Understanding the Dynamics of Milk Pricing and Revenue in a Time of Change

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The Issue

Changes are occurring to farm milk pricing in Canada. In April, 2016 Ontario began implementation of a new milk price class (Class 6). Manitoba has since announced its intention to introduce a Class 6 as developed in Ontario in the next dairy year (beginning August 1, 2016) and the prospect exists that other provinces could also adopt Class 6. Meanwhile, national negotiations are ongoing to establish an ingredient strategy, leading to a national Class 6 program. Pressure is mounting from some in the dairy industry for some kind of action on imports or use of diafiltered milk.

These changes are occurring on a fragmented basis, in an environment that is complex and even confusing for many dairy industry stakeholders. At the same time the changes present the prospect of warding off hard dairy industry adjustments, but also entail some risk. The risks of these changes need to be understood in the context much broader risks to Canadian dairy policy.

This policy note provides a review of milk pricing in Canada as it has been structured, and considers the potential adjustments as the structure of milk pricing is changed with the introduction of Class 6 and other measures.

Essentials of Milk Supply Management in Canada

Milk supply management is federal-provincial policy in Canada. More specifically, it is federated provincial policy in which most aspects of regulation of milk marketing, organization of dairy producers, quota administration and transfers, and producer-processor settlement are undertaken by provincial milk marketing boards. The federal government is involved in administering import controls and export approvals, and through the operations of the Canadian Dairy Commission (CDC). The CDC establishes support prices for butter and skim milk powder (SMP) and operates surplus removals at the support prices, removing butterfat and SMP from the market for export or later sale. It also facilitates the process for the setting of market share quota (MSQ) for industrial milk nationally, and provides a number of secretariat services for provinces and regions.

Milk is sold to processors on the basis of end-use classes and on the basis of components- butterfat and skim. Table 1 below summarizes milk end-use classes, which are standard across provinces. There are a total of 19 milk classes listed in the table, subject to utilization audit for settlement purposes. Milk is marketed into these classes on a component basis, and not necessarily according to the yields of components in cows' milk. For example, comparing Class 1 (fluid milk) with Class 3(cheese), there is much more butterfat used in Class 3 than Class 1, but very similar levels of skim (protein and other solids).

Table 1 Milk End Use Class Definitions in Canada

Class	Subclasses	Products
1	a b c d	Fluid milk products
2	a b	Yogurt, ice cream, soft products
3	a b c d	Cheese
4	a b c d m	Butter, milk powders
5	a b c d	Exports under access, permits 5(d) subsidized exports

Producers are paid for their milk based on the blended (pooled) price across classes, adjusted for the component content of their milk shipments. This amounts to the total revenue from all milk shipments in regional pools, divided by the total volume marketed. Table 2 below provides an illustration, based on the 2014-15 dairy year, for the country as a whole[1]. Prices can vary significantly by component across class. For example, the value of protein in Class 3 exceeded $10/kg in 2014/15, compared with a protein value of about $6/kg in Class 2. These prices are paid by processors, and the relative prices of components and classes can influence processors' choices of product to process, given processing technology, brands, and customer demand.

Conversely, the starting point for producer pricing is the total revenue from all classes and components, divided by the total volume of milk shipped. In Table 2, nationally total revenue from all milk classes and components in 2014-15 was about $6.49 billion; when this is divided by milk marketings of about 8.031 billion litres, the resulting blended price is $.8083/litre, or $80.83/HL based on actual butterfat and skim test.

In practice, the separation between protein and other solids in milk is somewhat artificial and in many cases in Table 2 the prices are the same for each, and effectively treated together as skim. The real demarcation between components in milk marketing is between butterfat and skim[2].

Volumes of fluid milk produced are established in provincial fluid milk quotas. Volumes of industrial milk in classes 2, 3, and 4 are established under MSQ and allocated to provinces based on historical shares and a market growth formula. Volumes in Class 5 are bound by export permits and by Canada's subsidized export limits. Milk marketed in Class 4m is also subject to permit. In all cases, the quotas are based on butterfat, and are presented to producers as a single, total production quota, rather than quota separated by market segment (e.g. fluid vs industrial).

Milk from the farm is allocated to plants on a provincial basis. Some classes, such as fluid milk, are supplied "on-demand" to processors. In other cases processors are granted quotas that entitle them to a fixed share of remaining milk after on-demand supplies are allocated, or entitle them to fixed volumes of milk for processing.

Established Market Adjustments Under Milk Supply Management

Milk price adjustment mechanisms vary according to fluid milk, industrial milk, and milk destined for export. Fluid milk is priced based on a national fluid price formula, which draws upon a cost of production (COP) reference and the consumer price index with equal weights. Milk marketed in Class 5 is based on world prices. Milk marketed in Class 4(m) is driven by prices in the feed market.

Pricing of industrial milk in Classes 2, 3, and 4 is more complex. The starting point is the farm COP survey conducted by the CDC. Changes in the measured COP trigger changes in support prices for butter and SMP. The change in butter and SMP support prices is reflected directly in the pricing of Class 4(a) butterfat and skim components using formulas and a processor margin allowance. The resulting change in 4(a) butterfat and skim prices, in $/kg, is applied to all of the subclasses in Class 2, Class 3, and Class 4.

The essential elements of the industrial milk pricing mechanism are similar to that in the US. Changes in dairy product prices, influenced by government intervention, shift the values of milk components in

[1] In practice, pooling occurs at the level of regional pools consisting of BC, Alberta, Saskatchewan, and Manitoba (Western Milk Pool- WMP) and Ontario, Quebec, New Brunswick, PEI, and Nova Scotia (P5). Pooling standards, specifically the weights given to protein and other solids in arriving at skim value, differ somewhat between the WMP and P5

[2] In some cases skim milk can be further fragmented into its constituent components. For example, in milk protein concentrates other solids are partially removed from protein, allowing a higher protein content

specific classes, which in turn shifts pricing over the range of classes, with producers paid based on the blend of classified prices.

Quota adjustments occur on a regional pool basis for fluid milk, and nationally for the MSQ. In each case, quota increases tend to be exceptionally conservative, ensuring that surpluses of butterfat at administered prices do not occur. In the current environment for the MSQ, butterfat demand is strong and there is little fear of surpluses; rather the surplus problem is with skim, hampering the expansion of quota despite the growing demand for butter.

Changes Initiated in the Fall of 2015

In the fall of 2015 significant changes were initiated to milk marketing. The Dairy Farmers of Ontario announced the initiation of Ontario Class 6. The CDC announced changes to its approach to support prices. Finally, based on the WTO Nairobi agreement in December 2015, Canadian subsidized exports of dairy products will need to stop by 2021.

The Ontario Class 6 initiative has the following major elements. (1) skim components in Class 6 priced at world price, (2) the same price on skim in Class 6 for either domestic or export markets, (3) limitations on the use of intermediate products made from Class 6 milk in displacing skim in Classes 2 and 3, (4) a phase out of CDC surplus removal activities and (5) additional committed milk allocation of Class 6 milk to plants making investments. These are largely the same elements of the national ingredient strategy, still under discussion.

In December 2015 the Canadian Dairy Commission announced a 5% increase in the butter support price and a 30% decrease in the support price for skim milk powder. However, the CDC directed that the support price change applied as usual for butterfat, but that it only applied to Class 4(a) for skim. The result was a 2.2% increase in the blended milk price. This approach will apply from this point onward, effectively meaning that the COP will apply only to butterfat pricing in industrial milk classes, and that skim in industrial classes will be priced by the national fluid milk price formula.

Under the Nairobi Agreement, milk currently marketed in Class 5(d) will need to cease by 2021. Based on Table 2, for 2014-15 Class 5(d) represented a small amount of total butterfat, but about 3.6% of total skim marketed.

These events occurred as milk quotas were increased relatively aggressively. Over the course of 2014-15, the MSQ was increased by almost 5%, and many provinces increased the number of production incentive days (a type of proxy quota). These increases were triggered by a butter market growing at 3-4% annually on top of significantly reduced butter stocks. At the same time, some provinces began to experience absolute surpluses of raw skim milk without sufficient capacity for processing it, and dumping of skim milk occurred in limited quantities.

Diafiltered Milk and Milk Protein Isolate (MPI)

Imports of diafiltered milk and its dried equivalent, MPI, are an irritant to dairy producers. They see these intermediate products as a regulatory loophole that is not being effectively enforced, and worry that they replace domestic skim components in cheese and other manufactured dairy products. This can better be understood as a relative pricing problem.

The federal compositional standards for cheese prescribe shares of the casein content in cheese that must come from milk (in various forms) rather than "other milk products"[3]. Whether diafiltered milk/MPI satisfies the definition of "filtered milk" under the cheese standards is apt to be a source of disagreement among producers and processors. A second difficulty has been attributing the source of casein sampled in cheese; it appears that this

[3] Federal Food and Drug Regulations http://laws-lois.justice.gc.ca/eng/regulations/C.R.C., c. 870/page-43.html#docCont

either cannot be done, or can only be done with limited accuracy, and/or can only apply to a limited variety of cheeses. Producers are concerned that the cheese standards have not been enforced, even though they were upheld in the recent Trans-Pacific Partnership agreement.

Increased imports of diafiltered milk/MPI have significantly reduced the use of domestic skim in cheese, but it is a nuanced issue. Figure 1 below provides some evidence, based on skim (protein and other solids) marketings in Class 3 and its subclasses versus production of cheddar and specialty cheese. The data range back to 2004-05, a point in time prior to significant use of diafiltered milk and MPI in cheese making. If diafiltered milk was eroding the market for domestic skim, one might expect it to have driven skim out of class 3 (perhaps into Class 4m) and that the share of total skim marketed accounted for by Class 3 would have declined. The figure shows that, comparing 2014-15 with 2004-05, skim components marketed in Class 3 only decreased by about 1.5%, and were mostly constant for the entire period; the share of total skim marketed in Class 3 has not declined dramatically, ranging in a tight band around 35% of total skim over the period.

However, comparing 2014-15 with 2004-05, cheddar production was up about 12% and specialty cheese production (which includes mozzarella) was up about 15%. This is consistent with diafiltered milk/MPI essentially being added to fresh milk to increase cheese production[4]. In other words, cheese processors use skim associated with the butterfat in fresh milk deliveries, and then add diafiltered milk/MPI to it. Supplemental cream is then added to restore the ratio of butterfat to skim required in the cheese vat. Consistent with this, butterfat utilization has been broadly increasing in Class 3 over time. Domestic skim use has not grown commensurate with growth in cheese production, as imported diafiltered milk/MPI has filled the gap.

[4] Increased use of recycled whey protein in cheese beginning in the early 2000's probably also contributed to a small extent to the trend in increased cheese production

The diafiltered milk/MPI imported from the US could have been produced from skim milk in Canada. However, the imports of diafiltered milk/MPI from the US are tariff-free under NAFTA, and will be under CETA and TPP as well. This creates a distinct price advantage to these imports, as imports of substitute products such as ultrafiltered (UF) skim milk and its dried equivalent milk protein isolate (MPC) are subject to a 270% tariff. UF skim milk is explicitly interpreted as "milk" under the federal compositional standards for cheese.

Under Class 6, skim will be available to produce a range of intermediate products used in cheese making, and other dairy products, at world price. This adjusts for the pricing gap that has previously motivated imports of diafiltered milk/MPI, and provides the incentive to use domestic skim (in the form UF skim milk, MPC, diafiltered milk/MPI or other skim-based products) as an ingredient that can be used in dairy manufacturing.

Rather than use compositional standards, Class 6 skim pricing will be limited by the economic extent to which it substitutes for pricing in Classes 2 and 3. For example, if a minimum requirement of 83% of skim derived from milk applies in a product, then up to 17% of actual skim deliveries would be eligible for Class 6 pricing. This approach avoids the difficulties of product inspection under the compositional standards, and represents a type of economic or virtual standard, applied only in producer settlement for milk and effectively limiting Class 6 pricing to the prescribed shares.

In understanding its impact in application, one can also envision prospective areas in which Class 6 skim could erode Class 2 and 3 skim values. One source of this erosion is that, compared with current rates use of diafiltered milk/MPI use, it is unclear how the established Class 6 shares will stack up; they could allow additional value to flow to Class 6 from Class 2 and 3 compared with what currently goes to imported ingredients. Conversely, Class 6 pricing will be extended to processors that may not have not been using imported diafiltered milk/MPI, limited by pricing share percentages as illustrated above.

The pricing-share approach is probably vulnerable to variation and improvements in processing technology, which allows for improved yields using ingredients over time; this could be remedied by periodically updating the ratios. It may also prove difficult to audit utilization given virtual standards, especially as technology varies and improves. Whether these will be problematic in practice remains to be seen.

Nature of Impact

The changes described above present the prospect of impacting farm price and revenue levels going forward, with an acknowledgment that significant uncertainty exists. One way to consider these is to look at how the conditions of 2014-15 would have been impacted by the above changes. To do so, the data contained in Table 2 is updated to reflect changes in prices and volumes as if they had occurred in 2014-15, and blend prices recalculated for comparison purposes.

It is assumed that butterfat in Class 6 would be priced at the existing 4(a) price, and that the 5(d) prices of protein and other solids serve as a good proxy for Class 6 skim prices. Throughout it is assumed that total milk marketed remains constant, so volume moved into Class 6 is shifted away from existing classes. Finally, a critical assumption is that processors retain the existing shares of utilization according to milk class (and product output).

These empirical estimates are for the national level; this is not currently in place and differences across regions are likely, so the empirical analysis serves largely as directional guidance. Figure 2 below illustrates the results.

Class 6

The immediate impact of Class 6 should be to replace skim in Class 4 and all of its subclasses, including Class 4(m). The effect of this change is to increase the value of skim currently marketed in Class 4(m) at very low prices, but also to decrease the price of skim in other subclasses of Class 4. The results in Figure 3 suggest that these effects essentially wash each other out- the blend price changes from about $80.83/HL to $80.87/HL on an at-test basis.

However, the possibility exists of erosion of Class 2 or 3 skim values. Two scenarios are considered here- one in which there is a 15% erosion of the skim used in Class 2 and 3 into Class 6, and a more extreme scenario with a 30% erosion of skim in Classes 2 and 3 into Class 6. At 15% erosion of Class 2 and 3 skim, the blend price decreases by just over $2/HL on an at-test basis. At a 30% erosion of Class 2 and 3 the blend price is reduced by $4.09/HL on an at-test basis.

Changing CDC Support Price Role

The future role of CDC support prices is unclear. Under provincial and national ingredient strategies (Class 6 initiatives), CDC surplus removals would be phased out, effectively removing the credibility of CDC support prices as price references. For now, CDC established butter prices will remain as a price reference for butterfat, but future announced SMP support prices will only apply to Class 4(a), which actually contains little skim. Thus, the CDC support prices will be much less relevant in the future; a new price mechanism for skim in Classes 2 and 3 will be required.

Future Lost Class 5(d) Volume

The volume currently marketed in Class 5(d) is considered subsidized, and will thus be stopped by the end of 2020 under the WTO Nairobi Agreement. The most obvious alternative is to market this milk in Class 6. It is expected that Class 6 will be viewed as non-subsidized, and the quota implication of redirecting the 5(d) volume into Class 6 would appear minor, as little butterfat is currently marketed in Class 5(d). The anticipated effect of doing so is that the skim currently marketed in 5(d) could move into Class 6 at essentially the same value (world price).

This is illustrated in the last two sets of bars in Figure 2. Under either a 15% or 30% erosion of Classes 2 and 3 skim into Class 6, the addition of the Class 5(d) volume results in a slight increase in revenue constant, since butterfat rolled into Class 6 from Class 5(d) is priced higher.

Alternatively the MSQ could be reduced in consideration of the lost Class 5(d) volume. That scenario is discussed below.

Situation Without Class 6

The results above suggest that Class 6 presents the prospect of maintaining near-existing blend price levels in competing with imports of skim-based products (such as diafiltered milk/MPI) and of accommodating the volume that will be lost from Class 5(d). The major variable influencing the blend price under Class 6 is whether, and to what extent, it erodes skim volumes from natural milk in Classes 2 and 3.

Class 6 is controversial in part because it introduces world pricing, on a limited basis, to the domestic market, Milk pricing will be somewhat more connected with world prices, and the associated volatility- albeit at much higher than world price level.

However, this risk should be weighed in consideration of what would happen without a Class 6 or analogous initiative. World pricing and prospective market growth under Class 6 provides the basis for renewed investment in processing, as evident in the apparent willingness of two Ontario processors to expand given Ontario's Class 6 initiative. This will help ease the binding constraint on skim processing, and help the market to rebalance itself between butterfat and skim to better serve the growing butter market. In particular, without new skim processing capacity and the business environment to warrant it, the dairy industry is at imminent threat of a skim processing plant breakdown or service interruption, which would immediately result in mass dumping of milk.

It also eases the implicit cost of Class 4(m). As shown in Table 2, the value of Class 4(m) in 2014-15 was $7.54/HL, compared with an overall blend price (including the impact of 4(m)) of $80.83/HL By making this milk available to compete with imports, it writes up its value to world price- which is much higher than $7.54/HL.

Another aspect relates to exports of skim products. Without a world price class that can be sold either domestically or in export, the volume currently in Class 5(d) will be lost by 2021, and there simply would be no other dairy exports apart from the special classes 5a, b, and c, which are bound by permit. This would result in lost revenue (about $52 million in 2014-15) and decrease in the MSQ, driven by the previously exported volume in Class 5 (d); in fact the loss in the MSQ would be effectively governed by the skim exported in 5(d), rather than the butterfat. Ironically it would increase the blend price, as Class 5(d) is relatively low-priced milk.

More fundamentally, it is practically difficult to operate a supply management program without exports as a check valve for market fluctuation, and these costs would need to be somehow internalized with the loss of Class 5(d) and without Class 6. However, with fully utilized skim processing capacity the internalization of 5(d) volumes would be more than a matter of cost. Canada would be left with skim that has literally nowhere to go, apart from the waste stream.

Conclusion

One of the difficulties of dairy policy discussions is that they can become easily mired in the arcane details of milk marketing. This may be somewhat unavoidable, as the elements are all interconnected. However, in understanding milk pricing in a time of change it is the fundamentals that are important.

- The current source of flux is industrial milk pricing- Classes 2-5. Fluid milk pricing is essentially unaffected. Producers receive the blend of the fluid and industrial milk class prices. Processors pay end-use class prices, and the nature of milk pricing thus

influences how processors can market their product, their profitability, and investments in processing that they will rationally make. Thus, processor market access, growth, and incentives to invest are related to individual class pricing. Conversely, producer profitability and investment is related to the level of the blend price- which is derived from sales to processors under end use classes.

- For the purposes of dairy manufacturing, milk is a composite product made up of butterfat and skim. Butterfat demand is growing robustly, and today there may be excess demand. Skim is currently in heavy surplus, based on growth in production, lack of concurrent investment in processing capacity, and growth that has been taken up by imports of skim-based products. Moreover, marketing of skim is constrained by caps on subsidized exports. Due to this mix of factors, some dumping of skim has occurred due to insufficient processing capacity. Canada is now struggling to serve a growing butter market, with really nowhere to go with additional surplus skim.
- Imports of diafiltered milk/MPI used in cheese and other dairy processing has been cast as a failure of regulatory enforcement and unfair competition. These imports could more usefully be viewed as an issue related to relative pricing, as diafiltered milk/MPI could be made in Canada
- Currently, only milk used to make products destined for export is priced at world price. This is intended to support the domestic milk prices, but the cap on subsidized exports means that much of our surplus skim must be disposed of internally under Class 4(m) at well under world price. Moreover, price undercutting is occurring as imports of diafiltered milk/MPI legally enter Canada free of tariff, priced well below domestic prices. By making skim available at the world price for either domestic or export under Class 6, it expands the market for surplus skim to compete with imports, or to be exported.

Producer milk pricing is an amalgam of milk class and component prices. It is somewhat akin to an investment portfolio based upon mutual funds; to understand its returns and risks one must understand the stock market and the performance of equities held within the portfolio. Producer milk prices are similarly linked to milk class prices, and the fate of broad producer returns rests with the class prices that make up the blend price, along with changes in quota.

With this understanding, the dairy industry is approaching a precipice in several dimensions, near-term. Increased marketing of skim in Class 4(m) at very low prices is imposing a steep cost burden on producers. Lack of processing capacity brings into question the feasibility of increases in the use of Class 4(m), and even the sustainability of existing use of 4(m), given the aging infrastructure in plants[5]. The butter market is growing, and quota growth to supply it is effectively limited by surplus skim. Class 5(d) will sunset at the end of 2020, at associated loss of revenue and the need to bring back still more skim into the domestic market.

The analysis here suggests that a Class 6 program could address many of these problems, at relatively low costs to producers, in a manner that addresses processor needs for growth, and can provide needed incentives for investment. In so doing, the Canadian milk price mechanism will more closely resemble that in the US, with the CDC out of its past role in effectively supporting skim prices and removing skim surpluses, and with skim components priced at world price, not contingent upon export.

There are risks to Class 6. One risk is that Class 6 skim could erode skim values in Class 2 and 3. The more

[5] Some evidence of this is contained in the recent announcement by the CDC that it will provide permits for liquid skim milk under Class 4(m) http://www.milkingredients.ca/userfiles/file/Information_Guide_4(m)_MPC%20May_2016.pdf

extreme Class 6 erosion scenario tested here envisions a loss of about $4/HL to the blend price. Another risk, not considered here, is a change in milk utilization due to Class 6. If processors were to leverage Class 6 and (for example) produce more yogurt and less cheese, then this could completely change the blend price picture, as the shares of classes and components going into the revenue calculation would change, dependent upon factors such as product yields and processing margins that are largely market driven. It is unlikely that a utilization change in reaction to Class 6 would act to increase the blend price.

There are also other pressures for adjustment yet to come. Effectively the price mechanism for Class 2 and 3 has been abandoned and needs replacement. With Class 6 milk being implemented with committed milk allocation to processors making investments, there is little remaining for processor plant quotas or traditional allocation, so a new allocation mechanism is required. Despite the fact that pricing and quota are formally independent in milk supply management, with individual provinces adopting Class 6 programs in the absence of a national agreement, the pricing under provincial Class 6 programs will create pressure for quota at the provincial level- in turn, pressuring the national milk marketing plan.

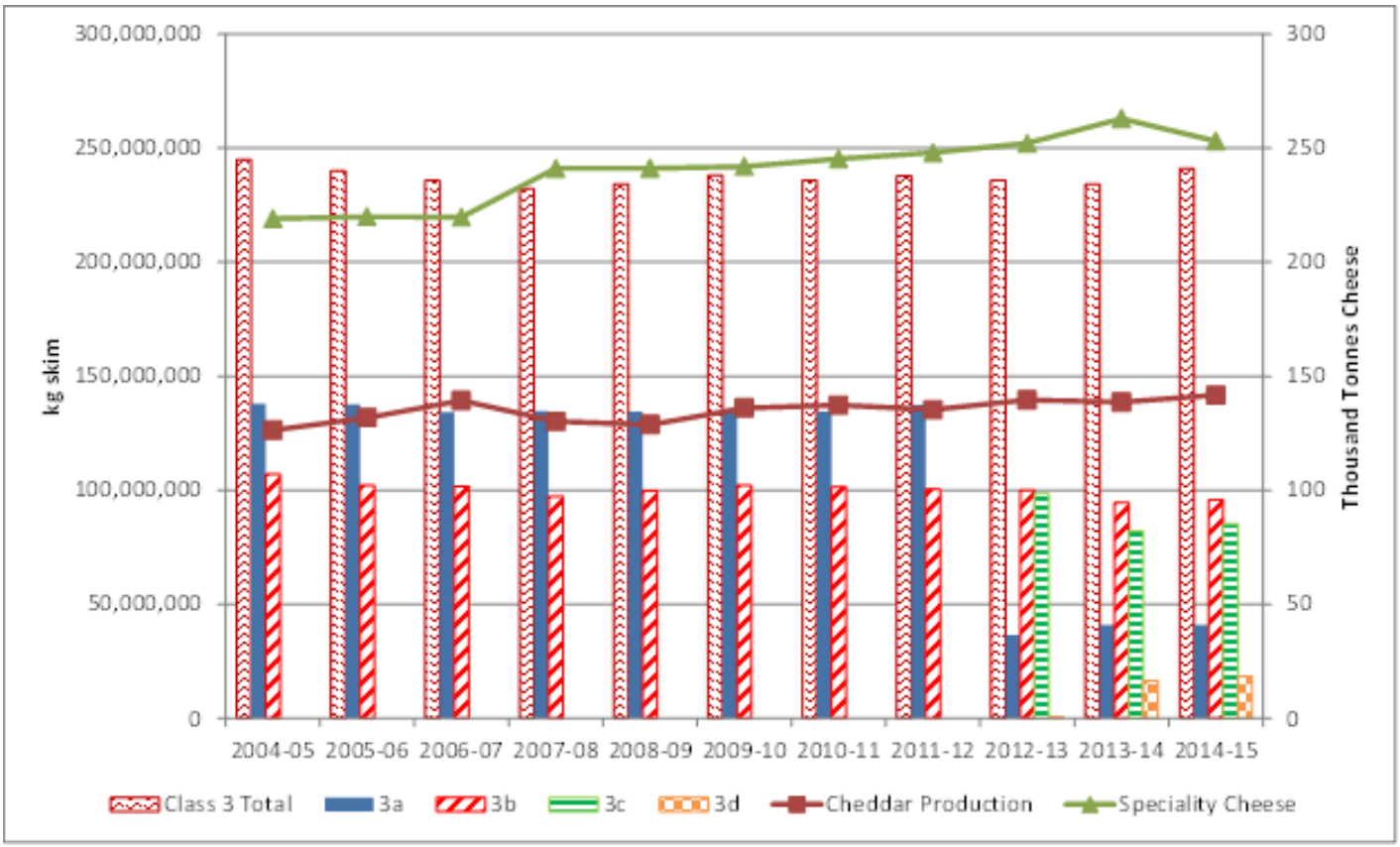
However, these risks and adjustments pale in comparison with the reality of the status quo in which the system will eventually be overrun under the weight of surplus skim it is unequipped to handle, and without the business model to adapt to it.

Table 2 Milk Utilization and Sales, Canada, 2014-15

		Volume (L)	BF (Kg)	BF Price	BF Revenue	PT (Kg)	PT Price	PT Revenue	OS (Kg)	OS Price	OS Revenue	**Total Revenue**	Price @ Test	Price @ 3.6 BF Std Test
Fluid Milk	1A	2,528,578,333	46,580,519	$6.8396	$318,592,524	86,522,029	$8.0175	$693,693,311	148,678,476	$8.0728	$1,200,245,017	**$2,212,530,851**	$87.50	$96.43
	1B	271,366,686	48,435,415	$6.8081	$329,755,111	7,677,525	$7.9171	$60,783,739	13,242,249	$7.9171	$104,840,836	**$495,379,686**	$182.55	$95.11
	1B1	368,306	150,701	$5.6729	$854,918	7,230	$2.9099	$21,038	12,597	$2.9053	$36,599	**$912,555**	$247.77	$46.35
	1C	464,136	5,443	$5.3120	$28,913	15,954	$6.0212	$96,062	27,056	$6.0200	$162,878	**$287,853**	$62.02	$72.81
	1D	2,575,592	53,206	$6.2814	$334,210	87,300	$6.8106	$594,562	150,523	$6.8110	$1,025,216	**$1,953,989**	$75.87	$83.35
	Total	**2,803,353,053**	**95,225,284**	**$6.8214**	**$649,565,676**	**94,310,038**	**$8.0075**	**$755,188,713**	**162,110,901**	**$8.0581**	**$1,306,310,546**	**$2,711,064,934**	$96.71	$96.25
Industrial Milk	2A	392,532,910	8,008,850	$8.0091	$64,143,891	13,549,795	$6.0277	$81,673,671	22,934,799	$6.0271	$138,230,721	**$284,048,283**	$72.36	$82.58
	2B	140,789,511	17,528,337	$7.9893	$140,039,785	4,188,446	$5.9665	$24,990,281	7,316,816	$5.9639	$43,636,657	**$208,666,723**	$148.21	$81.95
	3A	447,425,864	15,667,558	$8.0099	$125,495,568	15,134,795	$14.0625	$212,832,509	25,783,281	$0.8882	$22,901,452	**$361,229,529**	$80.74	$79.34
	3B	1,069,789,651	55,577,704	$7.9991	$444,569,586	35,369,140	$13.6109	$481,405,503	60,566,529	$0.8898	$53,890,165	**$979,865,255**	$91.59	$77.85
	3C	937,546,869	35,695,663	$7.9964	$285,438,034	31,551,343	$14.0592	$443,587,579	53,872,413	$0.8889	$47,889,860	**$776,915,473**	$82.87	$79.29
	3D	204,828,688	8,221,421	$7.9358	$65,243,553	6,915,743	$10.3794	$71,781,288	11,745,132	$0.8761	$10,290,392	**$147,315,233**	$71.92	$67.10
	4A	182,510,008	55,788,380	$7.9908	$445,792,522	3,878,662	$5.4352	$21,081,263	6,591,102	$5.4326	$35,806,950	**$502,680,736**	$275.43	$77.22
	4A1	204,791,452	297,913	$8.0002	$2,383,370	7,127,183	$2.5457	$18,143,490	12,244,582	$2.5458	$31,171,827	**$51,698,687**	$25.24	$51.50
	4B	54,661,544	1,863,934	$7.9483	$14,815,125	1,830,302	$5.5415	$10,142,598	3,141,268	$5.5408	$17,405,275	**$42,362,999**	$77.50	$78.03
	4C	212,759	(41,655)	$7.5174	($313,136)	16,997	($30.1701)	($512,800)	15,772	$44.4542	$701,132	**($124,805)**	($58.66)	$182.26
	4D	44,263,515	1,172,851	$7.9522	$9,326,714	1,440,082	$3.1742	$4,571,147	2,541,659	$3.2283	$8,205,339	**$22,103,201**	$49.94	$57.24
	4M	772,904,560	575,982	$1.9273	$1,110,062	26,890,952	$0.7843	$21,090,017	46,161,049	$0.7812	$36,060,387	**$58,260,466**	$7.54	$13.91
	Total	**4,452,257,331**	**200,356,938**	**$7.9760**	**$1,598,045,075**	**147,893,440**	**$9.4040**	**$1,390,786,544**	**252,914,402**	**$1.7642**	**$446,190,160**	**$3,435,021,779**	$77.15	$69.14
Class 5	5A	211,111,692	8,094,351	$5.8363	$47,240,878	7,138,652	$7.2295	$51,609,171	12,222,307	$1.0616	$12,975,265	**$111,825,314**	$52.97	$50.42
	5B	142,340,157	16,052,003	$5.7173	$91,774,578	4,717,158	$2.9498	$13,914,814	8,164,405	$2.9481	$24,069,707	**$129,759,098**	$91.16	$46.88
	5C	142,633,603	5,862,022	$4.3982	$25,782,267	4,800,111	$1.9623	$9,419,243	8,275,521	$1.9660	$16,269,864	**$51,471,374**	$36.09	$33.35
	5D	279,663,703	1,251,970	$3.3725	$4,222,268	9,702,283	$2.4778	$24,040,774	16,786,600	$1.4355	$24,097,037	**$52,360,079**	$18.72	$28.31
	5E	0	0		$0	0		$0	0		$0	**$0**		
	Total	**775,749,155**	**31,260,346**	**$5.4068**	**$169,019,990**	**26,358,204**	**$3.7553**	**$98,984,001**	**45,448,833**	**$1.7033**	**$77,411,873**	**$345,415,864**	$44.53	$41.29
TOTAL Canada		**8,031,359,539**	**326,842,568**	**$7.3939**	**$2,416,630,741**	**268,561,682**	**$8.3592**	**$2,244,959,258**	**460,474,136**	**$3.9740**	**$1,829,912,579**	**$6,491,502,578**	$80.83	$76.23

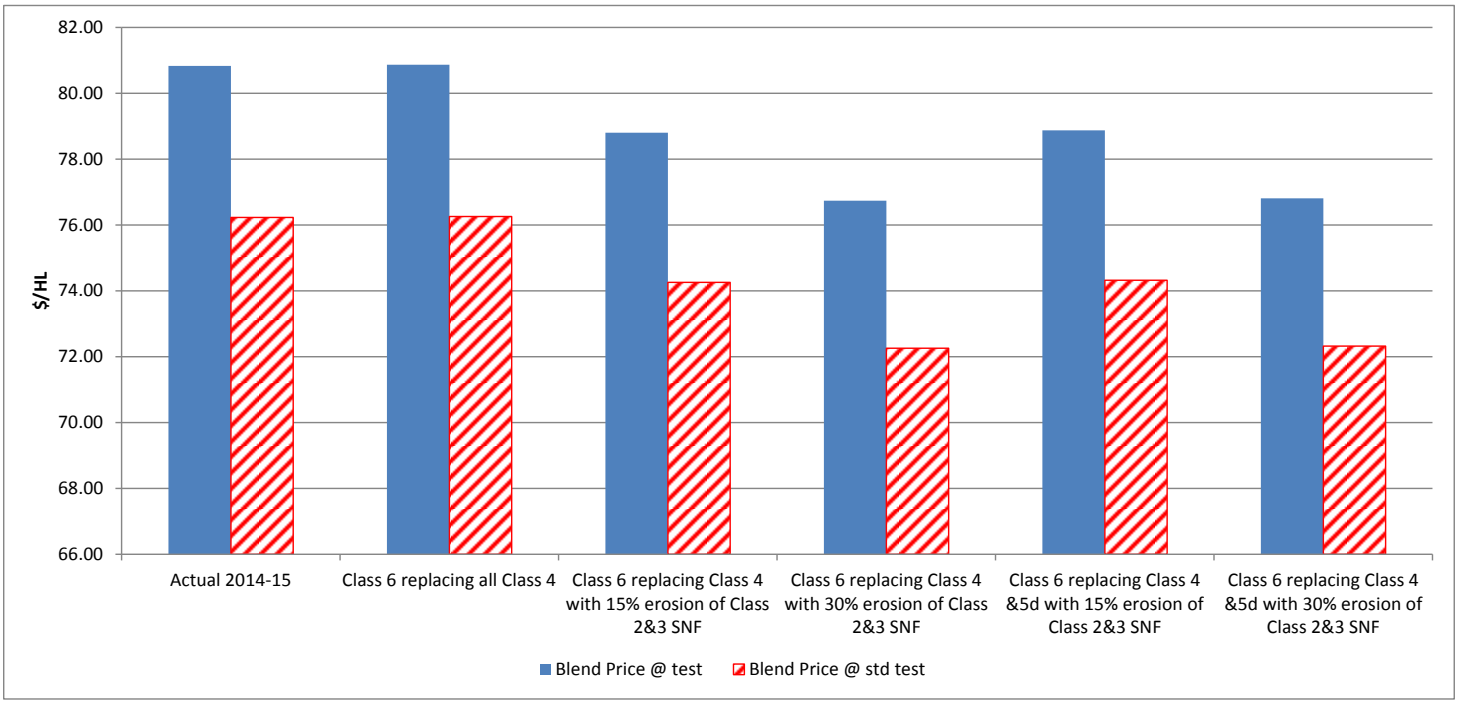
Source: Provincial Milk Boards and Agencies, accessed from www.dairyinfo.gc.ca

Figure 1 Skim Use in Class 3 and Cheese Production, 2004-05 to 2014-15



Source: Calculations based on data obtained from Canadian Dairy Information Centre

Figure 2 Milk Blend Price Scenarios, based on 2014-15



Actual test : 4.07 kg/HL butterfat, 3.34 kg/HL Protein, 5.733 kg/HL Other Solids
Standard test: 3.6 kg/HL butterfat, 3.23 kg/HL Protein, 5.685 kg/HL Other Solids