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# An International Comparison of Milk Supply Control Programs and Their Impacts

*Prepared for*

## International Dairy Foods Association


**Dairy Group**

**Informa Economics, Inc.**

3464 Washington Dr.

Eagan, MN 55122

USA

Tel 651 ▪ 925 ▪ 1060

Fax 651 ▪ 925 ▪ 1061

**www.informaecon.com**

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# Executive Summary

## *At a Glance*

A rapid rise in milk prices during 2007 and early 2008, and the even quicker collapse in 2009 has left farmers feeling vulnerable and powerless, and renewed interest in a government run supply control program. There have been numerous attempts to control milk production by various countries since World War II. In this study we examined the impact of these programs on the number of dairy farms, their size, milk prices and volatility, consumption growth, consumer prices, imports and exports, the processing industry, and government expenditures. Among many findings, this study shows that market price volatility is unlikely to be reduced through a supply control program, and that while market volatility is unlikely to fall in coming years, US farmers are uniquely positioned to protect themselves from it with market based and government supported risk management policies.

A thorough evaluation of a new supply control policy in the US must consider these real world "test cases" from the past six decades. Once in place, new government programs are difficult to dismantle and tend to be placed on top of old ones in an attempt to fix. instead of scrap, poor policies. While econometric models of proposed supply control policies can be helpful, by necessity they represent a simplification of the marketplace and economic variables. With the dairy industry becoming increasingly globalized and complex, higher volatility in output and input prices, and new sources of demand growth (exports, functional nutrients, pharmaceutical products), the models may over simplify and miss the obvious impacts of supply control programs that have been validated through experience.

There have generally been five different ways that governments have attempted to limit production or production growth. The results of the programs have generally been the same across each country that tries them, yet policy makers have typically ignored the programs failures in other countries when instituting it in their own countries. These results are:

- **Milk supply control programs in other countries have not reduced price volatility or slowed the decline in farm exits**.
    - Only a small percentage of US dairy farmers hedged their milk and feed prices through futures, options, forward contracts, margin insurance and other risk management programs.
    - The collapse in US milk prices in 2009 was not driven by over production in the US but from a shift in global demand due to the financial crisis.
- **Consumption growth for fluid milk, cheese, and butter has been slower or declining in countries with supply management.**

- High dairy prices disproportionately hurt low income consumers and families, raise government costs, and encourage more consumption of imitation and substitute dairy products.

- **Supply management programs have constrained dairy industry and job growth in the EU and Canada and created an economic incentive for imports.**

  - Slow domestic and export growth has pushed Canadian and European processors to invest and expand in the US and other countries.

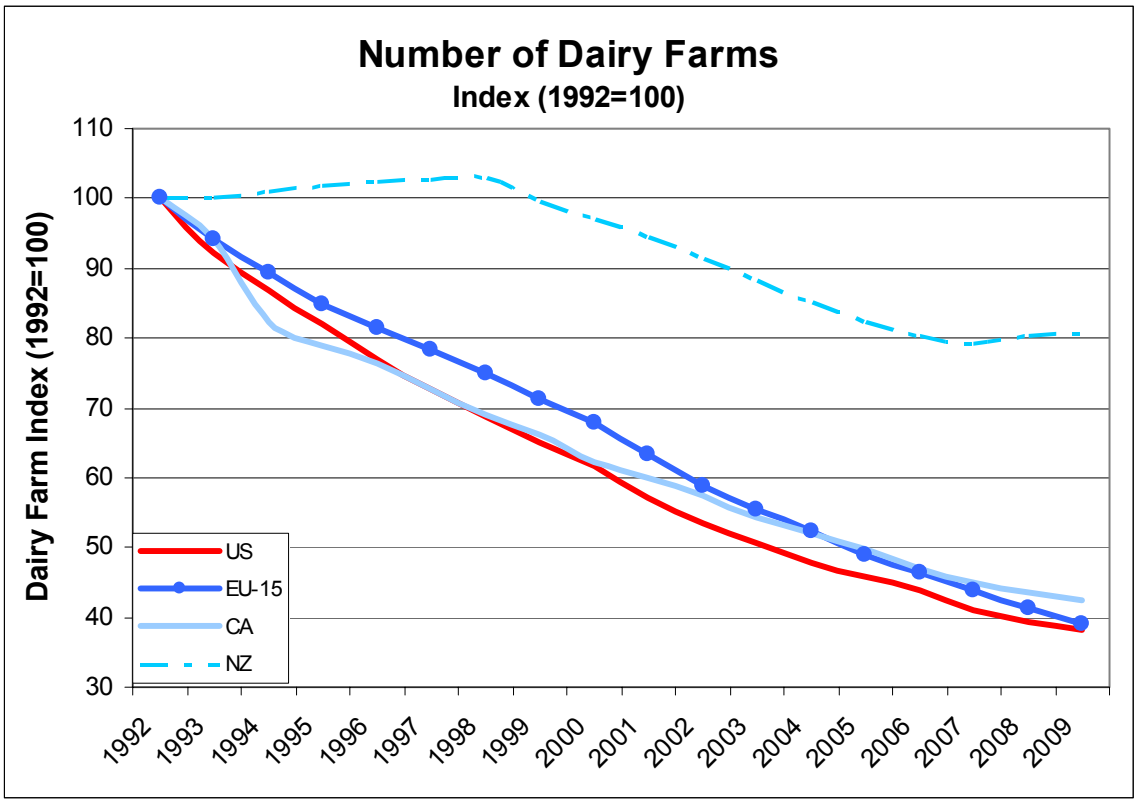
  - Canadian imports, as a percent of domestic milk production reached 24% in 2009 compared to the US where imports were only 3% of production.

## *Attempts to Limit Supply*

There have been numerous attempts to control milk production by various countries since World War II. There have generally been five different ways that governments have attempted to limit production or production growth. The results of the programs have generally been the same across each country that tries them, yet policy makers have typically ignored the programs failures in other countries when instituting it in their own.

| Program Type | Attempted In | Description | Result |
|---|---|---|---|
| Revenue Sharing Quota | Canada (1960s), California (current) | Does not restrict overall production, but farmers are paid more for milk "within quota" | Raises average price paid to farmers, which actually encourages production |
| Marketing Quota | Canada (current), EU (current) | A strict cap on total milk marketed by each farm. A penalty is charged if farmer overproduces | If the penalty is large enough, it will slow production growth, being phased out in EU |
| Assessments, Co-Responsibility Fees, Levies | Canada, EU, and US at various times | The government charges a tax on each unit of milk produced when supply exceeds demand. | Does little to slow production growth, high fixed costs keep farmers thinking long-term |
| Paying farmers not to produce | EU (1976-80), US (1984-85) | The government pays a farmer to reduce his production from a base level | Works so long as the farmer continues to receive the payment. As soon as the payment ceases, milk production surges |
| Paying farmers to retire | EU (1985), US (1986-87,2003-10) | A subsidy is paid to slaughter or export a farmer's entire dairy herd | Most farmers who participate would have retired without the program, so the net reduction is minimal |

## *The Number of Dairy Farms is Falling Everywhere*




Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

| Number of Dairy Farms | | | | |
|---|---|---|---|---|
| | **US** | **EU-15** | **CA** | **NZ** |
| **1992** | 170,500 | 1,018,077 | 31,200 | 14,458 |
| **2000** | 105,055 | 690,140 | 19,411 | 14,025 |
| **2009** | 65,000 | 397,435 | 13,214 | 11,638 |
| **1992-2009** | -62% | -61% | -58% | -20% |

Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

| Average Milking Cows per Farm | | | | |
|---|---|---|---|---|
| | **US** | **EU-15** | **CA** | **NZ** |
| **1992** | 57 | 23 | 40 | 188 |
| **2000** | 88 | 29 | 57 | 250 |
| **2009** | 142 | 45 | 74 | 374 |
| **1992-2009** | 149% | 95% | 83% | 98% |

Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

Supporting small sized and family farms is a common justification for providing high levels of support to dairy farmers, but despite varying levels of support, there has been a near identical percentage decline in the number of dairy farms in the US, EU, and Canada. New Zealand is included for a comparison to a dairy industry with little to no government control. Over the last 17 years the number of farms in the US, EU, and Canada has dropped by roughly 60%, while the average number of cows per farm has increased between 83-149%. New Zealand, with little government support, has seen a 20% decline in the number of farms, and the average size has increased by a comparable 98%.

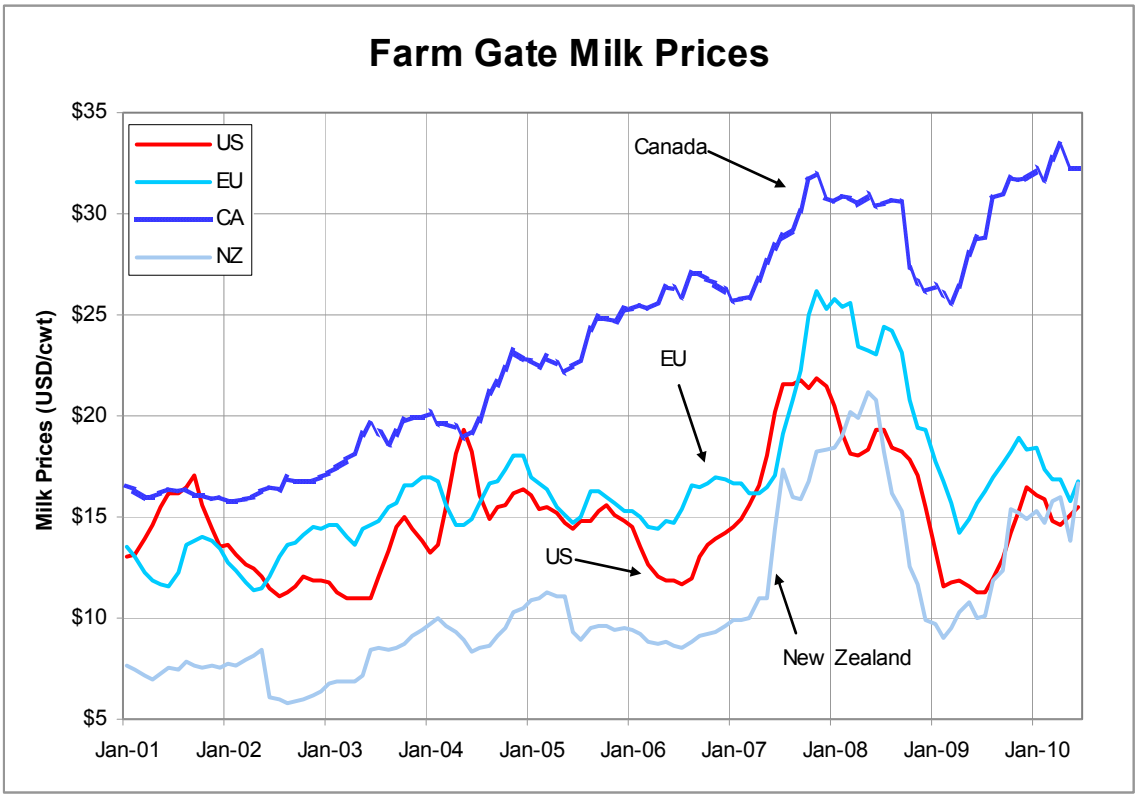
Farmers and their cows continue to become more productive year after year. A single farmer can milk, feed, and care for more cows than his father could thanks to advances in machinery, building design, automated systems and other technological advancements. Individual farmers almost always desire to increase production and reduce costs. As long as productivity growth outpaces demand growth, the net result will be the need for fewer farms despite even the most aggressive attempts to manage production at the national or regional level.

| Milk Production per Farm (Mil Lbs/Yr) | | | | |
|---|---|---|---|---|
| | **US** | **EU-15** | **CA** | **NZ** |
| **1992** | 0.88 | 0.24 | 0.49 | 1.23 |
| **2000** | 1.59 | 0.36 | 0.85 | 1.98 |
| **2009** | 2.91 | 0.64 | 1.30 | 3.25 |
| **1992-2009** | 229% | 171% | 163% | 165% |
| **CAGR** | **7.3%** | **6.0%** | **5.9%** | **5.9%** |

Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

Even with the number of farms declining milk production is typically growing or holding steady most years. This means that the remaining farms are more than making up for the production lost by outgoing farms. The compound average growth rate (CAGR) in the EU, Canada, and New Zealand are almost exactly even at 6%. The US has had a slightly faster average growth rate at 7.3%. Even with national production capped in the EU, and very tight controls on national growth in Canada, the average farm size is growing by about 6% a year. Under both of these countries quota systems, quota can be bought and sold, which is important for overall efficiency in milk production. Inefficient producers and farm operations need to be able to exit the system while efficient and new farmers need to be able to grow. In the EU, milk quota was originally attached to land, so that the land needed to be bought or sold in order for the quota rights to be transferred. This led to various leasing schemes that left both buyer and seller in a legally precarious situation. Eventually quota was allowed to be traded without land in a number of countries. Whether policy makers intend it or not, any implicit value of supply control programs will be capitalized into an asset, whether it is tradable quota, cows, or land.

## *Farm Gate Milk Prices Fell in All Countries in 2008/2009*




Sources: USDA, LTO-Nederland, CDC, Informa Estimates

While the pricing structure and absolute level of prices vary by country, there has been an increasing level of correlation between milk prices since 2005. Growing world demand, slow growth in global milk production, falling government inventories and fewer export subsidies pushed prices on the world market to record highs in 2007 and 2008. The economic crisis combined with a rebound in global milk production in late 2008 pushed prices down in late 2008 and early 2009. The epic run-up in prices during 2007 and early 2008 can be seen in all of the countries examined. The collapse in prices also occurred in all countries, whether they had active supply control programs or not.

Prior to 2007 there was nearly always a surplus of dairy products in the US or the EU, which generally offered a buffer against higher prices. Since 2007, prices have become more volatile, not just in the US, but worldwide.

## *Milk Price Volatility Has Increased*

| Average Farm Gate Milk Prices (USD/cwt) | | | | |
|---|---|---|---|---|
| **Years** | **US** | **EU** | **CA** | **NZ** |
| **01-06** | 13.95 | 14.81 | 20.27 | 8.46 |
| **07-10** | 16.40 | 19.19 | 29.87 | 14.49 |

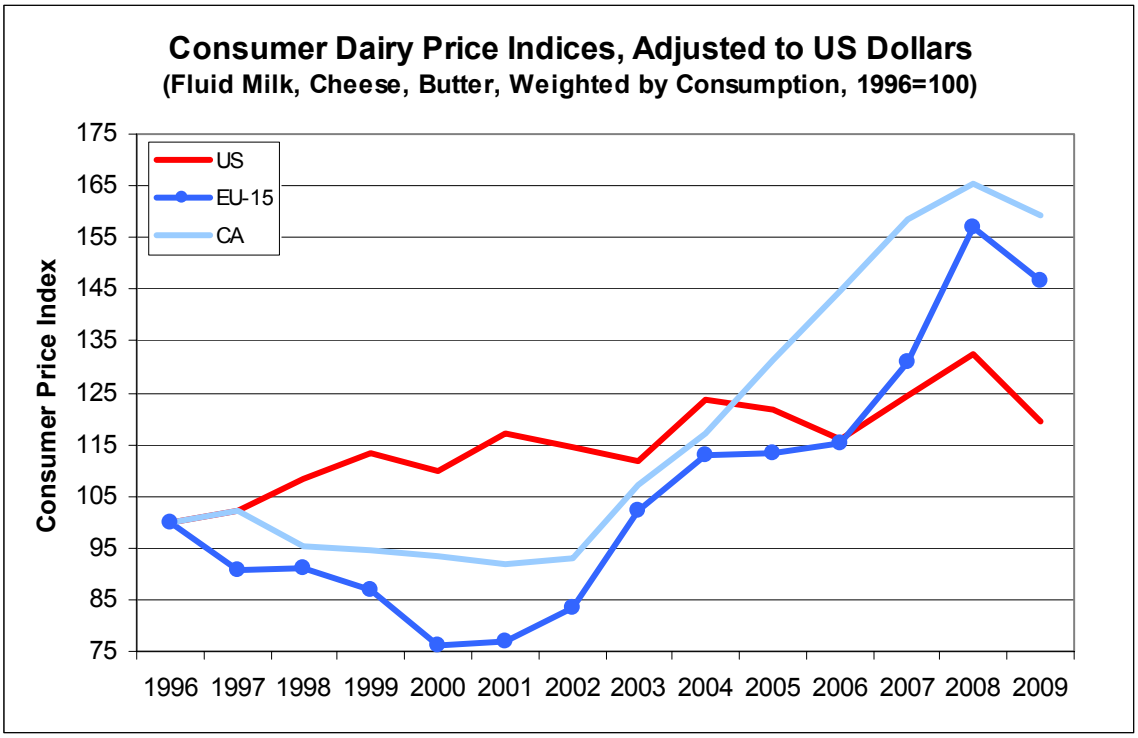
| Standard Deviation of Farm Gate Prices | | | | |
|---|---|---|---|---|
| **Years** | **US** | **EU** | **CA** | **NZ** |
| **01-06** | 1.93 | 1.69 | 3.76 | 1.35 |
| **07-10** | 3.28 | 3.62 | 2.34 | 3.61 |

| Coeficient of Variation of Farm Gate Milk Prices | | | | |
|---|---|---|---|---|
| **Years** | **US** | **EU** | **CA** | **NZ** |
| **01-06** | 14% | 11% | 19% | 16% |
| **07-10** | 20% | 19% | 8% | 25% |

Sources: USDA, LTO-Nederland, CDC, Informa Estimates

Since 2007, milk prices have, on average, been higher than the 2001-2006 period across all of the countries, but they have also been more volatile. Volatility has clearly increased in recent years, driven by lower buffer stocks, weather events that reduced production, strong growth in global demand, and lower government support prices. The increase has been across all countries, even those with supply control programs.

## *Supply Control Raises Consumer Prices*




Sources: Eurostat, Statistics Canada, CDC, BLS, ERS, Informa Estimates

| Dairy Consumer Price Index | | | |
|---|---|---|---|
| | US | EU-15 | Canada |
| 1996 | 100 | 100 | 100 |
| 2003 | 112 | 102 | 107 |
| 2009 | 119 | 147 | 159 |
| 1996-2009 | 19% | 47% | 59% |
| CAGR | 1.4% | 3.0% | 3.6% |

Sources: Eurostat, Statistics Canada, CDC, BLS, ERS, Informa Estimates

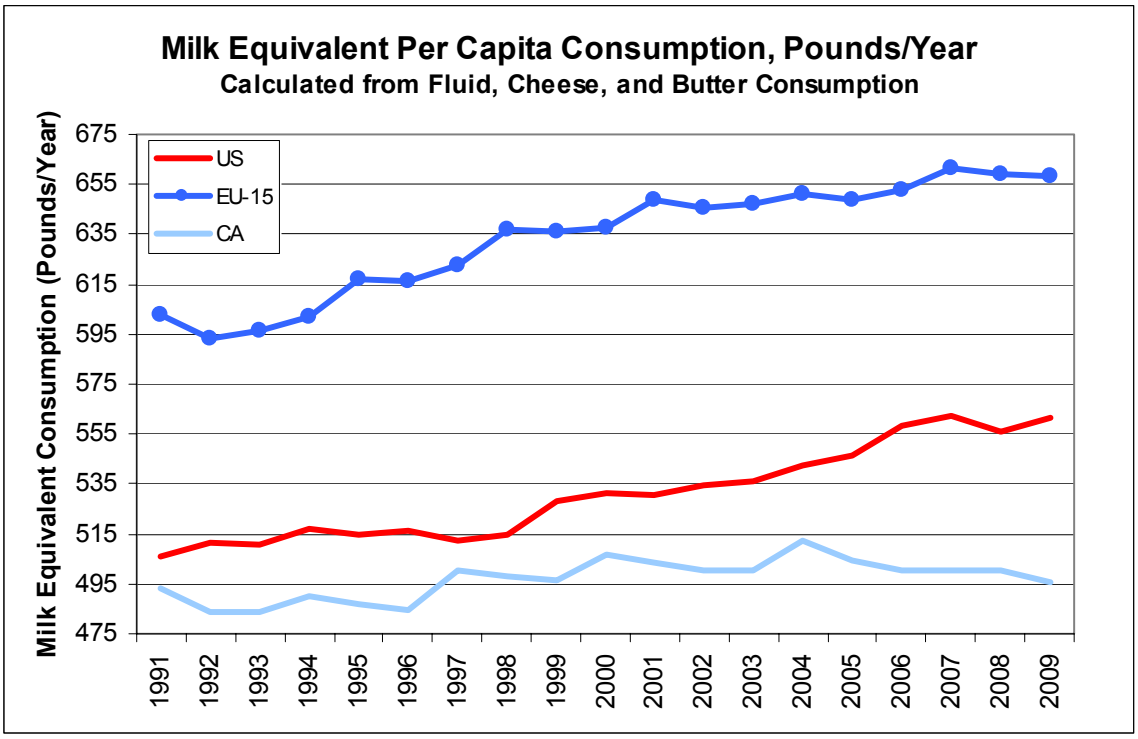
While there were some declines in EU and Canadian prices in the late 1990s, on average prices paid by consumers have been increasing faster than in the US. Over the last 13 years, average consumer prices in the US have increased by an average of only 1.4% per year. In Canada and the EU, where quotas limit production, consumer price increases have averaged 3% or more annually.

Supply control programs are regressive in nature, forcing low income consumers and families to pay a higher percentage of their income for dairy products. Historically, support given to US dairy farmers has come from government programs that set a floor price, subsidized insurance, or provided direct payments in periods of low milk prices. These programs were financed by the government and paid for through the federal budget, which is progressive in nature, taking less from low income tax payers and more from high income tax payers. Government enforced restrictions on the milk supply directly raises consumer prices, which results in a regressive transfer of wealth from the low income consumers to dairy farmers, instead of the more progressive wealth transfers from tax payers to farmers. Low income individuals and families already spend a disproportionate percentage of their income on food, and supply control would further raise dairy prices.

| Average Annual Percentage of Income Spent on Food by Income, 2008 | | | | | |
|---|---|---|---|---|---|
| | $5,000 to $9,999 | $15,000 to 19,999 | $30,000 to $39,999 | $50,000 to $69,999 | $100,000 and more |
| % of Pre-Tax Income Spent on Food | 39.8% | 20.4% | 14.8% | 10.8% | 6.8% |
| Dairy Share of Food Expenditures | 7.9% | 8.7% | 7.4% | 6.5% | 5.9% |

Source: BLS

## *Supply Control Limits Consumption Growth*



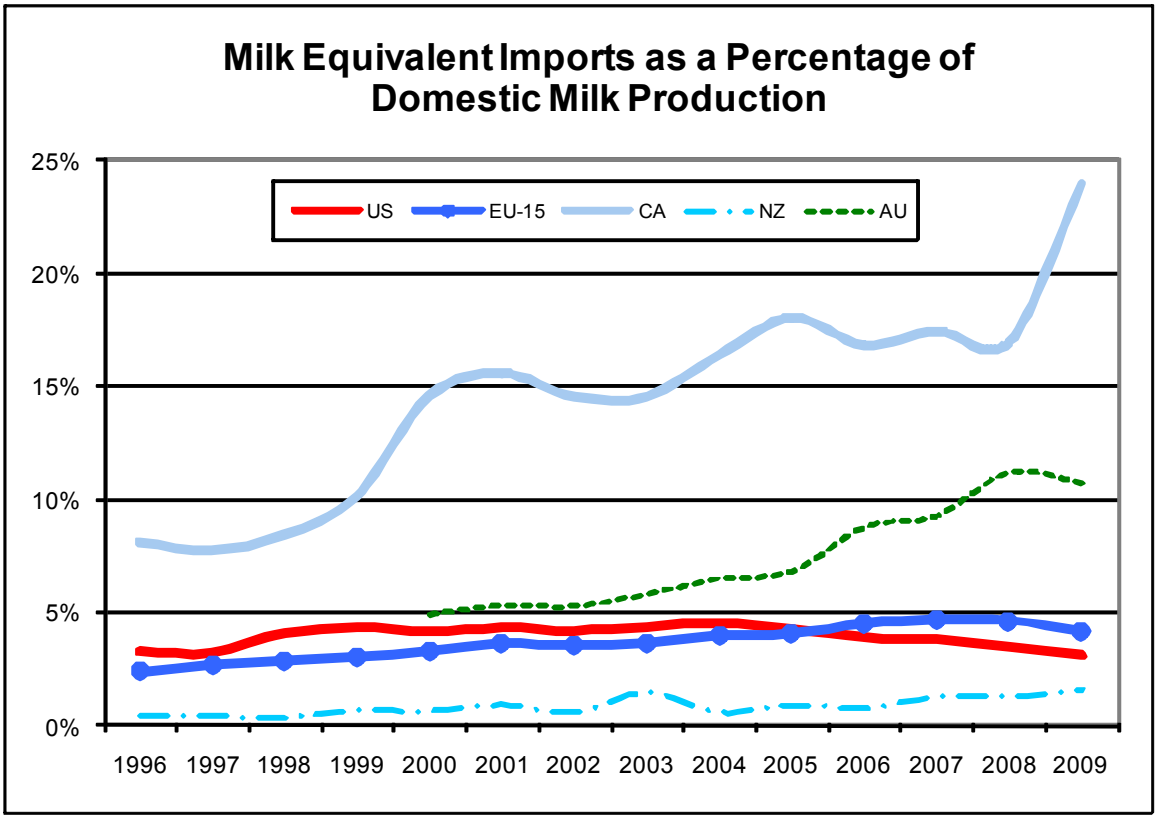

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

| ME Per Capita Consumption (lbs) | | | |
|---|---|---|---|
| | US | EU-15 | Canada |
| **1991** | 506 | 603 | 493 |
| **2000** | 532 | 638 | 507 |
| **2009** | 561 | 659 | 496 |
| **1991-2009** | 11% | 9% | 1% |

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

The result of the higher prices in the EU and Canada has been slower consumption growth. Since 1991, US consumption of fluid milk, cheese, and butter is up 11%, while consumption in the EU is only up 9%, and Canada is only up 1%. The higher prices in Canada and the EU also encourage consumption of imitation and substitute dairy products, such as margarine, instead of butter.

## *Supply Control Encourages Imports*

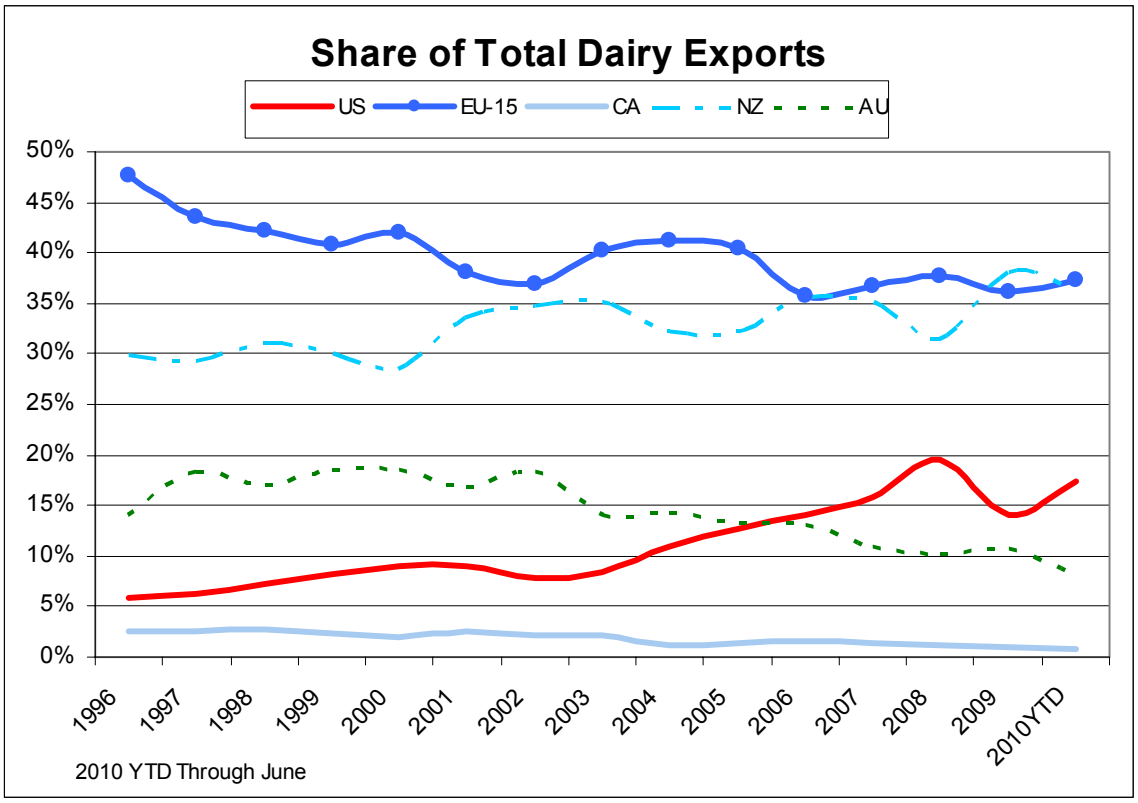



Sources: Eurostat, GTIS, MAF, USDA, Eurostat, DairyAustralia, Informa Estimates

By supporting domestic prices well above world prices, an economic incentive to import dairy products is created. To counter that, governments with quotas and high levels of price support have had to impose significant tariffs. The trend in global trade is toward freer markets and lower tariffs, which is a significant risk for Canadian and EU milk producers. Of the countries examined, Canada imports the most relative to their domestic milk production, which means Canadian dairy farmers are losing market share to imports.

## *Supply Control Limits Export Growth*

Global demand for dairy products is increasing, driven primarily by income growth and changing diets in developing countries. That has opened up new opportunities for exports and generally raised milk prices for dairy farmers around the world, however, countries with restrictions on production growth are losing market share to those without production restrictions.




Sources: Eurostat, GTIS, Informa Calculations

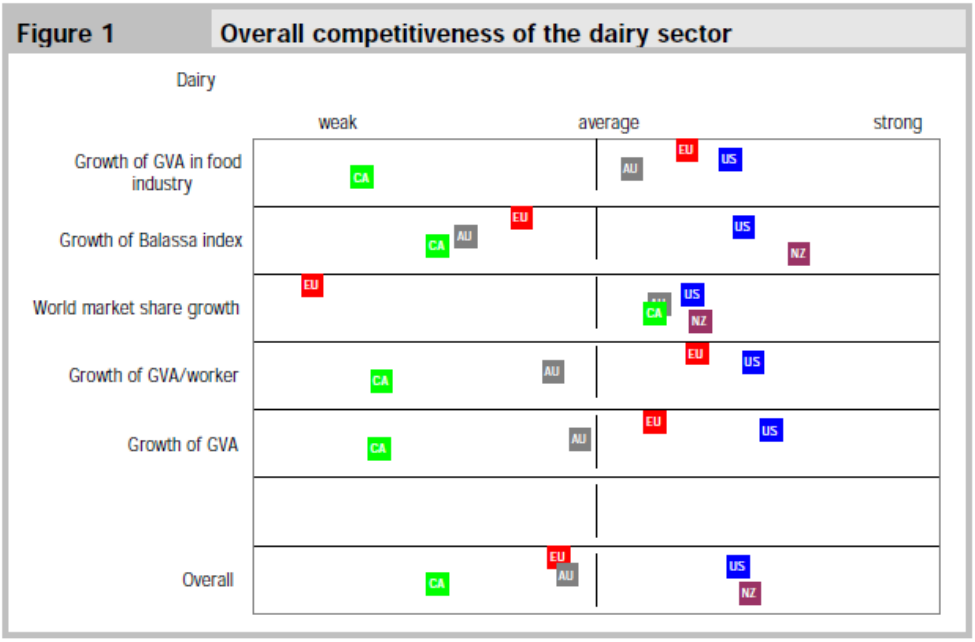
| Share of Total Dairy Exports | | | | | |
|---|---|---|---|---|---|
| | US | EU-15 | CA | NZ | AU |
| 1996 | 6% | 48% | 3% | 30% | 14% |
| 2002 | 8% | 37% | 2% | 35% | 18% |
| 2010YTD | 17% | 37% | 1% | 36% | 8% |

Sources: Eurostat, GTIS, Informa Calculations

The US and New Zealand have both significantly increased their share of the world market, while the EU and Canadian shares have been declining. Australia's share has also declined, but that has been partially driven by declining milk production and consecutive years of drought.

## *Supply Control Hurts Industry Investment and Competitiveness*

**Figure 1** Overall competitiveness of the dairy sector




Source: LEI Wageningen UR: Competitiveness of the EU dairy industry

High consumer prices, slow growth in consumption, and limited ability to take advantage of growing supply for exports makes the EU and Canada look less attractive to processors and weakens industry investment in infrastructure and innovation. A recent report on Europe's competiveness ranked New Zealand and the US as the strongest, followed by Australia, then Europe and Canada.[41]

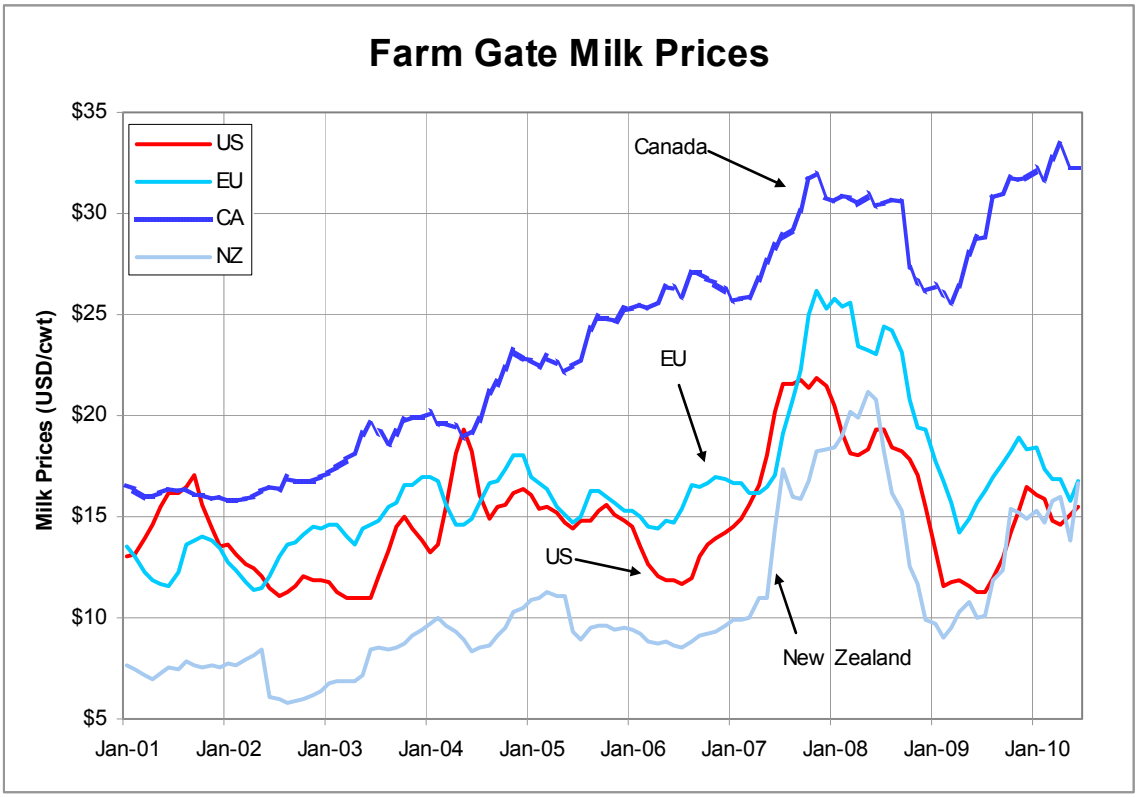
Canadian co-operative/dairy processors Agropur and Saputo have both made substantial investments in the US since the late 1990s. In their 2009 annual report Agropur CEO Pierre Claprood stated that,

*"acquisitions made over the past two years outside of Canada, including La Lacteo (a JV in South America) and Trega Foods are worth over $400 million…On an annualized basis, operations outside of Canada represent between $750-800 million in sales or 25% of our revenues. In 2010, US cheese facilities should produce 50% more cheese than our Canadian plants, and twice as much with a few years."*

Saputo is the other major Canadian player that has entered the US market looking for greater opportunities. Since 2005 Saputo has invested nearly $450 million USD in acquisitions of US facilities. A number of European companies have made investments and acquisitions in the US, including Glanbia, Arla, Dannon, Sorrento Lactalis, Nestle, and Unilever.

## I. Impact of Supply Control at the Farm Level

### *Farm-gate Milk Prices*




Sources: USDA, LTO-Nederland, CDC, Informa Estimates

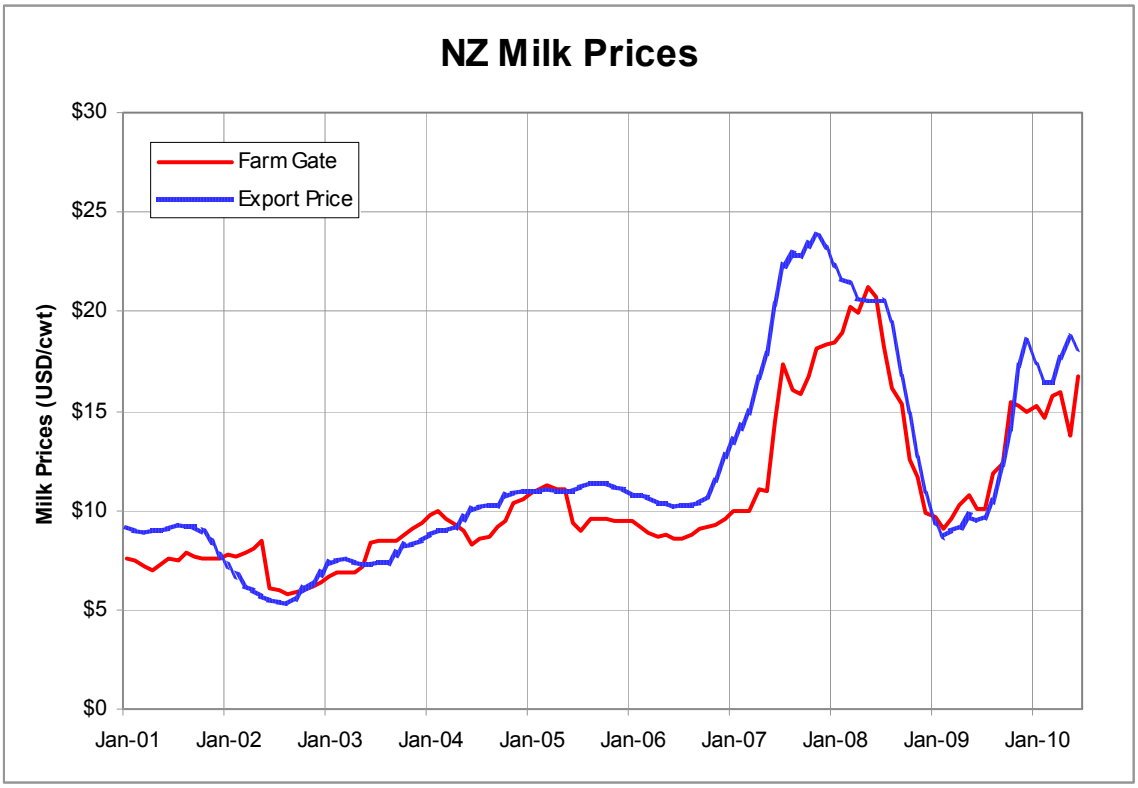
| Farm Gate Milk Prices (USD/cwt) | | | | |
|---|---|---|---|---|
| | US | EU | CA | NZ |
| **2001** | 14.97 | 12.92 | 16.16 | 7.47 |
| **2002** | 12.11 | 12.95 | 16.38 | 6.84 |
| **2003** | 12.52 | 15.17 | 18.79 | 7.96 |
| **2004** | 16.05 | 16.34 | 20.65 | 9.37 |
| **2005** | 15.14 | 15.81 | 23.47 | 10.10 |
| **2006** | 12.91 | 15.64 | 26.14 | 9.00 |
| **2007** | 19.13 | 19.81 | 28.53 | 14.07 |
| **2008** | 18.30 | 23.14 | 29.65 | 16.94 |
| **2009** | 12.81 | 16.79 | 28.92 | 11.61 |
| **2010-YTD** | 15.33 | 17.00 | 32.41 | 15.36 |

Sources: USDA, LTO-Nederland, CDC, Informa Estimates

While the pricing structure and absolute level of price varies by country, there has been an increasing level of correlation between milk prices since 2005. Growing world demand, slow growth in milk production, falling government inventories and fewer

export subsidies pushed prices on the world market to record highs in 2007 and 2008. The economic crisis combined with a rebound in global milk production in late 2008 to push prices down in late 2008 and early 2009. The sharp drop in prices resulted in a contraction in milk production in the US, EU, and Australia, while drought in New Zealand limited their growth. As economic conditions stabilized and buyers started taking advantage of the low prices, they ran up against tight supplies and milk prices rebounded strongly in late 2009. The epic run-up in prices during 2007 and early 2008 can be seen in all of the countries examined. The collapse in prices was also prevalent in all countries, whether they had active supply control programs or not.

## New Zealand

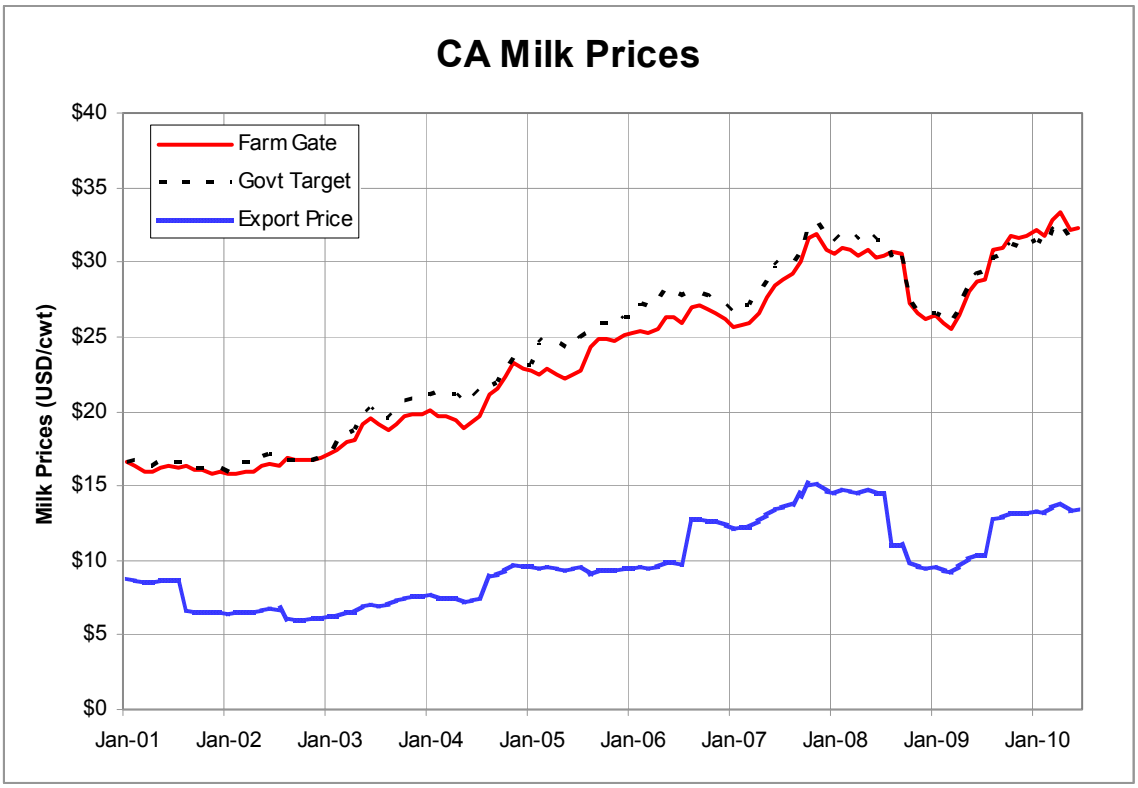



Sources: LTO-Nederland, MAF, AMS, Informa Estimates

There is no direct government support to milk prices in New Zealand. A budget crisis in the mid-1980s led to a partial deregulation of the industry and the removal of price and production controls. In 2001, the New Zealand Dairy Board, New Zealand Dairy Group, and Kiwi Cooperatives merged to create a single entity, the cooperative Fonterra. Fonterra handles, processes, and markets about 95% of the milk produced in New Zealand, although that percentage has been decreasing as new cooperative and commercial companies are building or expanding processing plants in the country. New Zealand's industry is geared toward exports. Somewhere between 93-97% of their milk is exported each year. With a population of only 4.32 million in 2009, the domestic market isn't large enough to absorb surplus product, so it is sold at the market clearing price on

the world market. As a result, their farm gate milk prices closely track market prices of commodities on the world market.

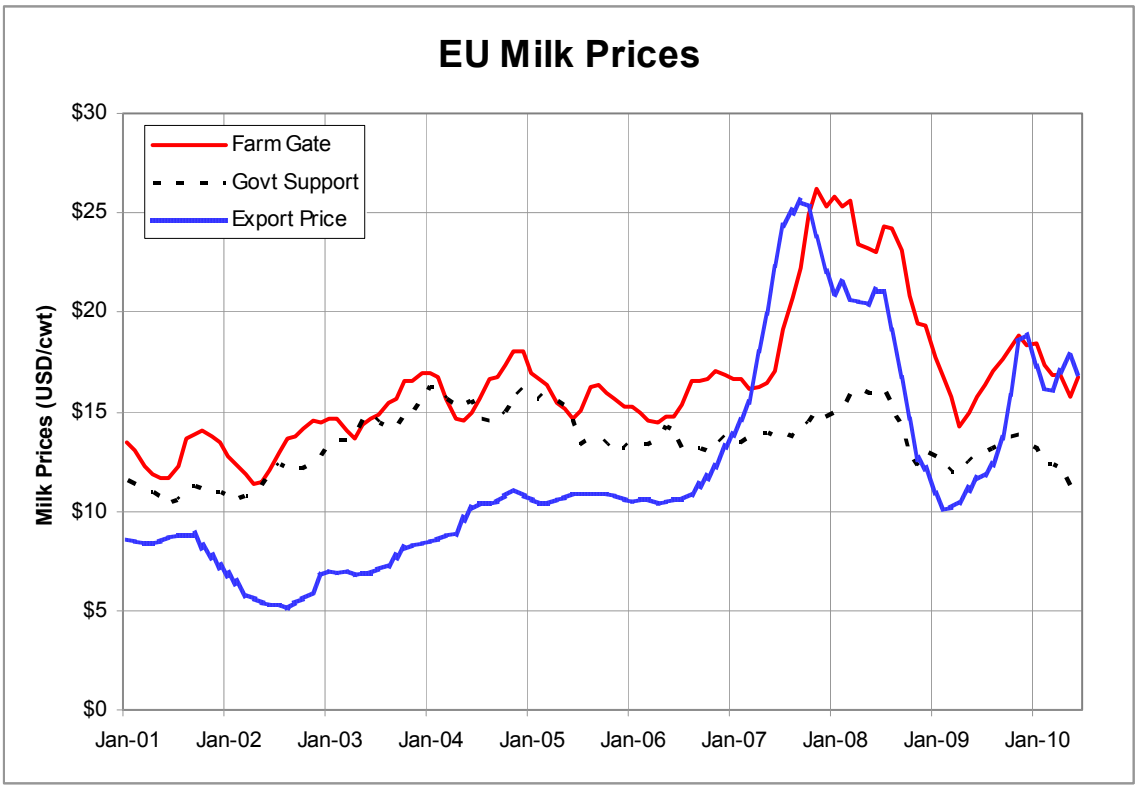
## Canada




Source: CDC

The farm gate milk price in Canada follows the "target price" set by the CDC closely. Each year the CDC does a cost of production survey and finds a target price that will cover the cost of most farms. From the target price, the CDC then calculates a butter and SMP price that equates to the target price, and they stand ready to buy surplus butter and SMP at those prices. The CDC then advises the provincial marketing boards of the target price. Canada, like the US, uses a classified pricing system where the cost of the milk to a processor depends on what product the processor makes with it. The provincial marketing boards then set the individual class prices at a level that should return a weighted average price close to the target price. With milk prices well above the US, EU, and New Zealand, Canada is not commercially price competitive in the world market and has to heavily subsidize exports of products made with Canadian milk.

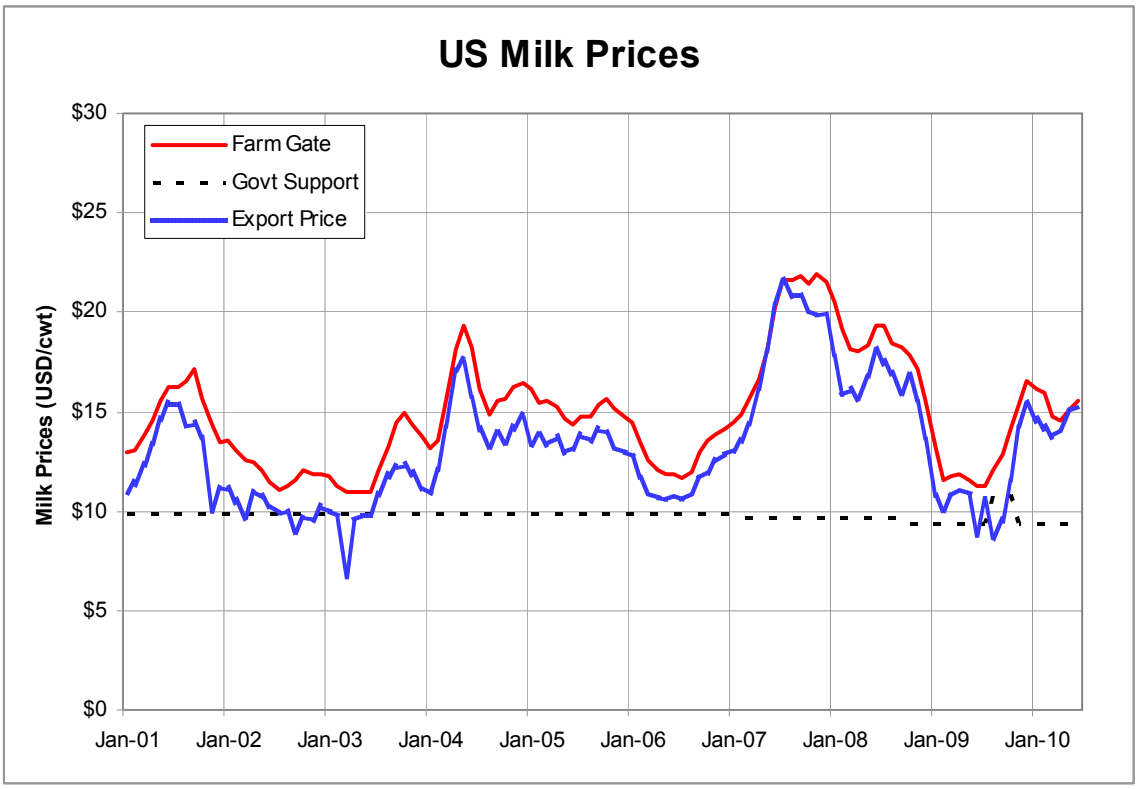
## EU




Sources: LTO-Nederland, AMS, DairyCo, Informa Estimates

There is no standard pricing system in the EU, it depends on the country and who is buying the milk. In countries that are large exporters, like The Netherlands, farm-gate milk prices will track the price of internationally traded dairy commodities closely, while countries with few exports, like Greece, will see steadier prices. The EU Commission supports EU milk prices in the same way that the US and Canada does, by standing ready to buy butter and SMP at set prices. With support prices generally above the cost of production, the EU faced chronic oversupply in the past, which was exported at subsidized prices. As world prices rose and EU intervention stocks were cleared out, market prices moved above EU intervention levels and exports were viable without subsidies until world prices collapsed late in 2008. Both the EU Commission and US government were subsidizing exports in the first half of 2009.

## US




Sources: USDA, AMS, CME, Informa Estimates

For the US, the export price represents the average Class III (cheese/whey) and Class IV prices (butter/NFDM), less any Dairy Export Incentive Program (DEIP) subsidies that were granted at the time. The US government supports milk prices by standing ready to buy butter, NFDM, and cheese at fixed prices. Those prices have generally been declining over time, except for a temporary increase for three months in 2009. The US government does subsidize exports through the DEIP program, but saw no use between mid-2003 and mid-2009. As prices on the world market rose above US government support in late 2004, US commercial exports became viable without government subsidies. The relatively consistent spread between the export price and the farm-gate price represents the value of milk used in fluid drinking milk, which is higher than the milk that is turned into manufactured products.

### *Milk Price Volatility*

From 1980 to 2006, the US farm gate price averaged $12.15/cwt, with the highest year being 2004 at $15.39 and the lowest year being 2000 at $9.74. In 2007 the average price hit a record of $18.04, in 2008 the farm gate price averaged $17.44, and then it plummeted to $11.36 in 2009. Up until 1988, milk prices rarely moved significantly above government support, but as government support was lowered during the 1980s,

milk prices were free to fluctuate more. By late 2007, government held inventories of surplus dairy products were empty in the US and EU, and prices were well above government support levels. Prior to 2007 there was nearly always a surplus of dairy products in the US or the EU, which generally offered a buffer against higher prices. Since 2007, prices have become more volatile, not just in the US, but worldwide.

| Average Farm Gate Milk Prices (USD/cwt) | | | | |
|---|---|---|---|---|
| **Years** | **US** | **EU** | **CA** | **NZ** |
| **01-06** | 13.95 | 14.81 | 20.27 | 8.46 |
| **07-10** | 16.40 | 19.19 | 29.87 | 14.49 |

| Standard Deviation of Farm Gate Prices | | | | |
|---|---|---|---|---|
| **Years** | **US** | **EU** | **CA** | **NZ** |
| **01-06** | 1.93 | 1.69 | 3.76 | 1.35 |
| **07-10** | 3.28 | 3.62 | 2.34 | 3.61 |

| Coefficient of Variation of Farm Gate Milk Prices | | | | |
|---|---|---|---|---|
| **Years** | **US** | **EU** | **CA** | **NZ** |
| **01-06** | 14% | 11% | 19% | 16% |
| **07-10** | 20% | 19% | 8% | 25% |

Sources: USDA, LTO-Nederland, CDC, Informa Estimates

Since 2007, milk prices have, on average, been higher than the 2001-2006 period across all of the countries, but the standard deviations have also been larger in all countries except Canada. Standard deviation can sometimes be misleading if the data being measured has significantly different mean values. It's quite clear that Canadian prices average significantly above the other countries, while New Zealand has historically averaged below. The coefficient of variation (CV) is the standard deviation divided by the average price, which makes for a better comparison across the different prices. The CV clearly shows increased volatility for the US, EU, and NZ since 2007, but it shows lower volatility for Canada. In the 2001-2006 time period, the CV was lowest for the EU, followed by the US, then New Zealand, and lastly Canada. Since 2007, US and EU volatility has been similar despite quota restrictions on production in the EU.

| YoY Absolute % Change, Farm Gate Milk Price | | | | |
|---|---|---|---|---|
| | US | EU | CA | NZ |
| 2002 | 19% | 4% | 3% | 16% |
| 2003 | 15% | 17% | 15% | 32% |
| 2004 | 30% | 8% | 10% | 20% |
| 2005 | 10% | 5% | 14% | 11% |
| 2006 | 15% | 6% | 12% | 10% |
| 2007 | 49% | 26% | 9% | 56% |
| 2008 | 17% | 33% | 12% | 51% |
| 2009 | 30% | 26% | 12% | 41% |
| 2010-YTD | 29% | 8% | 21% | 56% |

| Average | US | EU | CA | NZ |
|---|---|---|---|---|
| 02-06 | 18% | 8% | 11% | 18% |
| 07-10 | 31% | 23% | 13% | 51% |

Sources: USDA, LTO-Nederland, CDC, Informa Estimates

There is no universally applicable measurement for volatility. Since milk prices tend to change in a regular season pattern, instead of looking at their deviation from average, it may be more appropriate to look at how they compare to the same month in the previous year. The table above shows the average year over year absolute percentage change calculated from monthly prices. Calculating volatility this way still shows increased volatility in all countries, compared to the CV, which showed a decline in Canadian volatility.

Volatility has clearly increased in recent years, driven by lower buffer stocks, weather events that hurt production, strong growth in demand, and lower government support prices. The increase has been across all countries, even those with supply control programs.

## *Farmer Use of Risk Management Tools*

Historically, countries with supply control programs have not had futures markets, which limited the farmer and processor/end user ability to lock in mutually advantageous fixed prices. Farmers are not completely risk adverse; they prefer to shoulder some level of risk as a tradeoff for the possibility of higher profits.[33,34] Supply control programs typically reduce risk for dairy farmers, which makes them less likely to use futures and forward contracts. Since futures and forward contracts require two parties, the buyer and the seller, reduced farmer hedging means a less liquid market and reduces the ability of processors and end users to lock in fixed prices. Greater uncertainty about future prices creates added costs throughout the value chain. Processors and end users have to adjust menu and shelf prices more often, hold larger inventories to buffer against sudden price changes, and may run fewer price promotions.

Volatility in agricultural production and prices has existed for thousands of years. Aristotle described the use of derivative contracts to speculate on olive production around 350 BC.[32] In the mid-1850s standardized futures contracts for agricultural products began trading on the Chicago Board of Trade (CBOT), enabling buyers and sellers to agree on a price for delivery of a commodity at some point in the future. It was more than 100 years later before the US had a futures contract for a dairy product in the early 1990s. If there isn't much volatility in the price of a commodity, there is little need to hedge it.

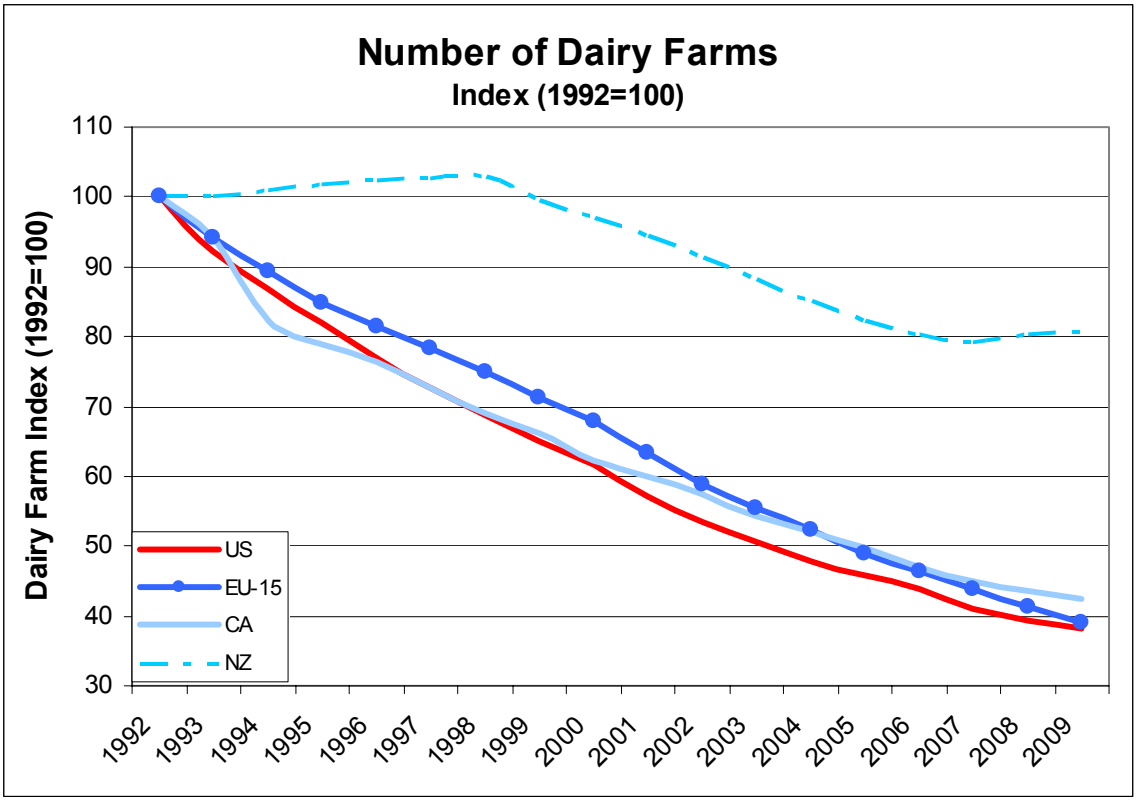
Increasing volatility in dairy prices in the late 1980s, as the government lowered support prices, drove the creation of a cheese futures contract at the Coffee, Sugar, and Cocoa Exchange (CSCE) in 1993. The future contract was used by both cheese buyers and by dairy farmers to reduce the volatility of the prices they were paying or receiving.[33] With increased volatility in milk and dairy prices over the last four years (2007-2010), futures and forward contracts have become even more important. Currently, the Chicago Mercantile Exchange (CME) offers futures contracts for a wide range of dairy products. The most liquid contract is the Class III milk futures, which represents the value of milk

used for cheese. With about 50% of US milk going into cheese, Class III typically offers good correlation to farm-gate milk prices and is used by farmers to hedge their price risk.

Futures and forward contracts require two parties, one to sell and the other to buy. Naturally, farmers need to sell their milk and they create sell side liquidity to the market. On the other side are buyers of dairy products: processors and end users. By agreeing on a fixed price for delivery of the commodity at some point in the future, both sides of the transaction lower the volatility in the prices they pay or receive. They are both able to make efficient longer-term investment and production decisions by knowing the prices they will face in the future.

## *Number, Size, and Growth of Dairy Farms*

### Number of Dairy Farms



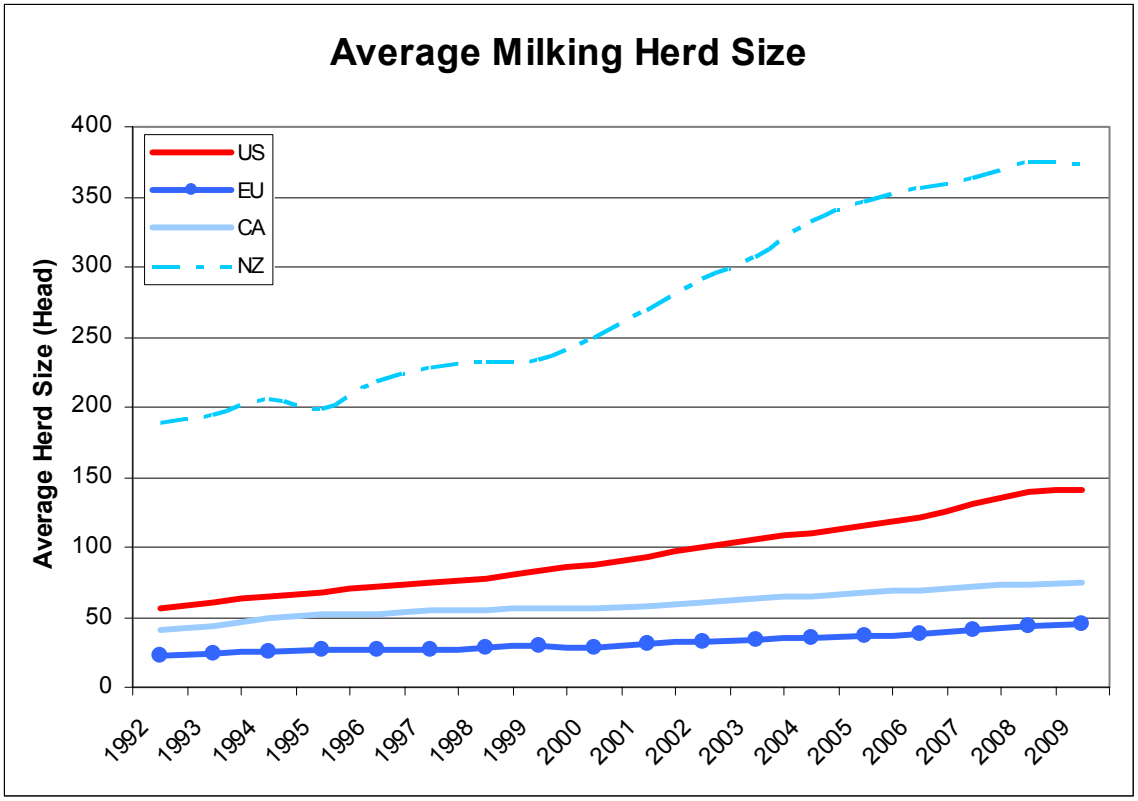

Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

| Number of Dairy Farms | | | | |
|---|---|---|---|---|
| | US | EU-15 | CA | NZ |
| 1992 | 170,500 | 1,018,077 | 31,200 | 14,458 |
| 2000 | 105,055 | 690,140 | 19,411 | 14,025 |
| 2009 | 65,000 | 397,435 | 13,214 | 11,638 |
| 1992-2009 | -62% | -61% | -58% | -20% |

Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

Supply control systems have done little or nothing to slow the secular decline in the number of dairy farms in the countries examined. In fact, the percentage declines in the US, EU-15, and Canada have been nearly identical from 1992 to 2009. New Zealand, the country with the least government intervention, has experienced the smallest declines. The trend in agriculture in developed countries has been toward greater concentration and specialization in the production of one or two specific commodities on each farm. This allows the farmer to invest in land, equipment, and knowledge that is well suited to the production of that commodity, lowering the cost of production and increasing efficiency. Dairy exemplifies the pattern, with fewer farms producing more milk at a lower cost over time. Even in Canada, where the average dairy farmer is nearly guaranteed a profit, the number of farms has more than halved (-58%) since 1992. The slower decline in New Zealand can be attributed to relatively higher returns for dairy farms compared to sheep and beef, which has resulted in farms to be converted to dairy.

## Size of Dairy Farms



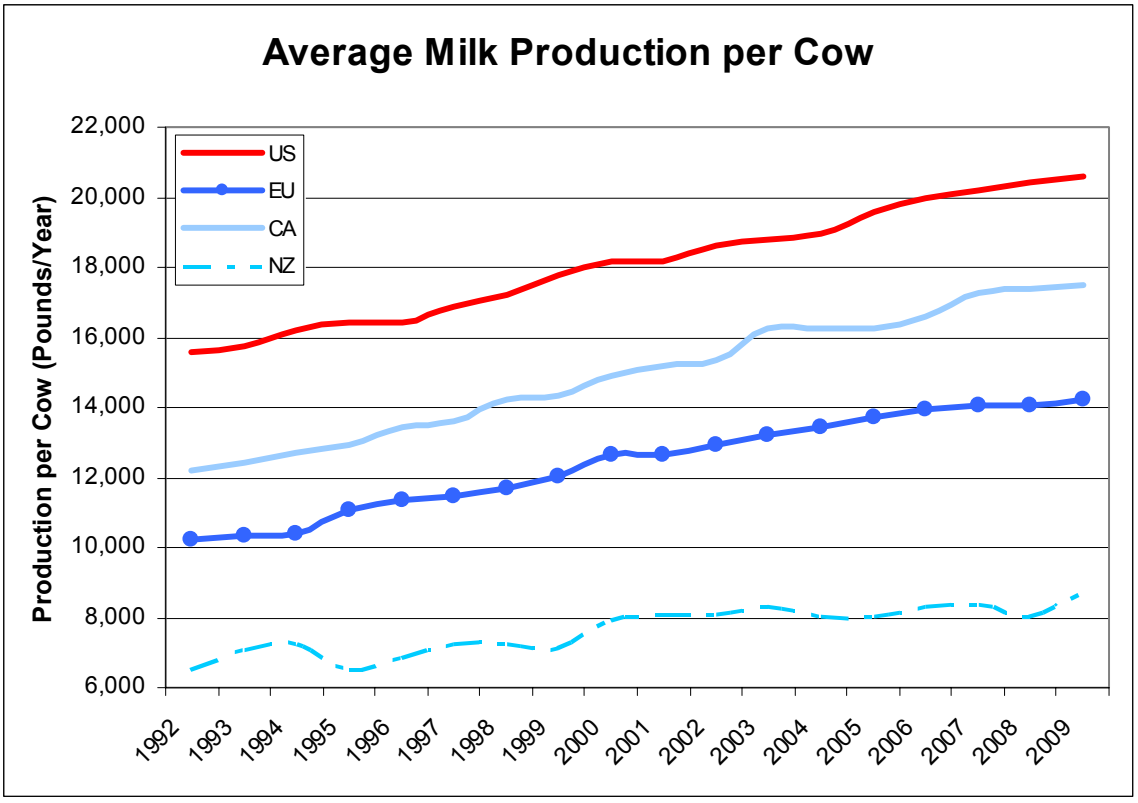

Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

| Average Milking Cows per Farm | | | | |
|---|---|---|---|---|
| | US | EU-15 | CA | NZ |
| 1992 | 57 | 23 | 40 | 188 |
| 2000 | 88 | 29 | 57 | 250 |
| 2009 | 142 | 45 | 74 | 374 |
| 1992-2009 | 149% | 95% | 83% | 98% |

Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

The average size of dairy farms is getting larger in all countries examined. Increased specialization lets each farmer manage a greater number of cows. While average farm sizes have increased the least in Canada and the EU-15, they have still nearly doubled since 1992. There are significant fixed costs on a dairy farm. Namely, land and housing for the cows and heifers, the milking parlor, milking equipment, insurance, and taxes. It makes economic sense, in most circumstances, for the farmer to try to spread those fixed costs over as many cows as possible to average down his total cost. It's not unusual for farms in the US to be stocked at 110% of planned capacity, and trends in New Zealand are toward more cows per acre.

## Production per Cow




Sources: Eurostat, USDA, CDC, MAF, Informa Estimates

| Average Production per Cow | | | | |
|---|---|---|---|---|
| | US | EU-15 | CA | NZ |
| 1992 | 15,574 | 10,215 | 12,200 | 6,518 |
| 2000 | 18,196 | 12,639 | 14,907 | 7,912 |
| 2009 | 20,577 | 14,212 | 17,498 | 8,692 |
| 1992-2009 | 32% | 39% | 43% | 33% |

Sources: Eurostat, USDA, CDC, MAF, Informa Estimates

Production per cow has been trending higher in all of the examined countries. The productivity of cows is driven by a number of factors. The largest two influences on productivity are the type and nutrient content of the feed they consume, along with their breed. Cows in the US primarily consume a nutrient dense ration of corn and high quality forages, resulting in the highest average productivity of the countries examined. Cows in New Zealand primarily graze on pasture, which is less nutrient dense than the concentrated feeds used in the US. The result is significantly lower production per cow in New Zealand. The second influence across countries is the breed of cows. The US herd is primarily Holstein, which is a more productive breed. For reference, the table below shows the production per cow broken down by breed in Canada during 2007.

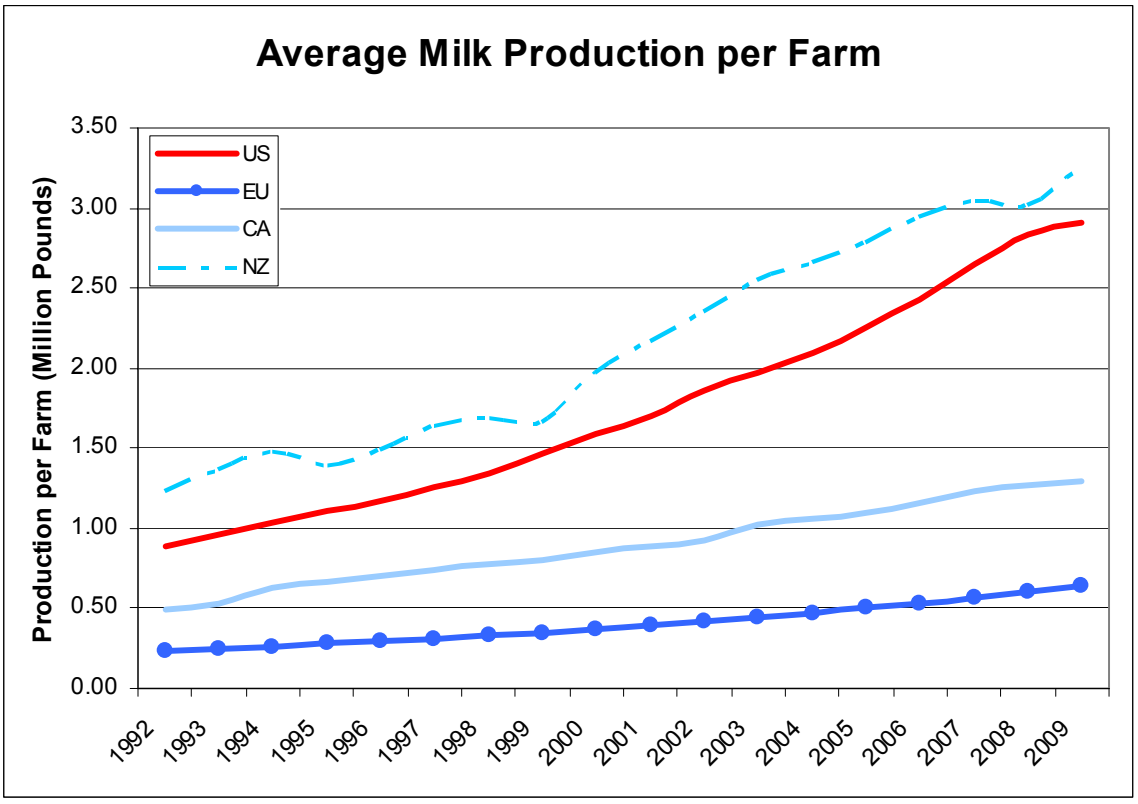
| Canadian Production per Cow by Breed, 2007 (lbs/yr) | |
|---|---|
| Holstein | 21,458 |
| Brown Swiss | 17,988 |
| Ayrshire | 16,363 |
| Guernsey | 14,711 |
| Milk Shorthorn | 14,458 |
| Jersey | 14,136 |
| Canadienne | 11,801 |

Source: CDC

While differences in productivity across countries in any particular year can mostly be explained by the type of ration and breed of cow, over time productivity has been increasing in all of the countries. Improvements in genetics, veterinary services, cow comfort, and efficiency in formulating and feeding rations all help to drive the long-run increases in production per cow. The increases have been relatively comparable across the four countries, though gains in the US and New Zealand have been the lowest. In New Zealand, the continued use of low input farming limits some of the gains that have been made from formulating and feeding of concentrated rations.

The presence of quota in Canada and the EU-15 does not appear to slow the growth in production per cow in the long-run. In the short-run farmers will adjust rations if they are over-running their current quota and are not able or willing to purchase additional quota.

## Milk Production per Farm




Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

| Milk Production per Farm (Mil Lbs/Yr) | | | | |
|---|---|---|---|---|
| | **US** | **EU-15** | **CA** | **NZ** |
| **1992** | 0.88 | 0.24 | 0.49 | 1.23 |
| **2000** | 1.59 | 0.36 | 0.85 | 1.98 |
| **2009** | 2.91 | 0.64 | 1.30 | 3.25 |
| **1992-2009** | 229% | 171% | 163% | 165% |
| **CAGR** | **7.3%** | **6.0%** | **5.9%** | **5.9%** |

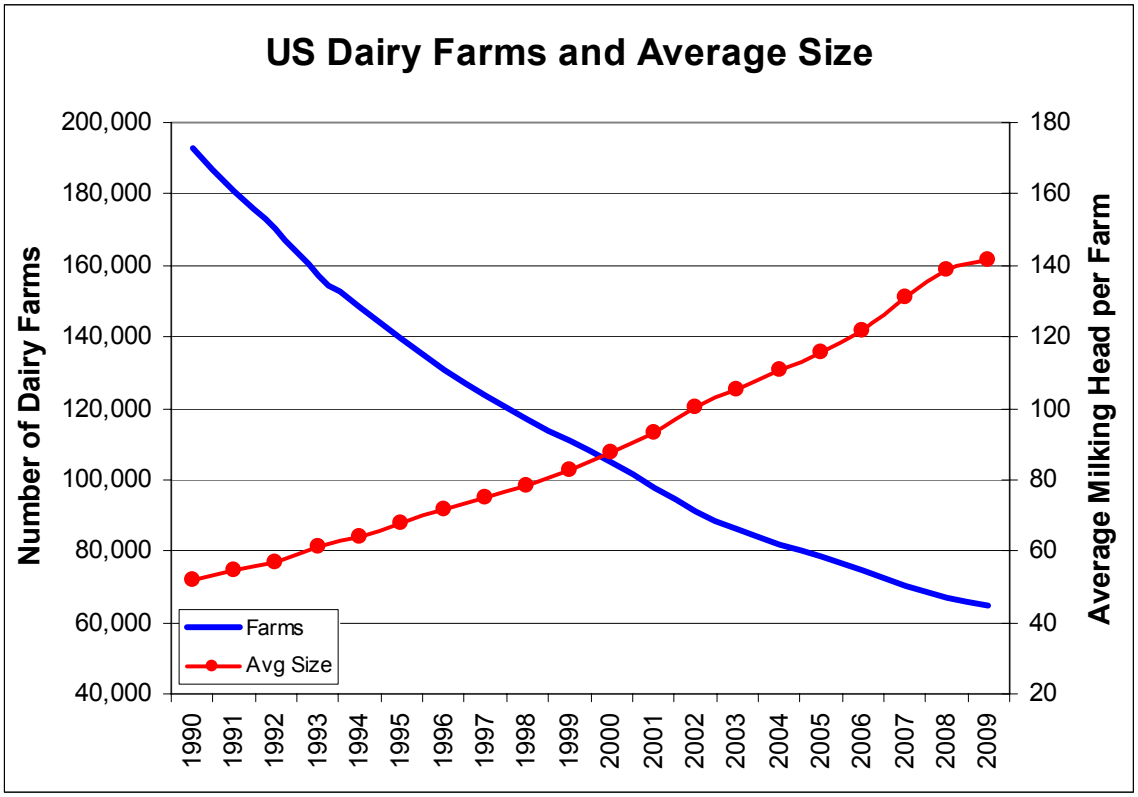
Sources: Eurostat, DG Agri, USDA, CDC, MAF, Informa Estimates

With dairy farms adding more cows and those cows each producing more milk every year, the average increases in milk production per farm are between 5.9% and 7.3% in the countries examined. Given the vastly different production systems, government and private efforts to slow milk production growth, and quota restrictions, the steady and consistent increases in milk production per farm line up remarkably well across countries. Even with total milk production growth in the EU-15 at 0.3% per year, and production in Canada at 0.6% per year, at the farm level production is increasing by 6% per year.

The steadily increasing output at the farm level even in countries where national production is nearly stagnant has important policy implications. If the goal is metered or no growth at the national level, farmers still need to have significant leeway in adjusting

their production levels. The long-run trend in all countries is toward fewer farms. The remaining farmers need to be able to grow enough to make up for the other farms exiting, as well as any growth in overall demand for milk. When milk quotas were first imposed in the EU, they were tied to land. In order for a dairy farmer to buy more quota to increase his production, he or she essentially had to buy another dairy farmer's land along with the rights to his quota. This was exorbitantly expensive and farmers found ways around it. Eventually the direct connection between land and quota was severed and farmers were free to buy and sell quota directly.

## United States

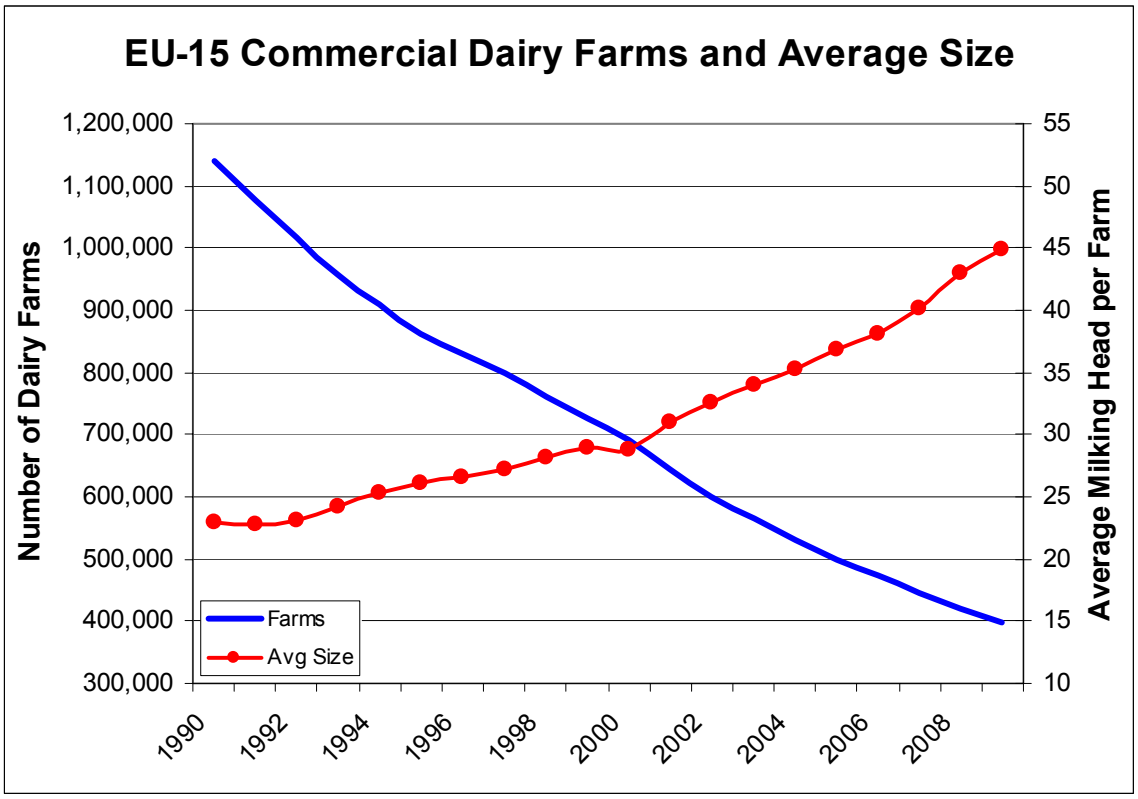



Sources: USDA, Informa Estimates

The decline in the number of dairy farms has been relatively steady in the US since 1990. On average, the number of dairy farms declines by 5.5% each year. In recent years that has translated to an annual decline of about 3,350 farms each year. While the pace of declines varies somewhat with profitability year to year, there is an unmistakable secular trend toward fewer dairy farms, which is evident in all of the countries examined. The average size of farms in the US has increased at a faster pace than in the other countries. Milk production in New Zealand is based on pasture. While the average cows per farm has increased, and the stocking rate per acre has increased as well, the low use of supplementary feed is slowing farm growth slightly compared to the US. The cost of quota and fewer economic pressures in the EU-15 and Canada have kept their average

farm size from growing as much as the US or New Zealand, though they have still nearly doubled since 1992.

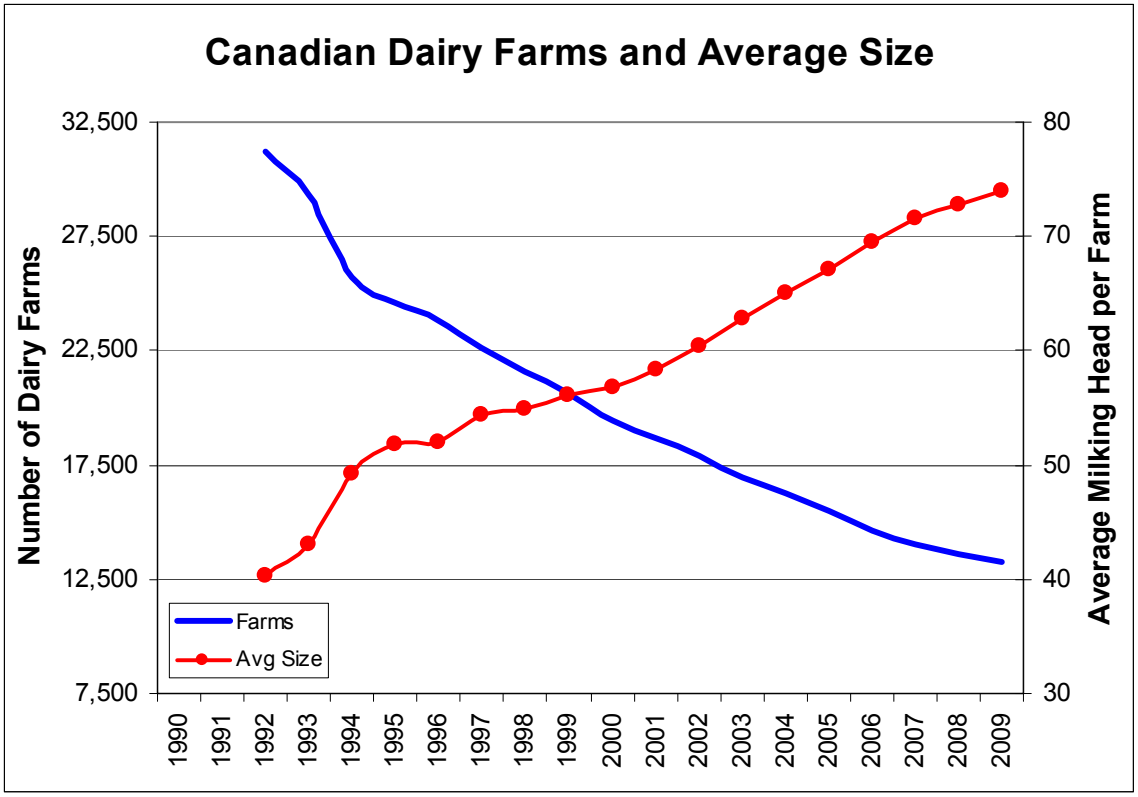
## EU-15




Sources: Eurostat, DG Agri, Informa Estimates

The number of commercial and non-commercial dairy farms in the EU-15 is declining. Dairy farms which hold quota are considered commercial, while the non-commercial farms only produce milk for on-farm consumption. In 2005 there was a total of 519,780 farms with dairy cows in the EU-15, with 498,885 delivering milk against quota holdings. The graph above shows only commercial farms which made up approximately 96% of all farms with dairy cows in 2005. On average, EU-15 farms are smaller than in the other comparison countries, though they are steadily trending larger. Tradition, lack of investment, government subsidy payments decoupled from production, and the cost of buying quota have all helped to keep the farm size relatively small.

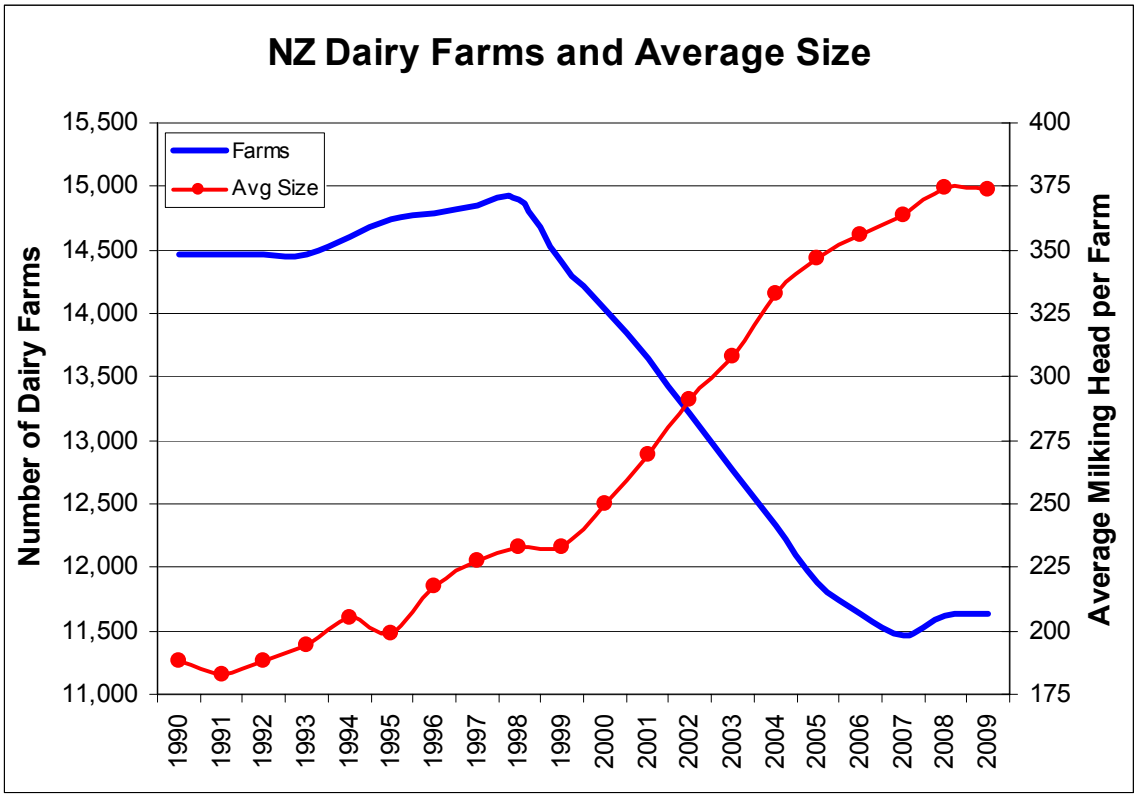
## Canada




Sources: CDC, Informa Estimates

After a sharp drop in the number of Canadian dairy farms in the early 1990s, the decline has steadied. Even with milk prices set based on the cost production, the number of farms has dropped by 58% since 1992. The remaining farms are getting larger, increasing from an average of 43 cows in 1992 to 74 cows in 2009.

## New Zealand




Sources: MAF, Informa Estimates

While there was an up-tick in the number of dairy farms in New Zealand in the mid-1990s, and again in the late 2000s, the long-term trend is toward fewer but larger farms. Without direct government intervention in the market, the number of farms does show a higher level of correlation with market conditions. The farm-gate milk price was generally rising in the mid-1990s, and again in the late 2000s, except for the 08/09 season which is reflected by a steady number of farms that season.

## *Dairy Farm "Multiplier Effect" on Local Economies*

US dairy farmers produced nearly 190 billion pounds of milk in 2009 valued roughly at $24.3 billion, which was significantly lower than in 2008 due to lower milk prices. Production in 2010 is on track to exceed 192.5 billion pounds with a value of over $30 billion, but the influence on the US economy goes beyond just the value of milk produced. Implement purchases, veterinarian expenses, construction, seed, fertilizer, equipment and the biggest expense of most dairy farms – feed, also impact local economies. These are just factors on the milk production side. What happens to the milk after it leaves the farm also needs to be accounted for. Transportation of the milk and end

products, processing and marketing must be taken into account when talking about the benefits of having a vibrant, healthy and growing dairy industry in the US.

Many studies have been done on the impact of dairy farms on local economies with a wide range of results. One common theme in all of them is the multiplier effect of the dairy industry. Dairy farming is a capital intensive industry with many direct, indirect and induced effects. Dairy farms and milk processors directly affect the economy by employing farmers, milkers, truck drivers and workers at processing plants, the dairy industry also indirectly affects local economies through the purchases of inputs and services required to keep the industry operating. Thirdly and finally there is an induced economic impact on the economy. The spending of salaries and wages of workers employed in the dairy industry helps support the economy. An example of this would be restaurants, retailers, and services provided to the workers.

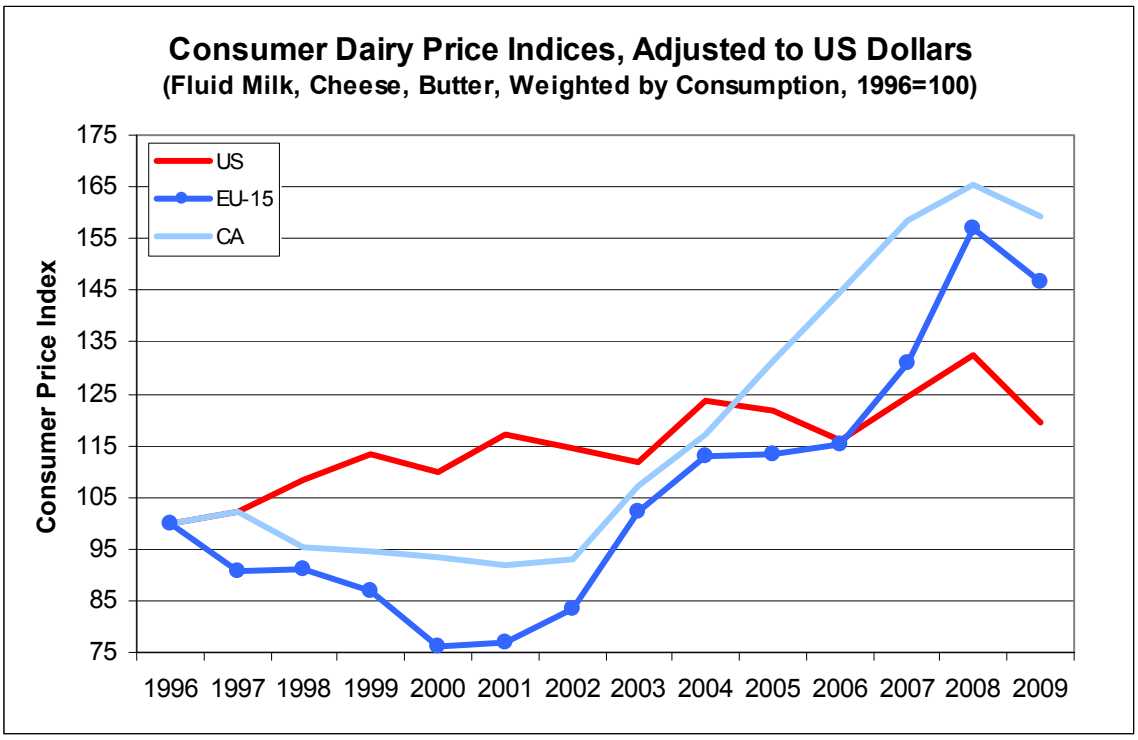
With multiple studies done on this topic, it has been estimated that each cow adds roughly $13,500 of economic activity to the region. Study results do vary with some of the lower findings adding $6,000 to $8,000, while high end estimates are more than double the $13,500 where there are larger farms that purchase more inputs and employ more people. On an employment basis, studies have found that for every 8 cows one full time job is created throughout the economy, with high and low calculations ranging from 4 to 20 cows per job. As revenue, wages and taxes "ripple" through the economy so do jobs. Most studies find the local dairy industry has a job multiplier effect of around 2, or for every job added directly to the dairy industry another supportive indirect job or induced job is created. Below is a table with results from various studies on the economic impact of the dairy industry.

**Estimated Economic Impact per Cow**

| | Annual Economic Activity per Cow | Cows to Create 1 Job |
|---|---|---|
| CA ('08) [35] | $34,165 | 4 |
| WI ('99) [36] | $13,526 | 8 |
| WA ('07) [37] | $6,180 | 19 |
| MO ('07) [38] | $8,533 | |
| GA ('05) [39] | $7,530 | 12 |
| MN ('99) [40] | $11,671 | 10 |

# II. Impact of Supply Control on the Consumer

## *Consumer Prices*




Sources: Eurostat, Statistics Canada, CDC, BLS, ERS, Informa Estimates

| Dairy Consumer Price Index | | | |
|---|---|---|---|
| | **US** | **EU-15** | **Canada** |
| **1996** | 100 | 100 | 100 |
| **2003** | 112 | 102 | 107 |
| **2009** | 119 | 147 | 159 |
| **1996-2009** | 19% | 47% | 59% |
| **CAGR** | 1.4% | 3.0% | 3.6% |

Sources: Eurostat, Statistics Canada, CDC, BLS, ERS, Informa Estimates

US consumer prices for dairy products have been consistently trending higher since our base year of 1996, but there was a trend toward lower consumer prices in the EU and Canada in the late 1990s. Part of the downtrend was due to currency exchange rates, but there was also a general decline in farm-gate milk prices in the EU over that period, and there was a surge in casein/caseinate/MPC imports into Canada that lowered the price of processed cheese. Since 2001, consumer prices in the EU and Canada have moved sharply higher, eclipsing the steady increases in the US. Given the strict supply management program in Canada, it's not surprising that consumer prices have increased

59% between 1996 and 2009. The EU, also with a quota system has experienced a 47% increase in consumer prices, while US prices are only up 19%.

| Consumer Prices, Average 2008 & 2009 | | | |
|---|---|---|---|
| | Fluid Milk<br>USD/gallon | Cheddar Cheese<br>USD/lb. | Butter<br>USD/lb. |
| US | $3.65 | $4.70 | $2.99 |
| Canada | $4.37 | $6.33 | $3.97 |
| Difference | $0.72<br>20% | $1.63<br>35% | $0.98<br>33% |

Sources: CDC, BLS

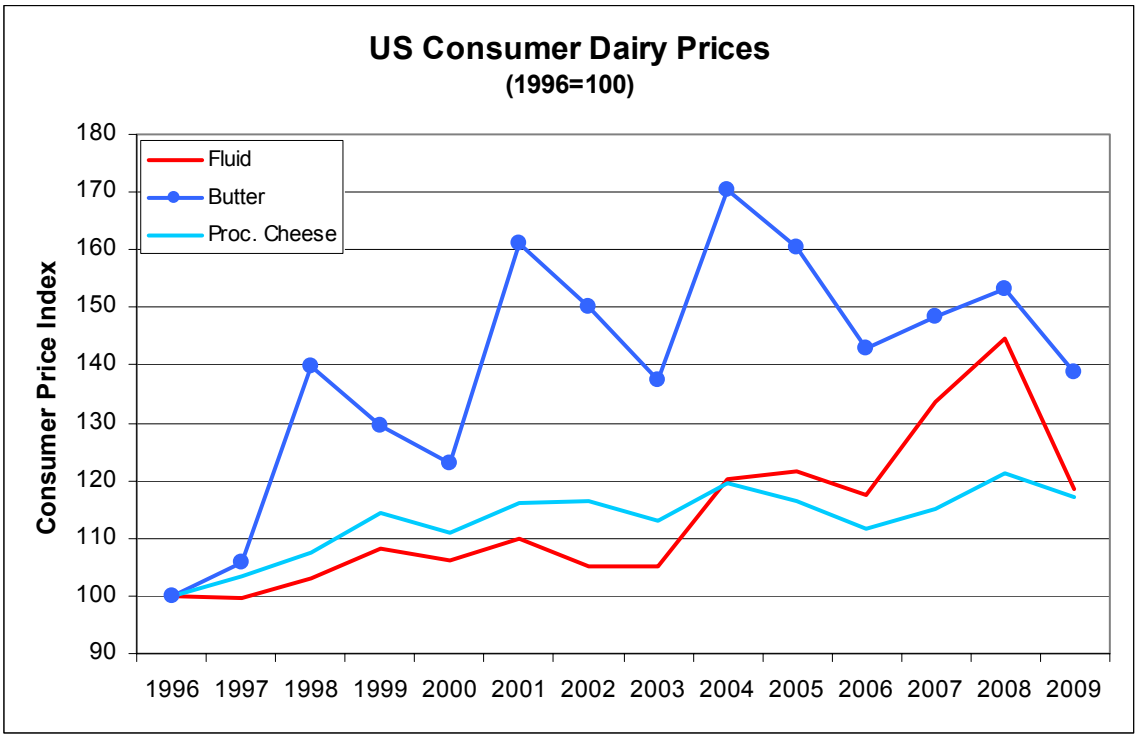
Looking at the actual price level of specific dairy products in the US and Canada shows that Canadian prices are 20-35% higher than in the US. While a $1 difference in prices may not seem significant per gallon or per pound, the average consumer in both countries is drinking more than 20 gallons of milk per year, and eating more than 7 pounds of Cheddar.

| Consumer Price X Per Capita Consumption | | | | |
|---|---|---|---|---|
| | Fluid Milk | Cheddar Cheese | Butter | Total |
| US | $86.88 | $48.00 | $14.59 | $149.46 |
| Canada | $94.13 | $45.98 | $24.18 | $164.29 |
| Difference | $7.25<br>8.3% | -$2.02<br>-4.2% | $9.60<br>65.8% | $14.83<br>9.9% |

Sources: CDC, BLS, ERS

The consumer price was multiplied by per capita consumption for three main dairy products to find the average expenditure per person in the US and Canada. Canadian per capita consumption of fluid milk and Cheddar is lower than the US, which helps to offset higher prices. The average Canadian is spending about 10% more on dairy products than the average American, and on a milk equivalent basis, they are consuming about 10% less dairy, based on the consumption of cheese, butter, and fluid milk. If consumption of all dairy products were included, the difference may very well be even larger. While the higher prices in Canada may not be a problem for those in the middle and upper income ranges, it has a greater impact on those in the lower income ranges who spend a larger percentage of their income on food.

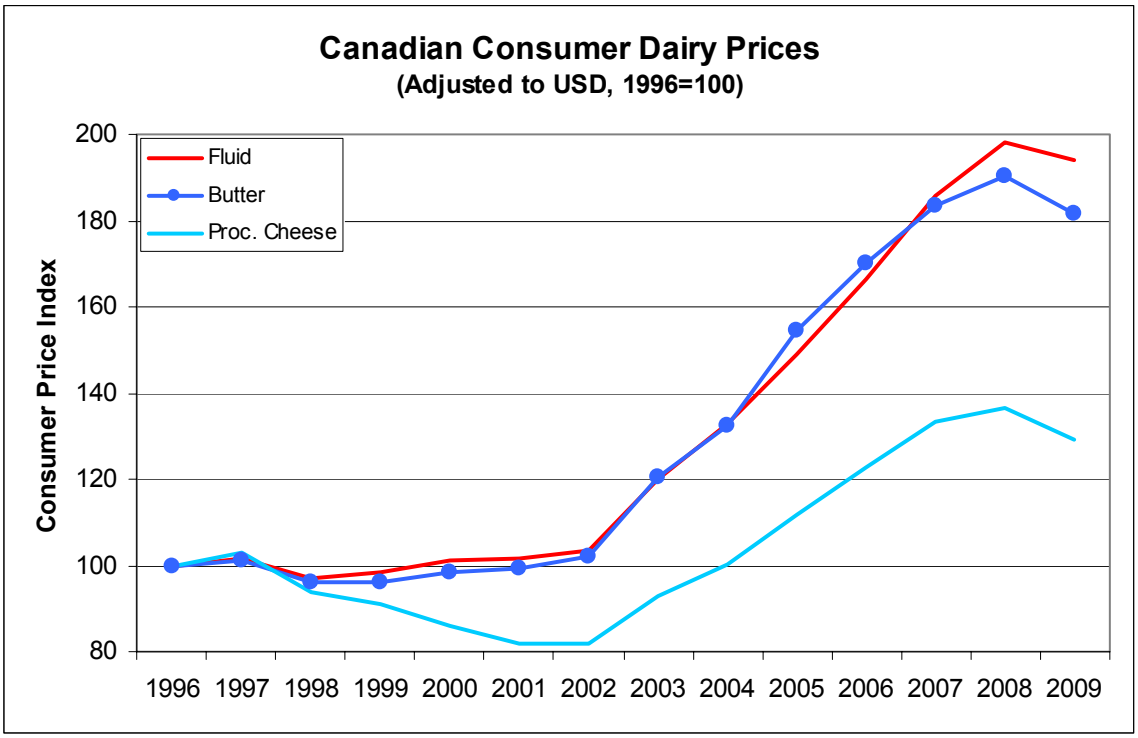
## United States




Source: BLS

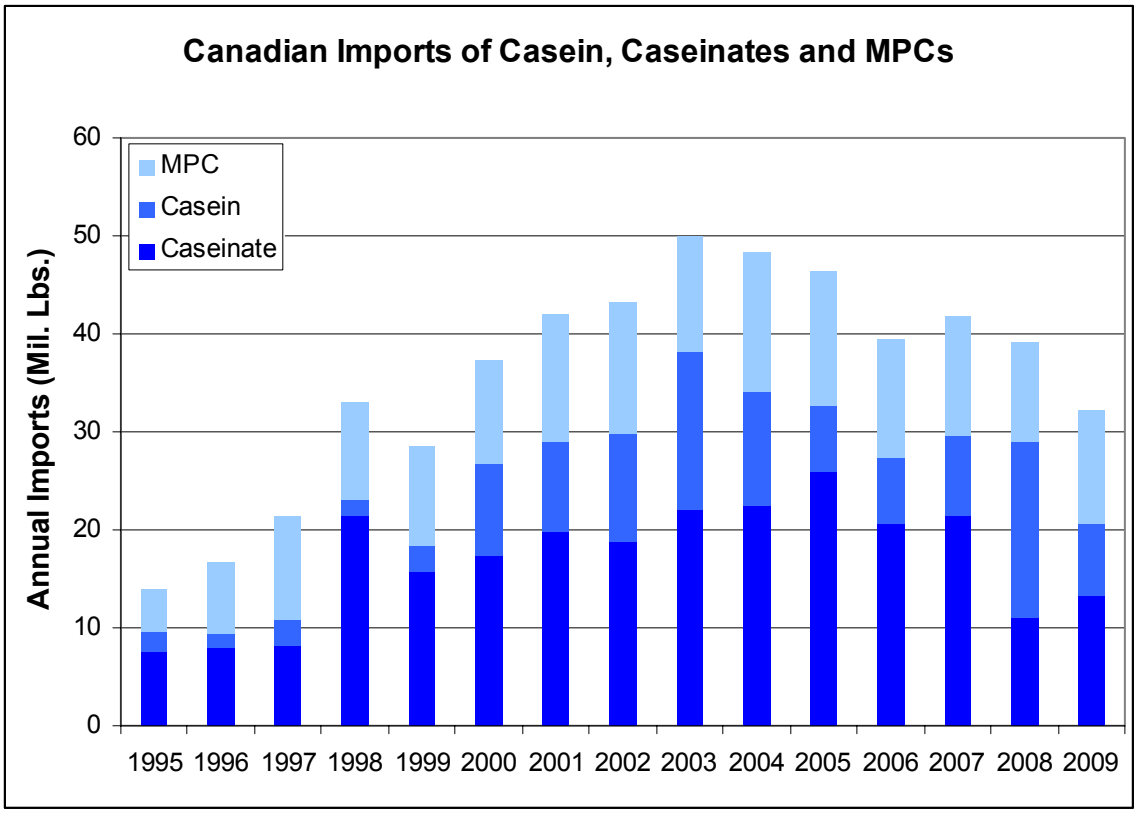
US retail prices have been trending higher over time, but at a relatively slow pace. The retail butter price appears more volatile than the other dairy products, and it has risen the most from the base year of 1996. Since 2006, the US consumer dairy price index has been below the EU's and Canada's.

## Canada




Source: Statistics Canada, CDC

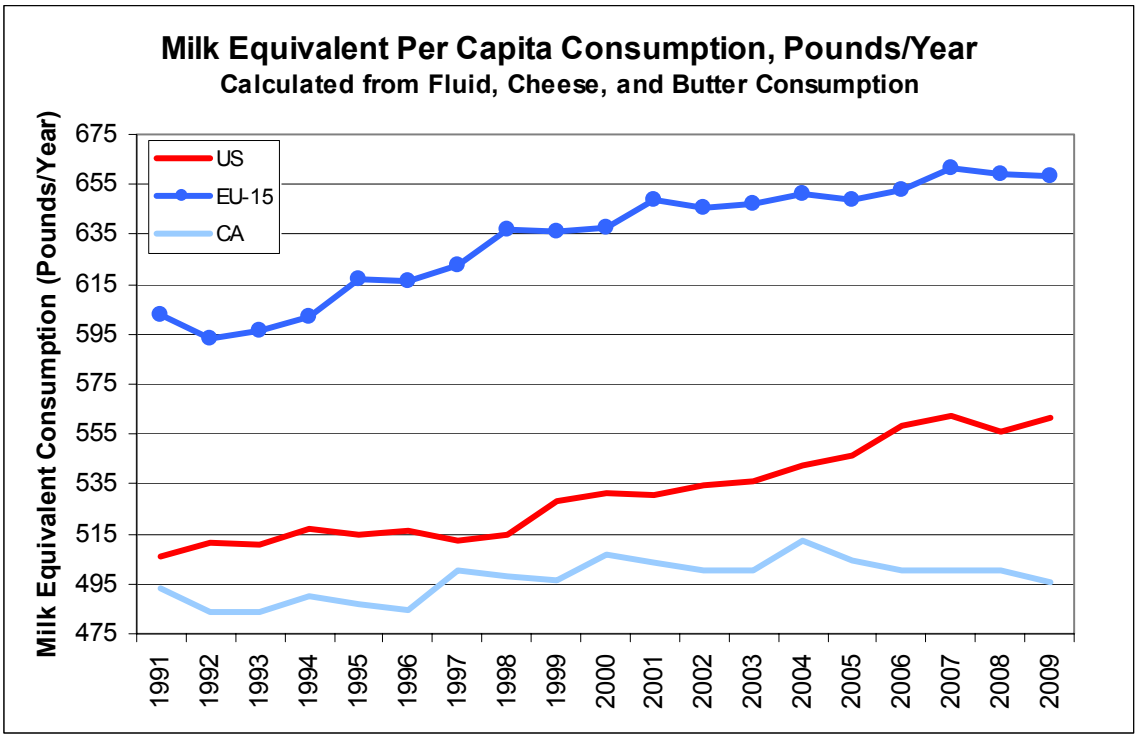
Canadian consumer prices have been trending higher over time, but the pace has quickened since 2002. Consumer prices for processed cheese actually declined in the late 1990s and early 2000s. There was a 300% surge in casein, caseinate, and milk protein concentrate (MPC) imports over that timeframe. "Whereas milk, cheese and other traditional dairy products face prohibitive import barriers, some ingredients that replace milk in dairy products, such as casein (the main protein in milk), butteroil–sugar blends and some milk protein concentrates, are not subject to import tariffs in Canada."[31]




Source: GTIS

We believe the increased use of casein, caseinates, and MPC helped to lower consumer processed cheese prices in the late 1990s. The other major dairy products, fluid milk and butter both trended dramatically higher in the early 2000s and have achieved roughly the same percentage increases since 1996.

## *Per-capita Dairy Consumption*



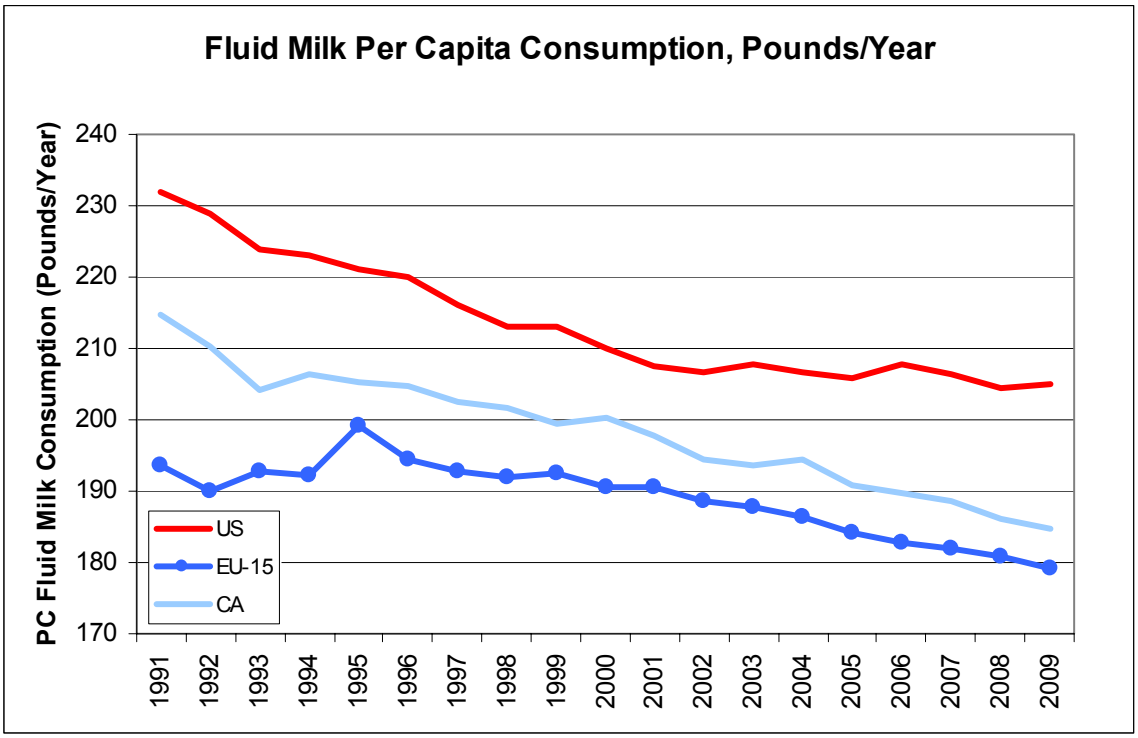

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

| ME Per Capita Consumption (lbs) | | | |
|---|---|---|---|
| | US | EU-15 | Canada |
| **1991** | 506 | 603 | 493 |
| **2000** | 532 | 638 | 507 |
| **2009** | 561 | 659 | 496 |
| **1991-2009** | 11% | 9% | 1% |

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

Per capita consumption of dairy has increased in all three countries, but US consumption growth has outpaced the EU-15 and Canada. Europeans have traditionally been large dairy consumers, and they consume more fluid milk, cheese, and butter per capita than Canadians or Americans. Canadian consumption has been stagnant since 2000, and is only up 1% since 1991 compared to the EU-15 which is up 9% and the US which is up 11%. Prices are higher in the EU-15 and Canada than in the US, which limits consumption and consumption growth in the EU-15 and Canada.

## Fluid Milk



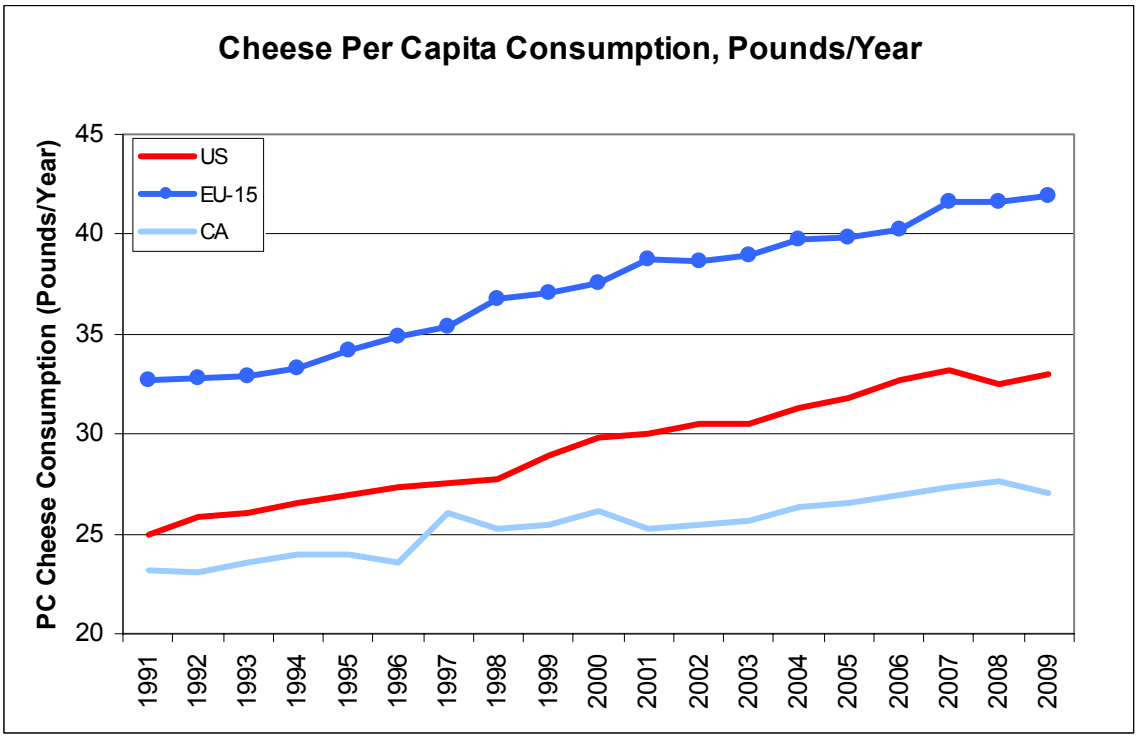

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

| Fluid Milk Per Capita Cons. (lbs) | | | |
|---|---|---|---|
| | US | EU-15 | Canada |
| **1991** | 232 | 194 | 215 |
| **2000** | 210 | 190 | 200 |
| **2009** | 205 | 179 | 185 |
| **1991-2009** | -12% | -7% | -14% |

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

Per capita fluid milk consumption has been trending down across the board, but the declines in the US have slowed in recent years. Increased consumption of other beverages (soda, bottled water, sports and energy drinks), along with fewer meals eaten at home and a generally aging population, have resulted in falling fluid milk consumption. Canada has experienced the fastest decline, followed by the US.

## Cheese



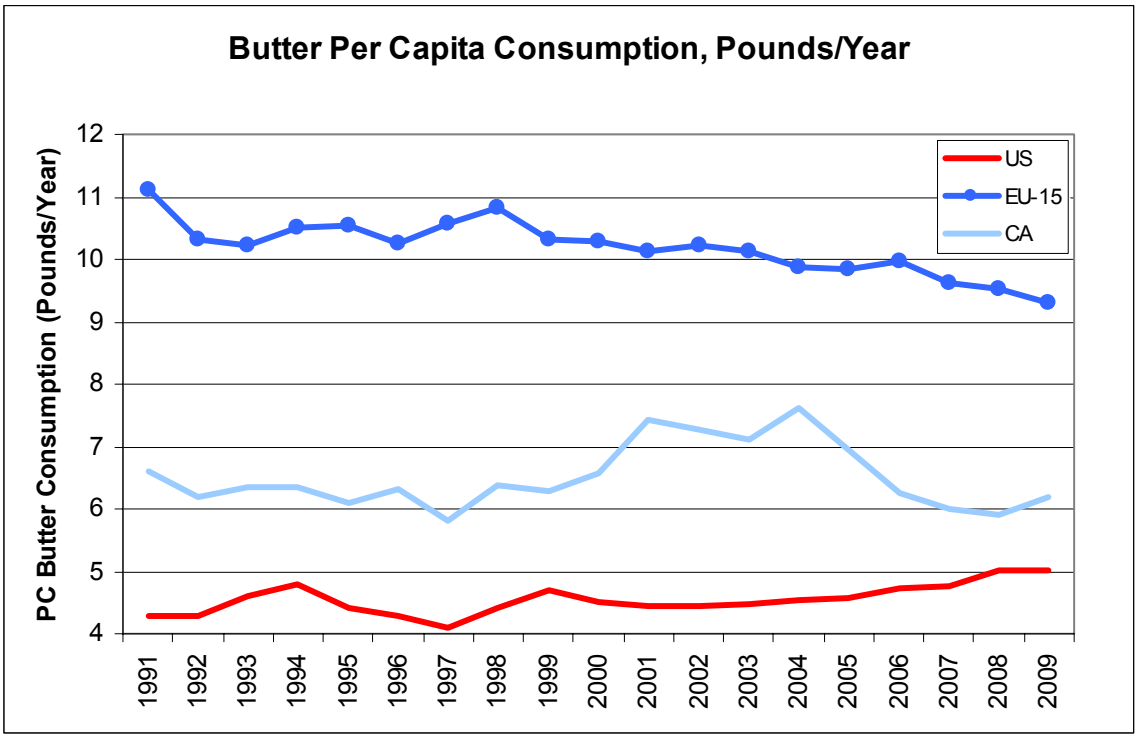

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

| Cheese Per Capita Cons. (lbs) | | | |
|---|---|---|---|
| | US | EU-15 | Canada |
| **1991** | 24.9 | 32.7 | 23.2 |
| **2000** | 29.8 | 37.5 | 26.1 |
| **2009** | 33.0 | 41.9 | 27.1 |
| **1991-2009** | 32% | 28% | 17% |

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

In contrast to fluid milk, per capita consumption of cheese is trending higher. Consumption growth for Cheddar in both the US and Canada is slowing and the strongest growth has been in specialty and mozzarella cheese. Consumption growth has been fastest in the US, followed by the EU-15, and slowest in Canada.

## Butter




Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

| Butter Per Capita Cons. (lbs) | | | |
|---|---|---|---|
| | US | EU-15 | Canada |
| **1991** | 4.3 | 11.1 | 6.6 |
| **2000** | 4.5 | 10.3 | 6.6 |
| **2009** | 5.0 | 9.3 | 6.2 |
| **1991-2009** | 17% | -16% | -6% |

Sources: Eurostat, CDC, Statistics Canada, ERS, Informa Estimates

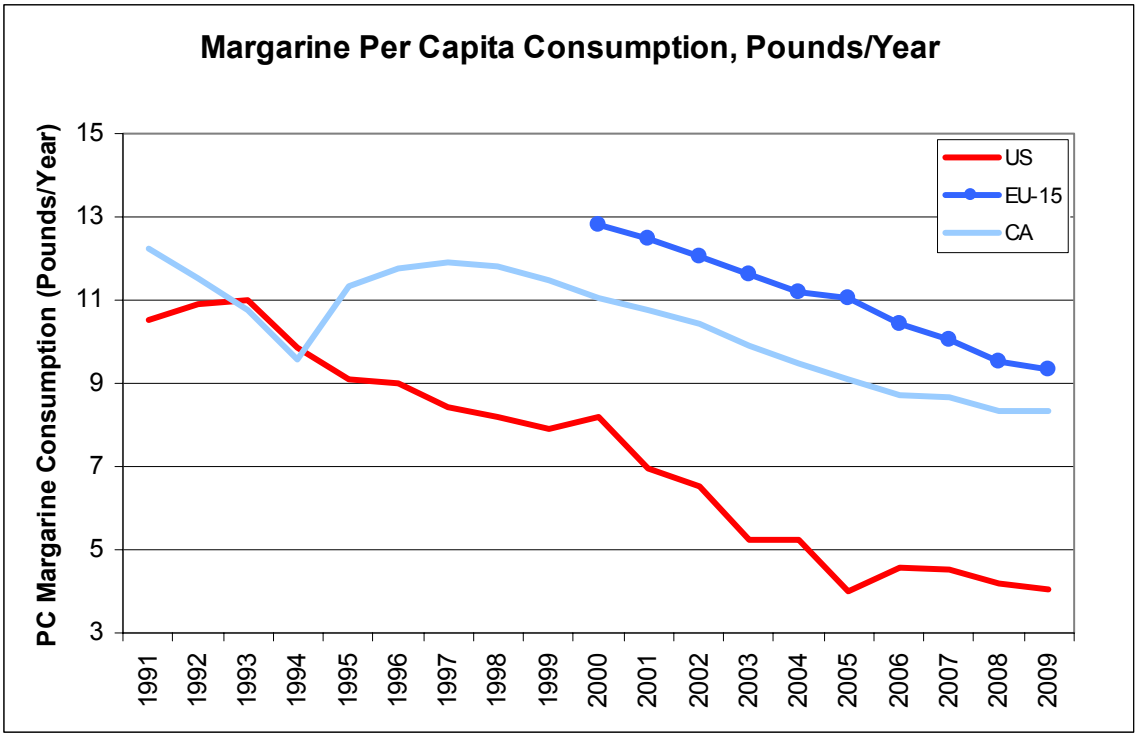
Consumption trends in butter aren't as clear cut as in fluid milk and cheese. EU-15 consumption is the only one that shows a clear trend, and it is down. The focus on low-fat diets in the 1980s and 1990s reduced butter consumption. A focus on more "natural" foods in recent years has helped to boost butter consumption in both the US and Canada. On a per capita basis, the EU-15 is by far the largest consumer, followed by Canada, and then the US. But between 1991 and 2009 per capita consumption increased 17% while it declined by 16% in the EU-15 and 6% in Canada.

## *Imitation and Substitute Products*

Substitutes are alternatives to dairy products while imitation products may be packed and marketed in such a way as to lead the unsuspecting consumer to believe that they are dairy products.[11] It's a fine distinction, and one that is based more on standards

of identity, packaging, and presentation than the chemical composition of the product. Most substitute products are made from soy protein and/or vegetable oils. These products are often engineered to look and taste as close to milk derived products as possible. There are fluid beverages made from soy, almond, and rice that often have "milk" in their name. Mellorine and margarine both use nonfat dairy solids mixed with vegetable oil. There are also soy based substitutes for cheese and sour cream. Vegetable protein and fat is cheaper than dairy protein and fat, so substitute and imitation products are usually cheaper to make and are priced cheaper at retail. While consumption statistics for these products are difficult to find, it is reasonable to assume that if the price of dairy products is high, there will be some consumers who will look for cheaper alternatives. Restricting the production of milk to raise milk prices will trickle through to the consumer, and likely increase the consumption of imitation and substitute products.

## Margarine Consumption



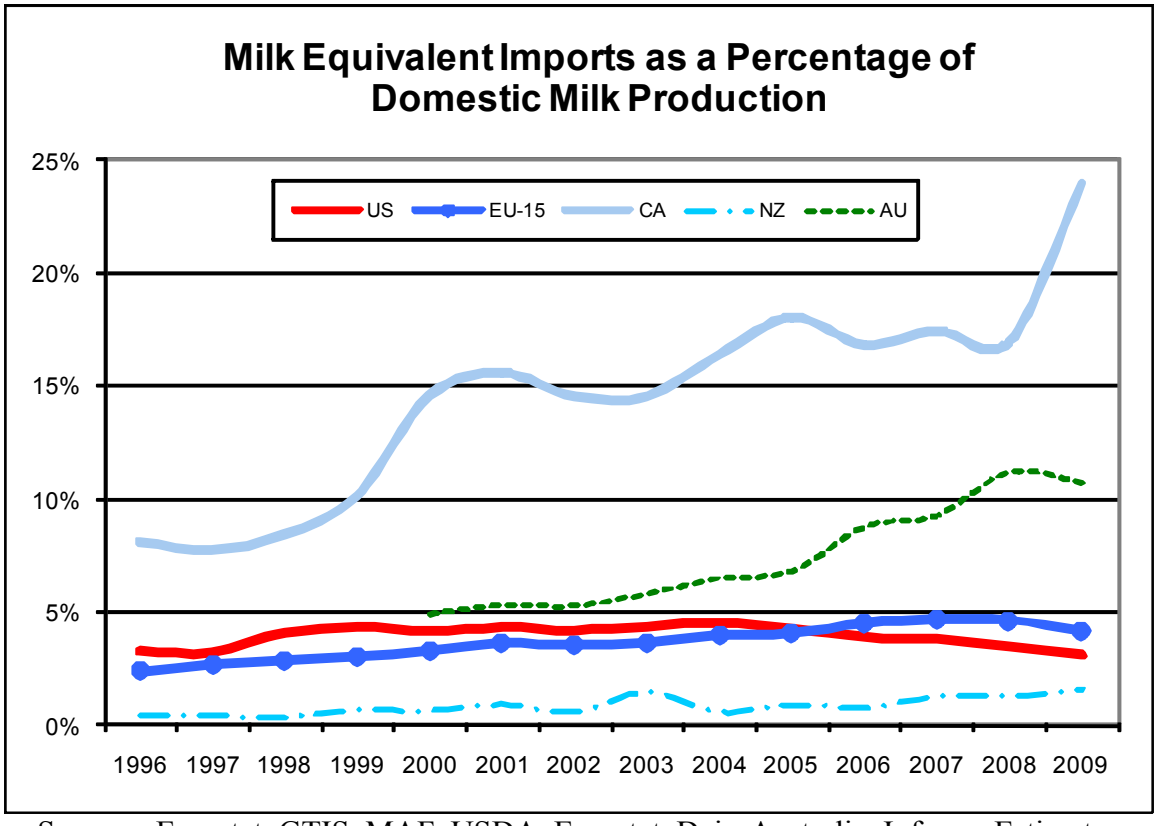

Sources: ERS, Statistics Canada, IMACE, Informa Estimates

| Margarine Per Capita Cons. (lbs) | | | |
|---|---|---|---|
| | US | EU-15 | Canada |
| 1991 | 10.5 | | 12.2 |
| 2000 | 8.2 | 12.8 | 11.1 |
| 2009 | 4.1 | 9.3 | 8.3 |
| 2000-2009 | -51% | -27% | -25% |

Sources: ERS, Statistics Canada, IMACE, Informa Estimates

The only product that we were able to find per capita consumption statistics for was margarine. Margarine consumption has been trending down in the US, EU-15, and Canada. Margarine was invented in France, and Europe has historically been a large consumer of it. Canadian consumption is relatively close to EU-15 levels, and both have been declining at about the same rate. US consumption has more than halved in the last 10 years, and is well below both Canada and the EU-15. While there are some historical reasons for the high consumption in the EU, relatively high dairy prices in the EU and Canada also play a role in the high levels of margarine consumption.

## III. Impact on International Trade

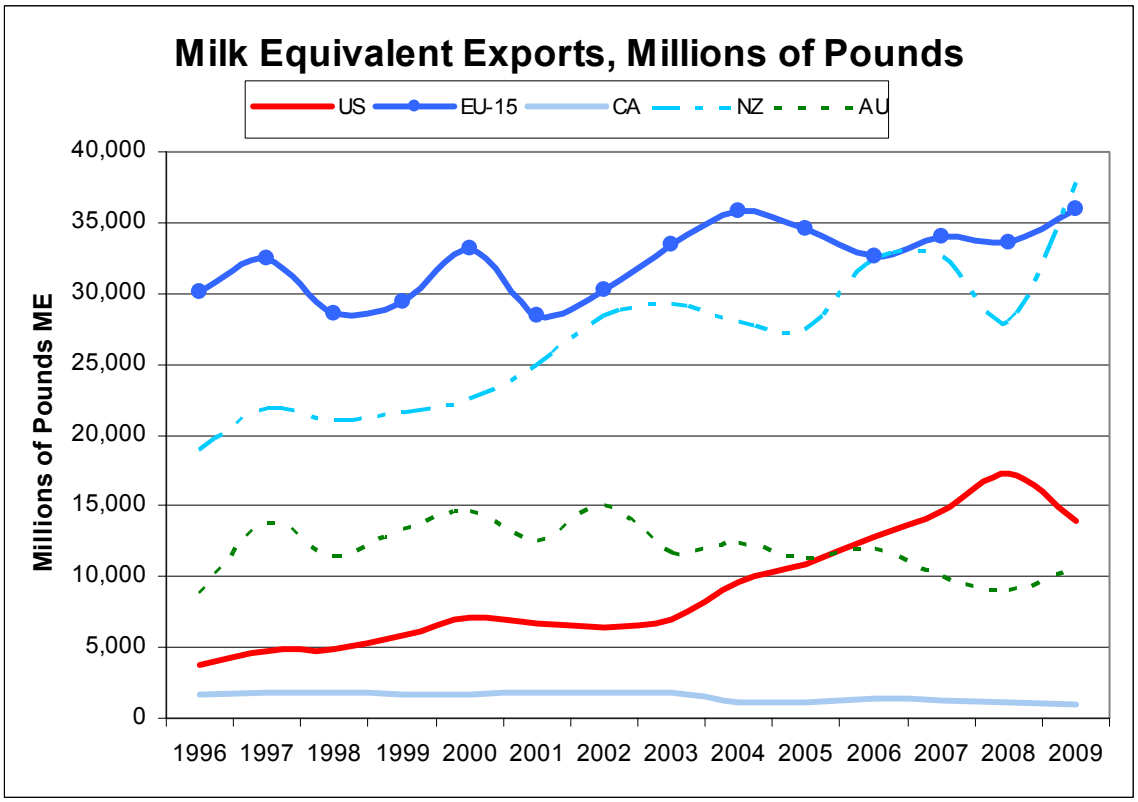



Sources: Eurostat, GTIS, MAF, USDA, Eurostat, DairyAustralia, Informa Estimates

| ME Imports as a Percentage of Production | | | | | |
|---|---|---|---|---|---|
| | US | EU-15 | CA | NZ | AU |
| 1996 | 3% | 2% | 8% | 0% | |
| 2002 | 4% | 3% | 15% | 1% | 5% |
| 2009 | 3% | 4% | 24% | 2% | 11% |

Sources: Eurostat, GTIS, MAF, USDA, Eurostat, DairyAustralia, Informa Estimates

Imports as a percentage of production has been relatively steady for the EU-15, New Zealand, and the US while it has been trending higher for Australia and Canada. Drought hit Australian milk production in 2007 and 2008, dropping production by 10% over those two years, and they have been importing more dairy products to make up for the shortfalls. But the steady increases in Canadian imports are primarily being driven by a domestic price that is well above international prices. In the Uruguay round of WTO negotiations, member nations committed to converting any quotas, which limit the physical amount of a product that can be imported, to tariffs, which are a tax on the imported product. If the original quota had kept prices in the country 200% higher than the world market, then the WTO allowed the country to put a 200% tariff in place, but they could not restrict the maximum amount of product coming into the country. While the high tariffs were initially adequate to keep imports into Canada steady, as the domestic price steadily increased, the spread between the domestic and world price kept widening to the point where it was profitable to import product, even with the tariff. Canada also has an import for re-export program where companies are allowed to bring in products at cheap prices, processes them, and export the resulting product. While this does account for some of the growth in imports, net exports as a percentage of milk production was still 18% in 2009.

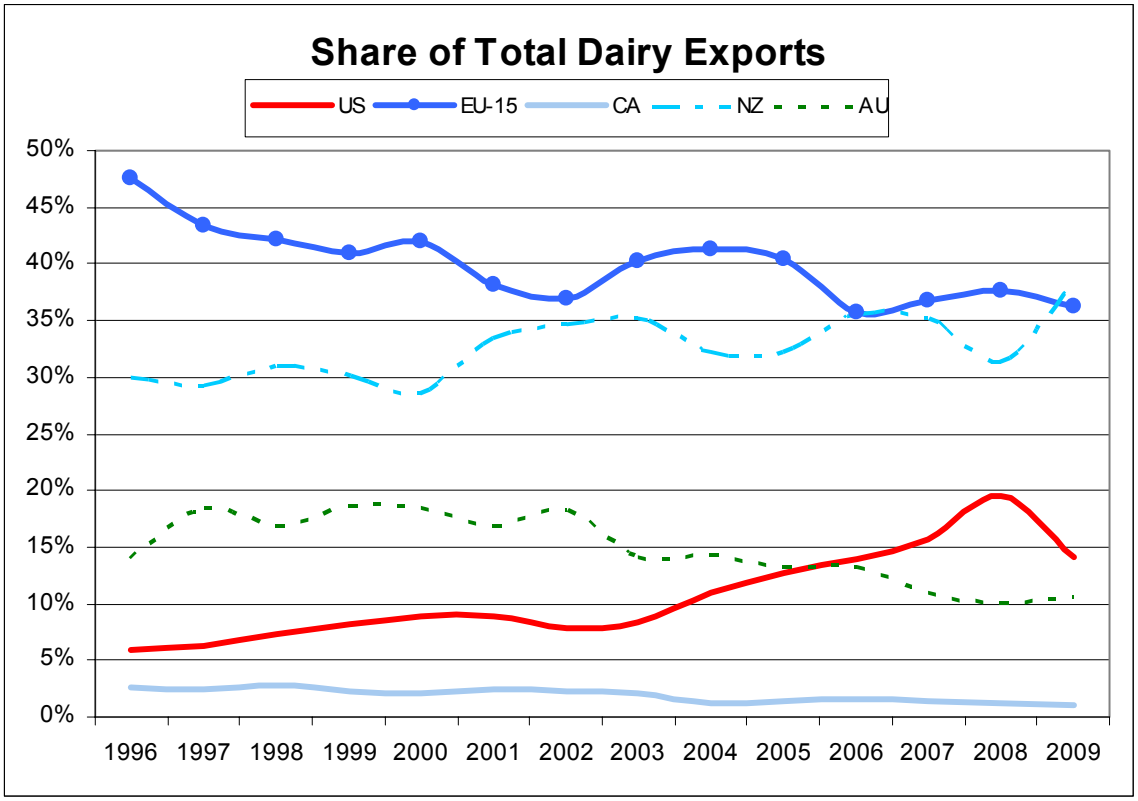



Sources: Eurostat, GTIS, Informa Calculations

| Milk Equivalent Exports, Mil. Lbs. | | | | | |
|---|---|---|---|---|---|
| | US | EU-15 | CA | NZ | AU |
| 1996 | 3,715 | 30,074 | 1,636 | 18,910 | 8,821 |
| 2002 | 6,410 | 30,209 | 1,793 | 28,398 | 15,000 |
| 2009 | 13,990 | 35,953 | 966 | 37,811 | 10,575 |
| 1996-2009 | 277% | 20% | -41% | 100% | 20% |

Sources: Eurostat, GTIS, Informa Calculations

Milk equivalent exports have increased from all of the examined countries except Canada. US exports are up an astounding 277% while New Zealand has doubled their exports since 1996. Milk production in the EU, limited by quota, has not been able to expand to take advantage of the growth in the world market. Canadian exports, which were never very large, have almost halved since 1996. A 2002 ruling by the WTO capped the value of subsidized exports from Canada. In essence, the wider the spread between domestic prices and world prices, the less volume they can export.



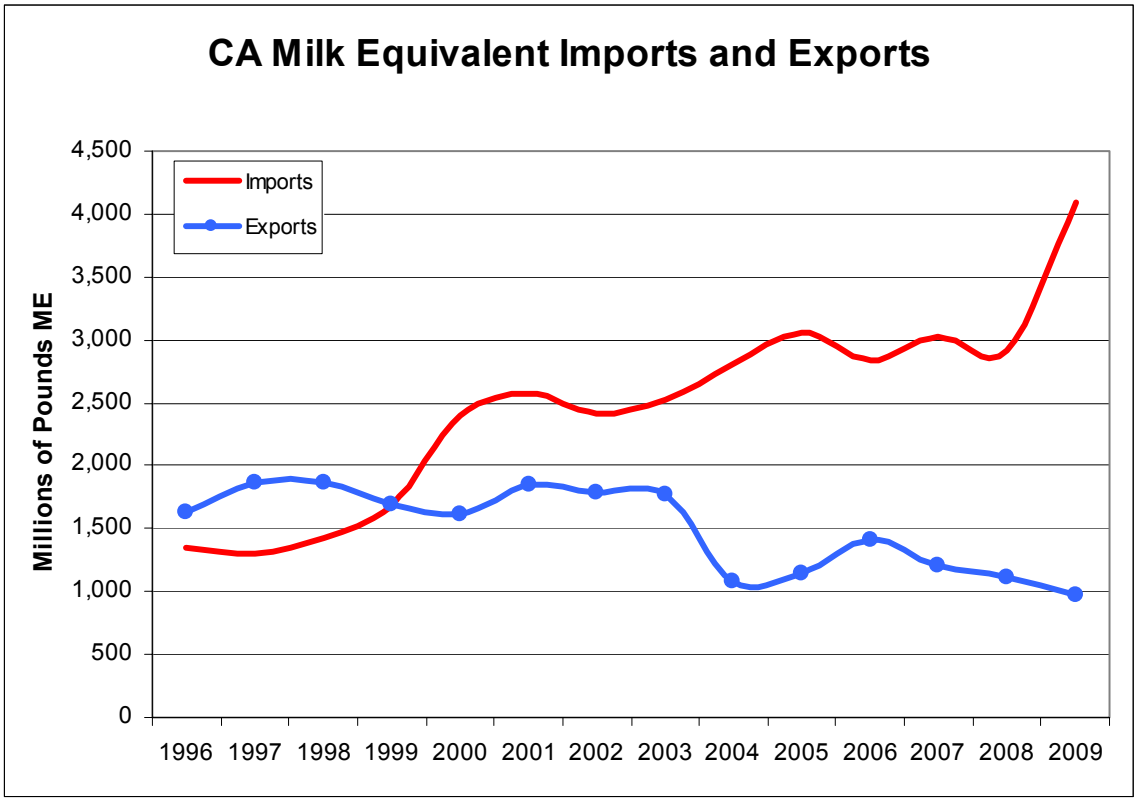

Sources: Eurostat, GTIS, Informa Calculations

| Share of Total Dairy Exports | | | | | |
|---|---|---|---|---|---|
| | US | EU-15 | CA | NZ | AU |
| 1996 | 6% | 48% | 3% | 30% | 14% |
| 2002 | 8% | 37% | 2% | 35% | 18% |
| 2009 | 14% | 36% | 1% | 38% | 11% |

Sources: Eurostat, GTIS, Informa Calculations

The EU, New Zealand, Australia, and the US account for approximately 80% of all dairy exports. The chart and table above does not include the other 20%. The EU-15's share of the world market has been declining as their production is limited by quota. Canada's share has dropped to 1% as their export subsidies are capped. Drought and falling milk production has decreased Australia's share of the export market. The US, which had a 6% share of exports in 1996, increased their share to nearly 20% in 2008 before falling back to 14% in 2009. New Zealand has taken the top spot from the EU-15, increasing their share from 30% in 1996 to 38% in 2009. Demand for dairy products in developing countries is growing quickly, and countries limited by supply control programs have not been able to capitalize on that growth to the same extent that the US and New Zealand have.

## *Canada*



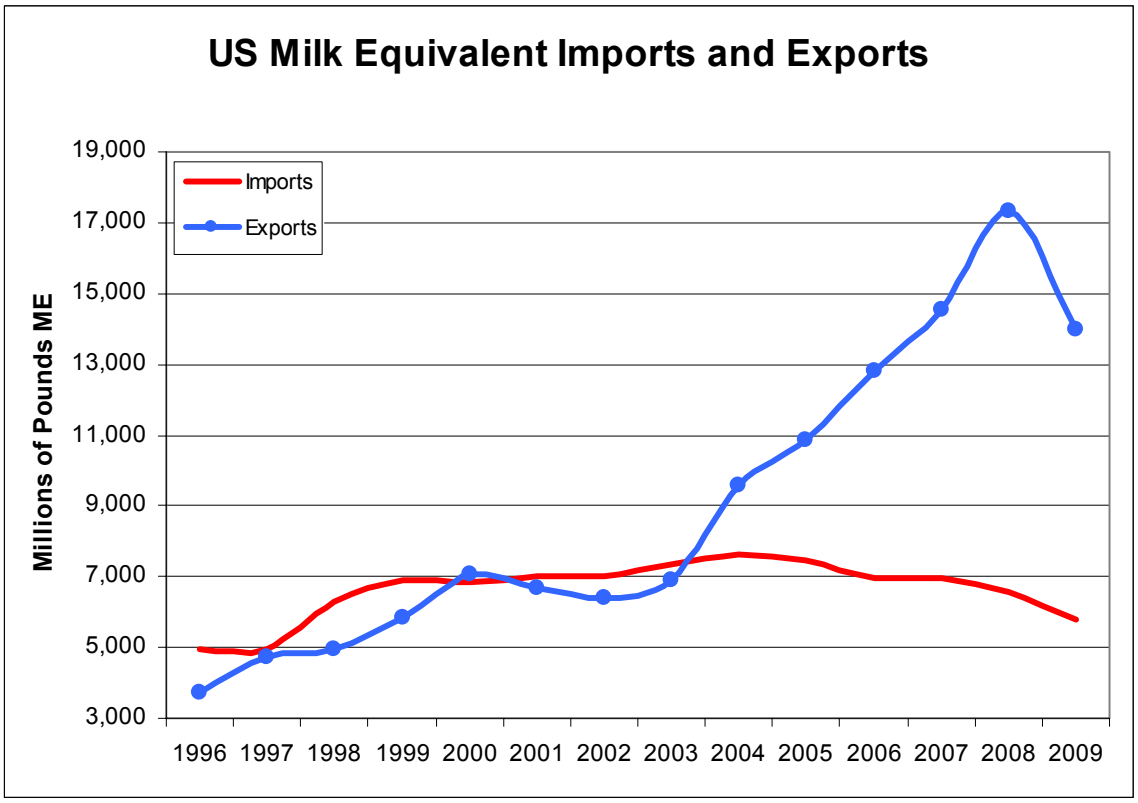

Sources: GTIS, Informa Calculations

| CA Milk Trade, Mil. Lbs. | | | |
|---|---|---|---|
| | Imports | Exports | Net Exports |
| **1996** | 1,346 | 1,636 | 290 |
| **2002** | 2,411 | 1,793 | -618 |
| **2009** | 4,099 | 966 | -3,133 |
| **1996-2009** | 2,753 | -670 | -3,423 |

Sources: GTIS, Informa Calculations

From 1996 through 1999, Canada was a net exporter of dairy products, primarily due to subsidies. As the Canadian milk price moved steadily higher and world prices remained relatively flat, the subsidy needed to export each pound of milk increased. The total amount they can spend is fixed, so the number of pounds of product they can subsidize has been falling. With prices well above the world market, imports have been trending up.

## *United States*




Sources: GTIS, Informa Calculations

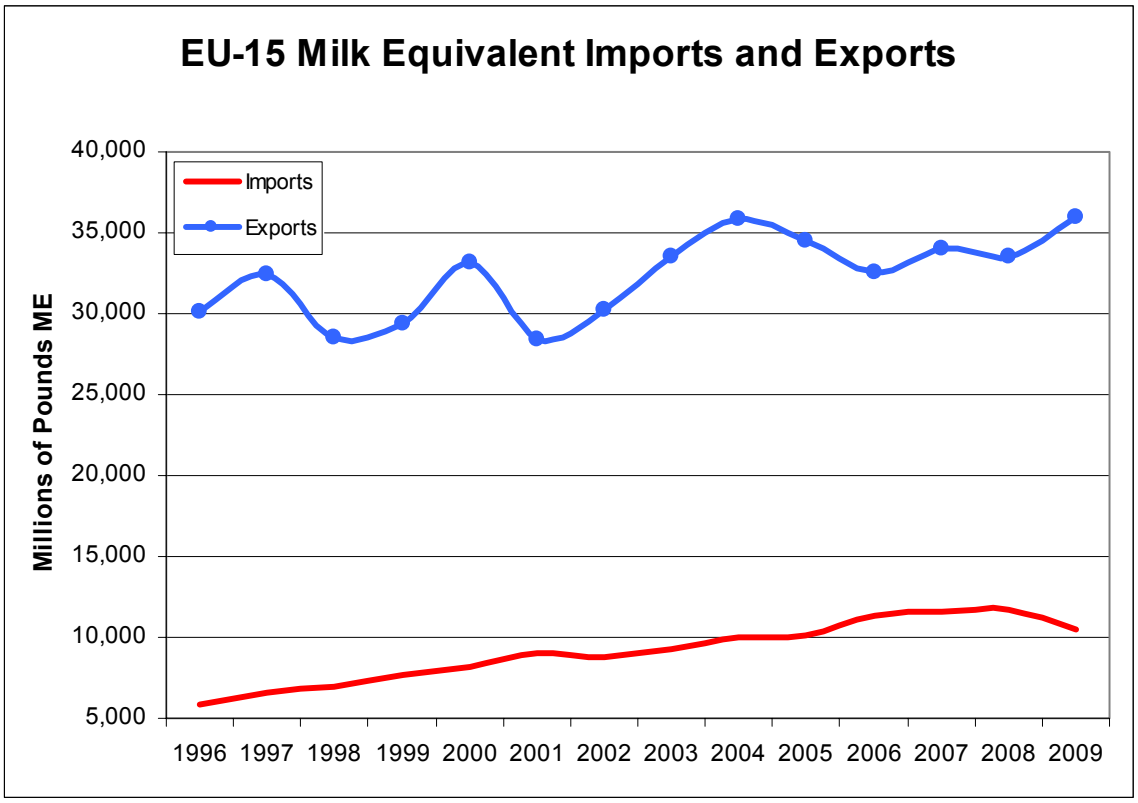
| US Milk Trade, Mil. Lbs. | | | |
|---|---|---|---|
| | Imports | Exports | Net Exports |
| **1996** | 4,947 | 3,715 | -1,232 |
| **2002** | 7,024 | 6,410 | -613 |
| **2009** | 5,776 | 13,990 | 8,213 |
| **1996-2009** | 829 | 10,274 | 9,445 |

Sources: GTIS, Informa Calculations

In sharp contrast to Canada is the US. The US was a net importer from 1996 to 2003 (except in 2000). Starting in 2004, the US became a net exporter of dairy products,

with nearly all of it being unsubsidized by the government. On top of the sharp increases in exports, imports have generally been trending down as well.

## *EU-15*



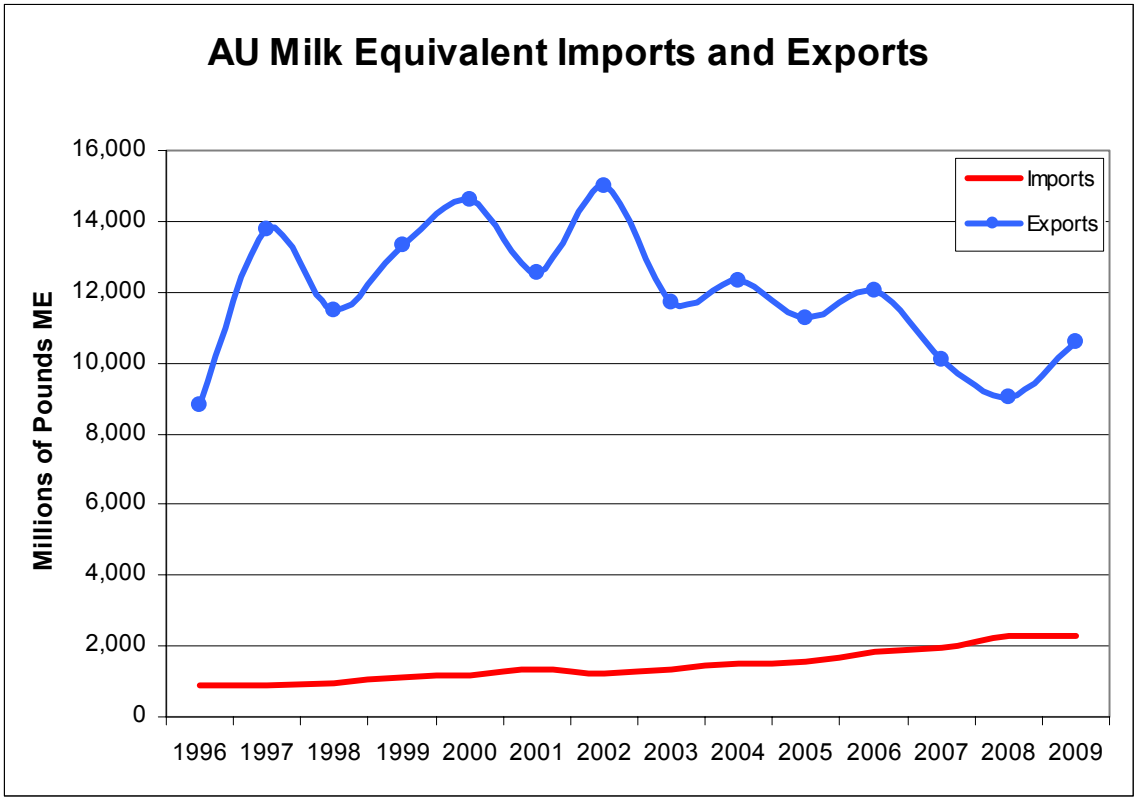

Sources: Eurostat, Informa Calculations

| EU-15 Milk Trade, Mil. Lbs. | | | |
|---|---|---|---|
| | Imports | Exports | Net Exports |
| **1996** | 5,892 | 30,074 | 24,182 |
| **2002** | 8,810 | 30,209 | 21,399 |
| **2009** | 10,523 | 35,953 | 25,429 |
| **1996-2009** | 4,631 | 5,879 | 1,247 |

Sources: Eurostat, Informa Calculations

The EU-15 is a net exporter by a wide margin. The data in the chart and table is EU-15 trade with other countries and does not include trade internally among the EU-15 countries. Exports have been limited by milk production growth in the region, but in preparation for the dispersion of the quota program in 2015, quota levels are being increased and EU-15 exports should see some growth in coming years. While exports have trended up, imports have as well, and between 1996 and 2009 there has been little change in net exports.

## *Australia*



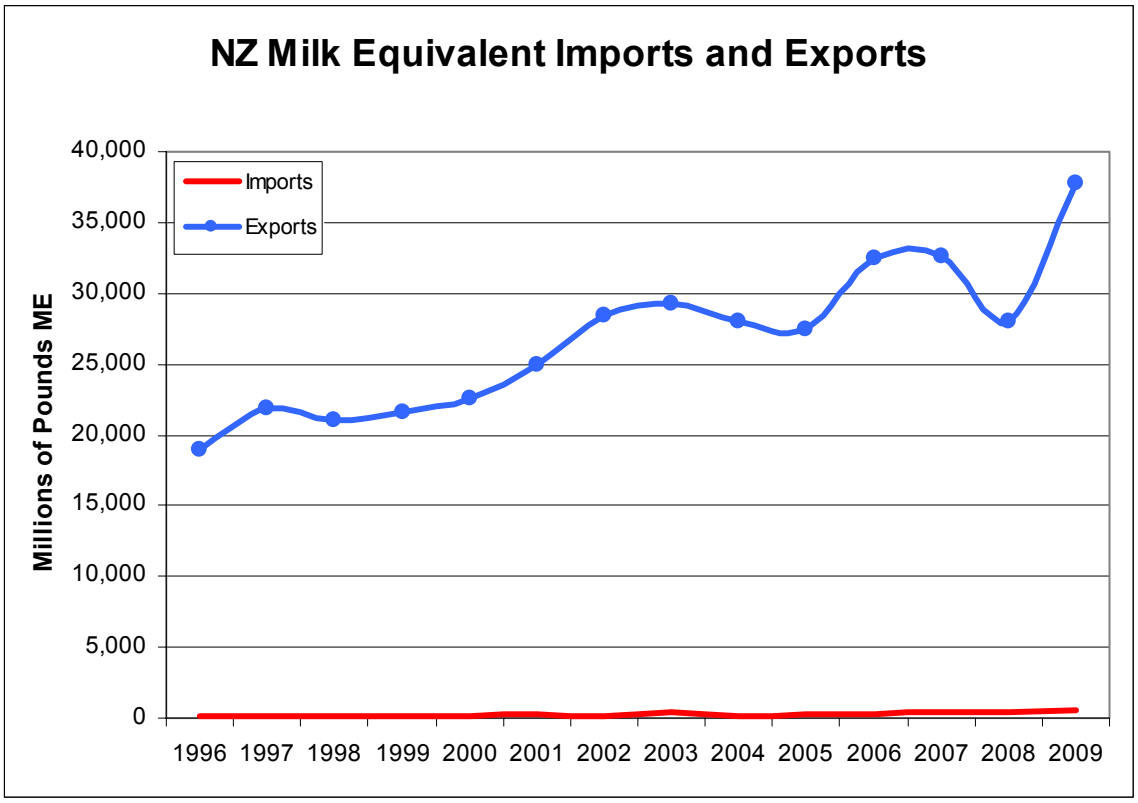

Sources: GTIS, Informa Calculations

| AU Milk Trade, Mil. Lbs. | | | |
|---|---|---|---|
| | Imports | Exports | Net Exports |
| **1996** | 890 | 8,821 | 7,931 |
| **2002** | 1,213 | 15,000 | 13,787 |
| **2009** | 2,287 | 10,575 | 8,289 |
| **1996-2009** | 1,397 | 1,754 | 357 |

Sources: GTIS, Informa Calculations

Australian milk production has been trending lower since 2000, with a sharp drop in 2007 and 2008 as drought reduced their production. This limited the amount of milk based dairy products available for export. Either low or no import tariffs and falling domestic milk production has boosted their imports since 1996.

## *New Zealand*




Sources: GTIS, Informa Calculations

| NZ Milk Trade, Mil. Lbs. | | | |
|---|---|---|---|
| | Imports | Exports | Net Exports |
| **1996** | 83 | 18,910 | 18,827 |
| **2002** | 175 | 28,398 | 28,223 |
| **2009** | 577 | 37,811 | 37,234 |
| **1996-2009** | 494 | 18,901 | 18,407 |

Sources: GTIS, Informa Calculations

While New Zealand's imports have increased, they remain insignificant compared to total production and exports. New Zealand's imports are primarily powders (whey, lactose, MPC) that we believe are being used as inputs into other products. The dairy industry in New Zealand is geared to exports, so that increases in production essentially go straight to the export market.

## *Tariffs*

| Import Tariffs for Dairy Products<br>In USD (Avg. 08/09 Exchange Rates) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Australia | New Zealand | Canada | | | EU | US | |
| Product | | | Within Access | Over Access | | Conventional Rate | General | Over Quota |
| | | | | % | Minimum | | | |
| **0401** | | | | | | | | |
| Milk (not concentrated) | Free | Free | 7.50% | 241% | $31.4/hl | $18-33/100 kg net | .34-.43¢/liter | .5-1.7¢/liter |
| **0402** | | | | | | | | |
| Milk (concentrated) | Free | 5% | 3.02¢/kg | 201-295% | 71¢-$3.90/kg | $48-186/100 kg net | 3.3-6.8¢/kg | 6.6-13.7¢/kg |
| **0403** | | | | | | | | |
| Buttermilk | Free | Free | 3.02¢/kg | 208-237% | 42¢-$1.96/kg | $143-239/100 kg net | .34¢/liter | .5¢/liter |
| Yogurt | Free | 6.50% | 6.5% | | | $28/100 kg net-8.3% + $241/100kg | 20.0% | 20.0% |
| **0404** | | | | | | | | |
| Whey | Free | 5% | 3.02¢/kg | 208% | $1.88/kg | $143-239/100 kg net | 3.3¢/kg | 6.6¢/kg |
| WPC | Free | 5% | 4.50¢/kg | 4.50¢/kg | | $143-239/100 kg net | 8.50% | 20% |
| MPC | Free | Free | 3% | 270% | $2.87/kg | $143-239/100 kg net | .37¢/kg | 12¢/kg |
| **0405** | | | | | | | | |
| Butter | Free | Free | 10.36¢/kg | 298.50% | $3.64/kg | $270/100 kg net | 12.3¢/kg | 30.9¢/kg |
| Spreads | 4% | Free | 7% | 274.5% | $2.62/kg | 9% + $171-243/100 kg net | 15.4¢/kg | 31¢/kg |
| Butter oil | | Free | 8% | 313.5% | $4.66/kg | $330/100 kg net | 10% | 20% |
| **0406** | | | | | | | | |
| Cheese | $1.00/kg | Free | 2.58-3.02¢/kg | 245.5% | $3.02-$5.26/kg | $199-316/100 kg net | 8-20% | 35% |

Sources: BITD, USITC

| Example Tariff on $1.50 Cheddar | | |
|---|---|---|
| | Within | Over |
| New Zealand | $0.00 | |
| Australia | $0.37 | |
| US | $0.18 | $0.53 |
| EU | $0.68 | |
| Canada | $0.01 | $3.68 |

Sources: BITD, USITC, Informa Calculations

If the government supports the price of dairy products above prevailing world market prices, it needs to tightly control imports or risk subsidizing farmers in exporting countries. The EU, Canada, and US all impose significant tariffs on dairy imports. Canada and the US both allow a certain amount of product to come in at a lower rate, but anything over that amount incurs a very large tariff. The long-term global trend is toward fewer barriers to trade, and that includes tariffs. A potential reduction in tariffs becomes another policy risk that farmers in highly protected countries have to contend with.

# IV. Impact on Processors and Industry Investment

## *Competitiveness*

When looking at competitiveness of dairy industries it is important to look at more than just production, growth and prices to determine a country's or region's rank. Many other factors like value added relative to the comparable food industry, growth of exports and export share and increases in labor productivity should be taken into account. A 2009 study of competitiveness in the global dairy industry looked at these issues. The study found that the US ranked very high, trailing just behind New Zealand overall. New Zealand's strong showing was driven largely by their large world export share and specialization with a high degree of external orientation. This is the key to the New Zealand market as their population is much lower than the other comparison countries. With their low cost of production and small domestic market it makes New Zealand tough to compete with even given its small geographical size.

Added to New Zealand's available supply of dairy products for exports, is their proximity next to the rapidly growing Asian market. One of the strikes against New Zealand is their susceptibility to weather issues as was seen in 2008. Weather is an issue for milk production anywhere, but a majority of their production is pasture based, which leaves them especially vulnerable. In the global competitiveness study, the EU came in fourth, while Canada was least competitive. Below is a chart with results from the study that shows the overall and categorical competitiveness of each country.

**Figure 1** **Overall competitiveness of the dairy sector**


Source: LEI Wageningen, UR: Competitiveness of the EU dairy industry

## *Canada*

Despite the Canadian population having the second strongest growth of the four countries/regions we looked at for this study since 2000, dairy consumption growth is lagging in Canada for many reason. Reasons for the industry stagnation of total milk sales include an aging population, growing consumer preference for low-fat foods and expanding immigrant population who consume fewer dairy products. Fluid milk products have also experienced heavy competition from other beverages such as bottled water, juices and soft drinks. Since 2000, milk equivalent consumption in Canada has only increased 7.1%. This trails the US growth of 15% and EU growth of 8.5%. The increase is totally derived from the growth in population. Per capita milk equivalent consumption is actually down 2.1% from 2000, but up slightly when compared to levels in the early 1990s. When looking at the other mature markets US per capita consumption is up 5.4% from 2000 while the EU per capita use was up 3.2%. When compared to 1991 levels, Canada's per capita consumption is up just 0.5%, while the US is up 11% and the EU is up 9%. This limited growth coupled with restrictions on export volumes has limited opportunities to grow their dairy industry within Canadian borders and has led to mass investment in US dairy companies.

Limited milk production growth and restricted exports have kept marketing options for Canadian farmers relatively unchanged from 10 years ago with federally registered establishments falling from 293 in 2002 to 275 in 2008, while the number of provincially registered establishments increased from 166 in 2002 to 184 in 2008. Today 3 companies (Agropur, Parmalat Canada and Saputo Inc.) process about 70% of the milk in Canada and two of those have been expanding through acquisitions of US firms.

In 2002, Agropur entered the US market through the acquisition of Deutsch Kase Haus of Middlebury, IN (which was later sold in January of 2009). Agropur's next purchase occurred in 2008 with the acquisition of Trega Foods, a company with three cheese plants in Wisconsin. Agropur entered the US fluid milk market via purchases of Schroeder Milk of Minnesota and Farmland Dairies' Grand Rapid, MI facility in 2008 and 2009. Their latest acquisition was of the recently built Green Meadows cheese and whey plant in Hull, IA. In their 2009 annual report CEO Pierre Claprood stated that,

*"acquisitions made over the past two years outside of Canada, including La Lacteo (a JV in South America) and Trega Foods are worth over $400 million…On an annualized basis, operations outside of Canada represent between $750-800 million in sales or 25% of our revenues. In 2010, US cheese facilities should produce 50% more cheese than our Canadian plants, and twice as much with a few years."*

Saputo is the other major Canadian dairy company to expand via the US market with roots going back to 1980. In the late 1990s Saputo tripled in size and become a major presence in the US among natural cheese producers with the purchase of Stella Foods. Since then they have invested $2 million to hold majority share of Gallo Protein, which processes whey from their California plants. In 2005, Saputo acquired Schneider Cheese of Wisconsin for $24.5 USD. One of their largest investments in US cheese

production was in 2007 when they purchased Land O'Lakes' "West Coast Industrial Business" for $216 million USD. This was followed by the 2008 $160 million purchase of Alto Dairy Cooperative of Wisconsin and the 2009 $44.5 million USD purchase of F&A Dairy of California. Currently Saputo operates 15 plants in the US with a total revenue of $1.9 billion dollars CN for fiscal year ending March 31, 2010. Since 2005 Saputo has invested nearly $450 million USD in acquisitions of US facilities.

## *EU*

Like Canada, European based dairy companies have embraced expansion of operations in the US. They have grown not just from acquisitions, but through joint ventures and expansions of plants to meet increasing demand. As with Canada, cheese production has been the major focus of European companies when entering the US market. The solid growth in cheese consumption per capita in the US combined with a faster growing population than the EU and unrestricted milk production growth makes the US an attractive market to invest in.

One of the most significant entrants into the US market from the EU is Ireland's Glanbia. In 1990 Glanbia (then Avonmore Foods) made its entrance into the US cheese market by purchasing 100% of the outstanding shares of Ward's Cheese, Inc of Richfield, Idaho. Within a year Glanbia moved cheese production to a new facility in Gooding, ID, while whey processing remained in Richfield. Since then, Glanbia has acquired another cheese plant in Twin Falls, ID remodeled and doubled its size and built an additional whey processing plant in Gooding, ID. But one of the most notable endeavors is the Southwest Cheese joint venture with Dairy Farmers of America and Select Milk Producers. Located in Clovis, New Mexico, this is one of the largest cheese and whey processing plants in the world, with an initial investment of around $190 million dollars. Further expansion plans were announced in early 2009, with the $90 million dollar investment expected to increase capacity by 33%.

French dairy giant Lactalis Group (Sorrento Lactalis) expanded outside of France for the first time in 1981 with cheese production in Belmont, Wisconsin. Later in the 1980's, as milk quotas were introduced in the EU, production was added in Turlock, California. Additional acquisitions followed and Lactalis American Group, Inc now operates five plants in four states and has become the fifth largest cheese manufacturers in the United States with total sales over $900 million.

Another example of expansion in the US market is from the European based company Arla Foods. Formed in 2000 Arla Foods was the result of a merger between Danish and Swedish cooperatives. Arla entered the US market via the purchase of a cheese plant in Wisconsin. In 2008 Arla invested an additional $15 million in the cheese plant with an aim to double production capacity. A further expansion was announced and is expected to be completed by early 2011. Besides the Wisconsin plant, Arla owns a plant in Muskegon, MI. With increased presence in the US, 70% of Arla's US sales are produced in the two plants, while just 30% of US sales are imported from Denmark.

European dairy companies have expanded in the US through other means than just through the cheese market. The world's largest food maker Nestle is a prime example. In 2003, Nestle entered the US ice cream market via the purchase of a majority stake in Dreyer's, acquiring the remaining outstanding shares in 2006. Along with Dreyer's, Edy's and Nestle Ice Cream frozen snacks, Nestle acquired the rights to Haagen-Dazs in the US and Canada. Nestle also produces sweetened and condensed milk in the US along with a wide range of food products that require dairy ingredients. In 2010 Nestle acquired Kraft's frozen pizza business for $3.7 billion.

Multinational conglomerate Unilever entered the US ice cream/frozen novelty market much earlier than Nestle with the purchase of Good Humor in the early 1960s. Looking to expand further, Unilever purchased Breyer's from Kraft Foods in 1993. In 2000, Unilever completed their US ice cream company acquisitions with the $326 million purchase of Ben & Jerry's.

In 1998 Greek yogurt maker Fage began importing product into the US. After just a few years of imports, Fage began to see the potential market in the US and built a $25 million plant in New York, which has since been expanded three times for a total investment of $125 million. An additional expansion is expected for 2011.

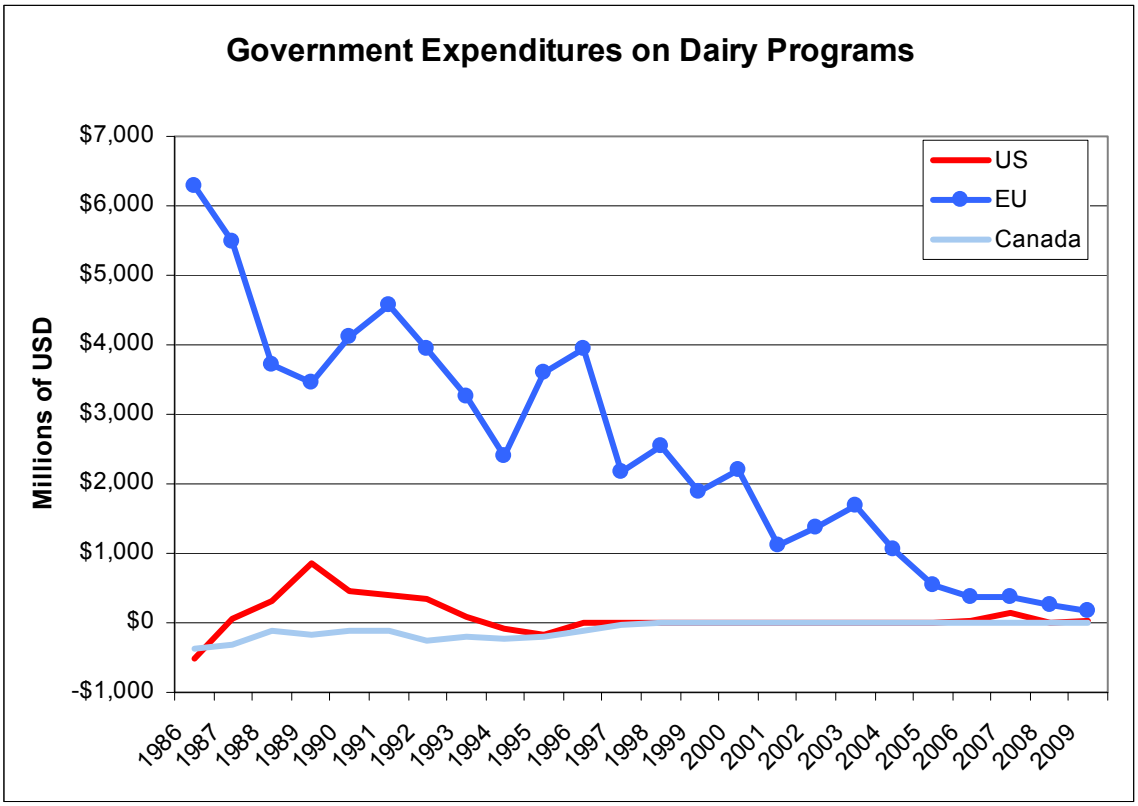
Yogurt maker Dannon also has roots in Europe and came to the US during WWII. Today, Dannon has three manufacturing plants in the US including the largest yogurt plant in the world and five distribution centers.

## *Investment from other regions*

Although New Zealand has vibrant and growing exports of dairy and the strongest population growth of the four areas of focus, their small domestic market size and long-term limited milk production growth potential pushed their biggest cooperative to expand across the globe including in the US. This is evident with Fonterra's joint venture with Dairy Farmers of American, called DairiConcepts. The partnership began in 2000 with an estimated $25 million investment from each co-operative. Ten processing plants are involved with DairiConcepts production and are focused on dairy powders and flavors for the processed food industry.

# V. Impact on Governments and Taxpayers

## *Transfers from Government/Taxpayers*




Sources: OECD Producer and Consumer Support Estimates, Informa Calculations

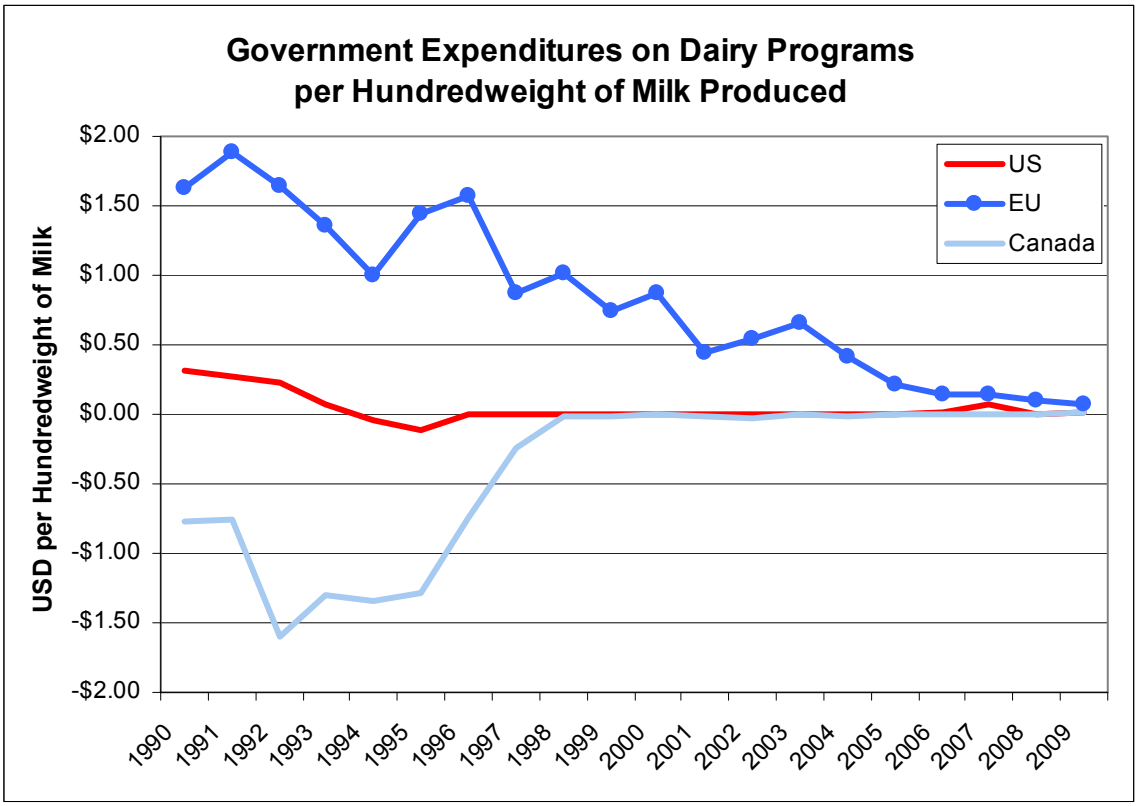
| Gov't Expenditures on Dairy (Mil. USD) | | | |
|---|---|---|---|
| | US | EU-27 | Canada |
| **1986** | -$510 | $6,292 | -$375 |
| **1997** | $0 | $2,183 | -$41 |
| **2009** | $30 | $167 | $1 |

Sources: OECD Producer and Consumer Support Estimates, Informa Calculations

The trend in both the EU and the US is toward lower expenditures by the government on dairy programs. Expenditures by the government include the cost of support purchases, domestic consumption subsidies, export subsidies, and direct payments to producers, minus any levies collected from producers. At first glance the difference between the cost in the EU and the cost in Canada during the late 1980s and early 1990s is surprising. During that time period, government price support levels were generally above the cost of production in both countries, which encouraged milk production. In the EU, the total level of quota was set well above the amount of milk that was being consumed domestically. The resulting surplus had to find a use, and the

government subsidized domestic use and exports of the product, leading to large expenditures. In Canada, quotas are adjusted annually in an attempt to match production with domestic demand. Any resulting surplus, which historically has been small, is then exported at a subsidized price. The government collected a levy on all milk produced to cover the cost of the exports, and the data from the OECD would suggest that the levy collected exceeded the cost of running the program. A ruling by the WTO has limited the amount that Canada can spend on subsidizing exports, and in 1996 they adopted a classified pricing system which blended the lower value of exported milk into the average price and allowing the government to avoid the export levy.

The cost of the EU programs has dropped from $6.3 billion in 1986 to $167 million in 2009. The US programs have dropped from a peak of $850 million in 1989 to $30 million in 2009. There are a number of reasons for the lower expenditures. The first is that both have lowered their intervention prices by about 13% measured in local currency. A second reason for the EU is increased domestic consumption. Prior to 2007, the total quantity of quota had remained fixed, and with both per capita consumption and the population growing, the amount of surplus milk declined. The third driver is rising world prices. Prices on the world market trended higher from 2002 through 2007, which reduced the cost and quantity of surplus product exports. Dividing total expenditures by milk production and putting it on a hundredweight basis makes the expenditures more easily comparable across countries.

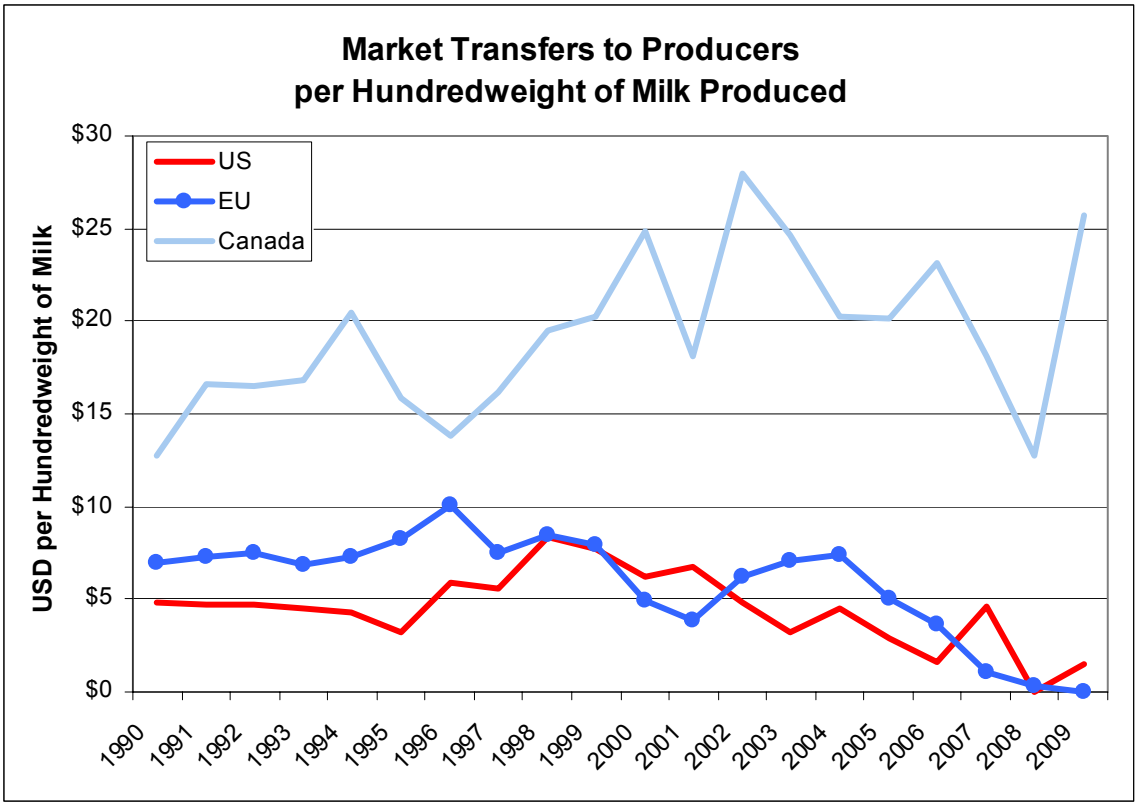



Sources: OECD Producer and Consumer Support Estimates, MAF, CDC, USDA, Eurostat, Informa Estimates

| Gov't Expenditures on Dairy (USD/cwt) | | | |
|---|---|---|---|
| | US | EU-27 | Canada |
| 1990 | $0.32 | $1.63 | -$0.77 |
| 2000 | $0.00 | $0.87 | $0.00 |
| 2009 | $0.02 | $0.07 | $0.01 |

Sources: OECD Producer and Consumer Support Estimates, MAF, CDC, USDA, Eurostat, Informa Estimates

## *Transfers from Consumers*




Sources: OECD Producer and Consumer Support Estimates, MAF, CDC, USDA, Eurostat, Informa Estimates

| Market Transfers to Producers (USD/cwt) | | | |
|---|---|---|---|
| | US | EU-27 | Canada |
| 1990 | $4.79 | $6.91 | $12.78 |
| 2000 | $6.21 | $4.98 | $24.85 |
| 2009 | $1.47 | $0.00 | $25.69 |

Sources: OECD Producer and Consumer Support Estimates, MAF, CDC, USDA, Eurostat, Informa Estimates

While actual government expenditures may be relatively low in Canada, the government has enacted policies that artificially raise consumer prices above theoretical free-market levels, which creates a transfer from consumers to milk producers. US transfers from consumers to producers are significantly lower, but they are still slightly positive. We believe the transfer is due to the rigid class price structure. With Class I prices tied directly to the commodity value of milk, plus a differential, the government is enforcing an above free-market price for fluid milk. The level of transfers has declined significantly since 2004 in both the US and EU, which is due to higher export prices from New Zealand, which the OECD uses as a benchmark for what prices would be in a free-market.

# VI. History and Current Structure of Milk Supply Control Programs

## *Canada*

The current price support and milk quota system of Canada can be traced back to government policies put into place during World War II. In 1939 the Wartime Prices and Trade Board was created to hold down inflationary pressures as the Canadian economy geared up for war. By 1941 the board had set maximum prices for a number of commodities, rent, and wages. The government also directly negotiated export contracts with the United Kingdom for a variety of agricultural products, with fixed prices and often with fixed minimum or maximum quantities. The contracts typically covered a 12 month period, and contract prices acted as a floor price for the domestic market[1]. The prices set in the contracts were not determined by a market, but they were set at levels that the government believed would be necessary to bring forth enough supply to meet the export contract. They often over or underestimated equilibrium prices and "… price control precluded the most obvious and direct method of adjustment and made it necessary to supplement food price ceilings by a variety of price supports in the form of premiums, bonuses, and other payments on agricultural products."[1] The price ceilings set by the Wartime Prices and Trade Board were often too low to encourage enough production to meet domestic demand and the export contracts, so the government found ways to make ad hoc payments to farmers to raise their effective prices above the price ceiling. This marked the beginning of the Canadian governments close management of prices, and consequently, production of milk and dairy products.

Farmers successfully argued that if they were to suffer through a price ceiling during the war, setting a price floor under the market after the war to prevent a collapse in prices was only fair. The Agricultural Prices Support Act was passed by parliament in 1944 creating a Board that was given CAD 200 million to support the prices of agricultural commodities either through direct purchases or through guarantees and deficiency payments. No floor prices or formulas were set in the Act, it was at the discretion of the Board to determine when and at what level to support various markets. The ad hoc nature of the program left much to be desired from farmers as they were not able to count on firm support prices when making production and investment decisions.

In 1958 the Agricultural Stabilization Board was created by the Agricultural Stabilization Act, which superseded the Agricultural Prices Support Act.

*"Under the Agricultural Stabilization Act all price support levels have to be related to a price formula based on the most recent ten-year average of market prices for the product concerned. In addition, the Board, unless the Government sets a higher support level, must support the prices of nine named key commodities at not less than 80 per cent of the ten-year average market price. The named commodities are butter, cheese, eggs, cattle, hogs, sheep, wheat, oats and barley…"*[2]

The Act also stated that support prices would be in effect for 12 months from an effective date after the announcement of support levels. The Board supported prices by purchasing commodities, guarantees and deficiency payments, and by making direct payments to producers. There were no policy restrictions on what the Board could do with purchased products, but they were typically sold back to the market at the purchase price plus carrying costs.[2]

The Canadian dairy market now had an effective and consistent floor price, but milk prices, processor margins, and production still fluctuated year to year. There was also a lack of coordination between federal and provincial policies affecting the dairy industry. Individual provinces attempted to implement supply control programs, but

*"Their effectiveness was undermined by a lack of regulatory control over marketings that crossed provincial boundaries and national borders. In many instances, despite local control of supply, surpluses from other areas could easily disrupt their orderly marketing and undermine their attempts to regulate prices."*[3]

In 1963 the federal government convened a Canadian Dairy Conference, which led to the creation of the Canadian Dairy Advisory Committee to study how to better match supply and demand in the Canadian dairy markets. In 1965 the Committee recommended the creation of the Canadian Dairy Commission (CDC). Late in 1966 the Canadian Dairy Commission Act created the CDC, which would have the tasks of monitoring demand and recommending changes in production, monitoring farm input costs and setting support price levels high enough to cover costs, and they were also responsible for exporting surplus production.

The decision to set floor prices based on a percentage of the rolling ten year average price was arbitrary with little consideration for the cost of production or allowing the market to find equilibrium. Since farm level prices were now set at levels that were profitable for most farmers, there was a need to limit milk production growth or the cost of exporting the surplus would become prohibitive. The first attempt was called Subsidy Eligibility Quotas (SEQ). The SEQ did not limit the total amount of milk a farmer could deliver to the market, and those without SEQ could still enter the market.[4] Holding SEQ entitled the farmer to a pro rata subsidy from the CDC, but the cost of exporting surplus

milk was subtracted from the subsidy payment. Farmers producing above quota, or those with no quota holdings, were not sharing in the cost of the surplus milk equally.

In 1970 the development of the Interim Comprehensive Milk Marketing Plan led to the creation of the Canadian Milk Supply Management Committee (CMSMC).[5] The National Milk Marketing Plan created the Market Sharing Quota system (MSQ). MSQ had harsher penalties for over-quota production than the earlier SEQ. Only farmers holding MSQ were allowed to produce milk, although there are some allowances for milk production if the milk is consumed on-farm. Ontario, Quebec, and the federal government were the first signatories, but by 1974 the remaining provinces (except Newfoundland, where very little manufacturing milk is produced) were signatories to the plan.

From 1975 to 1987 the target price for manufacturing milk was determined by the Returns Adjustment Formula (RAF), "…that tried to balance the farmers' cost of living and the cost of production. On top of this there is still a high degree of *ad hoc* adjustment possible by the administrative authority."[6] (emphasis in the original) In 1988 the RAF was dropped, and replaced with a survey based procedure for determining the cost of production.

## Current Structure

The production and pricing of milk is highly regulated, with government agencies setting both a target production level and a target price to be paid to farmers. The goal each year to is to match expected supply with demand to keep the market balanced at prices that cover the estimated cost of production for farmers.

Canada's dairy supply control system is based on three pillars:

- Planned domestic production to ensure a steady supply of quality milk to meet consumer demand for milk and dairy products. This is done with Market Sharing Quotas (MSQ).

- Dairy product import controls which is done through tariff-rate quotas. A predetermined quantity of dairy products is imported tariff-free every year and a negotiated higher tariff applies to any import above the quota level.

- Target pricing and price pooling among producers. Once a year farm gate prices for milk are reviewed taking into account costs to produce milk, labor, and investments and market indicators. A target price is then announced, and provincial marketing boards set the price of milk used for various purposes (drinking milk, cheese, butter, etc.) at levels that are expected to average out to the target.

Three key sets of organizations are involved in formulating and implementing Canadian dairy policy. These are the Canadian Dairy Commission (CDC), the Canadian Milk

Supply Management Committee (CMSMC), and the provincial milk marketing authorities.

## Canadian Dairy Commission (CDC)

The CDC supports the dairy industry by implementing national policies for dairy production, by assessing changes in demand for milk and dairy products and production of milk, and by coordinating the pooling of milk revenue and the market-sharing systems. The CDC plays a key role as facilitator and stakeholder in the various forums that influence dairy policy in Canada and offers a framework for the management of the industry as a whole, which is a jurisdiction shared by the federal government and the provinces.[7]

Since supply management was first applied to the dairy sector, the CDC has been in charge of two of the three pillars of the system: support prices and Market Sharing Quota. Once a year, the CDC sets the support price of butter and skim milk powder following consultations with industry stakeholders. These prices are used as a reference by the provincial milk marketing boards to establish the price of industrial milk in each province. The CDC also monitors national production and demand and recommends the necessary adjustments to the national production target for industrial milk.[7]

A summary of CDC activities and programs includes:

- Through its chairmanship and work for the Canadian Milk Supply Management Committee (CMSMC), the CDC provides ongoing support to the Canadian dairy industry while operating in close co-operation with national and provincial stakeholders and governments.

- It acts as a facilitator and provides secretariat services to the revenue pooling and market sharing systems. Provisions for these functions are set out in the All Milk Pooling Agreement, the Western Milk Pooling Agreement, and the Comprehensive Agreement on Pooling of Milk Revenues. The CDC also administers the financial mechanisms required by these agreements.

- It calculates and recommends to the CMSMC the target national milk production for industrial milk, or Market Sharing Quota.

- It has the authority to purchase, store, process, or sell dairy products on the domestic or export market, within World Trade Organization (WTO) commitments. The CDC also imports and redistributes tariff rate quota butter on behalf of the industry.

- The Commission establishes support prices at which it will purchase butter and skim milk powder. These support prices are used as references by provinces to establish prices for milk used to manufacture products such as butter, cheese, and ice cream.

- It administers the Special Milk Class Permit Program and issues permits allowing processors to have access to competitively-priced dairy ingredients, and allowing exporters to export dairy products within Canada's WTO commitment levels.

## Canadian Milk Supply Management Committee

The Canadian Milk Supply Management Committee (CMSMC), chaired by the CDC, is a permanent body created by the provincial signatories to the National Milk Marketing Plan and is responsible for policy determination and supervision of the provisions of the Plan. The CDC acts as the national facilitator and mediator in helping build consensus between all parties.[8]

It meets five times a year to review and consider the major production, economic and marketing factors affecting the dairy sector. These include trends in domestic consumption and production of milk and dairy products, the level of skim milk powder and butter stocks held by the Commission and commercially, and export market activities. The CMSMC also reviews and monitors the CDC's marketing operations and promotional activities, the pooling of market returns, and provincial quota allocation and utilization.[8]

Each year, the CMSMC sets the national industrial milk production target or Market Sharing Quota (MSQ). This target is constantly monitored and adjusted when necessary to reflect changes in demand for industrial milk products such as butter and cheese, as measured in terms of butterfat. The CMSMC applies the terms of the National Milk Marketing Plan to establish the provincial shares of the MSQ. Each province allocates its share of the MSQ to its respective producers according to its own policies and in accordance with pooling agreements.[8]

## Provincial Milk Marketing Boards and Agencies

The provincial milk marketing boards or agencies are the third key set of institutions involved in Canadian dairy policy and milk marketing. These organizations play several roles, some independently and some in cooperation with the CDC and the CMSMC. Provincial marketing boards and agencies govern the production and marketing of milk within their own borders. Marketing activities related to industrial milk are carried out under concurrent federal and provincial legislation.

In order to manage the marketing of milk, provincial governments delegate statutory powers to either provincial agencies or marketing boards. Although responsibilities vary from province to province, boards and agencies generally:

- Allocate milk quotas to producers
- Establish prices paid to dairy farmers
- License producers
- Determine provincial fluid milk demand

- Market farmers' milk
- Administer the decisions of CMSMC.

The administration of fluid milk pricing is one of the provincial authorities' most important roles. Each provincial authority determines annually the amount of fluid milk that will be required. It also determines the prices to be received for fluid milk (Class 1) and milk used to make fresh dairy products (Class 2) such as cottage cheese, yogurt and ice cream. These prices will vary among provinces. Most provinces price industrial milk on the basis of its multiple components, e.g., butterfat, protein, and other nonfat solids; as well as the cost of production.

In many provinces, the dairy boards are also directly involved in the marketing of farmers' milk. They collect milk from producers and allocate it among processors for various uses. In some provinces this function is performed by large cooperatives. The allocation process gives first priority to meeting fluid milk needs and those for fresh products. Second priority is given to supplying milk to cheese manufacturers. Producers of butter and skim milk powder have last claim on milk supplies.

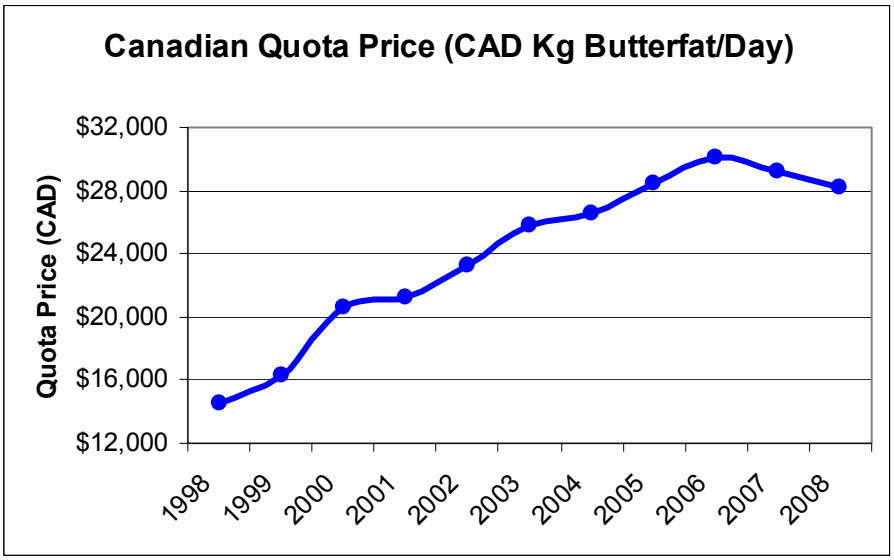
## Milk Quota System and Its Operation

To control the amount of milk sold, the Canadian Milk Supply Management Committee (CMSMC), under the direction of the Canadian Dairy Commission (CDC), calculates and recommends the national industrial milk production target, also known as the Market Sharing Quota (MSQ). MSQ is calculated based on the previous year's domestic consumption, anticipated changes in demand, projected dairy stocks, import commitments, and export obligations. A safety margin, known as the sleeve, is added to the estimated MSQ, to absorb unexpected increases in demand. The milk production target is constantly monitored and adjusted when necessary to reflect changes in demand, as measured in terms of butterfat, during the course of the year. The objective is to minimize the possibility of shortages in the domestic market.

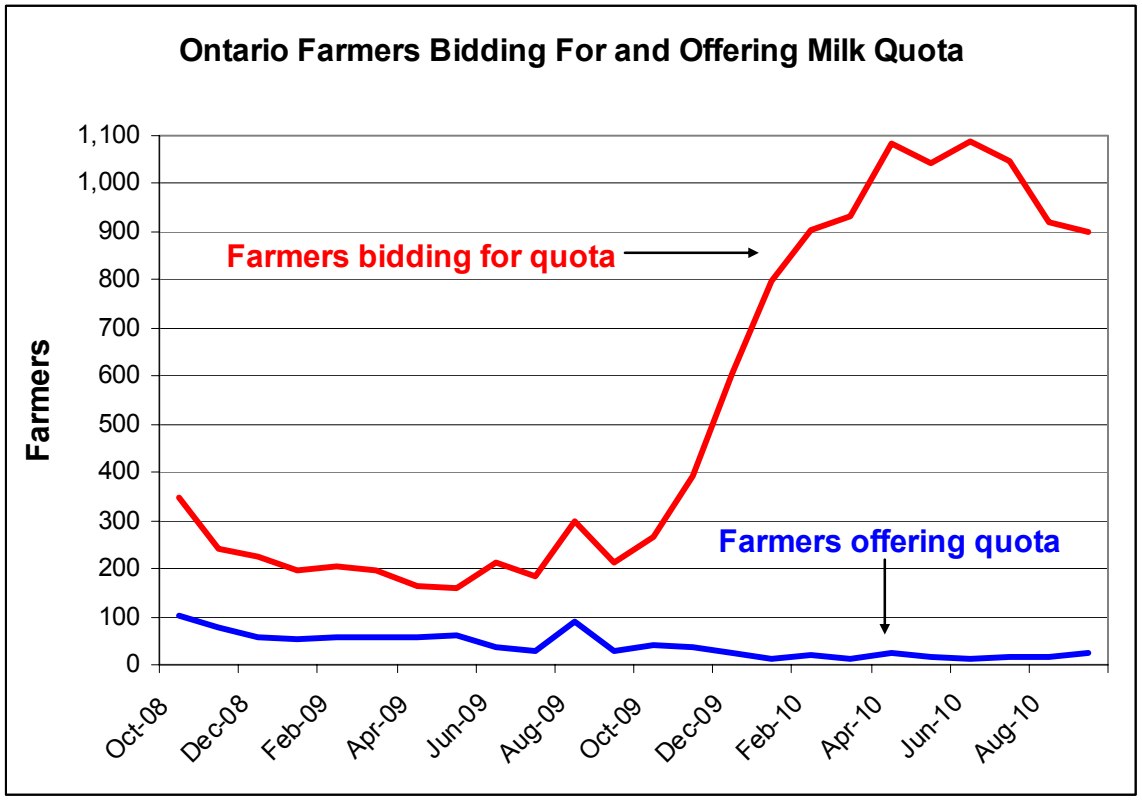
The National Milk Marketing Plan establishes each province's share of the MSQ, and provides for the sharing of any quota increase or decrease. Once the MSQ has been calculated, it is delegated to the provinces, and the provinces through their agencies and marketing boards, distribute the quota to individual producers. The amount of quota a producer owns determines the amount of milk the producer can sell for consumption. The provinces' milk quotas generally are expressed as the right to produce one kilogram of butterfat daily.

The CDC monitors trends in Canadian requirements (demand) and industrial milk production (supply) on a monthly basis. Canadian requirements are defined as total domestic consumer demand plus planned exports for industrial dairy products. Production includes all production of industrial milk and cream within supply management.

Each province allocates its respective share of the MSQ to its producers according to its own policies, and in accordance with pooling agreements. All producers selling farm milk must hold quota issued by provincial milk marketing boards. Quota can be bought, sold, or leased. Quota is not cheap. In the 07/08 season quota prices ranged from USD 29,878 per kilo of butterfat in Ontario to USD16,947 in Saskatchewan. The national average was USD 27,965.[9] With an average of 74 cows per farm, the cost of quota to start an average sized farm is about USD 2,069,429. Thus new entrants into the dairy sector face high quota costs which are a significant barrier to entry. The value of quota is established on an open, quota-exchange market. Quota represents 365 days of production and each unit is roughly equal to the milk produced by one cow. Quota prices have more than tripled since the 1980s, which is making it harder for new farmers to enter the market, and for current farmers to expand. The value of quota accounted for nearly 52% of farm level assets in 2004, and that percentage has been trending up.[42] To address the issue, Dairy Farmers of Ontario (DFO) has instituted a price ceiling of CAD 25,000 (USD 24,000) for quota, which went into effect in January of 2010.[43] The price ceiling all but dried up the quota market in early 2010 as sellers refused to sell at the capped price. Generally when governments set binding price ceilings, market participants find ways around them including the development of black markets or adding other fees or charges on top of the actual price of the good.




Source: CDC




Source: Dairy Farmers of Ontario (DFO)

## *European Union*

While dairy policy can be tracked back further at the national level, the beginning of a coherent multi-national European policy goes back to 1960 and the adoption of the Common Agricultural Policy by the six members of the European Economic Community (Belgium, France, Germany, Italy, Luxemburg, the Netherlands). The European Economic Community (EEC) was formed in-order to create a common market among the member countries, allowing goods, services, and the factors of production to flow freely. The member states, to one degree or another, intervened in their domestic agricultural markets. If trade was going to be opened between them, there needed to be a common agricultural policy.

The CAP came into force in 1962. It took until 1968 for a common organization of the market (COM) to be established for milk and milk products. The European Council had already set a target price for milk in 1966, but didn't have a uniform price support system in place yet. By 1968 when the foundations of the intervention system were being debated, there was already a surplus of milk. In 1968, the Council changed the definition of the target price for milk, "The target price shall be the price for milk which it is intended to guarantee for all milk sold by producers during the marketing year, in so far as outlets are available on the Community market and on external markets."[10] (emphasis

in the original) This weakening of the original target price concept allowed individual countries some leeway in setting their support and producer prices. Along with the target price for milk, the COM for milk and milk products created a price support program that operated through purchases of butter and skim milk powder (SMP), similar to nonfat dry milk (NFDM) in the US, and cheese purchases in Italy (which produced very little butter/SMP at the time). The COM also created export subsidies and domestic subsidies for the use of milk and dairy products in animal feed.

*"The financing of the common milk policy is the most sensitive and critical aspects of the financing of the common agricultural policy. It is closely bound up with the program of surpluses. Since July 1966, when the Council took its decision on the common target price to the producer, the formation of surpluses has become a much more serious problem than seemed possible two years ago."*[10]

In 1968 the Commission projected that the situation would get worse, and it did. The situation deteriorated through the 1970s, and the Commission made increasingly frequent attempts to put forward proposals to deal with the situation:[11] "the Lardinois Memorandum in October 1973; the Stocktaking in February 1975; the Commission's Action Programme for the progressive achievement of balance in the milk market in July 1976; its Report on the situation in the milk sector of September 1978; its Communication to the European Council of November 1978, its budget savings package of November 1979, its Reflections up the CAP of October 1981, and its 'post-Stuttgart' proposals in July 1983. Even in those documents which dealt with other questions, the milk problem constituted a key factor."[12]

## First Attempt at Supply Control – Co-Responsibility Levy

By 1976, the situation was dire. "The Commission considers that a continuation of the basic imbalance between supply and demand on the milk market could endanger not only the operation of the common organization of the market in milk and milk products but the common agricultural policy as a whole."[13] In response the Commission created a "co-responsibility levy" which was a flat rate levy on all milk deliveries to processors to reduce the effective price paid to farmers along with offsetting some of the cost of dealing with the surplus.

*"The Commission considers it indispensable to establish a more direct link between the production and marketing of milk by creating, through the introduction of a milk producers' co-responsibility levy, a more favourable economic and psychological climate for achieving balance on the milk market."*[13]

Each year between 1976 and 1980 the Council would decide on the size of the levy to be charged based on market conditions, with some of the revenue being used to pay farmers to convert from dairy to beef. But the program had little impact on reducing production or fixing the chronic surplus of milk. "Whilst the levy provides a fund from

which measures designed to expand markets can be financed, experience has shown that it is of insufficient size to have any impact on production levels."[14]

## Introduction of Quota

The first attempts to balance the dairy markets had failed, and the cost of the intervention program had gone from 1.81 billion ECU in 1982 to 3.07 billion in 1983. "The cost of sustaining the CAP, and the dairy regime in particular, threatened the financial integrity of the Community."[11] To keep milk production from growing further, the European Community introduced quotas in 1984. Quotas were set at the national level for each member country, equal to the quantity produced in 1981 plus 1 percent, except for Ireland and Italy, where quotas were based on 1983 milk deliveries. Each country then allocated the quota to individual producers. The decision to set quota at 1981 levels plus a percent was a political one. Even with milk production restricted at that level, there was still a substantial annual surplus that needed to be dealt with. To offset some of that cost, the co-responsibility level was increased from 1% of the target price to 3%. Any milk produced above quota faced a 75-100% "super levy".

Quota was set at the national level, and it was up to each member state how to distribute it to regions and farmers within their borders. There is no cross-national trading of quota allowed. Originally, quota was attached to land. The Court of Auditors in 1987 ruled, "quota is only transferable when land is sold, leased or inherited, buying or leasing of quota without land generally not being permitted."[21] But farmers found ways around the restrictions, "The usual procedure has been for the purchaser of quota to take a twelve month grazing license on the land the quota is attached to….There are legal pitfalls which could arise if, for example, the original owner of the quota sells the farm, or if the seller goes bankrupt."[11]

The EC continued to deal with a large surplus, and in April 1985, quota was reduced by 1%. In October, an Outgoers Scheme that offered to buy back quota from farmers if they agreed not to produce any milk for five years was implemented. The scheme was considered an "expensive flop"[15] and "a complete shambles."[16] Few farmers took advantage of the program as the price offered for quota was too low relative to the market value. With a continued surplus and still high government costs, quotas were reduced by 2% in 1987, and another 1% decline in 1988. The rules for intervention purchases were also changed. Instead of purchasing an unlimited amount of butter and SMP at fixed prices, purchases of the products could be suspended if inventories of butter reached 397 million pounds and a suspension of purchases of SMP between March 1st and August 31st if inventories reached over 220 million pounds (later raised to 240 million pounds).

The earlier use of co-responsibility fees to encourage a shift from dairy farming to beef created a legal challenge to quota allocations. Farmers who had converted to beef production, or reduced their marketings of milk, were given reduced or no quota allocations. A Dutch farmer won his case in the European Court of Justice which ruled

that producers who take advantage of government programs to reduce production in the late 1970s and early 1980s should be allocated a larger share of quota. So quota was increased by 1.6% in 1989 as allocations were made to the farmers who had voluntarily reduced production prior to quota implementation, and to make allocations of quota to new farmers. To offset the cost, intervention prices were lowered and the super levy on over quota production was raised to 100-115% of the market value of the overproduction.

The complicated structure of the CAP left it vulnerable to serious fraud, estimated between $4.5 and $6 billion a year.[17]

*"Lorries of butter have crossed and re-crossed the border between the Irish Republic and Northern Ireland, claiming monetary compensation amounts designed to even out differences between the British pound and the Irish punt. In Italy, the Community was swindled of millions of pounds through phoney butter exports, supposedly sent to Turkey but in fact resold on the Italian market at a higher price. The company involved is alleged to have links with organized crime."*[11]

## CAP Reform – 1992, 2000, 2003

The 1992 CAP reforms were primarily to crop programs, but intervention prices for butter were reduced by 2.5% in 1993, and again in 1994. Reforms were meant to lower the overall cost of the CAP and to reduce the market distorting affects from the policy. To compensate farmers for lower intervention prices, fixed direct payments to farmers, typically unconnected to the level of production were instituted. The quota program was left in place with no changes in quantity, although they would be subject to annual review and possible declines in the future.[18] Total CAP expenditures across all programs were also set at a fixed level for seven years.

The 2000 reforms had more substantial impacts on dairy. In general,

*"The reform aims to foster a more competitive, more environmentally friendly farming industry. It also marks a further step towards a policy that provides support for farmers rather than subsidies for products…The reform will also provide a foundation for the Union's position in the forthcoming...WTO [negotiations]."*[19]

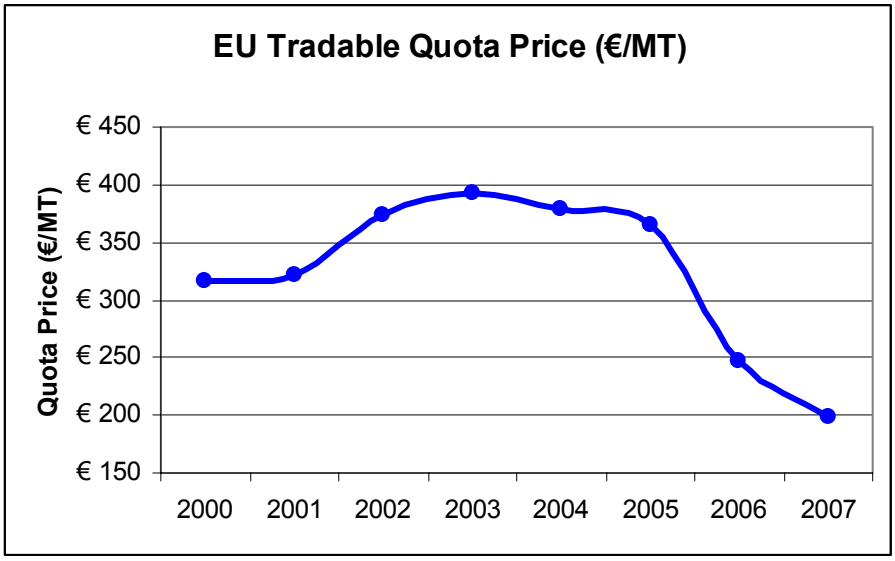
Intervention prices for butter and SMP were slated to be lowered by 15% in 2005, in 2006, and again in 2007. Direct payments to producers were increased in each of those years to offset the lower intervention prices. Quotas were left unchanged, except that the commission would review the system in 2003, with an eye toward discontinuing them by 2006.

In 2003, the abolition of quota was put off until 2015 and a "soft landing" plan was put into place to prepare for the eventual abolition. The planned reductions in intervention prices were brought forward by a year, starting in 2004 instead of 2005, and the butter support price would drop by 25% over the course of four years instead of 15%

over the course of 3 years as laid out in the 2000 reform. Maximum purchases of butter were also reduced, from 154 million pounds in 2004 to 66 million in 2007. Purchases above that level are done through a tendering processes, at prices that the Commission deems appropriate. The official target price for milk was also abolished.[20]

### Milk Quota Abolition

Since 1987, when limits were placed on intervention purchases, and 1989 when intervention prices were lowered, the trend has been toward a freer market. By 2000, there were already expectations for the eventual abolition of quota. A "soft landing" plan has been put into place (and into practice) to prepare the market for the eventual removal of quotas on April 1, 2015. Quota was increased by 2% in 2008, and is set to expand by 1% each year until 2013. There is no increase slated for 2014, and quota is scheduled to dissolve on April 1, 2015. While there have been plans to dissolve quota some-time-in-the-future since the 2000 reforms, the current soft landing plan is being carried out according to plan. The increases in quota for 2008, 2009, and 2010 have taken place as scheduled, and the value of quota has been falling steadily as farmers anticipate the eventual abolition.




Source: FADN

## *United States*

There has never been a mandatory supply restriction system at the national level in the United States, but the federal and state governments have been deeply involved in the pricing of milk. The US government has generally influenced milk production by changing the government support price for milk. The first nationwide foray into milk pricing was in the Agricultural Adjustments Act (AAA) of 1933. The AAA setup a classified pricing structure and the pooling of milk receipts by a handler or marketwide.

But the pricing structure in the AAA was voluntary and inadequately enforced.[22] A number of amendments were made by Congress in 1935. The voluntary "marketing agreement licenses" were replaced with the Federal Milk Marketing Orders (FMMO). The amendments also authorized funds to be used by the government to purchase surplus dairy products and distribute them for relief efforts. The Agricultural Marketing Agreement Act of 1937 restated and strengthened the earlier AAA, as well as adding an explicit mechanism for supporting farm level milk prices. "One of the policies of the AMAA was 'to establish and maintain such orderly marketing conditions for agricultural commodities in interstate commerce as would provide farmers with parity prices...'. However, USDA contended that the chief objective of the AMAA was to stabilize milk markets rather than to raise milk prices to artificially high levels."[22] Parity prices were based on the relationship between input prices and milk prices between 1910 and 1914. That time period was chosen because input prices were relatively low compared to milk prices at the time.

In response to the more stable and generally higher milk prices, farmers increased production which led to surpluses in some regions. Attempts were made to lower the minimum price, but that failed to sufficiently reduce production. But demand surged in the early years of World War II and the government whipsawed from trying to reduce production to encouraging it. The Steagall Act of 1941 set the minimum milk prices at 85% of parity and also authorized open market purchases of butter by the government as well as direct payment to farmers who were willing to expand production. There were still periodic shortages of fluid drinking milk in some regions, so fluid pricing (Class I) was set as a fixed premium above the price of manufacturing milk, which was adopted by most of the FMMOs during WWII. Further,

*"Supply and demand adjusters were added later to vary the price actually paid from that determined through the use of the formula. The inclusion of the supply and demand adjusters was intended to reflect local market conditions, but they were limited in their usefulness as a result of difficulties encountered when incorporating them into pricing mechanisms."*[22]

The end of WWII brought to an end a number of the temporary supports to the market, but parity pricing (with adjustments to the actual formulas) and authorization to purchase dairy products to support the market were included in the Agricultural Act of 1949.

There were a few revisions and changes to the system during the 1950s and 1960s, but for the most part the system worked well. In 1972, demand began to outstrip supply, and prices were rising quickly. Market prices were well above government support. The government was fighting inflation at the time, and decided to temporarily suspend import quotas for a number of dairy products to help lower consumer prices.[22] To make the imports politically palatable, support prices were raised, though they were still below the current market price level.

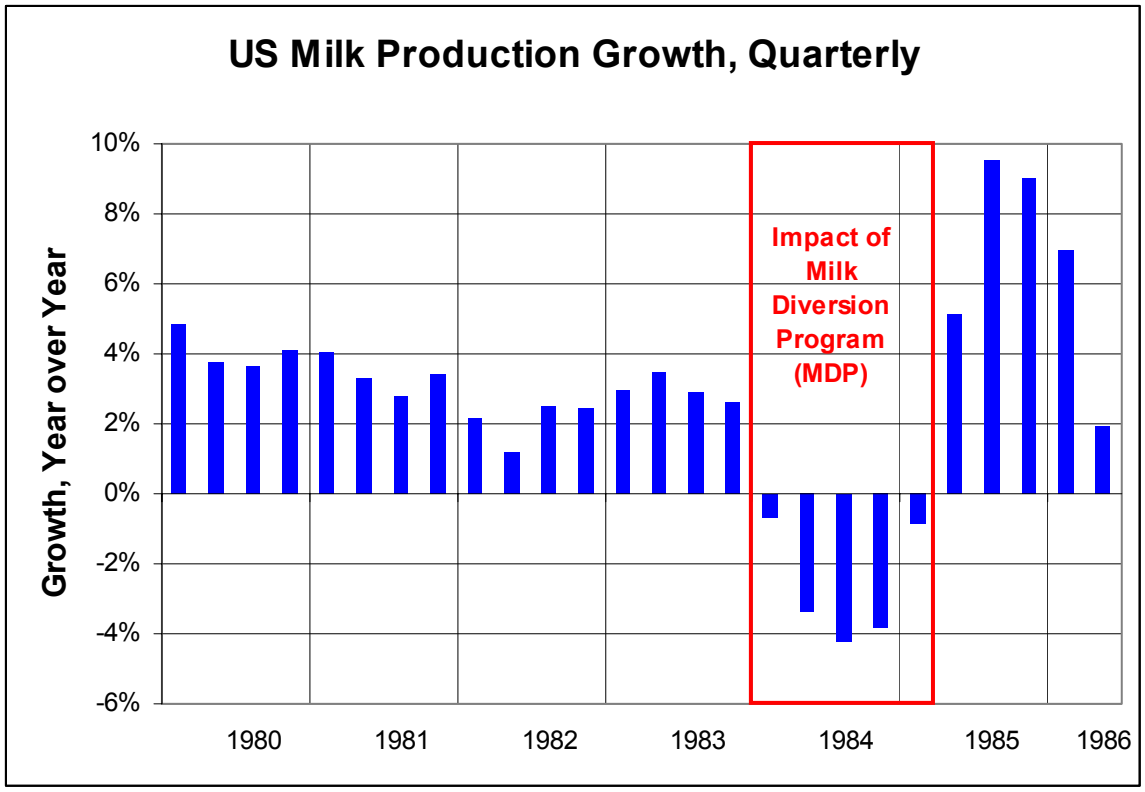
The Food and Agriculture Act of 1977 set the minimum price paid to farmers at 80% of parity, and required it to be adjusted semi-annually. Prior to the 1977 Act, the minimum price had been 75% of parity and it was only adjusted annually. Milk production was growing and was well above commercial demand, leading to ever increasing government purchases of surplus dairy products in the early 1980s. In 1979 government purchases of dairy products removed 4.2 billion pounds of milk equivalents, representing about 1.2% of national milk production. By 1983 the surplus had quadrupled to 17.4 billion pounds of milk equivalents, representing 12.2% of production. The cost of the purchases ballooned from $247 million in 1979 to $2.7 billion in 1983.[23] Adjusted for inflation; the $247 million spent in 1979 would represent $730 million in 2009 dollars. The $2.7 billion spent in 1983 would be $5.8 billion in 2010 dollars.

To deal with the burgeoning surplus, the link between the support price and parity was cut in the 1981 Agriculture and Food Act, but the act set incrementally higher support prices for 1982-1985. "By the end of 1981, milk production was still increasing and net removals remained high. Legislators concerned only with the federal budget and the mounting deficit stepped into the picture with the intent of reducing governmental expenditures on dairy products."[22] The steady to slightly higher support prices were not enough of a disincentive to reduce production, and the government was worried about the ever growing cost of the dairy program. To send a clear message to milk producers without going through the politically difficult processes of lowering the support price, Congress included a nonrefundable farmer paid $0.50 assessment per hundredweight of milk marketed in the 1982 Omnibus Budget Reconciliation Act to help cover the cost of the dairy program. There was also a second $0.50 assessment, which was refundable to milk producers who cut their milk marketings by at least 8.4% below their base.[27] "The assessments and deductions proved to be effective instruments for generating revenue to assist in the funding of the dairy price support program; from October 1, 1983 to September 30, 1984 over $800 million was collected from dairy farmers. However, the assessments were extremely unpopular with farmers and did little to curb total milk production, forcing legislators to seek other means of reducing milk production."[22]

## Milk Diversion Program (MDP)

Since the assessments were having little direct impact on milk production, Congress passed the Dairy Production and Stabilization Act of 1983 in November of that year. The Act (1) established a 15-month milk diversion program (MDP), (2) eliminated previous milk assessments and authorized a new, 50-cent assessment, (3) established a program to promote the sale of dairy products, funded by a 15-cent assessment, (4) reduced the price support level from $13.10 to $12.60, and (5) authorized further price support level reductions in 1985 if estimated CCC (government) purchases exceeded specific levels.[23] The MDP was the core of the Act. Milk producers had until January 31st of 1984 to sign contracts to reduce their milk marketings by 5 to 30% from a base period. The producer could choose the base period, either average marketings in 1981 and 1982, or marketings from just 1982. Producers had to withhold the milk for 15 months, from January 1984 through March 1985, and would be paid $10.00 per hundredweight of

reduced production from their base. About 38,000 milk producers signed up for the program, contracting to reduce marketings by 6.9% from the 1982 base production.[11,23] While the MDP did reduce milk production over the 15 month period that it was in effect, milk production surged as soon as the program ended in April of 1985.




Source: USDA

The results from the program were mixed. It did reduce milk production, although only temporarily. The $0.50 assessment to cover the cost of the program covered 92% of its total cost of $955 million dollars.[23,11] The reduction in milk production slowed government purchases of dairy products under the price support program, saving an estimated $614.3 to $664 million.[25] But, it's estimated that about half of the reduction in milk production would have taken place even without the payments from the MDP.[23] In a survey done by the General Accounting Office, 72% of the MDP participants indicated that they planned to increase marketings again after the program ended.[25] The program was also susceptible to fraud; one farmer was caught crediting his marketings to a producer who was not part of the program. If the fraud had not been detected, the farmer would have received about $69,000 in MDP payments.[25]

From a long-term perspective, the MDP did little to slow milk production growth. "The milk diversion program was a short-term program in an industry that operates in a longer time frame."[23] "The … experience suggests that schemes to compensate farmers for not marketing milk are best avoided."[11]

## Dairy Termination Program (DTP)

Recognition that the effects of the MDP were only temporary and the rebound in milk production and government purchases led to further attempts to slow milk production growth in the 1985 Food Security Act. The Act authorized reductions in the government support price, and the Dairy Termination Program (DTP), sometimes referred to as the whole herd buyout program.

*"Under DTP, the U.S. Department of Agriculture (USDA) paid participating farmers to dispose of their entire dairy herds, either by slaughter or by export, during 1986 and 1987. Participants also agreed not to involve themselves or their facilities in dairy production for 5 years. Although DTP reduced dairy production capacity for a time, it was not designed to permanently do so."*[26]

Milk producers submitted competitive bids per hundredweight (cwt) to the government for the right to participate. "Bids ranging from $3.40 to over $1,000 per cwt of base production were submitted by about 39,500 producers. All bids up to $22.50 per cwt (averaging $14.88 per cwt) were accepted, a total of 13,988."[28] The 13,988 farms that participated accounted for about 5% of all dairy farms at the time. Total cost for the program was about $1.83 billion, adjusted for inflation it would be $3.58 billion in 2009 dollars. The program removed about 1.55 million cows from the herd, about 14% of the herd in 1985. The program ran from April 1986 to August 1987.

As with the MDP, results from the program were mixed, although there seems to be consensus that the DTP was more effective in the short and long-run than the MDP was. The average size of the dairy herd was down 1.9% during 1986 compared to 1985, but milk production was actually up 0.1%. Gains in production per cow more than offset the decline in the herd. Farmers who participated were locked out of using their dairy facilities or starting another dairy farm for five years. A survey by the General Accounting Office done in 1991 found that 3.4% of the participants planned to "definitely" return to dairy farming, and 4.6% "probably" would.[26] The GAO estimates that returning farmers would add about 0.6% to milk production by 1992. While the DTP was taking place, government support prices were also being lowered, which makes it difficult to disentangle the impacts of the two programs on milk production and government expenditure. The GAO estimates that the impact from the DTP was felt quickly, while the impact of lower support prices would have a larger impact on government purchases in the future.

*"The results … suggest that both DTP and support price reductions have proven, in this experience, to be a cost-effective means of substantially reducing the quantities of government purchases of excess dairy products. Nonetheless, we project that in the coming years, with no change in current policy, government purchase levels will be similar to the current levels and will remain appreciably above the levels achieved during several decades before the 1980s."*[26]

One of the unintended consequences of the program was a drop in beef prices as the surge of dairy cows went to slaughter. During the spring and summer quarters of 1986, cow slaughter jumped 23% and 15% respectively. Supply changes of this magnitude typically have a major negative impact on pricing in the beef complex and that was certainly experienced. The cattle and beef complex was already struggling in an environment of weak demand and the extra supply of beef put on the market by the buy-out program exacerbated the already weak market for cattle. At times, cattle and beef prices traded as much as 5-10% below prices experienced the previous year which were already at depressed levels. As a result of this severe negative impact, the National Cattlemen's Association has lobbied hard against a repeat of the DTP using public funds.

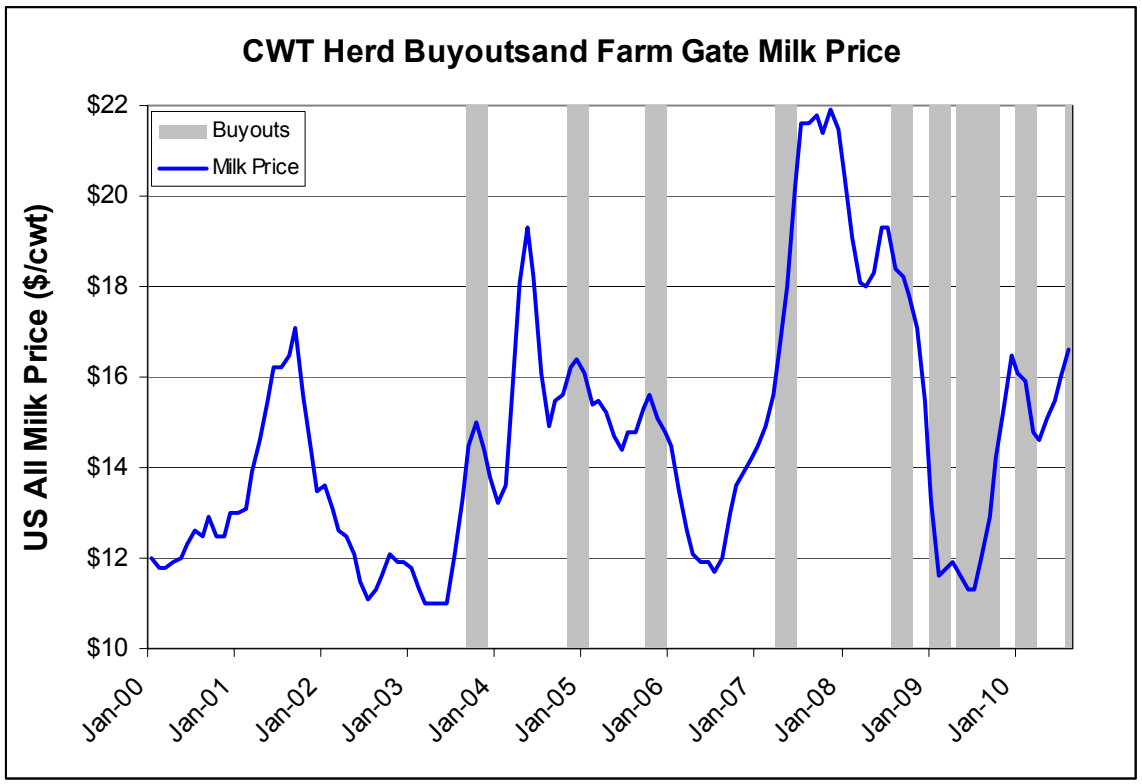
## Cooperatives Working Together (CWT) Herd Retirement Program

The Cooperatives Working Together (CWT) is a voluntary association of cooperatives and individual milk producers that carries out activities to support milk prices. The CWT was developed by the National Milk Producers Federation (NMPF), which is a national lobby group for dairy cooperatives. The program is funded by member cooperatives and individual producer members paying an assessment on each hundredweight of milk they produce. The program started in July of 2003, and the assessment at the time was 5 cents/cwt. According to the CWT, they were collecting the assessment on nearly 70% of the milk produced in the country. The assessment was later raised to 10 cents/cwt in July of 2006.

The CWT helped to support prices in two ways, the first is subsidizing exports of dairy products, and the second is through their herd retirement program, which operates similarly to the Dairy Termination Program (DTP) run by the US government in the mid-1980s. The CWT Committee, made up of the Board of Directors of NMPF along with representatives from each participating cooperative who is not a member of NMPF and representatives for individual producers who are members. The Committee closely monitors market conditions, and when they anticipate that farm level margins will come under pressure, they announce a herd retirement round is open. Farmers then calculate their bids and submit them to the CWT. The payment from the CWT is theoretically the difference between what the cows are worth alive as milking cows and what the cows are worth at slaughter. But instead of being done on a per-cow basis, the difference between the slaughter value and the "replacement" value is divided by average production per cow and the bid is submitted as dollars per hundredweight of milk to equalize bids from herds with above or below average production. If the farmer's bid is accepted, he is required to send the entire milking herd to slaughter and he keeps the revenue from the slaughter house. On verification that the cows have been slaughtered (done with ear tags), the CWT then pays the farmer his bid price multiplied by his herds production.

| Round | Announced | Farms Retired | Cows Retired | Heifers Retired | Average Price per cwt/milk | Average Price per cow | Total Cost |
|---|---|---|---|---|---|---|---|
| 1 | Jul-03 | 299 | 32,724 | | $4.03 | $749 | $25,451,030 |
| 2 | Sep-04 | 363 | 51,700 | | $5.24 | $1,005 | $51,450,000 |
| 3 | Aug-05 | 442 | 64,000 | | $6.75 | $1,266 | $85,050,000 |
| 4 | Feb-07 | 333 | 52,783 | | $5.50 | $1,042 | $58,866,000 |
| 5 | Jun-08 | 203 | 24,860 | 275 | $6.10 | $1,059 | $26,625,070 |
| 6 | Oct-08 | 186 | 50,630 | 1,240 | $6.49 | $1,251 | $64,861,531 |
| 7 | Apr-09 | 367 | 101,040 | 818 | $5.76 | $1,119 | $113,033,000 |
| 8 | Jul-09 | 274 | 74,114 | 2,958 | $5.58 | $1,146 | $84,967,000 |
| 9 | Oct-09 | 143 | 25,620 | 372 | $5.25 | $1,059 | $27,402,900 |
| 10 | May-10 | 180 | 33,409 | 0 | $3.75 | $730 | $24,375,000 |
| **Total** | | **2,790** | **510,879** | **5,663** | **$5.70** | **$1,100** | **$562,081,530** |

Source: CWT Press Releases, CWT Financial Statements, Informa Economics Estimates




Sources: USDA, Informa Estimates

Up to August of 2010, there have been 10 rounds of retirements. In the first three rounds, the CWT announced that they were targeting a specific amount of milk to be removed. Announcing a target ahead of time tied their hands in determining what bid prices they could accept. If they failed to accept enough bids to achieve their targeted reduction it would be a disappointment to the market and the retirement would not have the same physiological impact. The CWT stopped announcing a target during the fourth round. In the fifth round, an option was added for farmers to sell their bred heifers as well. Through the fourth round there were "regional safeguards" in place to limit the percentage of milk that could come out of particular regions of the country. The regional safeguards were dropped in the 5$^{th}$ round as producers in those regions argued that they

had been paying into the program at the same rate as non-safeguarded regions and they deserved a fair shot at having their bid accepted based on price. While producers who participated in the retirements were not barred from starting up another dairy farm, they were barred from participating in the program again. In round 7 that changed and producers who had previously participated were allowed to participate again. Also in the seventh round, accepted bids would be paid 90% of the total payment upfront, and the remaining 10% (plus interest) if both the farmer and his facilities remained out of milk production for one year. In rounds 8 through 10, the CWT announced the maximum bid they were willing to accept at the time that they announced the start of the round. In rounds 8 and 9 they also shortened the bidding window to 2 weeks instead of the more typical 4-6 weeks. The announcement of a maximum price and the shorter bidding windows were meant to give farmers a realistic expectation of what prices the CWT would accept, and to speed up the bidding and bid review processes.

The herd retirements suffer from some of the same problems that the Milk Diversion Program and Dairy Termination Program encountered in the 1980s, namely that a significant portion of the reduction (~50% in the MDP) would have likely taken place without the program. At best, it could be argued that the retirements "pulled-forward" the slaughter of those cows which would have eventually been slaughtered a few months later if the financial incentive was not offered. The program also suffered from a free-rider problem. Those farmers and cooperatives not paying into the program were still getting the benefits from the reductions in milk production. Prior to July 2006 the CWT claimed to be collecting an assessment on 70% of the milk produced in the country. After the assessment was increased to 10 cents/cwt, some members dropped out of the program, and we estimate the program was only covering about 63% of total milk production. Lastly, while some farmers were taking part in the retirements, others were still expanding, sometimes completely offsetting the retirements.

The future of the CWT is in question. Since its inception in 2003, farm level margins came under significant pressure in 2006, and then hit record lows in 2009. The collapse in milk prices during 2009 was due primarily to a collapse in exports and a slowdown in domestic demand due to a weak economy. The CWT was unable to remove enough cows in a quick enough to stop milk prices from falling to unprofitable levels. The inventory of heifers has been growing over the last five years, and producers who did not participate in the retirements have been expanding their herds. Those who are still paying into the CWT are growing increasingly frustrated by the free riders, and some are voicing moral objections against sending perfectly healthy and productive milking cows and bred heifers to slaughter.

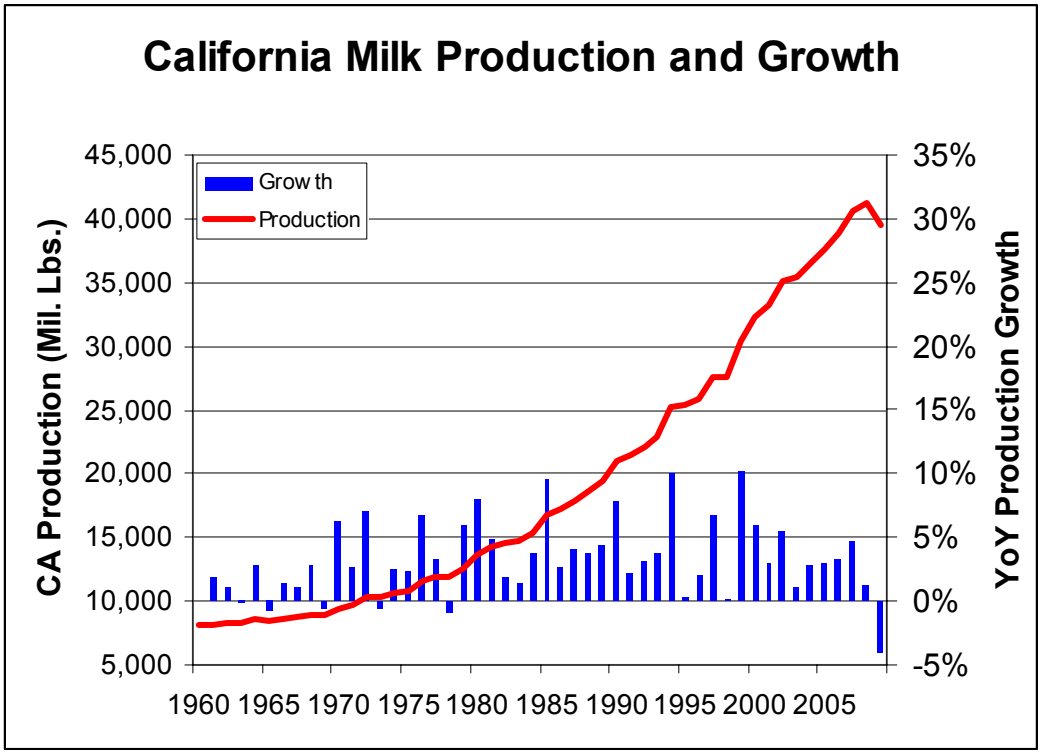
## California Quota System

California's dairy industry was hit by the great depression like much of the rest of the US and world. "By June of 1932, the situation had developed into all out war. Milk trucks were tipped over, store fronts were damaged and an air of violence began to develop, particularly in the Los Angeles milkshed."[30] The Young Act of 1935 created

minimum producer price system in California, but producers were still competing against each other for Class I sales, which put processors in a strong bargaining position.

In 1967, the California Legislature passed the Gonsalves Milk Pooling Act, which led to a quota and pooling system. California's quota is not a restriction on production, it's a way to divvy up the price premium received for Class I (fluid drinking) milk. Quota was issued in 1969 based on annual shipments of milk for Class I use from 1966 to 1967 plus 10%. The value of milk sold for Class I is divvied up to quota holders based on their relative holdings. Any milk produced above quota, or produced by those who hold no quota, is paid the manufacturing milk price. Quota is fully transferable with prices in 2006 around $500 per pound of nonfat solids per day.[29]

"As it originally developed, the California quota plan was principally a means of maintaining the Class I market for existing producers rather than a mechanism for controlling supply as in the European Community."[11] Instead, there is a strong argument that the quota system has actually helped to expand production in the state. Banks are willing to accept quota as collateral, which has allowed producers to access capital and grow their farms. Although, "The original assumption was that 'nobody would operate except within quota because of economics…Why produce at a loss?' (Interview information, Sacramento, 8 February 1990)."[11] Similar two-tier pricing systems have been used elsewhere as well, namely Australia prior to the year 2000, but they have done little to slow milk production growth.




Source: USDA

# Report Abbreviations

AMS: Agricultural Marketing Service
AU: Australia
CA: Canada
BLS: Bureau of Labor Statistics
CAD: Canadian Dollar
CAP: Common Agricultural Policy
CBOT: Chicago Board of Trade
CDC: Canadian Dairy Commission
CME: Chicago Mercantile Exchange
cwt: Hundredweight (100 pounds)
CWT: Cooperatives Working Together
CMSMC: Canadian Milk Supply Management Committee
DEIP: Dairy Export Incentive Program
DTP: Dairy Termination Program
EC: European Community
ECU: European Currency Unit
EEC: European Economic Community
ERS: Economic Research Service
EU: European Union
FADN: Farm Accountancy Data Network
FMMO: Federal Milk Marketing Orders
GTIS: Global Trade Information Services
GVA: Growth in Value Added
IMACE: International Margarine Association of the Countries of Europe
Informa: Informa Economics
MAF: Ministry of Agriculture and Forestry
MDP: Milk Diversion Program
MPC: Milk Protein Concentrate
MSQ: Market Sharing Quota
MT: Metric Ton
NFDM: Nonfat Dry Milk
NMPF: National Milk Producers Federation
NZ: New Zealand
OECD: Organization for Economic Co-operation and Development
SEQ: Subsidy Eligibility Quotas
SMP: Skim milk powder
WTO: World Trade Organization
WWII: World War II (2)
USD: United States Dollar
USDA: United States Department of Agriculture

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