Livestock Price Volatility

Eric Belasco
Assistant Professor
Department of Agricultural Economics and Economics
Montana State University
Bozeman, MT

Montana Agriculture in Volatile Times, October 2011
1. Update on Livestock Prices
2. Rationale Behind Price Movements
3. What’s Next?
4. Managing Livestock Risk
Livestock Price Volatility

Belasco

Update on Livestock Prices

Rationale Behind Price Movements

What's Next?

Managing Livestock Risk

Feeder Prices are up more than 20% over last year

Nearby Futures Cattle Prices

Source: CME, compiled by LMIC
Volatility has remained relatively stable in cattle market

Monthly Historical Volatility

Source: Chicago Mercantile Exchange
Deseasonalized basis prices

Average Monthly Basis, By Cwt Steers, Billings 2000 to 2010

Source: Provided by LMIC, complied by Duane Griffith
Basis risk is relatively calm

Average Monthly Seasonally Adjusted Basis price, by cwt Steers, Billings

<table>
<thead>
<tr>
<th>Yrs</th>
<th>500-600 lbs</th>
<th>600-700 lbs</th>
<th>800-900 lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2003 - 2004</td>
<td>1.44</td>
<td>1.66</td>
<td>1.75</td>
</tr>
<tr>
<td>2005 - 2006</td>
<td>5.87</td>
<td>2.85</td>
<td>1.12</td>
</tr>
<tr>
<td>2007 - 2008</td>
<td>-4.35</td>
<td>-3.85</td>
<td>-2.74</td>
</tr>
<tr>
<td>2009 - Now</td>
<td>0.80</td>
<td>0.36</td>
<td>-0.51</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Standard Deviation</strong></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2003 - 2004</td>
<td>4.05</td>
<td>2.67</td>
<td>2.79</td>
</tr>
<tr>
<td>2005 - 2006</td>
<td>4.45</td>
<td>3.74</td>
<td>3.45</td>
</tr>
<tr>
<td>2007 - 2008</td>
<td>3.54</td>
<td>3.51</td>
<td>2.07</td>
</tr>
<tr>
<td>2009 - Now</td>
<td>3.53</td>
<td>3.67</td>
<td>2.27</td>
</tr>
</tbody>
</table>
What drives cattle price volatility?

Instability in the cattle market can come from
- Uncertain demand
  - Domestic preferences and consumption
  - Foreign preferences and new consumer markets

⇒ Domestic consumer demand for beef has been solid
⇒ Beef demand is inelastic (not very sensitive to price changes)
⇒ New trade deal with S. Korea
Instability in the cattle market can also come from

- Uncertain supply
  - Input prices (fuel and grains)
  - Weather uncertainty
    - Direct effect through placement shocks
    - Indirect effect through grains price shocks
  - Foreign suppliers (e.g., the TB case in Mexico)

⇒ Fuel and corn prices are volatile (as usual)
⇒ Weather always uncertain (this year, last year,...)
What are current expectations for prices next year?

<table>
<thead>
<tr>
<th></th>
<th>March ’12</th>
<th>August ’12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Price</td>
<td>140.06</td>
<td></td>
</tr>
<tr>
<td>Feeder Futures Price</td>
<td>146.95</td>
<td>148.75</td>
</tr>
<tr>
<td>20-Day Hist. Vol.</td>
<td>7.92%</td>
<td>9.00%</td>
</tr>
<tr>
<td>Expected Steer Prices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 - 600</td>
<td>169.62</td>
<td>155.55</td>
</tr>
<tr>
<td>600 - 700</td>
<td>158.63</td>
<td>149.85</td>
</tr>
<tr>
<td>700 - 800</td>
<td>146.34</td>
<td>147.39</td>
</tr>
<tr>
<td>Expected Heifer Prices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>500 - 600</td>
<td>158.92</td>
<td>150.70</td>
</tr>
<tr>
<td>600 - 700</td>
<td>149.37</td>
<td>144.96</td>
</tr>
</tbody>
</table>

Assumes today's futures prices and seasonal basis adjustment

Note: Futures and cash prices as of 10/26
Thinking about prices for next year

Distribution of Expected Feeder Prices (Per cwt) - Aug 2012

As of 10/26/2011
Expected Price = 148.75
Implied Volatility = 9.00%
Pr (Price < 139.83) = 25%
Pr (Price < 130.90) = 8%
Is the drought over?

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu/

Extent:

- **D0 Abnormally Dry**
- **D1 Drought - Moderate**
- **D2 Drought - Severe**
- **D3 Drought - Extreme**
- **D4 Drought - Exceptional**

**Drought Impact Types:**

- **S = Short-Term**, typically <6 months (e.g. agriculture, grasslands)
- **L = Long-Term**, typically >6 months (e.g. hydrology, ecology)

Released Thursday, October 27, 2011

Author: David Miskus, NOAA/NWS/NCEP/CPC
Managing Price Risk
- Futures and options market
  - Put on feeder or live cattle prices
  - Call on corn prices
- Forward contracting
- Federal insurance
  - Livestock Risk Protection (cattle price)

Managing Production Risk
- Pasture, Rainfall, and Forage (Rainfall index)
Representative MT livestock operation

- 2,000 head herd
- 15% cull rate
- Steers sold at 575 lbs and $1.50 per lb
- Heifers sold at 535 lbs and $1.45 per lb
- Compare this case with that of 6% (32% likelihood) and 12% (17% likelihood) reductions in revenue
- Initial cash on hand: $25,000
## A Comparison Using the Case Farm

<table>
<thead>
<tr>
<th>Metric</th>
<th>Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base</td>
</tr>
<tr>
<td>Revenue ($M)</td>
<td>1.46</td>
</tr>
<tr>
<td>Current Assets ($Thousands)</td>
<td>497.16</td>
</tr>
<tr>
<td>Net Cash Flow ($Thousands)</td>
<td>202.16</td>
</tr>
<tr>
<td>Current Ratio</td>
<td>3.02</td>
</tr>
<tr>
<td>Working Capital ($Thousands)</td>
<td>332.49</td>
</tr>
<tr>
<td>Rate of Return on Business Equity (%)</td>
<td>2.01</td>
</tr>
<tr>
<td>Net Business Income ($Thousands)</td>
<td>308.55</td>
</tr>
<tr>
<td>Net Business Income from Operations Ratio</td>
<td>0.21</td>
</tr>
<tr>
<td>Term Loan Credit Score</td>
<td>1.50</td>
</tr>
<tr>
<td>Operating Loan Credit Score</td>
<td>1.90</td>
</tr>
</tbody>
</table>
Thank you for your time

Send any remaining questions to me at eric.belasco@montana.edu
or
(406) 994-3706