

California Farm-Retail Milk Price Relationships

by Hoy F. Carman

Milk pricing in California is often controversial. Consumer advocates and their organizations periodically charge that retail milk prices are “unfair” or “too high” and call for public intervention in the fluid-milk market. The consumer view is expressed by Consumers Union, which after conducting surveys of retail milk prices in Los Angeles and San Francisco area food stores, charged that large supermarket chains were “gouging” consumers and that this gouging was the primary cause of surging retail milk prices that were leading to an increasing gap between the price per gallon received by farmers and the price paid by consumers. A 1997 Consumers Union press release based on their price surveys observed that:

“When the farm price increases even a penny, grocers generally raise the price to consumers quickly and exponentially. When the farm price drops, as it has three times in the past two years, grocers have slowly passed on a fraction of the decrease to their customers. If that historical trend continues, the large gap between the farm price and the price consumers pay will steadily grow.”

Consumers Union used their September 1996 Bay Area milk price survey to call on the California Attorney General to “investigate whether there exists an unspoken agreement on the part of the major Bay Area supermarket chains to set the price of milk.” There was an investigation and on July 22, 1997, the Attorney General’s office announced that they had “found there is no evidence of an agreement to

establish prices among the supermarkets.” Questions remain, however, concerning the relationships between farm and retail milk prices and food retailers’ pricing methods and practices.

This article examines the relationship between farm-level and retail prices for whole fluid milk in California over time. The focus is on the responsiveness of retail milk prices to both increases and decreases in farm-level prices, with attention to the possible lags involved. The relationship between marketing margins and changes in marketing costs, which are the major determinants of the difference between farm-level and retail prices for food, is also examined.

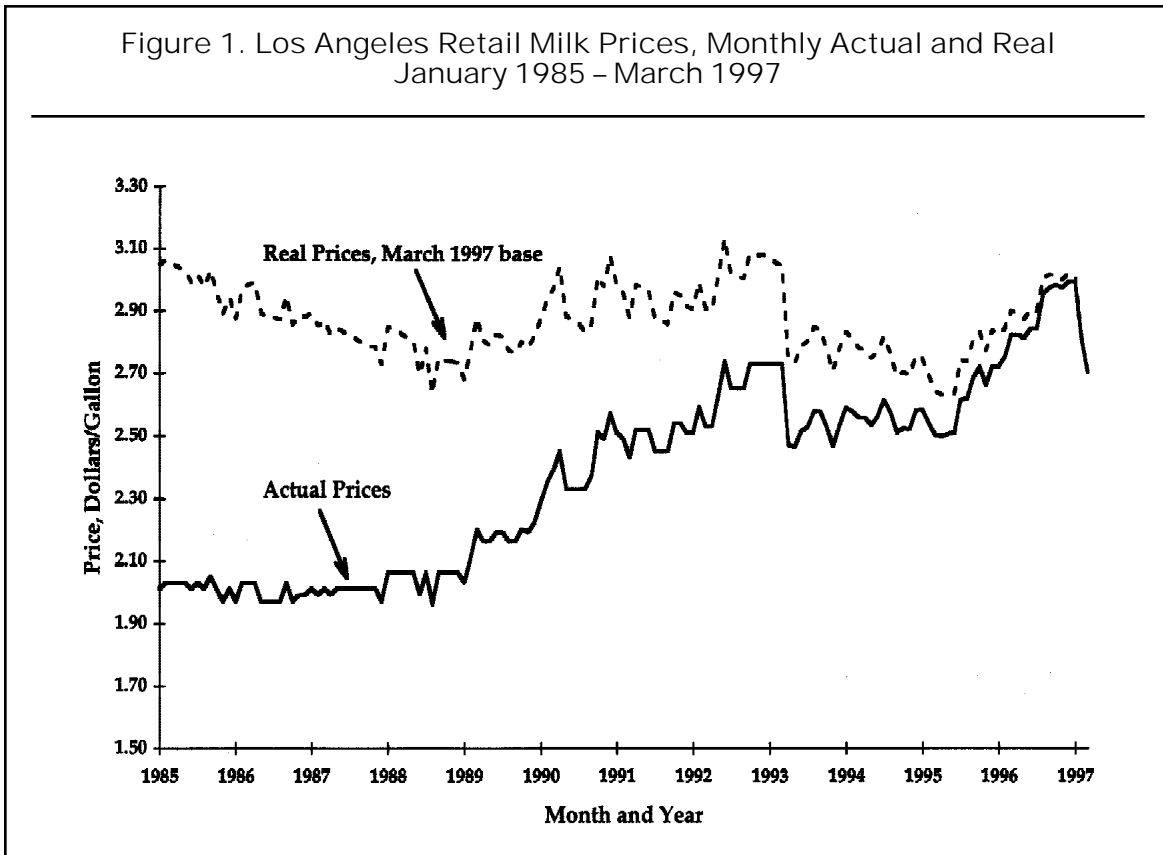
California Milk Price Data

Farm and retail milk price relationships are analyzed for three major California retail market areas: Los Angeles, San Francisco and Sacramento. Monthly retail milk prices for the period from January 1985 through March 1993 were collected by the California Department of Food and Agriculture (CDFA) during the first week of each month from five stores in Sacramento, four stores in San Francisco and seven stores in Los Angeles. Beginning in April 1993, the Department contracted with A.C. Nielsen to provide the retail price survey data. The Nielsen prices, from Scantrack Reports on Refrigerated Milk, are weighted averages of prices for 4-week periods. California farm prices are monthly minimum producer prices for class 1 milk (delivered at the processing plant) for two production areas (Northern California and Southern California). Producer and retail prices are reported in the *California Dairy Information Bulletin* issued monthly by the Dairy Marketing Branch of CDFA.

Pricing patterns and marketing margin behavior were similar for each region. The behavior of retail milk prices for the Los Angeles market over the period of analysis is illustrated by the data in Figure 1. While retail milk prices tended to be highest in Los Angeles and lowest in Sacramento, the price and margin trends for San Francisco and Sacramento were generally similar to those observed for Los Angeles. As shown, average retail prices varied around \$2.00 per gallon from January 1985 through January 1989; average retail prices then began a rather steady upward climb, reaching \$2.73 per gallon from October 1992 through March 1993. There was a sharp drop in average retail prices in April 1993 when data collection procedures were changed; average retail prices remained under



Figure 1. Los Angeles Retail Milk Prices, Monthly Actual and Real January 1985 – March 1997



\$2.61 per gallon until July 1995 and then began a steady increase, reaching \$2.99 per gallon in December 1996 and January 1997. Average retail prices then decreased to \$2.70 per gallon in March 1997. When adjusted for changes in the general level of prices as measured by the Consumer Price Index (March 1997 = 100), the average real retail price of milk per gallon in Los Angeles showed periods of increasing and decreasing price trends, but the real price in March 1997 (\$2.70) was well below the real price in January 1985 (\$3.05). Data on the actual milk marketing margin (retail price minus producer price) for the Los Angeles market reveal significant variability but with an upward trend over the 12-year period (Figure 2). In real terms, the margin was higher in March 1997 (\$1.45) than in January 1985 (\$1.23), but it decreased slightly from April 1993 (\$1.53) to March 1997 (\$1.45), when A.C. Nielsen collected the retail price data.

Retail Price Response

CDFA, under provisions of a state marketing order, sets the monthly California farm price for fluid and manufacturing milk. Prices at other levels in the milk marketing channel are established by market forces.

As noted, the level and behavior of retail milk prices and milk marketing margins have raised questions about how well the market is functioning.

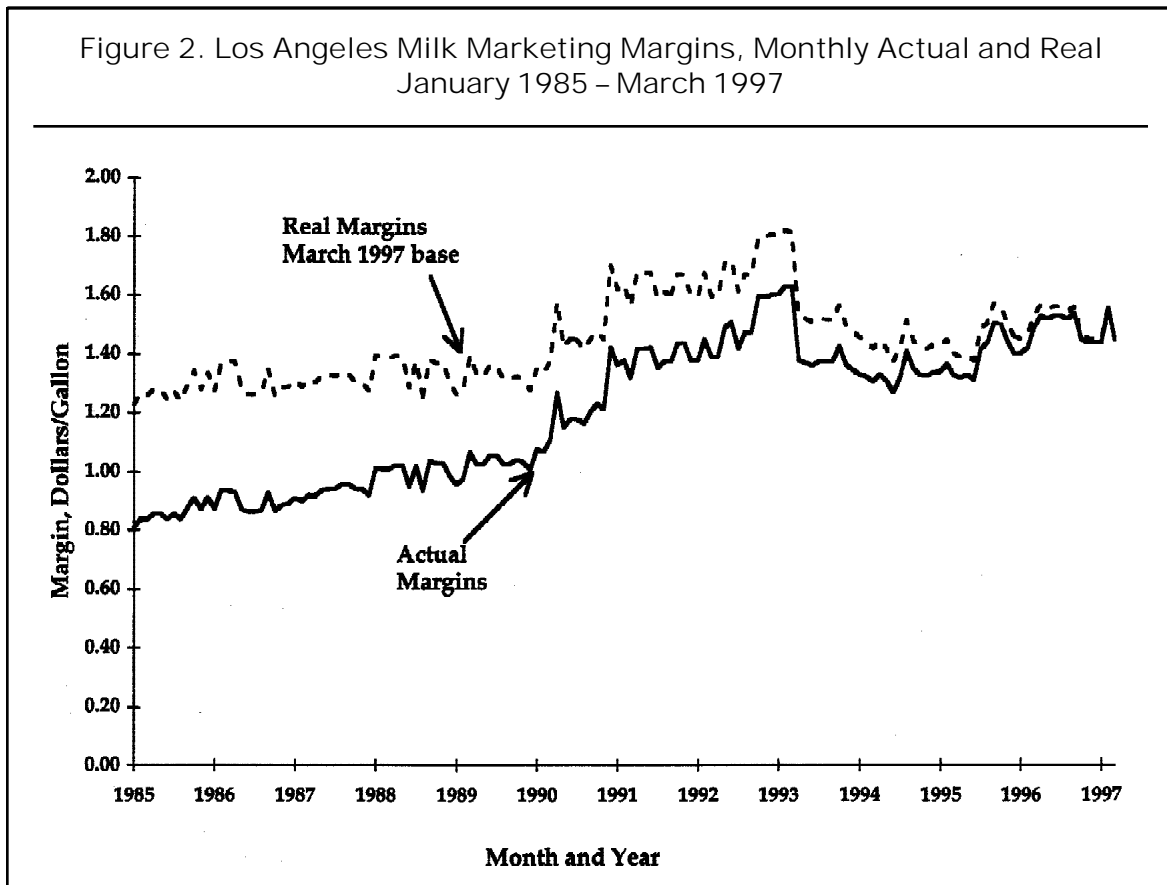
This study focuses on the behavior of retail milk prices in response to farm price changes. A price-response equation, with average retail prices as a function of farm price increases, farm price decreases and marketing costs, was estimated using monthly observations for each of the three retail markets for the four-year period from April 1993 through March 1997, during which the retail price data were collected by A.C. Nielsen. Even though a much longer data series is available for analysis, the focus is on the most recent period for two reasons. First, the shorter period has a lower probability of structural change and is more representative of current conditions; second, the A.C. Nielsen retail price data are preferred to CDFA-collected retail price data. The variables included in the equation (farm-level prices and marketing costs) explained 96–98% of the variation in retail milk prices for each market.

Statistical test results, each using a 95% confidence level, are as follows. First, the estimated coefficients for farm price increases and farm price decreases are

all significantly greater than zero. The positive coefficients for each market indicate that farm and retail prices move together; retail prices increase when farm prices increase and decrease when farm prices decrease. Second, the difference between the coefficients for price increases and price decreases is not statistically significant. This implies that the response of retail milk prices to a one-dollar farm price decrease is similar to the response to a one-dollar farm price increase, leading to the conclusion that retail price changes are symmetric for farm price increases and decreases. Third, the estimated coefficients are not significantly different than one for the Sacramento and San Francisco markets, implying that the marketing margin is constant, with a one-dollar increase or decrease in the farm price resulting in a one-dollar increase or decrease in retail prices in these two markets. In Los Angeles, however, the estimated coefficient for a farm price increase was significantly less than one, while the coefficient for a farm price decrease was not significantly different than one. This indicates that retailers increased retail prices by less

than one dollar when farm prices increased one dollar and decreased retail prices one dollar when farm prices decreased one dollar, which results in more stable retail prices and decreased marketing margins. Fourth, there was a positive trend in retail prices in each of the markets but it was significantly greater than zero only in Los Angeles. This indicates that retail milk prices in Los Angeles were increasing over time independent of farm price changes or marketing cost changes. All of the estimated coefficients for the marketing cost variable are also positive, but none was statistically greater than zero. This result was surprising; one expects to find that increased marketing costs increase the margin between farm and retail prices. This lack of statistical significance could be due to the data series used to measure marketing costs. Finally, an analysis of the timing of price changes indicates that there was no lag between farm price increases and retail price increases, with both occurring in the same month. There was, however, a significant one-month lag between farm price decreases and total retail price decreases for each market area. The retail price

Figure 2. Los Angeles Milk Marketing Margins, Monthly Actual and Real January 1985 – March 1997



adjustment process to decreased producer prices, which begins during the month of the price change, requires the following month to be completed.

Conclusions

Data used for this analysis indicate that California's retail price of milk in current dollars has been trending up over time, but they also show that there has been no clear trend in real milk prices (prices adjusted for the effects of inflation). Contrary to the perceptions of many, there is a strong direct relationship between California retail and farm-level milk prices in each market area. Retailers increased their milk prices in response to farm-level price increases and they also reduced prices in response to farm-level price decreases. Comparison of the coefficients indicates that there is no statistical difference in the total amount that retail prices increase or decrease in response to a one-dollar producer price increase or decrease. It does, however, take retailers a month longer to fully respond to a farm price decrease than it does to respond to a farm price increase, and this delay can benefit retailers at the expense of consumers.

The cause of this asymmetric timing of retail price adjustments cannot be fully explained. Other economists have observed similar lags for other perishable commodities. Some portion of the observed price behavior could be due to the actions of milk processors and wholesalers in response to farm price changes, but data were not available for these sectors. Lag differences could also be due to the nature of competitive price adjustments in food retailing, or they could result from market power.

One hypothesis holds that the observed price behavior is consistent with supermarket pricing practices for goods, such as milk, that have inelastic demand. With inelastic demand, total revenue increases with a price increase and decreases with a price decrease. Thus, retailers may be much more reluctant to reduce prices than to raise them. This reluctance is especially evident when using gross margin pricing by major department because of the adverse impact of price reductions on gross margins, even for goods with very elastic demand. This can be illustrated with a simple example. Suppose that weekly sales of a produce item that a retailer buys for \$10 per carton and sells for \$16.67, is 300 cartons. This 40% margin on selling price yields a total gross margin of \$2,000 (\$5,000 minus \$3,000). If the item were placed on sale at \$15 per carton (10% off), then sales would have to increase to 400 cartons (33.3%) to maintain the \$2,000 total gross margin for the item. Thus, the price elasticity of demand

(percentage change in quantity divided by the percentage change in price) would have to be at least -3.33 to maintain the total dollar gross margin.

Retailers may not respond to a price decrease until they observe a decrease in unit sales, or until they become concerned about an actual or possible loss in market share. The observed pricing behavior is also consistent with the use of search costs to explain lagged price changes. Here, each supermarket has possible spatial market power that is limited by consumer search for information on prices. When producer prices increase, supermarkets maintain profit margins by quickly passing the increase on to consumers. When producer prices decrease, however, each retailer can temporarily improve profit margins by slowly reducing prices in response to the consumer search process. As customers gain knowledge of comparative prices and respond, prices (and margins) will be pushed down to a competitive level. Finally, the observed price behavior could be the result of price leadership in markets with a few large participants. Using this explanation, large retailers would wait for their major direct competitors to reduce prices before following, in order to avoid the adverse effects of "price war" behavior on profits.

While there are several possible explanations for the observed relationships between farm and retail fluid-milk prices in California, the specific reasons are not isolated. It does appear, however, that the false perception that California retail milk prices tend to only increase and not respond to producer price decreases is largely due to the one-month lagged delay of retail price decreases in response to farm-price decreases.

For more information

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Hoy F. Carman is a professor of Agricultural and Resource Economics at UC Davis. His areas of interest include agricultural marketing, managerial economics and economic aspects of taxation. Professor Carman can be reached at (530)752-1525 or by e-mail at carman@primal.ucdavis.edu. Visit his Web site at: www.agecon.ucdavis.edu/Faculty/Hoy.C/Carman.html