Options for Canada’s Dairy Sector: The Potential For Exports

Rick Barichello, Michael Grant, and Mark Liew

Selected Paper prepared for presentation at the International Agricultural Trade Research Consortium’s (IATRC’s) 2014 Annual Meeting: Food, Resources and Conflict, December 7-9, 2014, San Diego, CA.

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Options for Canada’s Dairy Sector: The Potential of Exports

Rick Barichello, Mark Liew and Michael Grant

Presentation to IATRC Annual Meeting, San Diego, December 8/9, 2014
Introduction

• Conference Board Report, recently published March 2014, has generated much attention and controversy
• It has been seized upon by various interests but the key audience is Cdn dairy farmers
• Makes three main points
  1. There are substantial export opportunities for Canada that are currently being missed
  2. Canada can be competitive in those markets, on both the demand and supply sides
  3. A proposal is presented for compensation that appears to be politically feasible and meets basic conditions of fairness
• I will elaborate on these, add further attention to how this proposal will affect different groups of farmers
Current Situation

• Production and consumption in Canada is basically stagnant, for reasons of domestic demand in the face of high dairy product prices
• Production per cow has risen, so cow numbers have fallen
• Farm numbers have fallen substantially, by 90 percent since the current supply management regime began in 1972/73
• Debt/farm has increased steadily by 2.5 times from 2001 to 2009 (since then flat), related closely to quota purchases for expanding farms
Chart 1: Stagnant production in Canada, past 40 years

- Human population
- Consumption/capita
- Flat Demand
- Yield/Cow
- Flat Demand
- Cow population

Higher yields = lower costs, some prices have increased through this period

Source: Statistics Canada, Census of Agriculture, 1976 to 2006 and CANSIM series 003-0011
Chart 2: Scale Economies have driven farm consolidation (~5% / year) similar to other types of farms

90% of dairy farmers have already left the industry since Supply Management started.
Chart 3: Quota Issues:
Shrinking industry but escalating debt at the farm

Chart 2
Fewer Cows, More Debt (Number of Cows and Debt Per Farm)

Source: Statistics Canada Farm Financial Survey
Expanding World Markets

• Growth in worldwide demand for dairy products is dramatic: since 1990, world dairy product trade increased from ~25M tons to ~55M tons, or approx 4%/yr (Chart 4)

• Largely due to rapid Asian income growth, not only from China but heavily Asian (next Table)

• Still very low consumption per cap levels in China and Asia, showing substantial likely future growth (Chart 5)

• If you doubt this, look at income elasticities for China:
  – Most cereals, staples are now inferior goods (negative)
  – Protein sources, notably dairy and meats, are not only positive but for dairy, around 1.5 (luxuries) and growing
World Dairy Trade has exploded

Chart 4

Mt of Dairy Products Traded

Without Canada
Net Dairy Trade between regions: Mostly from Oceania and Europe to Asia

Europe is frequently cited as having the largest % global exports – this is misleading.

Most European trade actually intra-regional (i.e. internal); only the net number is relevant in world markets.

NZ is effectively supplying more than 50% of inter-regional demand

Table 5
Top Exporting and Importing Regions 2010, Net Dairy Trade (US$ billions)

<table>
<thead>
<tr>
<th>Top four exporting regions</th>
<th>Net trade value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oceania</td>
<td>8.2</td>
</tr>
<tr>
<td>Europe</td>
<td>4.7</td>
</tr>
<tr>
<td>Americas, North</td>
<td>1.4</td>
</tr>
<tr>
<td>Americas, South</td>
<td>0.5</td>
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</table>

<table>
<thead>
<tr>
<th>Top seven importing regions</th>
<th>Net trade value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia, East</td>
<td>4.7</td>
</tr>
<tr>
<td>Asia, Southeast</td>
<td>3.2</td>
</tr>
<tr>
<td>Asia, West</td>
<td>2.8</td>
</tr>
<tr>
<td>Africa, Northern</td>
<td>2.0</td>
</tr>
<tr>
<td>Americas, Central</td>
<td>1.3</td>
</tr>
<tr>
<td>Africa, Western</td>
<td>1.0</td>
</tr>
<tr>
<td>Asia, South</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Sources: FAOSTAT; authors’ calculations.
China dairy market has grown at more than 30% pa in recent years and still has huge upside.
**Income Elasticities tell striking story:**

Staples have become inferior goods

### Table 4.1 Income Elasticity of Main Food Items in China (1978 to 2010)

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Barley</td>
<td>1.3205</td>
<td>1.1497</td>
<td>0.6836</td>
<td>0.4638</td>
<td>0.2113</td>
<td>0.0971</td>
<td>-0.0066</td>
<td>-0.0596</td>
</tr>
<tr>
<td>Wheat</td>
<td>0.8877</td>
<td>0.7461</td>
<td>0.3597</td>
<td>0.1775</td>
<td>-0.0319</td>
<td>-0.1266</td>
<td>-0.2016</td>
<td>-0.2565</td>
</tr>
<tr>
<td>Rice</td>
<td>-0.0084</td>
<td>-0.0328</td>
<td>-0.0994</td>
<td>-0.1308</td>
<td>-0.1669</td>
<td>-0.1833</td>
<td>-0.1962</td>
<td>-0.2057</td>
</tr>
<tr>
<td>Maize</td>
<td>0.3866</td>
<td>0.3862</td>
<td>0.3850</td>
<td>0.3845</td>
<td>0.3839</td>
<td>0.3837</td>
<td>0.3834</td>
<td>0.3833</td>
</tr>
<tr>
<td>Soybeans</td>
<td>-0.2968</td>
<td>-0.1384</td>
<td>0.2935</td>
<td>0.4972</td>
<td>0.7313</td>
<td>0.8371</td>
<td>0.9209</td>
<td>0.9823</td>
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<td>Sugarcane</td>
<td>0.9374</td>
<td>0.8524</td>
<td>0.6207</td>
<td>0.5114</td>
<td>0.3858</td>
<td>0.3290</td>
<td>0.2840</td>
<td>0.2511</td>
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<td>Vegetables</td>
<td>0.8612</td>
<td>0.8275</td>
<td>0.7357</td>
<td>0.6924</td>
<td>0.6426</td>
<td>0.6202</td>
<td>0.6023</td>
<td>0.5893</td>
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<td>Fruits</td>
<td>1.4657</td>
<td>1.3667</td>
<td>1.0966</td>
<td>0.9693</td>
<td>0.8229</td>
<td>0.7568</td>
<td>0.7043</td>
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<td>Rapeseed</td>
<td>1.9336</td>
<td>1.6886</td>
<td>1.0203</td>
<td>0.7051</td>
<td>0.3429</td>
<td>0.1792</td>
<td>0.0494</td>
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<tr>
<td>Pig meat</td>
<td>1.5429</td>
<td>1.3812</td>
<td>0.9400</td>
<td>0.7320</td>
<td>0.4930</td>
<td>0.3849</td>
<td>0.2992</td>
<td>0.2366</td>
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<td>Beef</td>
<td>3.1949</td>
<td>2.8760</td>
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<td>1.5955</td>
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<td>Mutton</td>
<td>1.8491</td>
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<td>1.1284</td>
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<td>Poultry</td>
<td>2.1630</td>
<td>1.9830</td>
<td>1.4919</td>
<td>1.2603</td>
<td>0.9942</td>
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<td>Eggs</td>
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<td>1.8628</td>
<td>1.2027</td>
<td>0.8914</td>
<td>0.5337</td>
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<td>Milk</td>
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<td>-1.0474</td>
<td>-0.0064</td>
<td>0.4845</td>
<td>1.0486</td>
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<tr>
<td>Fish</td>
<td>2.1678</td>
<td>1.9168</td>
<td>1.2321</td>
<td>0.9092</td>
<td>0.5382</td>
<td>0.3705</td>
<td>0.2375</td>
<td>0.1403</td>
</tr>
</tbody>
</table>

Source: Food Consumption Trends in China, Apr 2012; Zhou, Tian, Wang, Liu

Substituting to meat, especially beef, mutton, poultry, dairy

Options for Dairy_CAES2014
Who are Competitors in Export Market?

- Main exporters of dairy products to Asia are New Zealand, Australia and US
- Since 2006, the US has had strong export growth although overshadowed by New Zealand
  - Australian exports have been roughly flat
- NZ now exports ~$9 billion to Asia, by 2013 US net exports ~$2 billion
- But NZ increasingly constrained on supply side: pasture land in very tight supply, forcing dairy farms to feed concentrates like NA, pushing up their costs to comparable levels with North America (Chart 7)
- Dan Sumner gave this assessment in ~2000, recently corroborated by K. Woodford, Lincoln Univ
Chart 6: NZ, AU milking Asia now US too

Chart 5
New Zealand, United States, Australia and Canada Dairy Net Exports US$ millions 2003-12

Source: USDA, Statistics New Zealand, DAFF Australia, Canadian Dairy Information Center
Feed costs have nearly doubled in NZ
~20% of operating exp in 2002 to ~30% of op ex in 2011

June 2012: NZ housed 6.5M hd of dairy cattle, plus 31M sheep and 3.7M beef cattle, all seeking pasture in an area the size of Colorado.

NZ milk now being produced at same cost as in N America

Source: Dairy NZ Econ Survey 2011-12
“They have figured out - correctly - that production costs per litre on the best American farms are already comparable to those in New Zealand. In fact their data suggests that for the largest American dairy farms the costs are actually lower than in New Zealand. Using current exchange rates, there is a good chance they are correct.”

“... The big message for the New Zealand dairy industry is that the North Americans are coming.”

-Keith Woodford, Lincoln University 28th Apr 2014

Three Myths in Canada

• First, Canada is not cost-competitive at farm level
• Second, that freight costs make our supplies uneconomic on world markets
• Third, that there is no precedent for strong export growth
How do we estimate Canada’s Supply curve?

Economists frequently use elasticities to calculate welfare changes from policies – this is due to the inherent difficulty in constructing supply curves. We could not use elasticities (40 yrs of price stabilization). But we found that Canadian herd sizes were distributed lognormally.
Everyone has log-normally distributed herds

Chart 11
Dairy Herd Size Distributions and average Herd Sizes - Canada vs Peers

% of farms

% of farms (US megafarm states)

Herd Size

CA Avg 77

NZ Avg 393

US ex-megafarm states
Avg 129

US megafarm states
Avg 1148

Ln (Herd Size) 1.4 1.8 2.2 2.6 3.0 3.4 3.8 4.2 4.6 5.0 5.4 5.8 6.2 6.6 7.0 7.4 7.8 8.2 8.6 9.0 9.4 9.8 10.2

Source: DFO, USDA, Dairy NZ, The Conference Board of Canada
Supply Management has not hindered technological transfer – Canadian farms are amongst best vs. peers

Chart 10
- Does not include capital costs

But Canadian Herd Sizes are sub-optimal

Can gain significant EOS by growing to at least 200

Compare to Modern Dairy in China (40,000 herd but producing at $0.50/litre)
Chart 11: 5 cents more profit/litre if we scale up

5 cents from economies of scale

Percentage of production

US$/Litre

- Canada - Current (Avg 77 head)
- Canada - Potential (Avg 187 head)
- United States - Current (Avg 187 head)
Additional evidence re CDN farm costs

- Historical comparability of US and CDN costs, history of Canadian milk product exports pre ‘70s
- Most inputs are freely imported or Canada is on an export basis (feed)
- Relatively abundant land, water, forage supply
- Quota Mkt data: rental markets in BC, AB
  - Consistent with industry being competitive w/ US
  - Quota rental value = net milk price less marginal costs
  - Those values for both provinces are consistent with ability to produce (2013-14) at ~$0.40/litre (MC)
Freight Myth

“Canada is so far away from markets compared to New Zealand”

• Vancouver – Shanghai: Cheaper than Auckland-Shanghai, 20% faster
• Montreal – Shanghai: only 15% more, same time

• Freight costs < $100/mt compared to product value of >$5000/mt => Differentials are <2%, insignificant
Chart 12: “Can’t Grow” Myth

Plenty of precedents both in dairy and non-dairy, and in Canada and beyond.

Source: OECD-FAO Statistics
Analytical Essence of Challenge

• As in a basic supply-demand diagram of supply management policy, shifting to an export regime involves a trade-off:
  – The rectangle of gains from high domestic prices serving only the domestic market would be given up
  – A triangle of gains would be gained from exporting profitably
  – The rectangle is high (domestic prices and margins are high) but its width is narrow and shrinking
  – The triangle is relatively thin but has the prospect of being very wide (high potential export sales); two export scenarios illustrated
  – The price that one could anticipate in 2013 terms is the 2013 world average of US$0.47/liter (=farm gate p of US$0.45)
    • One could reasonably expect a rising future price, given growth in world demand and the supply constraints facing several countries noted above

• Ignoring consumer gains, the issue facing producers is whether the triangle gains will outweigh the rectangle losses

• Chart 13 illustrates the situation
Chart 13: Export-oriented dairy mkt vs status quo

Industry growth:
1.2 – 2.5 bn total welfare gains
2000-8000 new jobs

The larger and more competitive the herds, the less the farm # decline
Opposition from varied Individual Interests

• Some smaller producers will have difficulty expanding, so they are unlikely to profitably share in export growth; the domestic milk price drop (e.g., from 75 cents to 45 cents) would spur their exit
  – They would look closely at the proposed compensation option
• Other farms potentially able to expand or are already competitive at 40-50 cents per litre but may be risk-averse; would want compensation options
• Some may look at only their own situation; accept their shrinking domestic quota base, ignore export prospects, continue producing at their current level less quota reductions (status quo for them)
  – Quota prices will be expected to move up as domestic market shrinks making them no worse off, especially when they decide to exit/sell
• Still others may have expected current quota values for retirement, even though this is capturing the future gains from the quota system from the pockets of entering or expanding farmers
• For all those with these perspectives, there will be opposition to the export option without some form of compensation
Compensation Option

- Therefore, a compensation option is judged essential to make this policy change politically feasible.
- A full buyout would cost ~$30-40 billion and is judged to be politically infeasible.
- One alternative: a buyout based on the book value of quota (price at which a farmer’s quota was purchased).
- We propose for illustration a buyout where book value of quota would be depreciated over ten years and farmers would be paid the undepreciated book value.
- This is estimated to cost the federal government $4.5-7 billion, a large sum but possibly feasible to Minister of Finance.
- Clear pattern of beneficiaries, because not all farmers emerge equally.
Distribution Effects of Compensation

- Farmers who just bought their quota would get full compensation
- Farmers who bought their quota within past 10 years would get partial compensation
- Farmers who bought their quota in earlier periods, or who were gifted their quota by initial allocation or by parents would receive no compensation
  - They would have earned profits from their quota to pay off their debt and have earned what would have been a very good *ex post* rate of return, but would have no sale value for this asset
- Adding more detail we can specify four groups of farms
Four Groups of Farmers

1. Quota purchasers who have inventory of regularly (or newly) purchased quota (i.e., large, expanding and newly entered farms; this group holds most dairy farm debt) (e.g., top ¼ of ODFAP sample); compensation here

2. Farmers who may have purchased quota but no significant amts for 10 years, w/ growth potential (all sized farms; debt retired); little/no compensation

3. Farmers who were given most of their quota, either initially or through parents, and with no recent growth (i.e., smaller farms); no compensation

4. Farmers who recently bought quota from rapidly exiting farmers, both on learning of the initiation of this program (a group that does not yet exist but can be expected to exist by responding strategically); “gaming the program”
Not all Dairy Farms are equal

Small, inefficient farmers have been slowly cashing out

Large, efficient farmers have been buying them out with debt

New, young, and most efficient farmers, quota buyers, being saddled w/ debt

<table>
<thead>
<tr>
<th>Key Operating and Financial Metrics, Ontario Dairy Farms, 2011 (n = 61)</th>
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<table>
<thead>
<tr>
<th></th>
<th>Bottom 15</th>
<th>Middle 31</th>
<th>Top 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Dairy Cows</td>
<td>47.0</td>
<td>68.1</td>
<td>162.8</td>
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<tr>
<td>Balance sheets</td>
<td></td>
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<tr>
<td>Quota at market value ($)</td>
<td>866,467</td>
<td>1,596,710</td>
<td>4,094,133</td>
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<tr>
<td>Quota at book value ($)</td>
<td>114,862</td>
<td>432,023</td>
<td>1,478,945</td>
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<td>Quota, book-to-market value (%)</td>
<td>13.3</td>
<td>27.1</td>
<td>36.1</td>
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<tr>
<td>Equity at market value ($)</td>
<td>2,363,721</td>
<td>2,770,128</td>
<td>5,884,193</td>
</tr>
<tr>
<td>Equity at book value ($)</td>
<td>745,947</td>
<td>897,173</td>
<td>2,042,383</td>
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<tr>
<td>Income statements ($)</td>
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<tr>
<td>Total farm revenue</td>
<td>360,855</td>
<td>549,802</td>
<td>1,351,239</td>
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<tr>
<td>Net farm income</td>
<td>74,876</td>
<td>124,878</td>
<td>389,317</td>
</tr>
<tr>
<td>Financial ratios (%)</td>
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<tr>
<td>Net margin</td>
<td>30.1</td>
<td>33.8</td>
<td>40.3</td>
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<tr>
<td>Net return on total assets</td>
<td>2.8</td>
<td>4.4</td>
<td>6.2</td>
</tr>
<tr>
<td>Net return on total assets (less quota)</td>
<td>4.0</td>
<td>7.7</td>
<td>12.3</td>
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<tr>
<td>Return on equity (%)</td>
<td>3.4</td>
<td>5.9</td>
<td>8.6</td>
</tr>
</tbody>
</table>
Likely Responses by Group

1. The first group would see two advantages, an opportunity to increase production at lower but still profitable prices and with compensation for the quota they have purchased within the last decade (covering its associated debt). *Beneficiaries*

2. The second group is mixed, some with growth potential to expand at lower milk prices and without the cost of buying quota, but with little or no compensation. *Some benefit, some lose*
   - Those without growth potential would most likely exit

3. The third group likely includes few who could or would want to expand at lower prices. By definition this group is largely debt-free, likely the smallest farms (e.g., the bottom ¼ in above Table) and would receive no compensation. *Most here would lose; additional compensation needed?*

4. If a farmer would see themselves as being without growth potential at lower prices, they might see themselves in this group, wanting to sell their quota at the earliest opportunity after learning about such policy change. Depending on the details of the buy-out, farmers who bought quota from these now-exiting farmers might be eligible for buyout, and the exiting farmers would in effect get some degree of compensation. It would be important for program designers to anticipate this behaviour.
Conclusions

- There are unique opportunities in world dairy trade for Canada that should be considered.
- Demand growing rapidly in Asia; this growth can be expected to continue for some time, especially in China.
- Canada has the cost conditions to compete if farms increased their herd size to roughly 200 or more cows.
- Competing countries all have supply constraints, making export entry for Canada highly feasible.
- A compensation scheme that appears politically feasible would have equitable elements but could not fully compensate all farmers for their current quota value; our proposal not rich enough for farmer acceptance.
- Given the shrinking Canadian milk market, the export route will almost certainly be chosen eventually, but the export opportunities are most attractive for early entrants, and for Canada to act soon.
- Post-script: All data calculated in 2013 at Canada-US exchange rate of ~0.95. But current XR roughly 0.88, closer to LR average and PPP estimated value. This would increase CDN industry competitiveness.