



CPDMP

Cornell Program on Dairy Markets & Policy

Farm and Retail Milk Price Relationships in New York

Briefing Paper Number 08-01

July 2008

by Andrew Novakovic and Esther Washburn*

Abstract

Food prices in general and dairy prices specifically have increased rapidly since early 2007, increasing some 4-6% on an annual basis. This is far less than the 10-20% inflation of the early 1970s, but it is stunning nonetheless. This has prompted many inquiries and concerns as to the causes, likely duration, and so on. Among the concerns often expressed is the extent to which retail price changes can be justified by or correlated with changes in prices received by farmers for the raw products. Marketing costs, most notably those that are energy related, are also increasing, but the relationship between retail and farm level prices remains of special interest.

This paper does not attempt to explain the causes of recent price changes. Its purpose is only to describe the price changes for beverage milk products and compare them to farm price changes, with a specific focus on markets in the Northeast, especially New York.

Among the basic findings are:

- *Nationally, farm and retail prices both increased about 90¢ per gallon from the low points of 2006 to the high points of 2007*
- *The “farm share” of the retail price ranged from 38% to 55% during 2006 to 2008 and this range is more or less observed in all markets*
- *Patterns of monthly changes are similar but not identical in major city markets in New York, Pennsylvania and New England.*

Although reduced somewhat from the 2007 peaks, prices remain high and variable in 2008.

* Andrew Novakovic is the EV Baker Professor of Agricultural Economics and Director of the Cornell Program on Dairy Markets and Policy. Esther Washburn is a MS student and Graduate Research Assistant. Both are in the Department of Applied Economics and Management at Cornell University

Prices for Farm Milk and Beverage Milk Products in the US

Federal data indicate that the average monthly price of a gallon of whole milk in grocery stores across the US increased 90¢, or 30%, from a low in late 2006 to high in late 2007. The average annual increase from 2006 to 2007 was about 14%. This large increase parallels rapid and large increases in all food prices but is in sharp contrast to the typically modest (2-3%) annual increases common over the last 25 years.

Having hit a 2006 peak of \$3.22 per gallon in February, the national average retail price fell during Spring 2006. It began to strengthen in Fall and Winter. From the beginning of 2007, milk prices rose rapidly. By May 2007 the average retail price hit the previous 2006 high; in November it peaked at \$3.90. Since then, up to Summer 2008, the average price has slid back to the \$3.75 neighborhood. Current markets are probably best described as unsettled, rather than clearly moving up or down.

Although the timing of price changes is not contemporaneous, this change at retail more or less mirrors change in the cost of raw milk for fluid milk processors. Looking at the same time frame and a corresponding price for farm milk, the price for farm milk hit a low in September 2006 and peaked in September 2007, whereas the retail price hit its low in November and December 2006 and peaked in November 2007. Thus, it seems that changes in retail prices have lagged changes in processor costs by about two months.

Given the difference in timing, the change in the corresponding price for farm milk was 92¢ per gallon. In other words, the absolute increase was almost identical to the 90¢ increase in retail prices reported at the beginning of this paper. If one looks at the percentage increase, the change translates to an 80% increase in the farm-level price and a 30% increase in the retail-level price. Both numbers are stunning for a change in a one-year timeframe. The big difference in percentages is predictable given that the price a plant pays for farm milk tends to be from 35-50% of the retail price.

Indeed, if we calculate a “farm share” for retail prices over this short time frame, we find that, nationally, farm-level value of fluid milk equaled about 38% of the retail price during the middle months of 2006, when prices were low. In mid to late 2007, when prices were high, the farm share increased to 50-54%. In other words, the retail price moved up to reflect the big increase in raw input costs, but other costs didn’t increase proportionately. Consequently, the price processors pay for farm milk is a higher percentage of the retail price charged for beverage milk products.

Given this quick review of the basic data, let us step back from the data a bit to better understand the nature of these prices. In particular, we will take a closer look at the sources and types of information available with respect to “farm prices”.

Farm Prices vs. Plant Prices vs. the Cost of Milk

When comparing dairy prices across market levels, several basic questions are key and should be considered at the outset if one wants to avoid confusion or misinterpretation:

1. Which specific prices should be compared?
2. What is the appropriate timing over which to evaluate how much of a price change at retail can be explained by a farm price change? Is it reasonable to expect price changes across markets to be full and contemporaneous, or should one look at a pattern of change over a period of time? How long a time?
3. Should one look at absolute prices or just changes in price? Is it more important to know that a price declined 50 cents or that it is now \$3.65?
4. Should one look at percentage changes or absolute changes, or does it matter?

For example, many people instinctively compare the monthly prices farmers receive for all milk with prices of beverage milk products in the supermarket. Moreover, it is common to see statements such as “farm prices declined 20% but retail prices have barely moved”. This is understandable, but there are several ways that seemingly reasonable price comparisons are in fact misleading.

Perhaps the easiest mistake to make is to confuse the average price received by farmers for milk as equal to the cost of milk for a fluid milk processor. Even for those familiar with Milk Marketing Orders, it is not uncommon to make this mistake. The price of milk that becomes the cost of milk in a container of beverage milk sold in a grocery store, begins with the so-called Class I price, one of several specific prices established as a minimum under Federal Milk Marketing Orders (and by some States). Indeed, virtually all milk that is sold for beverage consumption is originally priced under a Milk Marketing Order.

Nationally, there is a Federal Milk Marketing Order for each of 10 multi-state regions that cover most of the US. The States that do not participate in a Federal Order typically have very similar pricing regulations under State law. The largest of these is California, which is also the largest milk producing and consuming State. In the Northeast, Federal Order 1 spans northern New England, western New York, central Pennsylvania and northern Virginia. The States of New York, Pennsylvania and Maine also have pricing regulations for portions of the milk produced in those states, the majority of which is priced under the Northeast Federal Order.

The Class I price, or perhaps, more accurately, one might say the cost of Class I milk for a processor, varies in ways determined by regulation but also in ways determined by market competition. Under Federal (or State) pricing regulations, Class I prices are typically announced for a specific location and milk composition. Most Orders make adjustments for location. In the Northeast, these adjustments are numerous and systematic. The Boston area is the highest priced zone and is the benchmark for NE Order 1 price announcements. Prices are similarly high along the East Coast but tend to slowly drop heading south from Boston. The New York City area is 10¢ per hundredweight less; Philadelphia is 20¢ less. For locations west of the Eastern Seaboard cities, prices decline more rapidly reaching a maximum of \$1.15 less than the Boston price in far western NY and Pennsylvania.

Another regulated adjustment is for milk composition, or more specifically fat content. This adjustment is not different by location, although there are some differences across marketing order areas (e.g., Northeast vs. Southeast). Typically, milkfat is priced higher than other components, such that skim milk has a lower price than whole milk. This is obviously meaningful when comparing to retail prices for beverage milk products, where the primary differences across the basic products are simply fat content and container size.

The processor's cost of raw milk also includes assessments that result from regulatory requirements (promotion and administrative assessments). These are generally not considered part of the price of milk and certainly do not accrue to farm returns. However, they are certainly part and parcel of the cost of raw product for a processor. Nationally, the mandated promotion assessment is 20¢ per hundredweight and the processor's contribution to covering the cost of the Northeast Order is about 5¢ per cwt.

The differences in regulated prices across a region are well defined and constant; hence, if you know one, you can calculate all the others. If one is interested in price movements, the ups and downs, looking at the Class I price for Boston, at 3.5% milkfat, adjusted for assessments or not, will basically tell exactly the same story as looking at a price for a different location or a different milkfat composition. However, if one wants to calculate a margin, e.g., the difference between the cost of raw milk and the price of a container of a certain milk product, then getting the location and milkfat adjustments correct is important and the assessments should be included.

There are also a variety of market determined price add-ons that should be included in any calculation of the cost of milk for fluid processors. Premiums, often called Over-Order Prices or Over-Order Payments, are negotiated for several reasons and take on numerous forms. Some are purely competitive and based on the relative demand for and supply of milk in a locality, obviously above and beyond what the nationally established price is. Some premiums are related to attributes of milk (e.g., quality factors) or attributes of the supplier (e.g., large, well located). Some relate to transportation costs or other services (e.g., delivery on demand vs. daily delivery). Accurate data on the premiums paid by fluid milk processors aren't available, but it is generally known that premiums tend to be a small share of the total price – around 5% - and they tend to not change very often, certainly not monthly.

For the purposes of this paper, the regulated minimum Class I price will be our measure of the cost of milk to fluid processors. When making comparisons to retail prices in a city market, we will use Class I prices adjusted to the corresponding location. All Class I prices will be calculated at 2% milkfat. This is the most common product sold in most markets, and it is near the average fat content for all beverage milk products. Lastly, we will add in 25¢ per gallon to cover the two assessments.

Prices in the Northeast

Up to this point, we have looked at US average prices. In the remainder of this paper, we will look at specific prices and price trends for selected city markets in the Northeast. Focusing on New York City and a representative Upstate market – Syracuse, we will also look at Boston and Providence, in New England, and Philadelphia, Pennsylvania. Syracuse and New York City

provide a secondary city/primary city contrast within New York State. Boston and Philadelphia provide major city contrasts to NYC. Providence provides another point of contrast that is somewhat intermediary, less than Boston but more than Syracuse. These locations also represent a contrast with respect to three different forms of State regulation on beverage milk product pricing. These differences are described in more detail in a later section.

Processor Prices for Farm Milk in Northeast Markets

Table 1 reports prices that beverage milk processors were required to pay for farm milk, adjusted as described above. The differences across locations are constant over time, so we will describe only the New York City price, as it is indicative of price changes elsewhere in the Northeast. To facilitate comparison with retail prices, Class I prices are converted to dollars per gallon.

The regulated price of Class I milk in New York City reached a minimum of close to \$1.00 per gallon in the middle of 2006. For September 2006 it was \$1.07 per gallon. From that point it rose steadily until peaking at \$1.99 in August 2007, where it stayed until December. Thus, the cost of farm milk to a fluid milk processor almost doubled over a 12-month period, comparable to the national numbers reported above

Also paralleling the national trend, this NYC Class I milk price dropped from late 2007 until it hit a low point of \$1.55 a gallon in May 2008, essentially dropping half of the amount it had gained during 2007. The Class I price fluctuated in this mid \$1 neighborhood from March to June but in July it moved more aggressively upward, reaching \$1.89 per gallon.

It is normal for milk prices to increase in the Fall; so this recent increase is a bit earlier than usual and may presage further price increases in the next few months.

Retail Price Response in Select Northeast Markets

In Table 1, the retail price is the weighted average price for beverage milk products sold in gallon containers at grocery stores in the selected city markets. The products include all of the usual fat contents (whole, 2%, 1%, and skim) but are only for gallon containers. All the products are so-called “white milk”, meaning that they do not include flavored milk, lactose-reduced milk or other variations of conventional milk. They include milk from cows that may have been treated with rbST as well as milk identified as coming from cows not treated with this approved bovine hormone. They do not include organic milks or non-dairy, white beverages. The retail prices reported below are the prices reported for each SKU in this product category, weighted by the volumes sold, on a monthly basis.¹

In interpreting the data in Table 1, keep in mind that the low 2006 and high 2007 data reflect the extreme values for each variable during the designated years. They may be in different months for each variable and a different month for each city.

¹ In retail parlance, every item that is not exactly the same is considered a different “stock-keeping unit” or SKU, often pronounced phonetically as “skew”. One might think of it as an item with a unique barcode.

The farm share is the lowest or highest value that was calculated for a given month, using the Class I price and retail price for the same month. The farm share listed in Table 1 is not equal to the retail price divided by the Class I price from the same row.

In the case of Class I prices, the high and low months are the same. Retailers are more or less free to set prices as they see fit and competition allows. They can pass on a wholesale price increase sooner or later. They can pass it on all at once or a little bit at a time. These pricing decisions can and do result in different price patterns when one is looking at daily, weekly or even monthly prices. The highest price in New York City and Providence occurred in September 2007. In Boston and Philadelphia it occurred in November. In Syracuse it was December. On the low side, all Northeast markets bottomed out in June 2006. This was also a low month across the US; however, as noted above, the lowest average prices in the US during 2006 were in November.

Table 1. Comparison of Class I and Retail Milk Prices in Selected Northeast Cities.

Location	Date	Class I total Price, adjusted to city location and 2% mf (\$ per gal)	Average Retail Price, gallon, white milk (\$ per gal)	Class I as % of Retail ("farm share")
New York	2006 low	\$1.07	\$3.07	34.6%
	2007 high	\$1.99	\$4.16	48.2%
	change	\$0.92	\$0.95	n.a.
Syracuse	2006 low	\$1.01	\$2.20	44.8%
	2007 high	\$1.92	\$3.16	61.6%
	change	\$0.92	\$0.85	n.a.
Philadelphia	2006 low	\$1.06	\$3.02	34.9%
	2007 high	\$1.98	\$3.97	50.1%
	change	\$0.92	\$0.81	n.a.
Boston	2006 low	\$1.08	\$2.85	36.7%
	2007 high	\$1.99	\$3.81	54.5%
	change	\$0.92	\$0.76	n.a.
Providence	2006 low	\$1.08	\$3.20	32.2%
	2007 high	\$1.99	\$3.93	52.3%
	change	\$0.92	\$0.49	n.a.

So, if we simply look at the low to high points in the most recent price cycle, we observe differences as follows:

NYC = \$1.09	Philadelphia = 95¢
Syracuse = 96¢	Boston = 96¢
	Providence = 74¢

Retail prices changed the most in New York City, and only $\frac{3}{4}$ as much in Providence. The other three Northeast cities were slightly less than NYC. In all of these cities the underlying regulated cost of farm milk changed identically and chances are that changes in the market premiums added to the minimum prices don't explain all the differences in retail pricing.

The change in Class I prices equaled 92¢ in all markets. This is 17¢ less than the change in retail prices in NYC and 19¢ more than the change in Providence. The retail price change in the other markets were virtually equal to the Class I price change. This doesn't necessarily mean Providence markets provide a better deal for consumers. Although the magnitude of change was least in Providence, retailers in Providence hit a higher peak and began moving prices up two months earlier than in nearby Boston. The Syracuse market peaked the latest, in December, and the Providence market peaked the soonest, in September. The New York City market had the highest increase but it was the slowest to begin increasing. In NYC, the retail price of milk held below \$3.10 from May to September in 2006 while retailers in other cities began increasing prices sooner, albeit by small amounts.

Of course, these price comparisons and the farm-to-retail price spread do not tell us anything about profitability. It is possible that a market with a high spread has less profitability than a market with a low spread. That, of course, hinges on differences in processing, marketing, and retailing costs. This kind of detailed analysis is beyond the scope of this short paper, but it is nevertheless important to keep these issues in mind when looking at market price data.

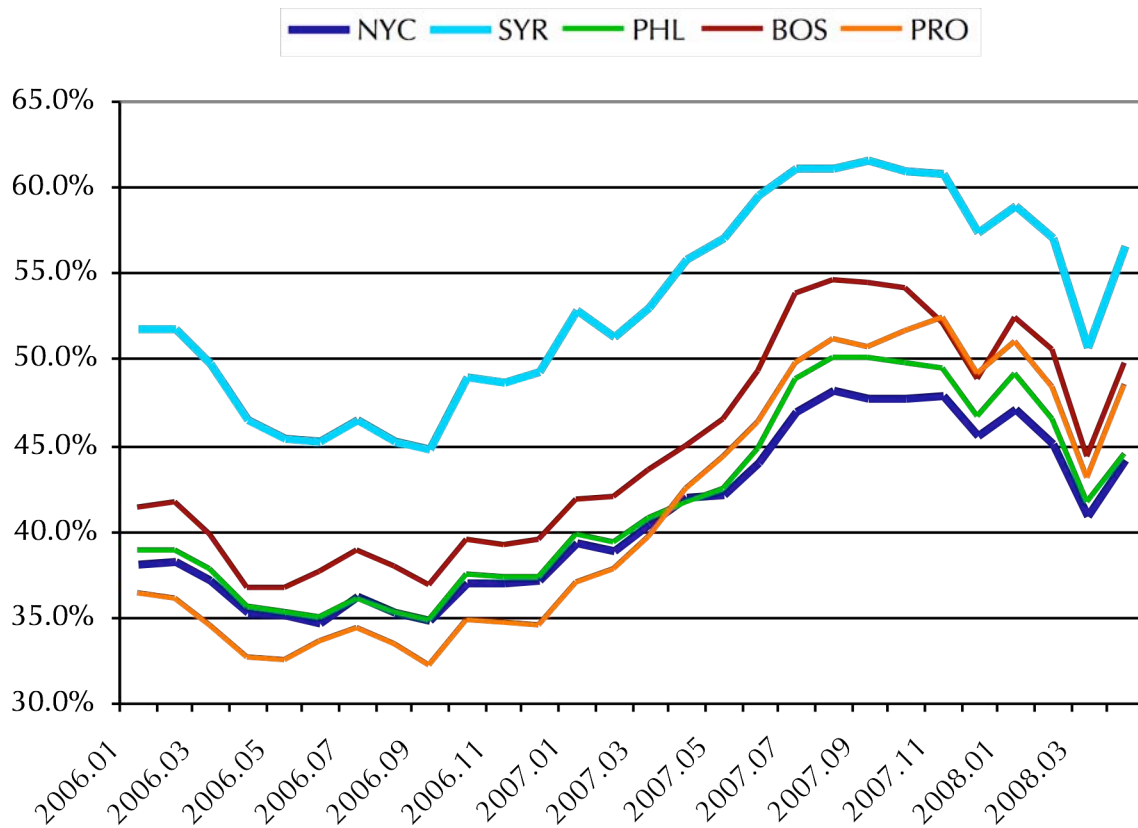
Absolute changes in prices across market levels can provide some useful insights about how price changes at the farm level are transmitted to the retail level. Percentage changes can be more confusing than helpful. For example, the percentage change in the Class I price from low to high is about 86% but the percentage change in retail prices is about 45%. Does this mean retailers are more restrained in increasing prices? No. It simply means that for similar absolute changes, the percentages are bigger on the smaller plant price base than the retail price base.

Another way to think about this is the farm share of the retail price. These data are illustrated for the selected Northeast markets from 2006 to 2008 in Figure 2. As discussed above, the farm share fluctuates over time and across markets, but tends to range from 40% or less to 50% or more. In the selected Northeast markets, the average farm share from January 2006 to April 2008 is as follows:

NYC = 40.9%	Philadelphia = 41.6%
Syracuse = 53.2%	Boston = 44.6%
	Providence = 41.2%

The higher farm share in Syracuse is probably the result of lower marketing costs in the small city market, including chiefly labor but perhaps also transportation and facility costs.

Figure 2. Class I and Average Retail Prices for Milk in Selected Northeast Markets, 2006-2008.



A Special Factor Affecting Retail Prices in Northeast Markets

In most parts of the US, there are no laws or regulations that establish or constrain prices that processors charge retailers for beverage milk products (the wholesale price) or the price that food stores charge for milk (the retail price). There are some exceptions. New York and Pennsylvania are two states among a handful that have wholesale or retail pricing regulations. .

New York is unique among the states in that it has a law that establishes a maximum retail price for any given Class I price, what is popularly called the Milk Price Gouging Law. This paper is not intended to explore the genesis, execution, or controversies surrounding this law, but some explanation is required to understand its potential relevance to comparisons of farm and retail price data.

The law is incredibly simple. It very tersely states that the retail price of milk should be no more than twice the price processors pay for farm milk. Thus, if the price paid by a fluid milk processing plant is \$1 per gallon, the retail price should be no more than \$2 per gallon. Although the law does not specify any allowance for standard industry or regulatory price adjustments for milkfat content nor any cost allowances for different package sizes or other marketing costs (low volume outlets, high cost outlets), it does provide some wiggle room insofar as the 2:1 price trigger is interpreted as a “threshold price”, not a strict maximum price. What this means is that if a store is found to sell no milk product (SKU) at a price equal to or less than the threshold price it is assumed, *ipso facto*, to not be in compliance with the law. However, if a store can demonstrate that it has a cost-based justification for the higher price, then the higher price can be allowed and in fact deemed in compliance.

In administering this law, New York State Department of Agriculture and Markets has made a couple of regulatory interpretations. It establishes not one threshold price but six. One for each of three container sizes and then two for each size corresponding to Downstate and Upstate market areas. By doing so, they recognize that packaging milk in a quart container is inherently costlier per unit than packaging in a gallon container. By differentiating Upstate from Downstate they acknowledge that the metropolitan New York City area has both higher marketing costs and tends to have lower volume retail outlets, both of which contribute to significantly higher marketing costs per unit. The law does not explicitly require or allow for these sorts of adjustments but their reasonableness has not been questioned.

Another important regulatory interpretation is that as long as a store is found in compliance for at least one product in each of the three container sizes (quart, half-gallon, and gallon) then the whole store is in compliance. The theory is that consumers have unlimited access to the cheapest product, but if they want to buy a milk product that is higher priced, that is their choice. This provides some flexibility for stores to charge different prices for organic products, premium labels or whatever else they believe justifies a higher posted price. The law is also applied only to conventional white milk products. It does not apply to flavored milks, fortified or otherwise modified dairy beverages, drinkable yogurts or the like, and it has no application to non-dairy beverages that compete directly with milk, such as soy or rice milk.

The rules on compliance are subtle but very important. Contrary to what a consumer advocate might assume or expect, having a label at a higher price does not violate the law, as long as at least one other label for a similar product (same size container, white milk) is in compliance. This has the further implication that data that are averages of many labels will tend to mask any possible effect of the law. The fact that the farm share in NYC averages less than 50% (the benchmark in the law) does not mean that NYC stores are not in compliance.

Pennsylvania has a very different type of law, indeed almost the opposite in that it establishes minimum prices that must be paid by retailers to wholesalers and by consumers to retailers. Whereas the New York law derives from a logic that tries to protect consumers from the possibility of retailers charging prices that can't be justified by changes in the cost of farm milk, the Pennsylvania law derives from a logic that tries to protect farmers from retail price competition that would presumably drive farm prices down. New York worries that retailers have a natural instinct to make money by overcharging for milk, whereas Pennsylvania worries that the natural instinct is to make money on volume through aggressive price competition that undercharges for milk.

In addition to this very different concept about the need for price regulation, Pennsylvania law manages marketing margins in the absolute, not by percentage. In establishing their minimum wholesale and retail prices for beverage milk, the Commonwealth attempts to determine fair and reasonable absolute margins for processors and retailers. These amounts are added to the regulated prices for Class I milk to arrive at the regulated wholesale and retail prices each month.

In Massachusetts and Rhode Island, there are no state laws that establish a retail or wholesale price of milk.

Given this, one might expect to see some difference in how retail prices move in response to changes in the Class I price. For example, the New York law, because it is based on percentages, should result in immediate and exaggerated changes. The Pennsylvania law would result in immediate changes but the spreads would tend to be less variable because the fixed marketing margin only changes when significant input costs change. To the extent that retailers engage in price smoothing, which is a common assumption in retail price analysis, one might expect the price spreads in New England to fluctuate the most because retail prices lag farm price changes on both the up and down sides. Whether the New England margins or spreads are higher or lower would be as much affected by competitive pressures, or the lack thereof, as any differences in costs.

While economic logic might lead to these conclusions, the data used here do not support any conclusions of the sort. Indeed, the pricing patterns seem more similar than different.

Summary

This paper does not attempt to rigorously analyze farm and retail milk price relationships; nor does it analyze the causes of recent, dramatic price changes. Rather, it simply seeks to illuminate what the price changes have been and generally discuss what insight might be drawn from these data. It also offers cautions about drawing conclusions that go beyond what the data can support.

Among the findings are the following:

1. Prices paid by processing plants for farm milk and prices charged for gallon containers of conventional, "white" milk by retail stores both increased by about 90¢ per gallon from the low month of 2006 to the high month of 2007, nationally.
2. Regulated prices paid by plants, the so-called Class I price, vary across city locations but they move in lock step from one month to the next.
3. Retail prices vary across city markets. They are correlated over time, but they do not move in lock step. They increase more rapidly and/or more completely in some markets, and the same is true on the downside.
4. Retail prices move up and down with farm prices but they do not move together on a month-to-month basis. To understand price relationships across markets, one needs to at least look at several months, not just one month. One also needs to be careful to look at the farm and retail price data that represents the best possible match in terms of the actual costs faced by processors.

5. Prices in major Northeastern cities tend to be higher and have lower farm price shares (higher marketing margins), compared to a secondary city, such as Syracuse.
6. Nationally, the monthly price of farm milk used to make beverage milk products ranged from about 38% to 55% of the retail price of milk during 2006 to 2008, rising when the farm-level price is high. Farm shares of the retail price in selected Northeast cities follow a similar pattern but the magnitude of the spread is significantly lower in Syracuse and higher in the major cities.
7. Although there are some notable differences in wholesale and retail milk pricing regulations across Northeast states, the basic patterns of retail prices and their relationship to farm prices are more similar than different across major city markets.

Additional Resources

Dairy price data are readily available on various government websites or in print. Retail price information is available from the Bureau of Labor Statistics, which is responsible for Consumer Price surveys and estimates, for example the well known and widely used Consumer Price Index or CPI. Some of the retail price data reported here was obtained from industry sources.

New York farm and retail price data are also reported by the New York State Department of Agriculture and Markets. The URL for their website is as follows:

<http://www.agmkt.state.ny.us/DI/DIStats.html>

There is an additional resource that may be of special interest to those who might want to get an estimate of what retail prices might or should look like for a given cost of farm milk. The Northeast Federal Order 1 Market Administrator provides a price calculation tool at the following Web address:

<http://www.fmmone.com>

This calculator uses the prices that are required under the Order along with standard conversion factors for container sizes and fat content plus estimates of marketing margins. The conversion factors are not subject to much debate or change over time. The marketing margins are estimates and may or may not be accurate over the entire marketplace at any point in time or for different stores at a point in time. They should be considered approximations, not a conclusive benchmark on a “fair” price or the like.