Market Situation & Outlook

- Interpret market factors that impact prices and resulting marketing and management decisions
- Analyze changing supply and demand factors and how they impact price
- Based on economic principles and statistical analysis

Motivations

- Enhance market efficiency by providing timely and relevant information to all participants
- Interpret information to simplify decisions
- Estimate elasticities for policy analysis

Limitations

- Efficient market hypothesis
  » All available information is quickly factored into the markets
- New information and/or changes in supply and demand alter outcomes
- Participants react to forecast
Market Situation

- Define current and recent past
- Typically measuring change in key variables to estimate change in price using historic relationships
- Evaluate how current relationships differ from historic patterns

Market Outlook

- Outlook on a time continuum
  - Long term: next growing season to multiple years
  - Intermediate term: within a growing season
  - Short term: few weeks to few months
  - Very short term: tomorrow to a few days to next week
  - Immediate: within day

Long term outlook

- Buyers and sellers fully respond to changes in price and adjust quantity supplied and quantity demanded
- Rely on elasticities and cost curves to estimate quantity changes
- Important for policy analysis and long term investment decisions
Intermediate term outlook

- Supply and demand become more inelastic
- Buyers and sellers less able to react to price changes and can make limited adjustments to quantity supplied and demanded
- Signals market on availability of supply

Short term outlook

- Relatively inelastic supply
  » Sellers willing to sell at prices less than average total cost
- Relatively stable demand
- *Prices adjust to clear supplies*

Very Short Term or Immediate

- More of a market timing issue
  » Should I take this price or wait
  » Non-storable commodities
  » Futures markets
Evaluating Source of Information

- Know the source of data and analysis
- Understand the motivation of the source
  » Public institution
  » Private analysis for sale
  » Private company confidential
- What are the resources and track record

Sources of Outlook Information

- USDA Outlook
  » 2005-14 agricultural baseline projections
  » World Agricultural Supply and Demand Estimates (WASDE)
  » Outlook reports for commodities and products
    – Livestock, Dairy, and Poultry Outlook
    – Feed Outlook Report

Sources of Outlook Information

- USDA Data and Analysis Sources
  » National Agricultural Statistical Service (NASS)
  » Agricultural Marketing Service (AMS)
  » Economic Research Service (ERS)
  » Foreign Agricultural Service (FAS)
Sources of Outlook Information

- Land Grant Universities
  - Long term, 10 Forecast
    - FAPRI 2005 U.S. and World Agricultural Outlook
  - Intermediate to short term
    - Iowa Farm Outlook (Grain, Livestock, Dairy)
    - Other Universities
    - Livestock Market Information Center

- Commodity organizations
  - Typically narrowly focused on commodity
  - May miss breath of outlook

- Private sector market analysis firms
  - For profit companies that sell services
  - Often more short-term focused
  - May be associated with a trading company

- In house analysis
  - Outlook for the company with own staff

USDA and Private Market Forecasts for 2004 Corn and Soybean Production Percent Forecast Error

<table>
<thead>
<tr>
<th>Month</th>
<th>USDA</th>
<th>Private</th>
<th>USDA</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2004</td>
<td>7.5</td>
<td>8.3</td>
<td>8.4</td>
<td>5.9</td>
</tr>
<tr>
<td>September 2004</td>
<td>7.2</td>
<td>7.1</td>
<td>9.7</td>
<td>8.0</td>
</tr>
<tr>
<td>October 2004</td>
<td>1.6</td>
<td>4.4</td>
<td>1.1</td>
<td>2.5</td>
</tr>
<tr>
<td>November 2004</td>
<td>0.6</td>
<td>0.8</td>
<td>-0.3</td>
<td>-0.1</td>
</tr>
</tbody>
</table>

Note: Forecast errors are computed as actual minus forecast values.
Source: AgMAS University of Illinois
Data Sources

- All forecasts rely on data estimates for inventories, production, and prices
- USDA
  - The official numbers in the US
  - Information is a public good
    - High exclusion cost
    - Non-rival consumption
  - Assists competitive markets by providing information to participants
- Private
  - Costly to collect beyond own company

Short to Intermediate Run Forecast

- Price
  - $P_i = f(\text{own supply}, \text{supply of substitutes}, \text{supply of complements}, \text{income}, \text{population}, \text{exports}, \text{imports}, \text{marketing margins})$
  - Typically combine own supply and net trade and population into a per capita consumption variable.

Short term outlook

- Use price flexibilities
  - The percentage change in price for a 1% change in some variable (quantity supplied)
  - $F_{p_i} = \% \Delta P_i / \% \Delta Q_i$
  - Approximately $= 1 / \text{elasticity}$
Own price flexibilities

- Assumes all else equal
- Always negative
- Typically about -2.0 to -3.0 for most ag commodities

Cross price flexibilities

- The percentage change in the price of good i resulting from a 1% change in the quantity supplied of good j
  \[ F_{pij} = \frac{\% \Delta P_i}{\% \Delta Q_j} \]
- For example, what is the impact on hog prices if beef supplies are large?
- Typically much smaller than own supply

Compare to another period

- Compare to same time period one year earlier
- Captures seasonal demand and marketing margin factors
- Estimate percentage change in supply and then use flexibility to estimate percentage change in price.
### Using Flexibilities

<table>
<thead>
<tr>
<th>Change in price of beef=</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>% Δbeef supply</td>
<td><em>x</em></td>
<td>-2.0</td>
</tr>
<tr>
<td>+ % Δpork supply</td>
<td><em>x</em></td>
<td>-0.3</td>
</tr>
<tr>
<td>+ % Δpoultry supply</td>
<td><em>x</em></td>
<td>-0.3</td>
</tr>
<tr>
<td>+ % Δincome</td>
<td><em>x</em></td>
<td>+0.2</td>
</tr>
<tr>
<td>+ % Δpopulation</td>
<td><em>x</em></td>
<td>+1.0</td>
</tr>
</tbody>
</table>

Flexibilities are estimated based on historic statistical analysis. Percentage change in variables are forecast based on inventory reports and production relationships.

### Forecast Supplies

- **Production driven and information available**
  - USDA inventory reports
  - Acreage, expected yield
  - Marketings
  - Imports and exports
  - Trends in weights or yields

- **Rely on historic and biological relationships**

- **Compare change to actual price**

### Forecast Supplies

- **USDA crop reports**
  - Acreage
  - Crop progress
  - Carryover in storage

- **USDA livestock inventory reports**
  - Cattle on feed
  - Hogs and Pigs
  - Hatchery numbers

- **Demand relatively stable**
  - Population
  - Exports
Price Forecast Example for Hogs

Predicted % change from same quarter the year earlier

<table>
<thead>
<tr>
<th>Quarter</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Per capita pork</td>
<td>-2.0</td>
<td>-2.5</td>
<td>-3.5</td>
<td>-2.0</td>
</tr>
<tr>
<td>Per capita beef</td>
<td>+2.0</td>
<td>+1.5</td>
<td>+2.5</td>
<td>+3.0</td>
</tr>
<tr>
<td>Per capita poultry</td>
<td>+3.5</td>
<td>+3.5</td>
<td>+4.0</td>
<td>+4.0</td>
</tr>
<tr>
<td>Per capita income</td>
<td>+1.5</td>
<td>+2.0</td>
<td>+2.0</td>
<td>+2.5</td>
</tr>
<tr>
<td>Population</td>
<td>+.9</td>
<td>+.9</td>
<td>+.9</td>
<td>+.9</td>
</tr>
</tbody>
</table>

Using Flexibilities

Change in price of pork in 3rd quarter

| %Δ pork supply | -3.5 x -3.0 = +10.5 |
| %Δ beef supply | +2.5 x -0.3 = -0.75 |
| %Δ poultry supply | +4.0 x -0.3 = -1.2 |
| %Δ income      | +2.0 x +0.2 = +0.4 |
| %Δ population  | +0.9 x +1.0 = +0.9 |

Total expected impact on price = +9.85

This is the expected percentage change in price resulting from the supply factors considered.

Price Forecast Example for Hogs

- Hog price in the third quarter one year earlier averaged $70/cwt carcass
- Forecast Price = \( P_t = P_{t-1} \times (1 + \% \Delta P) \)
- \( $70 \times (1 + 0.0985) = $76.90 \)
  - Point estimate serves as a starting point
  - There is an error range around the point
  - Try to account for other factors such as recent demand, exports, farm to retail margins, etc.
**Summary of Live Hog Price Forecasting Errors ($/cwt), ISU Iowa Farm Outlook, Futures with Three-year Basis, and Ten-year Seasonal Index during the last 10 years (1995-2004).**

<table>
<thead>
<tr>
<th>Isu Futures Index</th>
<th>One Quarter Out Forecast Error</th>
<th>Two Quarter Out Forecast Error</th>
<th>Three Quarter Out Forecast Error</th>
<th>Four Quarter Out Forecast Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>0.07</td>
<td>0.00</td>
<td>0.63</td>
<td>0.41</td>
</tr>
<tr>
<td>Std Dev</td>
<td>4.86</td>
<td>7.06</td>
<td>7.96</td>
<td>9.29</td>
</tr>
</tbody>
</table>

**Summary of Cattle Price Forecasting Errors ($/cwt), Futures with Five-year Basis, and Ten-year Seasonal Index (1995-2004).**

<table>
<thead>
<tr>
<th>Seasonal Index</th>
<th>Futures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg</td>
<td>Stddev</td>
</tr>
<tr>
<td>1</td>
<td>-0.26</td>
</tr>
<tr>
<td>2</td>
<td>-0.37</td>
</tr>
<tr>
<td>3</td>
<td>-0.11</td>
</tr>
<tr>
<td>4</td>
<td>0.56</td>
</tr>
</tbody>
</table>
Grain Balance Sheet

- **Total available**
  - Beginning stocks + production + imports

- **Total utilization**
  - Exports + processing + seed + food + feed and residual

- **Carryover**
  - Total available – total utilization
  - Supply at the end of the marketing year

Grain Balance Sheet

- **Incorporate supply and demand into one number**
- **Relate relative supply to price levels**
  - Supply to Use ratio (S/U)
  - Supply at the end of the year divided by use
  - What percent of a year’s demand is in storage
  - The smaller the number the higher the price
  - Non-linear relationship

US Corn Supply to Use and Price

![Graph showing the relationship between supply to use ratio and price]

- As the supply to use ratio increases, the price decreases non-linearly.
Grain Price Forecasting

- Corn price flexibility = -2.2
- Forecasted change in supply from year before

<table>
<thead>
<tr>
<th>Estimate</th>
<th>% Chg</th>
<th>Flex</th>
<th>%ΔP</th>
<th>Pf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>-5%</td>
<td>-2.2</td>
<td>+11.0%</td>
<td>$2.28</td>
</tr>
<tr>
<td>Medium</td>
<td>-1%</td>
<td>-2.2</td>
<td>+2.2%</td>
<td>$2.10</td>
</tr>
<tr>
<td>High</td>
<td>+3%</td>
<td>-2.2</td>
<td>-6.6%</td>
<td>$1.91</td>
</tr>
</tbody>
</table>

Year earlier price = $2.05

$P_t = P_{t-1} \times (1 + %ΔP)$
Other impacts

- Imports & exports
  » Put in perspective
- Marketing margins
- Seasonal patterns
- Cyclical patterns

Seasonal patterns

- A price pattern that repeats itself with some degree of accuracy year after year.
  » Supplies and demand
  » Often sound reasons
  » Widely known
  » Linked to storage cost or basis patterns in grains
  » Linked to conception and gestation in livestock

Iowa Barrow and Gilt Seasonal Price Index
Iowa Corn and Soybean Price Index, 1995-2004

Cyclical Pattern

- A production and price pattern that repeats itself over longer than a year.
- Production tied to profits
- Biological lag
- Hogs and Cattle

U.S. Cattle Inventory
**Market Situation and Outlook**

- Economic principles and statistical analysis
- Based on historic relationships and patterns
  - Seasonal and cyclical patterns
- History is not a perfect predictor of future
  - Forecast errors
- Efficient market hypothesis
- Understand the source of data and analysis