LGM-Dairy: A Risk Management Tool for Small and Large Dairy Farms

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Overview of This Presentation

- Price risk in the U.S. Dairy Industry
- What are the objectives when using LGM-Dairy as a risk management tool?
- Overview of the “Black-Box” of LGM-Dairy
- What are the future prospects of this program?
We have seen a tremendous increase in the volatility of farm milk prices over the last 20 years.

Modern dairy-based futures and options

Parity milk price support

Use of BFP formula

Federal Order Reform

% of Milk Solids

Dairy Exports

Dairy Imports

Source: U.S. Dairy Export Council
Revenue Risk in Today’s Dairy Industry

16% Dairy Ration and Class III Price Indexes (Jan. ’85 = 1)

- 16% dairy ration = 51% (by weight) corn, 8% soybeans and 41% alfalfa hay

How have dairy farmers been able to control their milk price in the recent past?

- Plant-sponsored fixed price contracts
  - Similar to Class III short hedge: No upside price potential
- Plant-sponsored minimum price contracts
  - Similar to Class III put option used to establish milk price floor: Allows for higher milk price
- Producer use of hedging and options systems
  - Outcomes/Opportunity Costs vary across strategy
  - Significant contract lumpiness
  - Possibility of margin calls with use of futures
30-Day Moving Average Class III Futures Open Interest

Class III futures: 2,000 cwt/contract

Open Interest

Peaks and valleys follow the spring flush

R² = 0.55

Dairy Revenue Risk Management

- How can a producer establish a floor on Income over Feed Costs (IOFC)?
  - Class III put options: Creates milk revenue floor
  - Feed call options: Establishes feed cost ceiling
  - Using this bundled option strategy, producer can establish an IOFC floor

$/cwt

Milk revenue floor

Minimum IOFC

Feed cost ceiling
Dairy Revenue Risk Management

$/cwt

Announced Class III ↑,
→ Don’t use Class III Put

Class III Put

IOFC*

IOFC* greater than IOFC

Feed Calls

$/cwt

Class III Put

IOFC*

IOFC* greater than IOFC

Feed Calls

Feed Price ↓ → Don’t use Corn/SBM Calls

LGM-Dairy: An Overview

- Aug. 2008: Livestock Gross Margin Insurance for Dairy (LGM-Dairy) became available
  - Objective: Establish minimum IOFC
  - Similar to bundled options strategy except:
    - No options purchased
    - No minimum size limit
    - Upper limit: 240,000 cwt over 10 mo./insurance yr
    - Premium not due until after contract period
    - Subsidized premiums
  - USDA-RMA administered and purchased from firms selling Federal crop insurance
    - As of July 2010: Available in lower 48 states
LGM-Dairy: An Overview

- LGM-Dairy is customizable with respect to:
  - Number of months insured by 1 contract
    - 1 – 10 months
  - % of monthly IOFC (production) covered
    - 0 – 100% of certified production each month
    - % coverage can vary across months
  - Farm specific production, declared feed use, deductible and premium
    - For feed may only want to protect market-based risk
    - NMPF proposed revenue insurance program would be much less flexible

- Gross Margin (GM) = Total contract Expected value of milk – Total contract Expected feed costs
  - Sum of monthly (Expected milk price x Insured milk) – Sum of monthly (Expected feed price x Insured feed use)
  - 1 GM per contract regardless of number of months insured
    - One month’s low margin can offset another’s relatively high value as only total sum matters

- Gross Margin Guarantee (GMG) = GM – (Deductible [$/cwt] x cwt insured)
LGM-Dairy: An Overview

- Actual Gross Margin (AGM) = Total contract Actual milk value – Total contract Actual insured feed cost
  - Sum of monthly (Actual milk price \times Insured milk) – Sum of monthly (Actual feed price \times Insured feed use)
  - 1 AGM per contract regardless of months insured
    - A month with a low value can offset a month with a relatively high value
- If GMG > AGM → Indemnity paid
  - Payout amount = GMG – AGM

LGM-Dairy: When Purchased?

- *LGM-Dairy* available for purchase each month
  - 12 contracts offered each year
    - Each contract covers up to 10 months
  - Purchase period starts at end of last business Friday of each month
    - July contract purchase period would have started on July 29th
  - Purchase period ends at 8:00 PM CDT Saturday
  - Points to the reason why planning is needed well in advance of contract purchase
LGM-Dairy: Milk and Feed Prices

- Class III, corn, and SBM futures markets used as information source of *Expected* (forward looking) and *Actual* ("observed") prices
  - No futures/options market transactions
  - Actual farm prices not used
  - No local basis added to expected or actual prices

- Prices:
  - Feed: Corn (Chicago), SBM (Chicago)
  - Milk: Class III (standard composition)
    - 3.5% Fat
    - Skim Portion: 3.1% Protein/5.9 Other Solids

LGM-Dairy: Expected Milk Production

- Approved target marketings
  - Maximum amount of milk that could be marketed
  - Milk actually marketed needs to be certified once contract ends
  - Milk marketed needs to be at least 75% of insured amount without penalty
LGM-Dairy: Expected Feed Use

- *Expected* feed use converted to Corn (Energy) and SBM (Protein) equivalents
  - Allowable range of feed equivalents:
    - Corn: 0.13 – 1.36 bu/cwt of milk
    - SBM: 1.61 – 26.00 lb/cwt of milk
  - Program default feed coefficients can be used:
    - Corn: 0.5 bu/cwt  SBM: 4.0 lbs/cwt
  - *No auditing of declared feed use*
  - Many producers only declare *purchased* feed
  - Using minimum feed amounts → approximate synthetic put option
    - Much less expensive than conventional put option

LGM-Dairy: Expected Prices and Gross Margin

- 10 months of *30 Expected Prices* are known at sign-up
  - Expected Prices = Average of last 3 days of futures settlement prices for each month including sign-up Friday

![Calendar Image](image)
LGM-Dairy: Actual Prices and Gross Margin

- Actual prices determined as futures contracts expire
  - Actual price = Average futures contracts settle prices from 3 days prior to futures contract last trading day

<table>
<thead>
<tr>
<th>March 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Settle prices used to calculate Actual March Corn/SBM prices</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Last Corn/SBM trading day</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Settle prices used to calculate Actual March Class III price</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>Last March Class III trading day</td>
</tr>
</tbody>
</table>

LGM-Dairy: Coverage Calendar

- Hypothetical insurance strategy
  - Purchase insurance at end of Sept.

<table>
<thead>
<tr>
<th>Hypothetical LGM Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep '11</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>Purchase at End of Month No Coverage</td>
</tr>
<tr>
<td>Production Coverage</td>
</tr>
</tbody>
</table>

By rule: No coverage the month after purchase
LGM-Dairy: Insurance Deductible

- Producer chooses amount of gross margin not covered by insurance, *(i.e., Insurance Deductible)*:
  - Portion of *Gross Margin* not protected
  - Program allows $0 - $2.00/cwt *Gross Margin* to be excluded from coverage
    - Same $/cwt for all months
  - Higher deductible → Lower premium
    - Producer assumes more risk

- Subsidy *increases* with higher deductible
  - Double impact on reducing premium

### LGM-Dairy: Premium Subsidy Schedule

<table>
<thead>
<tr>
<th>Deductible ($/cwt)</th>
<th>Subsidy (%)</th>
<th>Deductible ($/cwt)</th>
<th>Subsidy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.18</td>
<td>0.60</td>
<td>0.31</td>
</tr>
<tr>
<td>0.10</td>
<td>0.19</td>
<td>0.70</td>
<td>0.34</td>
</tr>
<tr>
<td>0.20</td>
<td>0.21</td>
<td>0.80</td>
<td>0.38</td>
</tr>
<tr>
<td>0.30</td>
<td>0.23</td>
<td>0.90</td>
<td>0.43</td>
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<tr>
<td>0.40</td>
<td>0.25</td>
<td>1.00</td>
<td>0.48</td>
</tr>
<tr>
<td>0.50</td>
<td>0.28</td>
<td>1.10 – 2.00</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Note: The subsidy % is the percentage by which premium is reduced.
### LGM-Dairy: Measures of Activity

<table>
<thead>
<tr>
<th>Insurance Year</th>
<th>Policies Sold (No.)</th>
<th>CWT Insured (000)</th>
<th>GMG ($000)</th>
<th>Premium ($000)</th>
<th>Indem. Paid ($000)</th>
<th>Subsidy ($000)</th>
<th>Loss Ratio</th>
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<tbody>
<tr>
<td>2010</td>
<td>153</td>
<td>1,872</td>
<td>24,915</td>
<td>782</td>
<td>280</td>
<td>0</td>
<td>0.36</td>
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<tr>
<td>2011: 7/10-1/11</td>
<td>690</td>
<td>19,025</td>
<td>303,715</td>
<td>9,100</td>
<td>0</td>
<td>3,494</td>
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<tr>
<td>2011: 2/11</td>
<td>401</td>
<td>15,523</td>
<td>271,972</td>
<td>9,121</td>
<td>18</td>
<td>4,061</td>
<td>0</td>
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<tr>
<td>2011: 3/11</td>
<td>318</td>
<td>11,660</td>
<td>194,583</td>
<td>6,820</td>
<td>40</td>
<td>3,187</td>
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<tr>
<td>2011: Total</td>
<td>1,409</td>
<td>46,209</td>
<td>770,270</td>
<td>25,041</td>
<td>58</td>
<td>10,742</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: The 46.2 million cwt insured in 2010/11 represents approximately 2.4% of 2010 U.S. milk production.

### LGM-Dairy: 2010/11 Measures of Activity

<table>
<thead>
<tr>
<th>State</th>
<th>Policies Sold No.</th>
<th>CWT Insured % of Total</th>
<th>Liabilities</th>
<th>Premiums</th>
<th>Subsidies</th>
<th>Subsidy %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$000</td>
<td>% of Total</td>
<td>$000</td>
<td>% of Total</td>
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<tr>
<td>CA</td>
<td>40</td>
<td>2.8</td>
<td>4,381</td>
<td>9.5</td>
<td>73,628</td>
<td>9.6</td>
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<tr>
<td>ID</td>
<td>28</td>
<td>2.0</td>
<td>1,405</td>
<td>3.0</td>
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<td>IA</td>
<td>45</td>
<td>3.2</td>
<td>939</td>
<td>2.0</td>
<td>16,658</td>
<td>2.2</td>
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<td>MI</td>
<td>119</td>
<td>8.4</td>
<td>4,723</td>
<td>10.2</td>
<td>80,072</td>
<td>10.4</td>
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<td>MN</td>
<td>163</td>
<td>11.6</td>
<td>2,268</td>
<td>4.9</td>
<td>38,150</td>
<td>5.0</td>
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<tr>
<td>NY</td>
<td>86</td>
<td>6.1</td>
<td>3,259</td>
<td>7.1</td>
<td>55,355</td>
<td>7.2</td>
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<tr>
<td>PA</td>
<td>133</td>
<td>9.4</td>
<td>2,269</td>
<td>4.9</td>
<td>37,543</td>
<td>4.9</td>
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<td>VT</td>
<td>94</td>
<td>6.7</td>
<td>4,746</td>
<td>10.3</td>
<td>76,965</td>
<td>10.0</td>
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<td>WA</td>
<td>40</td>
<td>2.8</td>
<td>2,427</td>
<td>5.3</td>
<td>39,415</td>
<td>5.1</td>
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<td>WI</td>
<td>422</td>
<td>30.0</td>
<td>9,273</td>
<td>20.1</td>
<td>154,487</td>
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<td>Other</td>
<td>239</td>
<td>17.0</td>
<td>10,473</td>
<td>22.8</td>
<td>175,864</td>
<td>22.8</td>
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<tr>
<td>Total</td>
<td>1,409</td>
<td>100.0</td>
<td>46,209</td>
<td>100.0</td>
<td>770,270</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: Data as of July 7, 2011. No subsidy existed for July-Nov., 2010.
LGM-Dairy: Future Prospects

- March 2011: Last contract offering
  - More than 2% of U.S. milk supply (2010) insured by end of March
    - Most activity occurred after Nov. 2010 contract

- $15 million expenditure by USDA this year:
  - Insurance provider administrative & overhead payments
  - Premium subsidy (since Dec. 2010)

- Insurance year runs from July – June while funding is from October - September
  - Next possible contract offering: Oct. 28th

LGM-Dairy: Future Prospects

- Unclear as to increased funding for LGM-Dairy
  - Substantial pressure on Congress to ↑ funding from farm groups, financial industry, etc.
  - Implications of NMPF revenue insurance plan?
    - Impact on the 2012 Farm Bill
  - Implications of DIAC recommendations
    - Increased emphasis on risk management
  - Rep. Ryan’s budget proposal
    - Significant reduction in direct cash payments
    - Increased reliance on individual producer risk management
LGM-Dairy: Summary

- LGM-Dairy a flexible insurance program
  - Need not insure all months or production
  - Could make sense to overlap contracts
  - Substantial premium subsidies

- Similar to combined use of Class III puts and corn/SBM calls as in a bundled option
  - Premiums are very sensitive to elected deductible

- LGM-Dairy Major Drawbacks
  - Short sign-up window at the end of each month
  - Indemnity determined after last actual price

Contact Information

- The Univ. of Wisconsin Dairy Marketing Website: http://future.aae.wisc.edu
- To join the LGM-Dairy Mailing List: http://future.aae.wisc.edu/lgm_dairy.html#5
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