2020 Dairy Market and Policy Issues

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Topics for Today

• Dairy consumption trends
• Dairy trade issues
• Dairy farm structural change
Is dairy consumption all bad news?

As milk consumption falls, Borden Dairy Co. files for bankruptcy protection

The mysterious case of America’s plummeting milk consumption

Milk retail sales in the United States from 2005 to 2018

(in billion pounds)

### US Beverage Sales, 2018

<table>
<thead>
<tr>
<th>Beverage</th>
<th>Sales (million $)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almond</td>
<td>1,208.1</td>
</tr>
<tr>
<td>Soy</td>
<td>230.3</td>
</tr>
<tr>
<td>Coconut</td>
<td>104.5</td>
</tr>
<tr>
<td>Rice</td>
<td>41.7</td>
</tr>
<tr>
<td>Oat</td>
<td>5.5</td>
</tr>
<tr>
<td>Dairy</td>
<td>15,600.4</td>
</tr>
</tbody>
</table>

Total non-dairy $2.11 billion
Beverage dairy milk consumption

Per capita beverage milk consumption declined 2.25% annually since 2010
Fluid Consumption

Million Lbs

- Whole
- Reduced-fat (2 % milk fat)
- Low-fat (1 % milk fat)
- Skim
- Other

Years:
- 1975
- 1977
- 1979
- 1981
- 1983
- 1985
- 1987
- 1989
- 1991
- 1993
- 1995
- 1997
- 1999
- 2001
- 2003
- 2005
- 2007
- 2009
- 2011
- 2013
- 2015
- 2017

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Since 2010 both butter and cheese consumption per capita increased 1.81% annually.
<table>
<thead>
<tr>
<th>Year</th>
<th>Fluid milk(^2) (pounds)</th>
<th>Total cheese (pounds)</th>
<th>Butter (pounds)</th>
<th>Yogurt (pounds)</th>
<th>All products(^3) (pounds)</th>
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<tbody>
<tr>
<td>1975</td>
<td>247</td>
<td>14.3</td>
<td>4.7</td>
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<td>1980</td>
<td>234</td>
<td>17.5</td>
<td>4.5</td>
<td>2.5</td>
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<tr>
<td>1985</td>
<td>227</td>
<td>22.5</td>
<td>4.9</td>
<td>3.9</td>
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<tr>
<td>1990</td>
<td>220</td>
<td>24.6</td>
<td>4.3</td>
<td>3.9</td>
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<td>1995</td>
<td>205</td>
<td>26.7</td>
<td>4.6</td>
<td>6.1</td>
<td>570</td>
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<tr>
<td>2000</td>
<td>197</td>
<td>29.5</td>
<td>4.5</td>
<td>6.5</td>
<td>595</td>
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<tr>
<td>2005</td>
<td>186</td>
<td>31.3</td>
<td>4.5</td>
<td>10.3</td>
<td>602</td>
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<td>2010</td>
<td>218</td>
<td>32.7</td>
<td>4.9</td>
<td>13.4</td>
<td>605</td>
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<tr>
<td>2011</td>
<td>214</td>
<td>33.0</td>
<td>5.4</td>
<td>13.6</td>
<td>602</td>
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<td>2012</td>
<td>217</td>
<td>33.3</td>
<td>5.5</td>
<td>14.0</td>
<td>617</td>
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<td>2013</td>
<td>165</td>
<td>33.4</td>
<td>5.5</td>
<td>14.9</td>
<td>608</td>
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<tr>
<td>2014</td>
<td>159</td>
<td>34.2</td>
<td>5.5</td>
<td>14.9</td>
<td>615</td>
</tr>
<tr>
<td>2015</td>
<td>156</td>
<td>35.1</td>
<td>5.6</td>
<td>14.4</td>
<td>630</td>
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<tr>
<td>2016</td>
<td>154</td>
<td>36.4</td>
<td>5.7</td>
<td>13.7</td>
<td>646</td>
</tr>
<tr>
<td>2017</td>
<td>150</td>
<td>36.9</td>
<td>5.7</td>
<td>13.7</td>
<td>645</td>
</tr>
<tr>
<td>2018</td>
<td>146</td>
<td>37.9</td>
<td>5.8</td>
<td>13.4</td>
<td>646</td>
</tr>
</tbody>
</table>

\(^2\) Fluid milk includes homogenized liquid milk, dry milk, and evaporated milk and cream.

\(^3\) All products includes fluid milk, total cheese, butter, and yogurt.
Population grows ~2 million people annually since 2010
Since 2005 skim disappearance grew 1.9% and butterfat grew 2.05% annually.
Factors related to decline in milk consumption

- Demographics
- Increasing consumption of alternative beverages
  - Bottled water
  - Plant based beverages
- Declining breakfast cereal consumption
- Changes in school lunch program
- Environmental Perceptions
- Lactose and allergy issues
Plant Based Beverages

• Sales grew rapidly in recent years (~1/8 dairy milk sales value but with double the price)

• Labelling them as “milk” is controversial with legislation aimed to stop this practice
  • Labels bestow legitimacy and substitutability

• There are many consumer misperceptions about dairy and plant based beverages
### k- Means Cluster of Milk Consumption

<table>
<thead>
<tr>
<th></th>
<th>Plant-Based Beverages</th>
<th>Rare Milk Drinkers</th>
<th>All-Types of Milk</th>
<th>Traditional Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dairy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2% milk</td>
<td>3.15 (1.00)</td>
<td>3.06 (1.03)</td>
<td>1.50 (0.73)</td>
<td>2.16 (1.15)</td>
</tr>
<tr>
<td>Whole milk</td>
<td>3.10 (1.06)</td>
<td>3.69 (0.59)</td>
<td>1.82 (0.82)</td>
<td>2.24 (1.09)</td>
</tr>
<tr>
<td>1% milk</td>
<td>3.62 (0.72)</td>
<td>3.13 (1.02)</td>
<td>1.63 (0.76)</td>
<td>3.24 (1.01)</td>
</tr>
<tr>
<td>Skim milk</td>
<td>3.76 (0.48)</td>
<td>2.50 (1.29)</td>
<td>1.86 (0.77)</td>
<td>3.57 (0.81)</td>
</tr>
<tr>
<td>Chocolate milk</td>
<td>3.23 (0.88)</td>
<td>3.56 (0.69)</td>
<td>1.83 (0.83)</td>
<td>2.88 (0.98)</td>
</tr>
<tr>
<td>Lactose-free milk</td>
<td>3.71 (0.66)</td>
<td>3.29 (1.12)</td>
<td>1.94 (0.83)</td>
<td>3.88 (0.49)</td>
</tr>
<tr>
<td><strong>Plant-Based</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Almond milk</td>
<td>1.59 (0.73)</td>
<td>3.18 (1.06)</td>
<td>1.83 (0.75)</td>
<td>3.55 (0.82)</td>
</tr>
<tr>
<td>Soymilk</td>
<td>3.14 (1.07)</td>
<td>3.26 (1.08)</td>
<td>1.81 (0.72)</td>
<td>3.86 (0.43)</td>
</tr>
<tr>
<td>Cashew milk</td>
<td>3.07 (1.00)</td>
<td>3.89 (0.32)</td>
<td>2.06 (0.90)</td>
<td>3.94 (0.29)</td>
</tr>
<tr>
<td>Other nut milks</td>
<td>2.92 (1.09)</td>
<td>3.86 (0.41)</td>
<td>2.04 (0.90)</td>
<td>3.94 (0.29)</td>
</tr>
<tr>
<td>Other grain milks</td>
<td>3.47 (0.85)</td>
<td>3.90 (0.34)</td>
<td>2.10 (0.89)</td>
<td>3.95 (0.28)</td>
</tr>
<tr>
<td>Percent of sample</td>
<td>13.3</td>
<td>20.8</td>
<td>7.8</td>
<td>58.1</td>
</tr>
</tbody>
</table>

1 = drink all the time; 4 = don’t drink at all
## Likelihood to substitute plant-based for dairy milk

<table>
<thead>
<tr>
<th></th>
<th>Plant-based Drinkers</th>
<th>Rare Drinkers</th>
<th>All-Types of Milk</th>
<th>Traditional Consumers</th>
</tr>
</thead>
<tbody>
<tr>
<td>As a beverage</td>
<td>2.36</td>
<td>3.87</td>
<td>2.10</td>
<td>3.97</td>
</tr>
<tr>
<td>On your cereal</td>
<td>2.01</td>
<td>3.46</td>
<td>1.98</td>
<td>3.83</td>
</tr>
<tr>
<td>For your children</td>
<td>2.40</td>
<td>3.76</td>
<td>2.15</td>
<td>3.95</td>
</tr>
<tr>
<td>For your pets</td>
<td>3.40</td>
<td>4.28</td>
<td>2.48</td>
<td>4.51</td>
</tr>
<tr>
<td>In coffee or tea</td>
<td>2.50</td>
<td>3.62</td>
<td>2.10</td>
<td>3.96</td>
</tr>
<tr>
<td>As an ingredient</td>
<td>2.38</td>
<td>3.57</td>
<td>2.13</td>
<td>3.62</td>
</tr>
<tr>
<td>In a smoothie</td>
<td>1.88</td>
<td>3.41</td>
<td>1.93</td>
<td>3.58</td>
</tr>
<tr>
<td>In a dessert</td>
<td>2.28</td>
<td>3.57</td>
<td>2.11</td>
<td>3.64</td>
</tr>
</tbody>
</table>

1 = very likely, 2 = likely, 3 = somewhat likely, 4 = unlikely, 5 = very unlikely, 6 = I would never substitute.
## Consumer Segments

<table>
<thead>
<tr>
<th>Segment</th>
<th>Age</th>
<th>Gender</th>
<th>Kids</th>
<th>Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant-Based</td>
<td>Young</td>
<td>More Female</td>
<td>Some kids</td>
<td>High</td>
</tr>
<tr>
<td>Rare</td>
<td>Oldest</td>
<td></td>
<td>Least kids</td>
<td>High</td>
</tr>
<tr>
<td>All-Types</td>
<td>Young</td>
<td>More Male</td>
<td>Some kids</td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>Older</td>
<td></td>
<td>Most kids</td>
<td></td>
</tr>
</tbody>
</table>
Milk Labels

• Clear that misinformation and perceptions are correlated with some milk choices

• Are labels the issue?
  • Legislation to preserve “milk” for dairy
Implications

• Not clear that label rules will solve consumption issues for dairy

• Dairy must compete for beverage consumption by meeting needs

• Is the Federal Milk Marketing Order model the best for producers and consumers?
  • Based on inelastic demand for fluid milk
  • Charge more for fluid (less Q consumed) and less for manufactured products (more Q consumed)
Percent of US Milk Solids Exported

- Skim exports
- Fat exports

1995 to 2018

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Impacts of Increased US Dairy Exports

• Exports support production growth
  • US has a home for excess snf/milk proteins resulting in higher dairy revenues in aggregate

• Exports can result in more price volatility
  • US dairy product prices are highly correlated with world prices which also means higher price volatility in some periods
  • Make markets vulnerable to political disagreements
Results of Increased Exports

US dairy product prices highly correlated with world prices for products exported

– Dry whey  94%
– SMP/NDM  93%
– Butter  48%
– Cheddar  78%
Dairy Trade Issues

• USMCA – NAFTA 2.0—APPROVED THIS WEEK
  – Expanded access to Canada—3.25 to 3.59%
  – Eliminate class 7 and 8 in Canada
• China
  – Tariffs—phase 1 trade deal
  – African Swine Fever—how many pigs will be culled? 40%? Equates to 24% of world swine herd
  – 175(?) million pigs culled so far; pork prices up 110% in China
  – Decline in soybean and lactose exports to China
    • Up to 150,000 metric tons lactose-equiv demand lost
• Japan – new free trade agreement
Estimating Trade Damage

Figure 1: Value of U.S. exports to retaliatory partner with and without the retaliatory tariff

Delta = Exports1 - Exports2

With Retaliatory Tariff
Without Retaliatory Tariff
US Response to Trade Wars

• Market Facilitation Payments:

  • Round 1 in 2018: $8.59 billion total -- $180 million to dairy producers

  • Round 2 in 2019: up to $14.5 billion total -- $351-371 million to dairy producers

  • Dairy-related payments represents 2.4–2.6% of 2019 MFP; in 2018 dairy received 2.1% of all trade assistance dollars.

• MFP is part of a broader USDA effort to help producers whose commodities have been directly impacted by tariffs. Other USDA programs include:
  • The Food Purchase and Distribution Program will purchase affected commodities.
  • And the Trade Promotion Program attempts to restore lost markets and develop new export markets for farm products.
    • $300 million total—USDEC $7.8 million
China “Phase One” Dairy Implications

• US Dairy Exports to China
  2017 $576million  2018 $499million  2019 $343million (Nov)

• China committed to streamline timelines/procedures for U.S. facilities and products and to provide regulatory certainty and market stability for products.

• Dairy and infant formula commitments could result in an additional $250-300 million in annual dairy and infant formula exports above current levels.

• China agrees not to undermine US product access with Geographic Indicators (EU)

• IDFA estimates China represents a $23 billion market opportunity for U.S. dairy over next decade
## Cornell Dairy Farm Business Analysis Summary

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
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</thead>
<tbody>
<tr>
<td><strong>Profitability</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ROA</td>
<td>6.1</td>
<td>7.9</td>
<td>14.1</td>
<td>1.2</td>
<td>1.3</td>
<td>3.6</td>
<td>1.3</td>
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<tr>
<td><strong>Solvency</strong></td>
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<td></td>
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<tr>
<td>D/A</td>
<td>32</td>
<td>31</td>
<td>28</td>
<td>31</td>
<td>33</td>
<td>34</td>
<td>36</td>
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<td><strong>Liquidity</strong></td>
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<tr>
<td>CR</td>
<td>2.46</td>
<td>2.49</td>
<td>3.01</td>
<td>2.42</td>
<td>2.15</td>
<td>2.11</td>
<td>NA</td>
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</tbody>
</table>

Source: Jason Karszes
Stressed Dairy Farm Profit Margins Past 5 Years

Two issues

• Low farm milk prices relative to costs and trade issues affecting prices

• Balancing capacity and market adjustment charges in many states and regions
Wisconsin dairy farm exit rate

% exit

0

8/1/2004 0:00
5/1/2005 0:00
2/1/2006 0:00
11/1/2006 0:00
8/1/2007 0:00
5/1/2008 0:00
2/1/2009 0:00
11/1/2009 0:00
8/1/2010 0:00
5/1/2011 0:00
2/1/2012 0:00
11/1/2012 0:00
8/1/2013 0:00
5/1/2014 0:00
2/1/2015 0:00
11/1/2015 0:00
8/1/2016 0:00
5/1/2017 0:00
2/1/2018 0:00
11/1/2018 0:00
8/1/2019 0:00
8/1/2020 0:00

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Name of Presenter / Event or Location / Date 30
Annual percent decline in licensed dairy herds

<table>
<thead>
<tr>
<th>Year</th>
<th>US</th>
<th>MI</th>
<th>CA</th>
<th>WI</th>
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<td>2004</td>
<td></td>
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<td>2017</td>
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<tr>
<td>2018</td>
<td></td>
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</tr>
</tbody>
</table>

Average since 1992:
- US: -4.70
- MI: -4.13
- CA: -1.83
- WI: -4.88

Note: WI -10% in 2019

-13.14%
New York Herds

- 2016: -3.83%
- 2017: -2.57%
- 2018: -7.71%
<table>
<thead>
<tr>
<th>Herd Size</th>
<th>Herds</th>
<th>Cows</th>
<th>Sales</th>
</tr>
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<tbody>
<tr>
<td>&lt;100</td>
<td>64.3</td>
<td>12.7</td>
<td>10.9</td>
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<tr>
<td>100-499</td>
<td>26.9</td>
<td>21.3</td>
<td>21.2</td>
</tr>
<tr>
<td>500-999</td>
<td>3.8</td>
<td>10.7</td>
<td>11.5</td>
</tr>
<tr>
<td>1000+</td>
<td>5.0</td>
<td>55.2</td>
<td>56.4</td>
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</tbody>
</table>
Milk Market Coordination
Challenges

• Seasonal Balancing
  • Milk production peaks in the Spring and is lower in the Fall
  • Fluid milk demand peaks in the Spring, cheese and butter demand peaks in late fall or early winter
  • Must manufacture cheese and butter for holidays in earlier months
  • Consequently milk prices tend to rise in September and fall in the Winter
Milk Marketing Coordination Challenges

• Daily Balancing
  • At any given time, cows produce about the same amount of milk from day to day
  • People do not purchase dairy products with the same consistency
  • Grocery store purchases are higher on the weekend and sales and holidays also affect store sales and consumption patterns
  • Some events are predictable—kids back to school—and some are not—snowstorms, flooding and plant closures
Milk Market Challenges

• Cyclical Balancing – there appears to be a somewhat regular 3-year cycle of rising and falling prices corresponding to the changing levels of excess supply

• Each of these creates a coordination challenge
Do we still have seasonal price effects?

Average Monthly US All Milk Price 2010-17

Average Minimum in May
Average Maximum in November
Surplus/Deficit Milk Production Areas

Source: Mark Stephenson
Compensation for Balancing

• All producers benefit when excess milk production is converted to storable products as that milk is not competing for fluid and other markets

• PPD from FMMO is minimum share of pool value for these activities

• Cooperatives also negotiate over-order premiums and sharing to compensate for balancing activities
Excess Milk Production

• When milk supply is long or does not make it to a plant there are two possibilities:
  • Distressed milk sales: sold at a deep discount
  • Dumped milk
Dumped Milk

• 0.2 to 0.4% of milk produced does not make it to the plant or is rejected because it is contaminated or spoiled.
  • Plant issues (breakdowns, maintenance) can result in spoiled and dumped milk

• 0 to 2% of milk is sometimes dumped for lack of a market.
  • May not leave the farm.
Milk Dumped

Percentage of milk dumped

Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec

- **Mideast Ave 2010-14**
- **Mideast Ave 2015-18**
- **Northeast Average 2010-14**
- **Northeast Ave 2015-18**
Coop Base Plans

• Charge milk production growth to dispose of excess milk is applicable

• Not having a base plan is having a plan where all milk pays excess balancing costs
Implications of Structural Change

• Market access continues to be a challenge

• Balancing issues in some regions

• Rural communities feel impact of farm exits (even if cow numbers are stable)
Policy Issues for 2020

• Trade agreements and implementation

• DMC and DRP

• FMMO’s
Thank You

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