong>Supplies:</strong></td>
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<tr>
<td>Planted acres (million)</td>
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<td>Harvested acres (million)</td>
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<tr>
<td>Production (mil. bu.)</td>
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<tr>
<td>Beginning carryover (mil. bu.)</td>
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<tr>
<td>Total Supply</td>
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<td><strong>Usage:</strong></td>
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<tr>
<td>Crush (mil. bu.)</td>
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<tr>
<td>Seed &amp; residual (mil. bu.)</td>
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<tr>
<td>Exports (mil. bu.)</td>
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<tr>
<td>Total Usage</td>
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<tr>
<td><strong>Ending Soybean Carryover: (mil. bu.)</strong></td>
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<tr>
<td>Carryover, weeks of total use</td>
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<tr>
<td><strong>Prices:</strong></td>
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<td>U.S. weighted avg. farm price</td>
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<td>Iowa weighted avg. farm price</td>
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<tr>
<td>Harvest price (central Iowa)</td>
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<td>Nov. futures price (harvest avg.)</td>
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<td>Soy meal, Decatur, $/T 48% protein</td>
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<tr>
<td>Soy oil, $ per cwt.</td>
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<td>Oil Yield</td>
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<td>Soybean oil use for biodiesel, mil. lbs.</td>
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</table>
Using electricity for SB forecast gives 2010-11 price below $5.00/bu.

- Corn price will keep soybean price higher
- The two markets will create a balance of needed acreages in 2010
- Biodiesel demand may also be a factor if Congress renews biodiesel tax credit & biodiesel mandates are enforced
- Seasonality: SB supplies are very tight until new S. American crop is available
Soybean/Corn Price Ratio & Change in U.S. Soybean Planted Acres
Selected Years

For needed 2010 acres, Implies IA cash SB price @ about $8.40 in May
Yearly Price Spread between value of products and soybean price

Mean Price Spread=.66
Standard Deviation Price Spread=.14
Monthly No.1 yellow soybean price, C. Illinois processors, 1995-2003

Mean = 5.77
Standard Deviation = .15
## U.S. Grain Sorghum Balance Sheet

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<td>Mil. A. planted</td>
<td>7.7</td>
<td>8.3</td>
<td>6.6</td>
<td>7.7</td>
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<tr>
<td>Mil. A. Harvested</td>
<td>6.8</td>
<td>7.3</td>
<td>5.5</td>
<td>6.8</td>
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<tr>
<td>Bu./A.</td>
<td>73.2</td>
<td>65</td>
<td>69.4</td>
<td>70</td>
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<tr>
<td><strong>Million Bushels</strong></td>
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<td>Beginning stocks</td>
<td>32</td>
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<td>55</td>
<td>58</td>
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<tr>
<td>Production</td>
<td>497</td>
<td>472</td>
<td>383</td>
<td>476</td>
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<td>Imports</td>
<td>0</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>Total supply</td>
<td>530</td>
<td>525</td>
<td>438</td>
<td>534</td>
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<td>Feed and residual</td>
<td>165</td>
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<td>Food, seed &amp; industrial</td>
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<tr>
<td>Total domestic</td>
<td>200</td>
<td>327</td>
<td>240</td>
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<tr>
<td>Exports</td>
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<td>140</td>
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<td>Use, total</td>
<td>477</td>
<td>471</td>
<td>380</td>
<td>470</td>
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<tr>
<td>Carryover</td>
<td>53</td>
<td>55</td>
<td>58</td>
<td>64</td>
</tr>
<tr>
<td>Carryover, weeks' supply</td>
<td>5.8</td>
<td>6.1</td>
<td>7.9</td>
<td>7.1</td>
</tr>
<tr>
<td>Avg. farm price/$/bu.</td>
<td>$4.08</td>
<td>$3.20</td>
<td>$3.30</td>
<td>3.4</td>
</tr>
<tr>
<td>Price, % of corn Price</td>
<td>97.1%</td>
<td>78.8%</td>
<td>88.0%</td>
<td>88.3%</td>
</tr>
</tbody>
</table>
Take-home Points: Fundamental Analysis

• Look at the big picture
• Demand elasticity is changing & making prices more sensitive to supply changes
• Typical approach uses balance sheets
• Price forecasts: typically based on stocks/use, forecasting models, and/or elasticity of demand
• Know where to get information: weather & crops, USDA reports, ethanol, international crop conditions
• Other related information is in next slides
Expect Higher Inflation in 12 to 24 months + Weaker U.S. $
Monthly U.S. $ Index to 12/31/09:
Linked closely to energy prices
& thus to grain markets
U.S. General Econ. Outlook

3 Highly Likely Developments

- Trend toward weaker $
- Increasing inflation, esp. in 2-3 years
- Higher interest rates— in 2-3 years, possibly sooner

Driving forces: huge budget deficits and “cap & trade”
World Feed Trade Outlook

- 10 to 18 months of slow world growth
  - then inflation risk, weaker U.S. $  
  - Increased price volatility  
  - slower growth in S. American Grain production
- Adequate feed grain supplies through late ’09, then gradual export supply tightening
  Tight protein meal supplies through early 2010, then easing with good S.Am. SB crop
- 5 Keys to global feed trade: (1) **U.S. biofuels**,  
  (2) U.S crop yields, (3) China, (4) FSU, (5) South America
- **Global warming: is it real?**
- **Will reason prevail in policies?**  
  - impact of GHG emissions controls on economy, grain and animal production and trade?
July '10 crude oil, 5/6/09

July '10 corn, 5/6/09

July 2010: $61.65, brings corn near $4.80/bu.
U.S. Ethanol Situation-Spring ‘09

- 2nd. Largest firm in bankruptcy
- 5-8 more in bankruptcy
- 24-28 formerly operating plants idled
- Several completed or nearly complete plants delay opening
- Returns: near break-even
- Severe loss in asset values
- Govt. Mandates support corn processing demand near current level -- “blending wall” issue
- Idle operating capacity: 13.5-15.0 mil. tons corn
- Idle plants =14%-18% of capacity
Biofuels: Problems with Greenhouse Gas Standards

Figure 1. CO₂ Emissions, Selected Biofuels as % Deviation from Proposed California Emissions Standards
How much recovery in oil price & how soon?

Figure 6. Annual U.S. Gasoline Consumption Since 1945 & Inflation-Adjusted Crude Oil Prices
(Crude oil prices are in 1982-1984 dollars)
41 Countries Encourage Biofuels

Ethanol, demand growth & food inflation shifting China from exporter to importer?
Temporary larger wheat feeding reduces coarse grain demand

Global Corn & Other Coarse Grain Exports & Wheat Feeding

- Other Coarse Grain Exports
- Wheat Feeding
- Corn Exports

Mil. Bu. Corn Equiv.

U.S. Ethanol & Yield Trend Have Big Implications for Corn Exports

World Corn Exports by Source, 2007-08

- U.S.
- Brazil
- Argentina
- Others
- EU
- S. Africa
- Ukraine
Sorghum Also is an Ethanol Feedstock
U.S., Foreign, and World Coarse Grain Exports

Data Source: USDA 3/12/09

- U.S. Exports
- World Exports
- Non-U.S.
World Corn Imports, Selected Countries & Regions

- Algeria
- Columbia
- S. Arabia
- Iran
- Morrocco
- Russia
- Egypt
- Taiwan
- S. Korea
- Canada
- EU
- Mexico

000 Metric Tons

1990/1991
1992/1993
1994/1995
1996/1997
1998/1999
2000/2001
2002/2003
2004/2005
2006/2007
2008/2009
China's Net Corn Exports, Marketing Years & USDA Projection for 2008-09

Bars above zero are exports, below indicate net imports
Corn Yield to Affect China Export Availability
Normal Yield: about 68-70% of U.S.
Southern Hemisphere Corn Exports
2008 crop down 17 mil. Tons or 670 mil. bu.
Net Grain Exports, Former Soviet Union, 1961-2008

Source of data: USDA, FAS, PSD & WAOB Projections
Major World Protein Exports, 2007-08

- **Soy Meal**
- Meal Copra
- Meal Cottonseed
- Meal Fish
- Meal Peanut
- Meal Sunflowerseed
Major Protein Meal Importers, 2007-08

- S. Korea
- Vietnam
- Indonesia
- Thailand
- Japan
- United States

Others

EU
Major Protein Meal Consumers, 2007-08

- EU
- China
- Others
- U.S.
- Brazil
- India
- Japan
- Mexico
- S. Korea
- Indonesia
China Soybean Meal Use

Slower growth in the Future?

[Graph showing the increase in soybean meal use in China from 1970 to 2005, with a notable increase after 2000.]

Mil. Metr. Tons

Marketing Years Beginning
Newly Cleared Land In Brazil
Planted to Upland Rice
Potential area to be cleared for crops

West Central Argentina, 2007
Four Key Areas to Influence Future Feed Exports

• U.S. -- Biofuels Policies & Crop Yields
  – Less restrictive GHG regulations?

• China
  – Will its SBM growth slow?
  – Will it be a corn importer?

• South America – can it continue to expand?

• Former Soviet Republics – political stability?
The Future

- *Grain & oilseeds will be energy crops*
- Cellulose crops will compete with other ag production
- Global supplies will tighten some, next 2 to 3 years as economy recovers
- China may be modest corn importer
- Non-U.S. feedstuff sources will gradually expand supplies
- U.S. will see significant crop yield increases, helping to supply biofuels growth
- Prices will be volatile
Thanks!

Questions?

Web Sites

http://www.econ.iastate.edu/faculty/wisner/

http://www.agmrc.org/renewable_energy/agmrc_renewable_energy_newsletter.cfm