Pricing Issues in Dairy Futures Markets

T. Randall Fortenbery
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<table>
<thead>
<tr>
<th>Contract</th>
<th>Contract Size</th>
<th>Terminal Price/Settlement</th>
<th>Date First Traded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cheddar Cheese (NYCSCE)</td>
<td>10,500 lbs of Cheddar cheese, in 40-lbs blocks</td>
<td>Physical Delivery</td>
<td>June 1993 (discontinued)</td>
</tr>
<tr>
<td>Nonfat Dry Milk (NYCSCE)</td>
<td>11,000 lbs in 25-kilo bags</td>
<td>Physical Delivery</td>
<td>June 1993 (discontinued)</td>
</tr>
<tr>
<td>Fluid-milk Contract (BFP) (NYCSCE)</td>
<td></td>
<td>Cash Settled</td>
<td>April 8, 1997 (discontinued)</td>
</tr>
<tr>
<td>BFP Milk contract (CME)</td>
<td>200,000 lbs (50,000lbs and 100,000lbs available)</td>
<td>BFP price, Cash settled</td>
<td>1997 (changed to Class III Milk contract in 2000)</td>
</tr>
<tr>
<td>Butter</td>
<td>40,000 lbs</td>
<td>Physical Delivery</td>
<td>March 20, 1997</td>
</tr>
<tr>
<td>Class III Milk</td>
<td>200,000 lbs of Class III Milk</td>
<td>USDA Announced Class III Price for contract month, Cash Settled</td>
<td>February 1, 2000 (Replaced BFP)</td>
</tr>
<tr>
<td>Class IV Milk</td>
<td>200,000 lbs of Class IV Milk</td>
<td>USDA Announced Class IV Price for contract month, Cash Settled</td>
<td>July 10, 2000</td>
</tr>
<tr>
<td>Cash-Settled Butter</td>
<td>20,000 lbs</td>
<td>USDA Announced Butter price for contract month, Cash Settled</td>
<td>September 19, 2005</td>
</tr>
<tr>
<td>Dry Whey</td>
<td>44,000 lbs</td>
<td>USDA Announced Dry Whey price for contract month, Cash Settled</td>
<td>March 19, 2007</td>
</tr>
<tr>
<td>Nonfat Dry Milk</td>
<td>44,000 lbs of Nonfat Dry Milk</td>
<td>USDA Announced Nonfat Dry Milk price, Cash Settled</td>
<td>October 10, 2008</td>
</tr>
<tr>
<td>Deliverable Nonfat Dry Milk</td>
<td>44,000 lbs</td>
<td>Physical Delivery</td>
<td>April 20, 2009</td>
</tr>
<tr>
<td>International Skim Milk Powder</td>
<td>20 Metric Tonnes</td>
<td>Physical Delivery</td>
<td>May 10, 2010</td>
</tr>
<tr>
<td>Cheese</td>
<td>20,000 lbs</td>
<td>Physical Delivery</td>
<td>June 21, 2010</td>
</tr>
</tbody>
</table>
Purpose

- Developed in response to commercial interests related to hedging milk prices.
- Assumption was that a Cheddar Cheese contract would be the most appropriate because it would entice large commercials, and still provide forward contract opportunities to dairy producers because of the high correlation between cheese and milk prices.
Unique Challenges

- Cash market with no price volatility experience.
- Dynamic public policy environment.
- Price manipulation accusations concerning large commercial’s behavior in the cash market (mid-1990’s).
- Head to head competition by two different futures exchanges.
Cash Market Challenges


- Examined trading from 1980 – 1993
- Less than ½ of 1 percent of all cheese produced was traded on the exchange, but 90 to 95 percent of all bulk cheese sold under long term contracts was directly priced off the Exchange price.
- Between 1988 and 1993, the market position of firms on the Exchange did not match their commercial interests.
- One company (Kraft) accounted for 74 percent of all sales on the Exchange.
- Concluded Kraft used the Exchange to lower cheese prices prior to buying on the larger cash market.
There was no evidence of a stable relationship between cash and futures prices for cheddar cheese in the first two years of trading.
This resulted in limited hedging opportunities, and explains the lack of commercial participation in the market.
A serious issue related to the way cash prices were determined.
Other “new” markets with similar volume were able to establish a predictable basis relationship.
Addressing Liquidity Issues

- Market Maker Program
- Smaller Contract Size
- New Contract Design - Milk
Price performance

- Derivative price action is dominated by the speculative community.
- This leads to biased prices and excessive price volatility.
Milk Open Interest - Long

- Commercial Long Positions
- Reportable Long Positions
Corn Open Interest - Long

- Commercial Long Positions
- Reportable Long Positions
What about volatility?

- Research has shown that for storable commodities (corn) price variances across contract months are heavily influenced by a common factor.

- For milk, this is not the case.
Proportion of Variance Explained by a Common Factor.
Common factor importance for Class III milk futures.

- Time to maturity when importance of common factor peaks
- Upper limit - Time when common factor first explains more than 70% of variance
- Lower limit - Time when common factor importance falls below 70% of variance
What about volatility?

- Research has shown that price volatility increases as contracts approach expiration.
- For milk this is not the case.
Class III Milk Futures: Unconditional Standard Deviation of Price Change as a Function of Time to Maturity.
Policy Strategies

• Develop a substitute to market exposure.
  – Livestock Gross Margin Insurance Policy

• Provide supplemental information and analysis

• Regulate the market directly
  – Understanding costs/benefits
Conclusions

• Price volatility does make it both difficult and expansive to manage profit margins directly in derivative markets.

• Futures cannot solve cash market problems.

• Perceptions of cash price discovery are critical to acceptance of a futures market.

• Markets are unique – there is no “one size fits all” policy/market intersections.
Thank You