Milk payment systems in the United States

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Abstract

Payment for milk in the United States is primarily controlled by the federal government. Federal Milk Marketing Orders have been in place for a century, and continue to dominate the payment for milk in the United States. The last major revision of the process was implemented in January 2000, and this system still controls payment in 60% of the milk in the United States.

Milk is so essential to health that it was controlled to ensure an adequate supply of fresh milk. Essential to ensuring an adequate supply of fresh milk, producer milk pricing processes were developed to help producers survive financially. The paper describes the history and current role of milk marketing orders in the US.

Key words: milk, dairy, Federal Milk Marketing Order

Résumé

Le contrôle des paiements pour le lait aux États-Unis est de compétence fédérale. Le système fédéral de décrets pour la mise en marché du lait est en place depuis plus d'un siècle et continue sa domination du paiement pour le lait aux États-Unis. La dernière révision majeure du processus date de janvier 2000 et ce système contrôle les paiements pour près de 60% du lait produit aux États-Unis.

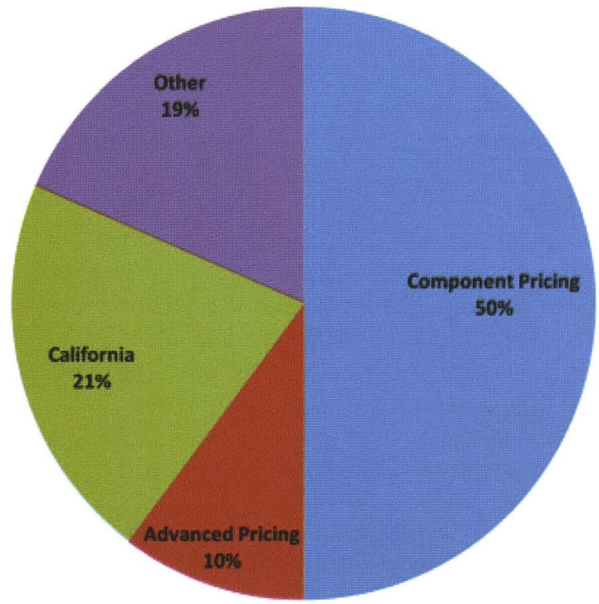
Le lait est si essentiel à la santé que sa production est contrôlée afin d'assurer un approvisionnement adéquat de lait frais. Les règles régissant le prix du lait des producteurs, essentielles pour l'approvisionnement adéquat de lait, ont été développées pour favoriser la survie économique des producteurs. Cette présentation décrit l'histoire et le rôle actuel des décrets sur la mise en marché du lait aux États-Unis.

Introduction

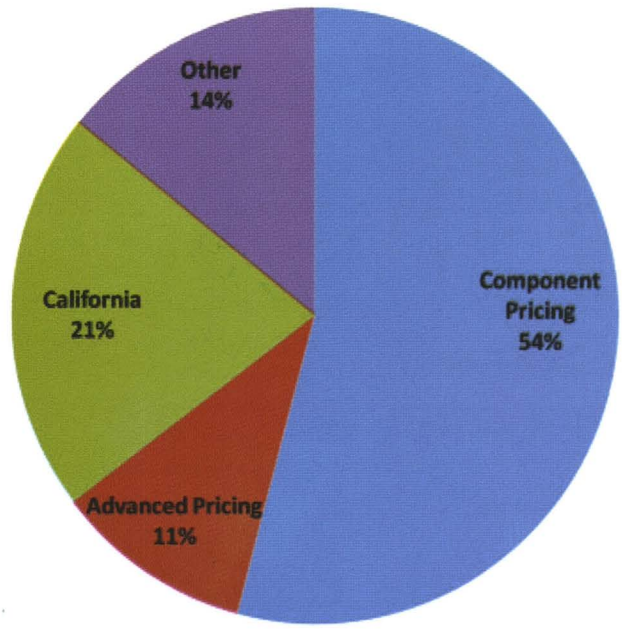
Federal milk marketing orders cover most of the milk in the United States. In 1937, California was able to convince the courts that their milk supply and usage were not interstate commerce, therefore California was excluded from the Federal Milk Marketing Orders and was allowed to manage its own payment system. Today, California officials would have difficulty proving that their milk is intrastate, but the system still stands.

More recently, other events have reduced federal government control of pricing. In May 2004, the Western Federal Milk Marketing Order was disbanded. In the Upper Midwest, nearly 20% of the milk is "de-pooled" from the federal order for that area. That has lead to a trend which will probably continue. By comparison, between 2011 and 2012, unregulated milk has increased from 14% to 19% of the total US milk supply.

2011 USA Milk Production



2012 USA Milk Production



Dairy has changed materially over the last 50 years. Consumer eating habits have significantly changed, and per-capita fluid milk consumption has dropped by 50% since 1945, while per-capita butter consumption has dropped by 70% since 1930. In contrast, cheese per-capita consumption has increased 300% since 1970.

During this session, we will concentrate on the Federal Milk Marketing Orders that pay on components. In 2012, they represented half of the US milk supply. If we consider the milk that is not pooled in the federal orders, and the payment systems that have perpetuated in other unregulated areas, the number would be well over 50%.

The Component Payment System

The component payment system pays based only on the solids in milk. The milk solids are divided into 3 categories: protein, fat, and all other solids, each with its own financial value. Each component has a value established by formulas based on the wholesale value of the major end-product use for each component. The formulas for the USDA Class II pricing are as follows:

- Class III Price = (Class III skim milk price x 0.965) + (Butterfat price x 3.5)
- Class III Skim Milk Price = (protein price x 3.1) + (other solids price x 5.9)
- Protein Price = ((cheese price – 0.2003) x 1.383) + ((((cheese price – 0.2003) x 1.572) – butterfat price x 0.9) x 1.17)
- Other Solids Price = (dry whey price – 0.1991) times 1.03
- Butterfat Price = (butter price – 0.1715) times 1.211

The formulas are pretty straightforward. The value of butterfat is established based on the wholesale price of butter, less the cost to make butter from butterfat (the make allowance). This is then multiplied by a yield factor to recognize that the end product has water and other items in addition to the butterfat.

The protein formula is slightly more complex, because in addition to recognizing the value of protein in cheese, it recognizes the increased value of butterfat when it is in cheese vs butter.

To recognize what is especially important in the calculation of the Class III price, the Class III milk price can be simplified to this equation:

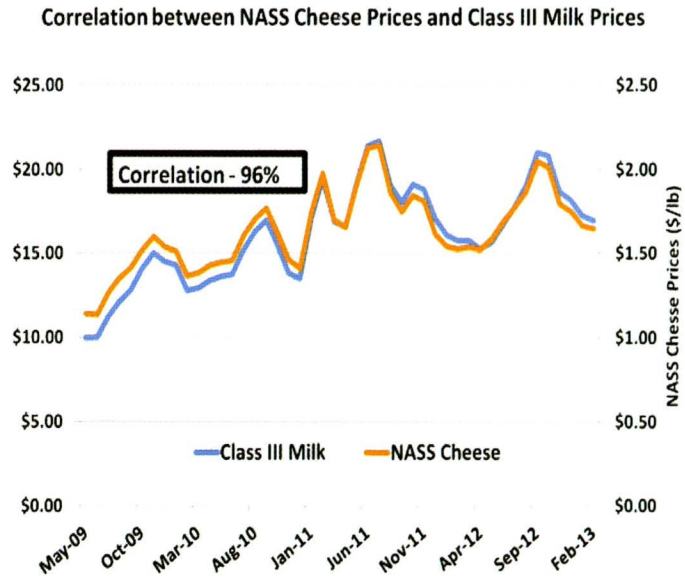
Class III Milk Price = 9.6 x cheese price + 5.9 x dry whey price + 0.4 x butter price - $3.17

From this formula, it's easy to tell that the cheese price is by far the dominant factor in the Class III price of milk. This means that if the price of wholesale cheese goes up, the payment for milk will increase in sync.

For the month of March 2013, the price of Class III milk is established as shown in the following table.

Prices/lb	Mar, 2013	Class III
Cheese	$1.6467	$15.85
Dry Whey	$0.6048	3.59
Butter	$1.6146	.66
Make Allowances		-3.17
Class III Price		$16.93

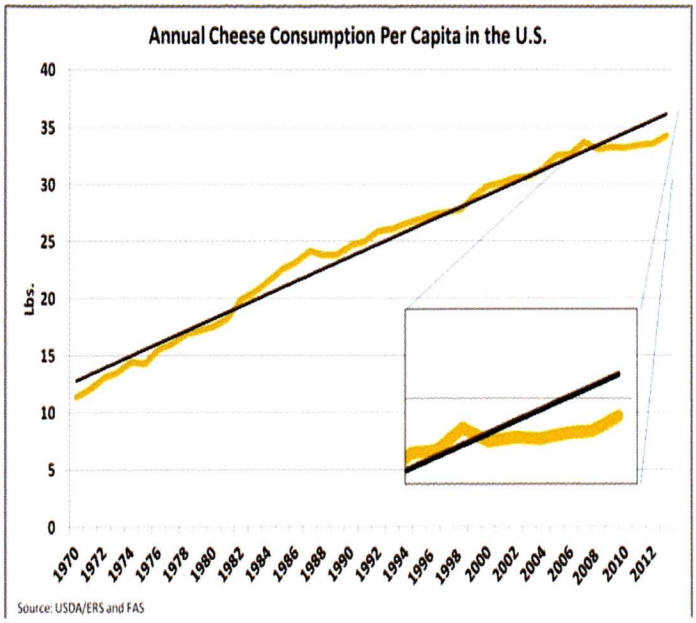
As a further indication of the relationship between Class III milk price and price of cheese, there is a 96% correlation between the price of cheese and the price of Class III milk. In other words, the price of Class III milk can be determined by the price of cheese with 96% accuracy.



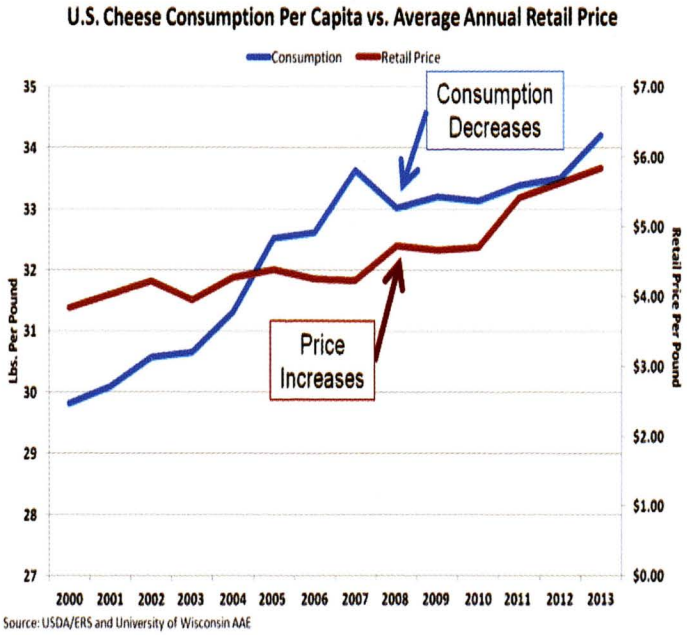
What Influences the Price of Cheese?

Prices are always established by the natural forces of supply and demand. Of course, cheese makers are interested in high prices, so they are incented to not over-produce. However, in the quest for market share and increased company sales there can be over-production in the short run. In the long run, no one will produce a commodity like cheese if there is not sufficient demand.

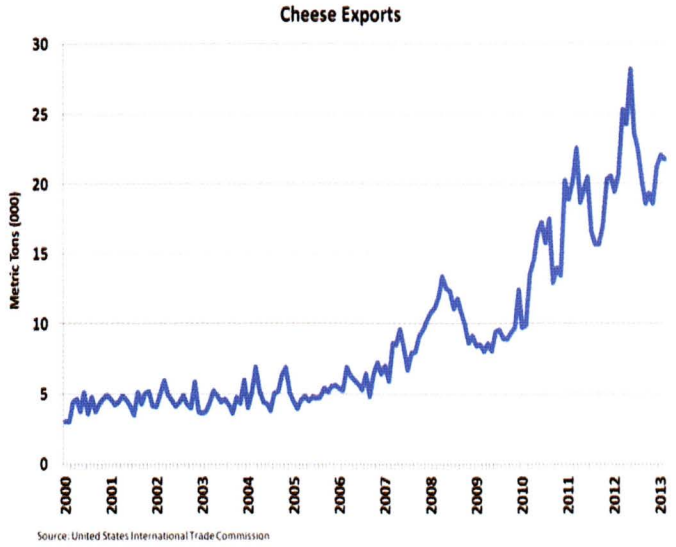
The demand side is made up of 2 distinctly different pieces, domestic consumption and exports. Domestic consumption has been increasing over at least the last 40 years. It is still well below the level of other affluent societies, so continued growth can be expected. Domestic consumption makes up nearly 95% of the total cheese disappearance, so this is obviously a major factor.

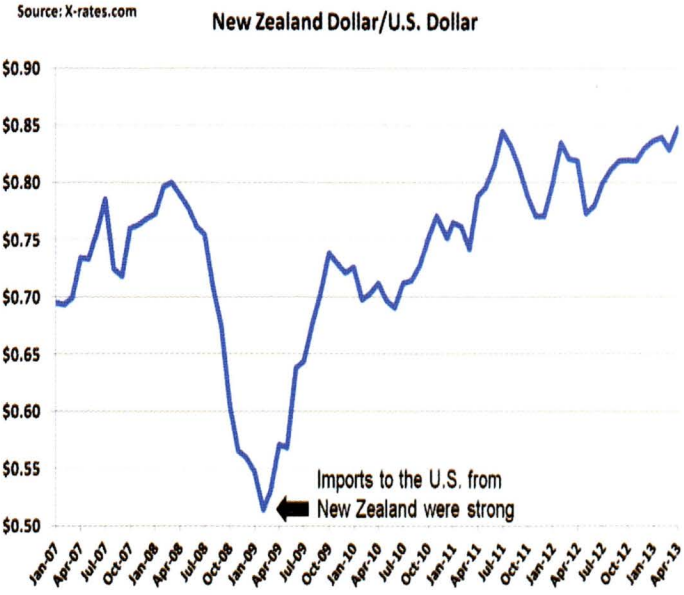


Note the recent drop-off from the long-term trend line. Cheese consumption does depend on pricing. If the cheese goes up in price, individuals and the food service industry find ways to reduce availability and consumption. The retail price of cheese is illustrated in the chart below. Retail prices of cheese have grown significantly since 2007, and while consumption has increased, it has increased at a slower rate than previously.



Exports of cheese currently make up a little over 5% of the demand for US cheese. This is by far the most volatile part of cheese demand, as it is dependent on worldwide events and exchange rates. Cheese exports have been increasing since 2006, quadrupling since that





time. However, the volatility is apparent in the chart below. The most obvious example of this is in the time frame from 2006 to 2008.

One of the big factors for this was the swing in exchange rates between the New Zealand dollar and the US dollar. In early 2008, the New Zealand dollar was very strong vs the US dollar, so US cheese was relatively less expansive. US exports increased in a matter of months to double the prior levels. Of course, cheese prices also increased as a result of the increased demand, and Class III milk went to over $20/cwt. In 2009, the New Zealand dollar returned to a more normal level, and US cheese became relatively more expensive on the world market. Cheese exports fell by a third, the price of cheese fell rapidly, and milk quickly dropped for $10/cwt.

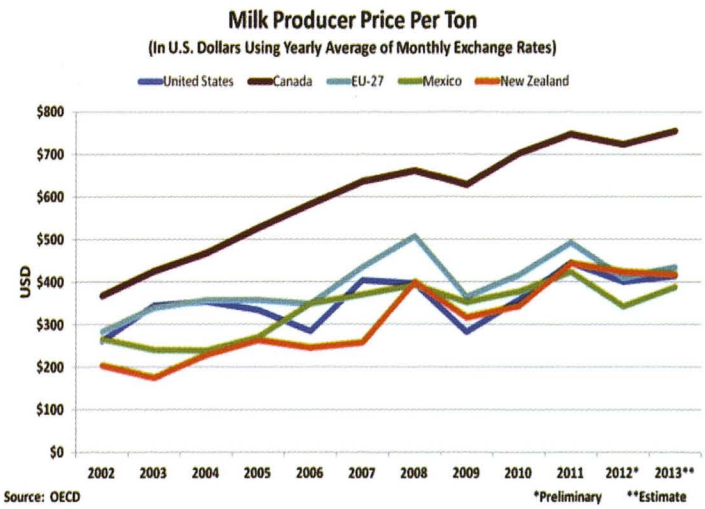
Global Dairy Markets

The US is becoming a major player in global dairy markets. To be successful, the US must be a low-cost producer. Below is a table which shows the 2012 US dairy exports. Nearly half of whey and nonfat dry milk are exported. Cheese is the least exported dairy commodity at 5.3%; there is obvious room for growth.

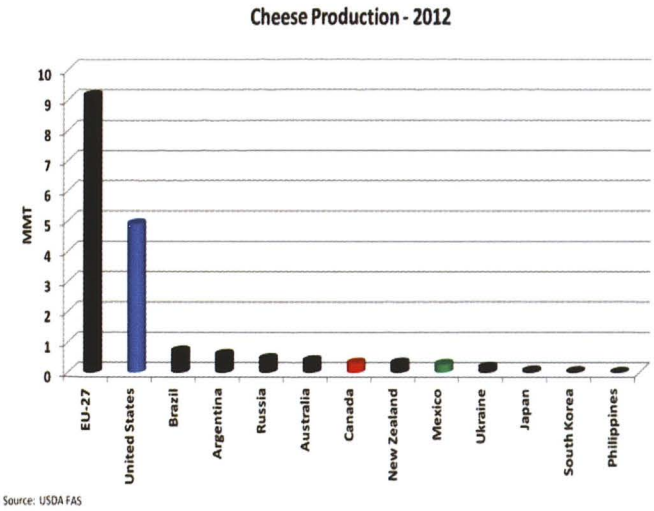
Total value of U.S. dairy exports	$5.2 billion
Total lbs. U.S. milk solids exported	3.3 billion
%U.S. milk production exported	13.2%*
Percent of U.S. whey proteins exported	47%
Percent of U.S. SMP/nonfat dry milk exported	45%
Percent of U.S butterfat exported	5.5%
Percent of U.S cheese exported	5.3%

*Total milk solids

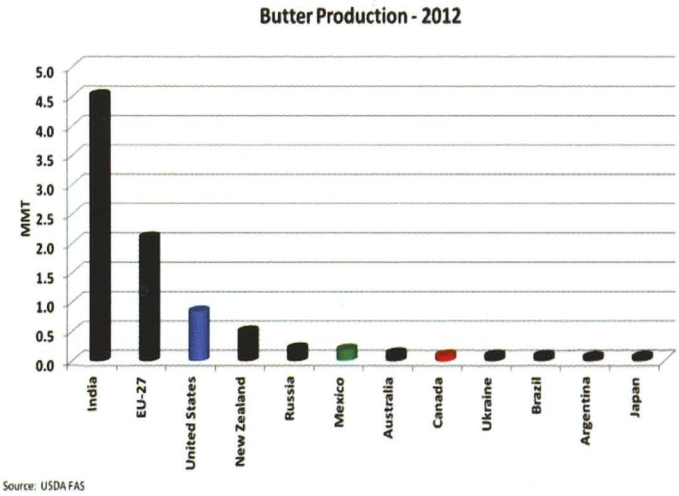
The US is a cost-competitive producer. The chart below shows how the price of US milk compares to other world dairy producers. One major difference is Canada, where the price of milk is inflated by their quota system restriction on dairy imports. With the high prices that a protective system brings, a country cannot compete in the global markets.



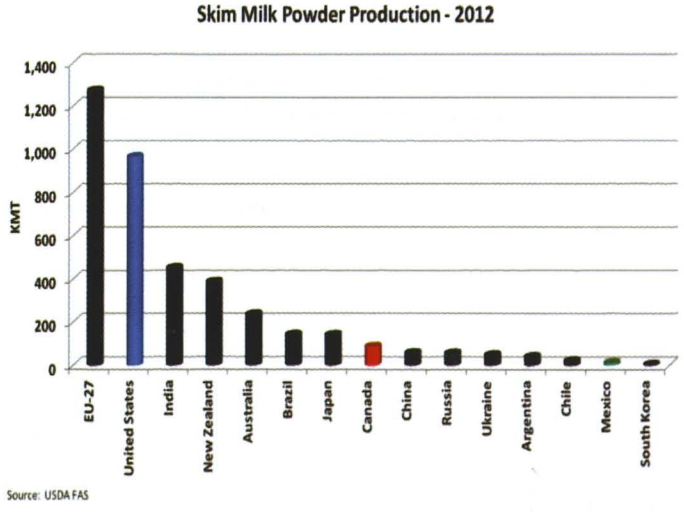
The global competitors for export are New Zealand, the European Union (EU-27) collectively, and for butter India is a major producer, but not a major exporter. In terms of cheese exports, the US is second only to the EU-27.



While India produces a lot of butter, almost none is exported. The major players are the EU-27, the US and New Zealand.

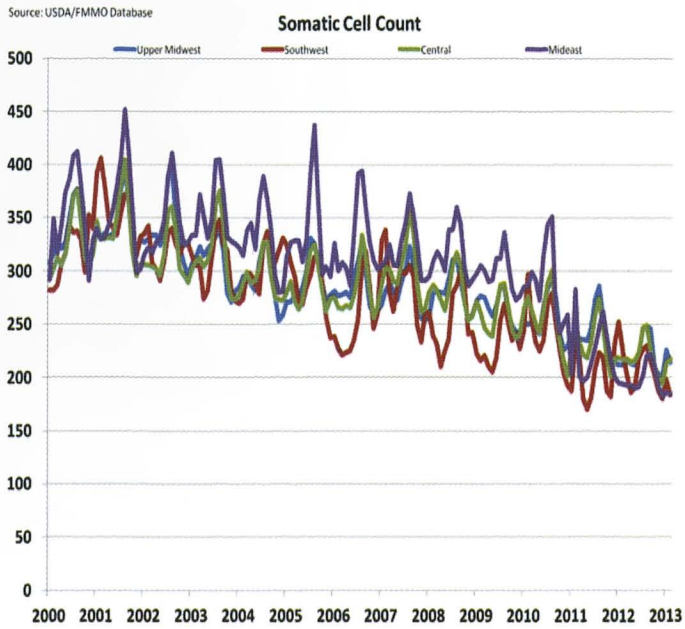


In terms of skim milk and nonfat dry milk, the EU-27, the US, India, and New Zealand are the major producers.



Clearly, in all cases, the US dairy industry is positioned to be a major global player. However, there are a few obstacles to overcome. One is the somatic cell count (SCC) difference between the US and Europe. The US standard is a maximum of 750,000 cells/milliliter. The standard for the EU, Canada, Australia, and New Zealand is a maximum of 400,000 cells/milliliter. Some differences in testing and compliance exist, but the standard is clearly different.

Over the last 13 years, US milk producers have significantly reduced SCC to the 200,000 to 250,000 level (as measured in the four FMMOs that collect data on SCC). There is very little justification to maintaining the 750,000 standard in the US, and it does leave the US at a disadvantage in the international markets.

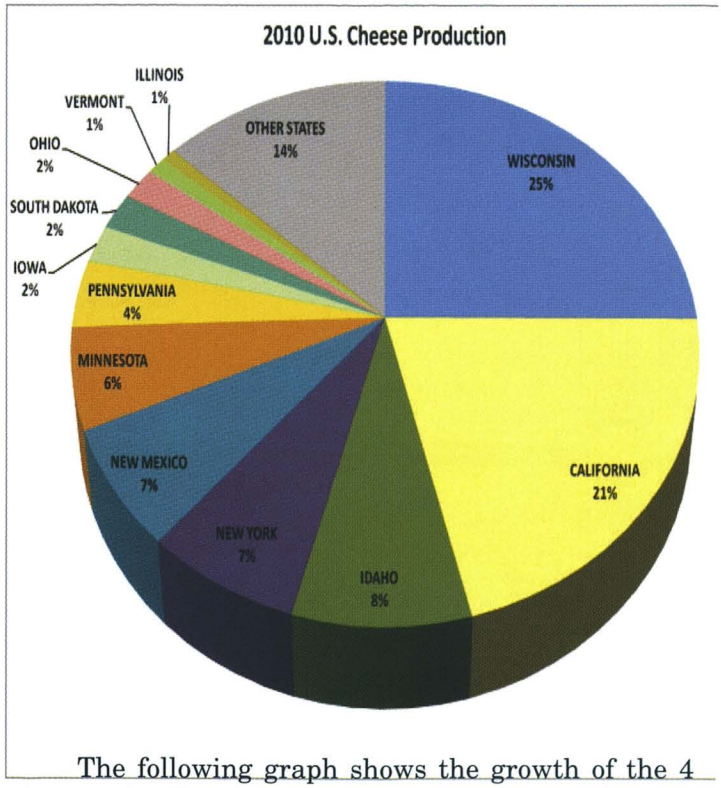


The US produces and exports nonfat dry milk, however the world standard is skim milk powder. The 2 are very similar, but not exactly the same. Skimmed milk powder has a minimum protein content of 34% and nonfat dry milk has no standard for this. While the US exports a lot of nonfat dry milk, meeting the global standard for skim milk powder would be beneficial.

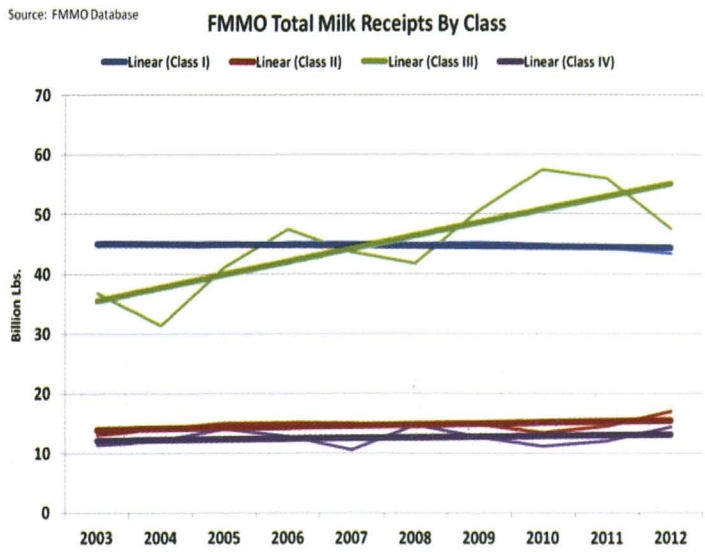
- Nonfat dry milk and skim milk powder are very similar. Both are obtained by removing water from pasteurized milk.
- Both contain 5% or less moisture (by weight), and 1.5% or less milk fat (by weight).
- Skim milk powder has a minimum milk protein content of 34%, whereas nonfat dry milk has no standardized protein level.

Why is Milk Protein Important?

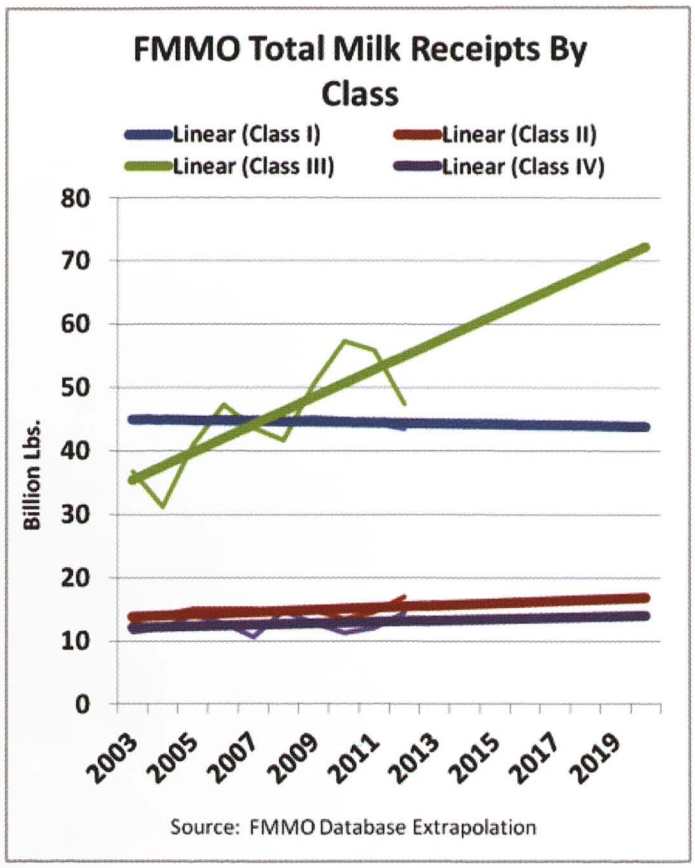
Fluid milk consumption continues to decline every year. However, there are 2 significant growth segments. One is yogurt, which is recently enjoying a significant growth spurt. The other is cheese, which is already quite significant and continues to grow. The 2 largest cheese states by far are Wisconsin and California.

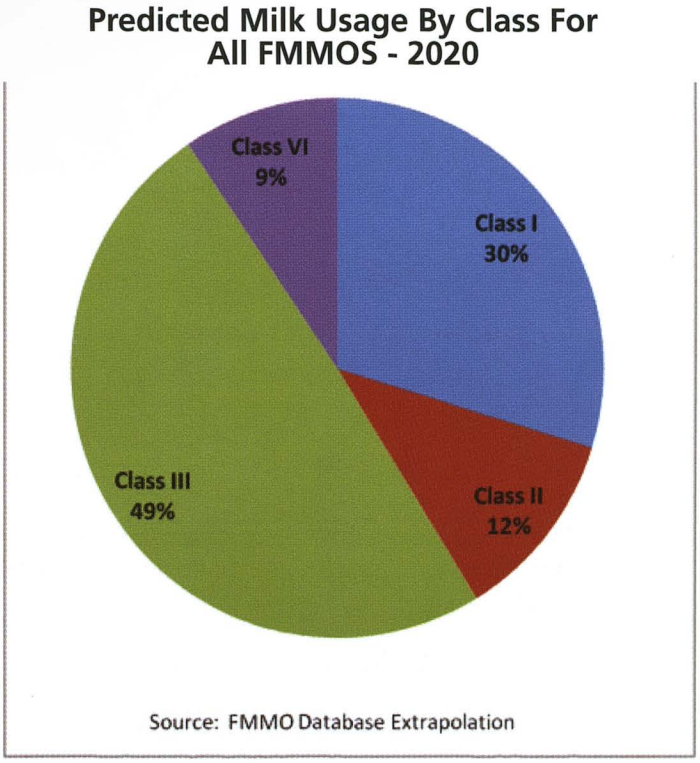


The following graph shows the growth of the 4 classes of milk. From this, it is obvious that Class III milk is the growth driver for the US dairy industry. Wisconsin, as the leading cheese producer, has benefited the most. In 2012, milk production was up 4.5%, with 80% of the milk headed to cheese producers.



If these trends continue, by 2020 Class III milk will make up nearly 50% of the milk in Federal Milk Order Marketing areas.





To make cheese, a high level of protein is needed, specifically casein protein. Casein protein makes up 80 to 82% of the protein in cows' milk. The original formulas developed by Dr. Van Slyke calculated a minimal casein protein-to-fat ratio of .7. At 80% casein protein, and 3.8% butterfat, 3.3% protein would be required. If the milk does not have this level of protein, nonfat dry milk must be added to increase the protein level. Obviously, this is an added expense for the cheese makers, so many cheese makers often pay additional premiums for high protein levels above the Federal Milk Marketing Order minimum for protein.

Yogurt, which is currently enjoying a growth spurt, also needs high protein levels as the protein acts as a thickener. Obviously, protein development is very important for the economic health of the dairy producer.

Conclusions

High levels of components are essential for the vast majority of dairy producers. In fact, in nearly 90% of the US, dairy production pays nothing for the water in milk. To achieve 80, 90, or maybe 100 lb of milk/day/cow is meaningless. Only components that have value are important.

For the rapidly growing export market, only components are important. It is too expensive to ship water for export markets.

While the different payment systems in the US vary, for the majority of dairy producers the payment system is for protein, fat, and other solids. The most important one by far is protein.

Trends in the use of milk show that milk for cheese is important in today's market, and even more important in the future.

References

USDA/Economic Research Service
USDA/Foreign Agricultural Service
USDA/Federal Milk Marketing Order Database
Organization for Economic Co-operation and Development
U.S. Dairy Export Council
X-Rates
U.S. International Trade Commission
University of Wisconsin Agricultural and Applied Economics
California Department of Food and Agriculture