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The U.S. Dairy Situation and Outlook for 1990

by

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Preface

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Maura Keniston assisted in the preparation of data presented in this paper. The manuscript was prepared for publication by Debbie DeCamillo.

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THE U.S. DAIRY SITUATION AND OUTLOOK FOR 1990

Andrew Novakovic

Milk Supplies

USDA has recently revised its estimates of milk production from 1983-1987 based on the 1987 agricultural census. This also resulted in changes in the 1988 and 1989 estimates. Some of the changes, particularly in cow numbers and production per cow, were quite substantial. All calculations and data reported in this publication use these latest revisions.

As in the saying, milk production in 1989 began with a bang and ended with a whimper. Cow numbers were consistently down through the year, averaging a decline of 1.3%. Decreases were slightly greater in the second quarter and slightly less in the fourth quarter. Production per cow, and consequently total production, began strong and slowed substantially in succeeding months. Milk production per cow in 1989 began with a substantial year to year increase, but by July, production per cow fell below 1988 levels. For the year, production per cow increased by an average of 99 pounds per cow, or .7% higher. When this is adjusted for the fact that 1988 was a leap year, the gain becomes about 1.0% on a daily average basis. This is less than half the normal annual gain. Milk production for the year is estimated to be about 0.6% less than 1988, as shown in Table 1. If one adjusts for the fact that 1988 was a leap year, the estimated decrease becomes 0.3% on a daily average basis. (Unless otherwise indicated, all percentage changes in quantities reported herein are calculated on a daily average basis.)

All of the major milk producing states followed the national monthly pattern, <u>except</u> California and Washington. Washington's 3.6% increase for 1989 reflects a nearly constant year to year gain in every month. California milk production dipped in the second quarter of 1989, recovered in the third quarter, and totaled an increase of about 4.3%. Gains in milk production in Texas slowed throughout 1989, but Texas production was still well above year earlier levels late in 1989. With a total gain of 6.4%, it has increased faster than any of the major milk producing states. In fact, Texas production exceeded Ohio's in 1988, and the Lone Star state has overtaken Michigan as the sixth ranked milk producing state in 1989.

Milk production in New York, Pennsylvania, and New England is down 2.4%, 1.8%, and 3.0% for the year, respectively. Showing trends lower than the U.S. average, New York and New England drifted down relatively slowly from the beginning of 1989. Pennsylvania started the year with gains more than twice the U.S. average and by the third quarter it was declining faster than it had been gaining during the first quarter.

Milk production is down in Wisconsin (-2.7%), Minnesota (-2.7%), Michigan (-1.2%), Ohio (-4.5%), Illinois (-1.9%), and Missouri (-.6%). It is up in Iowa (4.3%). Although the latter stands out simply because it is counter to the national trend, the most noteworthy among these states is Wisconsin. The sharp drop in 1989 stands in marked contrast to the earlier pattern of milk production gains in Wisconsin. Although several other states have shown much larger percentage increases, only California has contributed more new milk volume in the 1980s than Wisconsin. For example, from 1980 to 1989, California production increased 5.8 billion pounds but Wisconsin's increased 1.6 billion pounds. (Texas and Pennsylvania were close behind at 1.5 billion

Table 1. U.S. Milk Supply and Utilization, 1982-1990.

	1982	1983	1984	1985	1986	1987	1988	1989[a]	1990[b]
Supply									
Cow Numbers (thousand.)	11011	11059	10793	10981	10773	10327	10262	10127	10148
Production/Cow (lbs.)	12306	12622	12541	13024	13285	13819	14145	14244	14580
					(billion pounds)				
Production	135.5	139.6	135.4	143.0	143.1	142.7	145.2	144.3	147.0
Farm Use	2.4	2.4	2.9	2.4	2.4	2.3	2.2	2.2	2.2
Marketings	133.1	137.2	132.5	140.6	140.7	140.4	143.0	142.1	144.8
Beginning Commercial Stocks	5.4	4.6	5.2	4.9	4.6	4.2	4.6	4.3	4.1
Imports	2.5	2.6	2.7	2.8	2.7	2.5	2.4	2.5	2.3
TOTAL SUPPLY	141.0	144.4	140.5	148.3	148.0	147.1	150.0	148.9	151.2
Utilization									
Commercial Disappearance	122.1	122.4	126.9	130.5	133.2	135.8	136.8	135.8	136.8
Ending Commercial Stocks	4.6	5.2	4.9	4.6	4.2	4.6	4.3	4.1	4.1
Net Government Removals	14.3	16.8	8.6	13.2	10.6	6.7	8.9	9.0	10.3
TOTAL USE	141.0	144.4	140.5	148.3	148.0	147.1	150.0	148.9	151.2

Source: Dairy Situation and Outlook, Milk Production, Milk, Final Estimates, 1983-87, U.S. Department of Agriculture.

[a] Revised.
[b] Projected by Andrew Novakovic

pounds each). What this means is that Wisconsin processors had become accustomed to steady and substantial increases in milk volume. The difference between what Wisconsin processors might have expected based on earlier years and what they actually got from Wisconsin farmers in 1989 represents a substantial volume of milk. Thus, the decline in Wisconsin milk production in 1989 may be the single most important factor driving the M-W price, and consequently milk prices throughout the U.S.

For 1990, a recovery in milk production is expected by almost everyone, but there is disagreement about when it will start and how big it will be. The projection in Table 1 is for a fairly strong recovery of about 1.9%, with some increase in cow numbers as well as gains in production per cow. Early indications are that very strong growth has already begun in the Far West.

Milk Utilization

USDA reports that commercial disappearance of all milk (milk equivalent) in 1989 is 0.7% below year earlier levels. When 1988 is adjusted for leap year, the 1989 estimate of 135.8 billion pounds is 0.4% below 1988.

Preliminary USDA data indicate that commercial disappearance of butter is off 7.3%; ice cream is down about 3%; and cottage cheese is down 6.9%. Cheeses are up almost 5%. Ice milk, probably masquerading as "light" ice cream, is up close to 4%. Fluid milk products have been doing quite well this year, up 1.1%. The startling story of 1989 is the large increase in commercial use of nonfat dry milk, up 19% through September.

Total disappearance is calculated on a milkfat basis, i.e. the milk equivalent is determined by the amount of milk necessary to yield the milkfat contained in the various individual dairy products. The change in total disappearance is very much affected by the decline in sales of butter and other dairy products which are generally higher in fat. At the other extreme, nonfat dry milk sales have no impact whatsoever on USDA estimates of total disappearance. Recognizing the switch that seems to be taking place from higher fat to reduced fat and no fat dairy products, the traditional measure of dairy product sales --commercial disappearance of all milk-- is conveying a much more gloomy picture of sales than is warranted.

For 1990, a slight recovery in commercial disappearance of less than 1% is projected. As with 1989, this modest gain in the standard sales measure belies what should be another good year for lower fat dairy foods and cheeses.

Price Support Program

Net removals of dairy products under the dairy price support program (DPSP) are estimated to about equal the 1988 level. At 9 billion pounds (m.e.), this represents over 6% of the milk produced in the U.S. Or does it? For the same reason that the conventional measure of disappearance understates commercial sales, the milk equivalent measure of net removals overstates what has been sold to the government under the DPSP.

From July 1988 to January 1990, there were no DPSP sales to USDA of nonfat dry milk, and sales of cheese have been minor. Sales of butter at 422 million pounds in 1989 exceed the record of 413 million pounds established in 1983. The amounts of cheese and nonfat dry milk are far below what was sold under the DPSP in other years when milk equivalent sales were as high as they are now.

For example, Table 2 illustrates five years of dairy product and milk equivalent net removals data. In four of the five years, the milk equivalent totals are very similar yet the relative amounts of each product are very different. Compare, for example, 1988 and FY 1962-63. The milk equivalent total is nearly identical, but the 1988 levels of cheese, butter, and nonfat dry milk are 104 million pounds higher, 34 million pounds lower, and 763 million pounds lower respectively. Thus, on a milk equivalent basis, the increase in cheese was mostly offset by a decline in butter that was one-third the number of product pounds, and a 1 billion pound reduction in nonfat dry milk sales makes no difference at all. If we compare 1989 and 1983 we see that butter sales were about the same, but the 1983 milk equivalent total is 85% or 7.7 billion pounds higher. The higher level in 1983 came because cheese sales were almost 24 times or 800 million pounds higher. Clearly, milkfat based milk equivalencies do have limitations when the relative proportions of individual products vary so much.

Table 2. Dairy Product and Milk Equivalent Net Removals Under the Price Support Program, Selected Years.

	1989*	1988	1984	1983	FY 62-63
			(million pounds)		
Cheese	35	238	447	833	134
Butter	423	313	202	413	347
Nonfat Dry Milk	0	267	678	1,061	1,030
Milk Equivalent	9,075	8,856	8,637	16,814	8,800

Source: Dairy Situation and Outlook, Econ. Res. Serv., USDA, various issues.

* based on total purchases, not net removals

For 1990, our projection of a somewhat larger increase in production than consumption results in an increase in milk equivalent net removals. Butter will still dominate sales to the government. Sales of cheese should be insignificant. Sales of nonfat dry milk to the CCC resumed in January 1990, after a hiatus of almost one and a half years. NDM sales could be fairly large for a while during the first half of 1989, but, if so, this should not be cause for alarm. Sales of NDM to the CCC should be low by historical standards. Moreover with U.S. prices so close to world prices now, export opportunities for NDM could become a serious factor again. In addition, if NDM prices hang near the purchase price, until manufacturing milk prices drop close to $10 per cwt., processors will have incentives to buy NDM to augment local milk supplies. Thus, domestic use should be a positive factor in NDM markets in 1990.

Farm Milk Prices

As shown in Table 3, farm milk prices in 1989 are estimated to average $1.25 per cwt higher than 1988. The benchmark M-W price (at 3.5% milkfat) bottomed out at about $11.00 in March and April then rose rapidly to a record

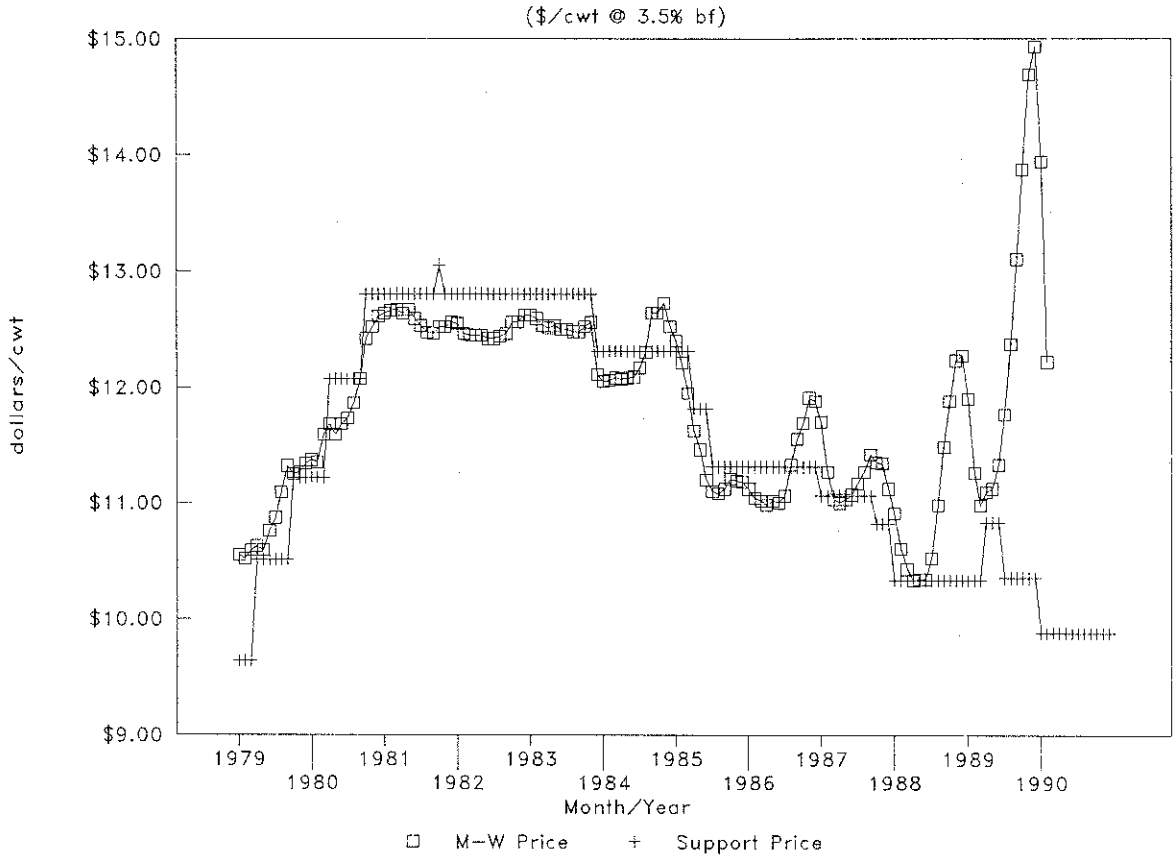
Table 3. Farm Prices for Milk; CCC Purchase, Wholesale, and Retail Prices for Manaufactured Dairy Products; and Selected Retail Price Indices, 1982-1989.

	1982	1983	1984	1985	1986	1987[a]	1988[a]	1989[b]
Farm Milk ($/cwt., ave. fat):								
All Milk	13.61	13.58	13.46	12.75	12.51	12.54	12.24	13.49
Grade A	13.80	13.75	13.61	12.90	12.62	12.66	12.34	13.50
Grade B	12.60	12.61	12.49	11.72	11.46	11.37	11.15	12.35
Milk Price:Concentrate Value	1.83	1.72	1.65	1.73	1.79	1.84	1.58	1.58
Assessment	.00	.48	.50	.125	.365	.188	.025	.00
Cheese ($/lb.):								
CCC Purchase, Natural Cheddar, Grade A or higher, blocks	1.400	1.391	1.348	1.279	1.250	1.219	1.1525	1.166
Wholesale, Cheddar (40 pound blocks), National Cheese Exchange	1.358	1.352	1.341	1.248	1.260	1.213	1.210	1.350
Retail, Cheddar Cheese (1 lb.)	N.A.	N.A.	3.065	3.093	3.049	3.056	3.165	3.300
Butter ($/lb.):								
CCC Purchase, Grade A or higher, Chicago	1.490	1.485	1.433	1.415	1.398	1.373	1.320	1.262
Wholesale, Grade A, Chicago (1 lb.)	1.477	1.473	1.488	1.411	1.445	1.402	1.325	1.276
Retail, Grade AA, sticks (1 lb.)	2.046	2.066	2.107	2.121	2.151	2.170	2.158	2.140
Nonfat Dry Milk ($/lb.):								
CCC Purchase, Spray Process, Extra Grade, Unfortified	.940	.937	.910	.843	.808	.783	.728	.774
Wholesale (1 lb.)	.931	.932	.909	.841	.806	.793	.802	1.070
Retail Price Indices (1982-84=100.0):								
Whole Milk[a]	99.3	100.0	100.7	102.3	101.7	103.6	106.0	114.3
All Dairy Products	98.8	100.0	101.3	103.2	103.3	105.9	108.3	115.6
All Food	97.4	99.4	103.2	105.6	109.0	113.5	118.2	125.1
All Consumer Prices	96.5	99.6	103.9	107.6	109.6	113.6	118.3	124.2

Source: Dairy Situation and Outlook, Dairy Market News, and Federal Milk Order Market Summaries, U.S. Department of Agriculture.

[a] Revised.
[b] Estimated by Andrew Novakovic from federal data for part of the year.

Figure 1. M-W Price and Support Price for Manufacturing Grade Milk.



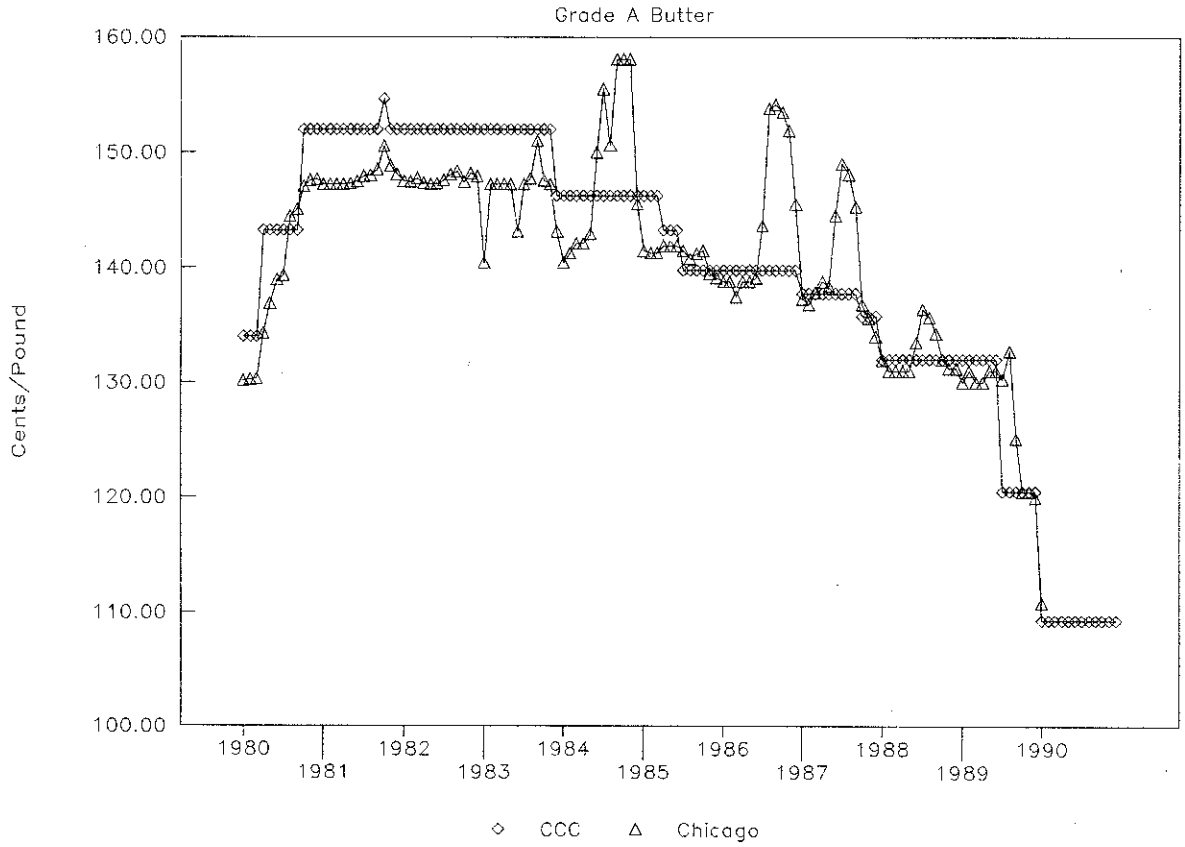
shattering peak of $14.93 in December, 1989. These levels were reflected in milk prices throughout the U.S. Figure 1 compares the M-W price to the support price during the 1980s.

For 1990, forecasts range from a higher average price in 1990 to much lower prices, depending on whether it is thought that production gains or strong demand will dominate. Exceptionally strong prices early in 1990 will help hold the annual average farm price near the 1989 average. A sluggish recovery in milk production, especially in Wisconsin, could keep milk prices at or above the 1989 average. Strong wholesale markets, especially for cheese, would also help keep milk prices near the 1989 average. If the production recovery is greater and more rapid, or if cheese markets show less strength, farm prices will fall further. In either case, farm prices are expected to be determined more by market forces than by price supports. Recognizing the uncertainty that exists, our expectation is that farm prices will average somewhat lower in 1990 but not be drastically lower. Recent USDA projections for larger increases in production and much lower milk prices are much more pessimistic than these projections.

Wholesale Product Prices

Wholesale prices for butter in 1989 for the most part followed the 5¢ to 6¢ decline in the average purchase price set by USDA. Market prices for butter quickly followed the CCC purchase price down more than 10¢ in January,

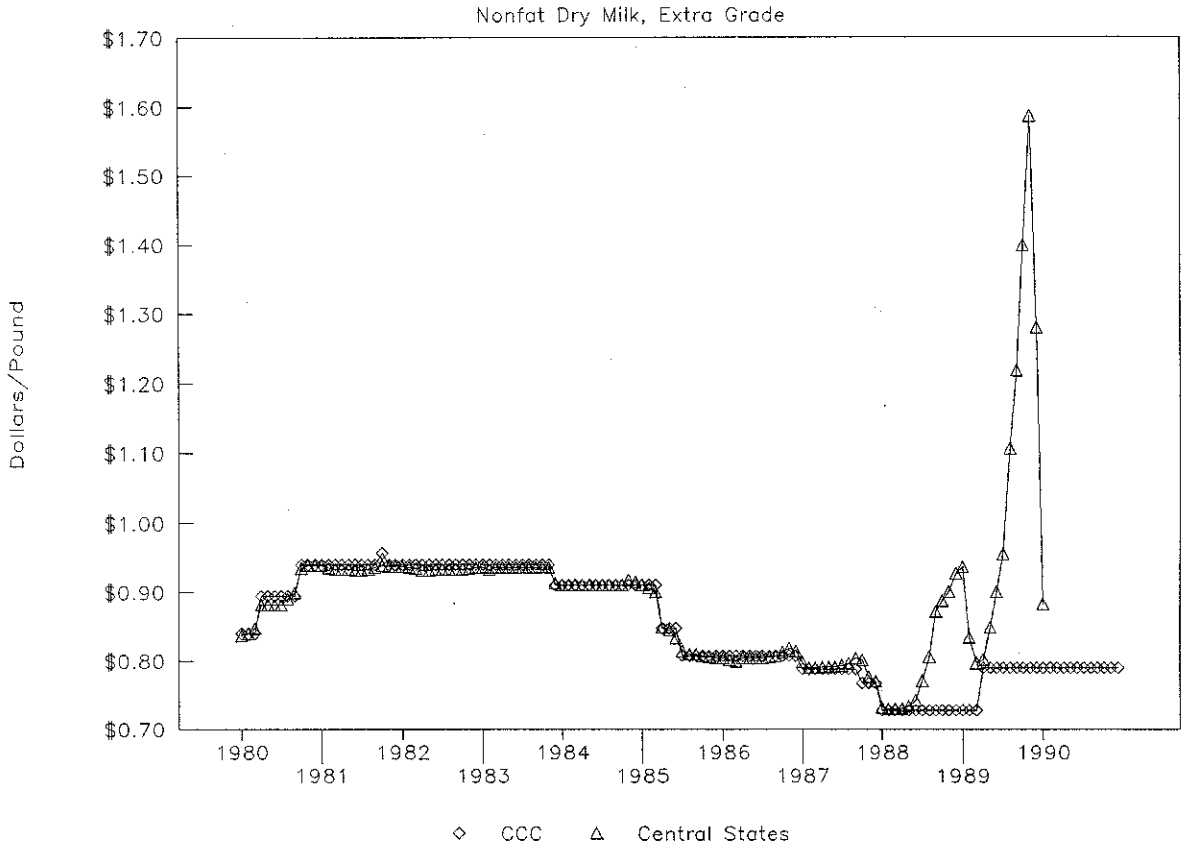
Figure 2. Chicago and CCC Purchase Prices for Grade A Butter.



1990. This purchase price is set at $1.0925 for the year; the Chicago wholesale price seems to be settling at about $1.0825 in January. Despite the seeming anomaly with this declining trend, the CCC purchase price for butter is the only DPSP price that is providing strong support to dairy markets presently, and this will basically be true for the rest of the year. With world market prices of plus or minus 75¢ per pound, the CCC price may be holding U.S. market prices for butter some 35¢ above where they would fall in the absence of price supports. This equates to almost $1.56 per cwt of milk value. Figure 2 compares the benchmark Chicago wholesale butter price to the CCC purchase price during the 1980s.

Wholesale prices for nonfat dry milk were exceptionally strong in 1989. Earlier in the year nonfat dry milk prices were buoyed by export market sales. Later in the year, nonfat dry milk prices reached unheard of levels largely due to extremely strong competition among domestic buyers who were struggling to find replacements for the shortfall of milk in their areas. At the end of 1989, NDM prices were falling rapidly as prior export commitments were postponed and current supplies were freed for domestic use. For the year, the benchmark wholesale price of nonfat dry milk is estimated to be about $1.07 per pound, a third higher than the 1988 average. In early 1990, market prices are rapidly dropping toward the CCC price and may reach it soon. CCC's price for NDM is at the high end of the world price range today. Over the course of the year, NDM processors may find that it is a toss-up between selling NDM on domestic markets, on world markets, or to the CCC. In either case, a CCC price at this level makes the CCC an alternative outlet, but it isn't support-

Figure 3. Central States and CCC Purchase Prices for Nonfat Dry Milk.



ing prices to anywhere near the extent of butter. Figure 3 compares the benchmark Central States wholesale price for NDM to the CCC purchase price during the 1980s.

In 1989, wholesale prices of cheddar cheese rose largely to keep pace with the nonfat dry milk sector, although good growth in cheese sales certainly contributed to the overall price strength. For the year, the benchmark wholesale price for cheddar cheese is estimated to be $1.35 per pound, 12% higher than 1988 and 20¢ higher than the federal purchase price. In early 1990, cheese prices have fallen almost 30¢/lb. below their peak; yet this decline is not as large nor as rapid as the declines in butter and NDM prices. Due to the stronger sales growth of cheese, cheese prices will not fall as close to support levels as prices for butter and NDM. In fact, cheese prices could be 10¢ to 20¢ per pound above the CCC purchase price most of the year. This equates to a $1 to $2 per cwt milk value. Thus, even if there are some limited cheese sales to the CCC, the CCC price for cheese isn't expected to add much support to cheese prices in 1990. Figure 4 compares the benchmark National Cheese Exchange price for 40-pound blocks of Cheddar to the CCC block purchase price during the 1980s.

The outlook for farm prices is shaped by current and expected wholesale prices, among other things. Numerous factors influence prices at all market levels. Disregarding short term fluctuations, prices at one level should be coordinated with prices at other levels. The relationship of farm prices to wholesale dairy commodity prices is illustrated in Figures 5 and 6. These

Figure 4.

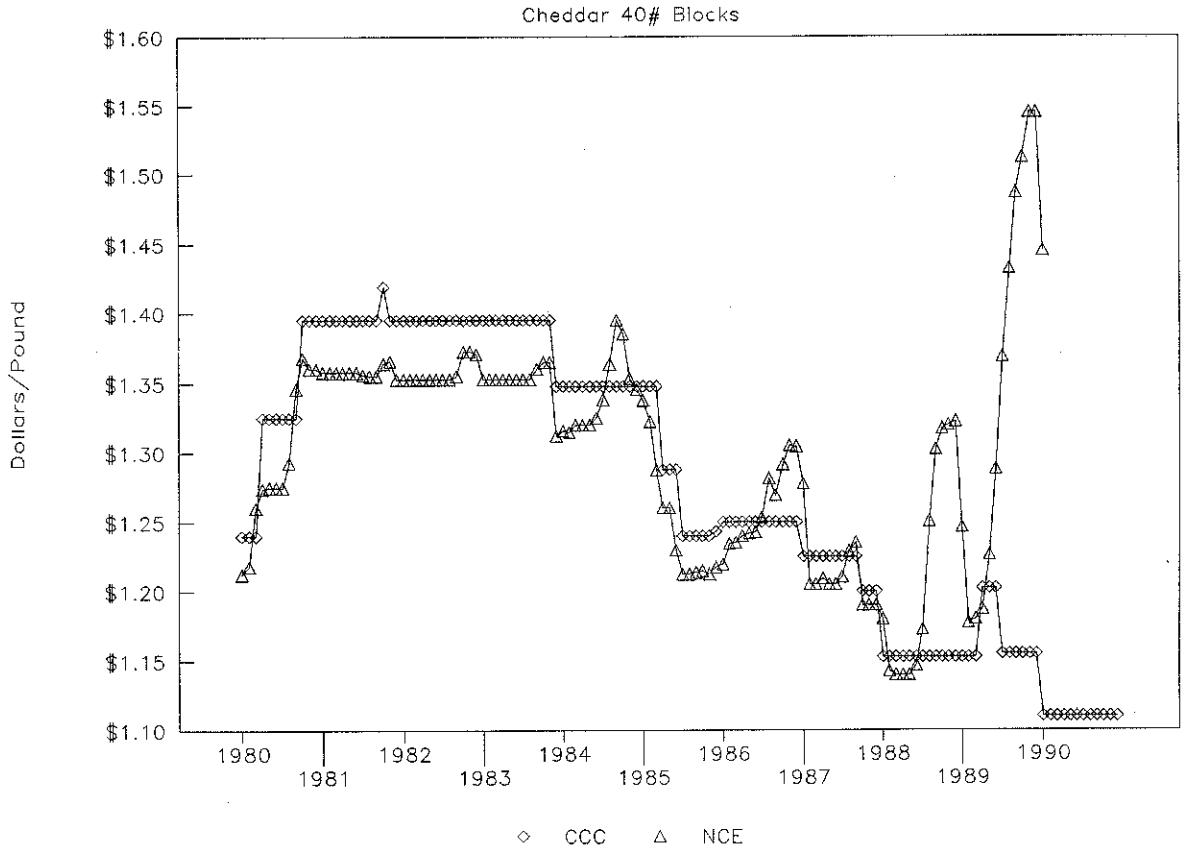


Figure 5.

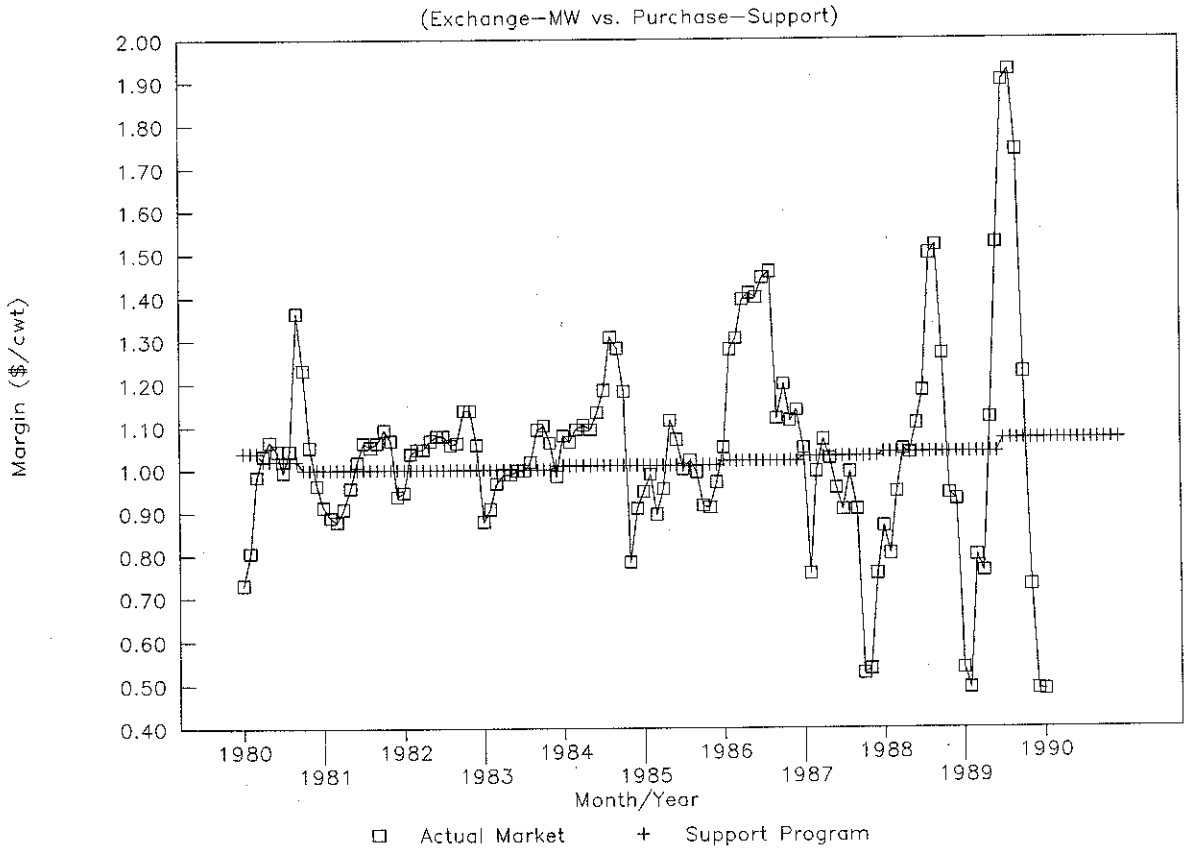
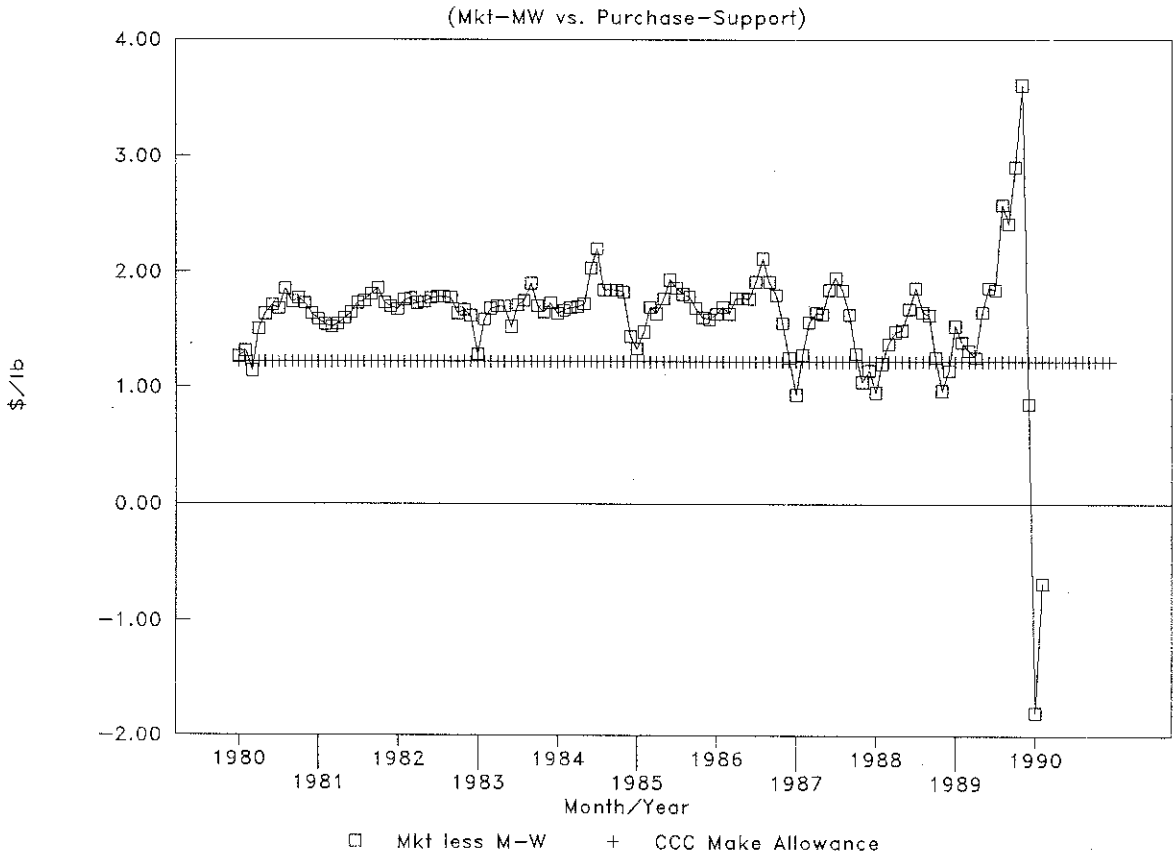


Figure 6. Gross Margins in the Butter and Nonfat Dry Milk Sector, Market vs. Support.



figures try to reflect current gross margins for cheese manufacturers (Figure 5) and butter/NDM processors (Figure 6). Specifically, they show the difference in dollars per cwt of milk between the M-W price and yield adjusted benchmark prices for butter/NDM and cheddar cheese.

These figures are rich with information. They indicate that 1) gross margins fluctuate considerably from month to month, 2) monthly fluctuations have become increasingly pronounced for cheese since the end of 1986, ranging from being well below processing costs to well above, 3) butter/NDM margins have fluctuated less until late 1989, and 4) in December 1989, the extremely high M-W depressed gross margins in both commodity sectors to their lowest point of the decade.

With commodity prices already softening in early January 1990, it was obvious that the M-W price must come down. The record setting drops of 99¢ in January and $1.72 in February were breathtaking but not all that surprising. At prevailing prices for dairy commodities, farm prices will fall another $1 to $1.50 before long. Butter prices will hang around the current level of $1.0825 for most of the year. NDM prices will probably fluctuate in the 80¢ range most of the year. Block Cheddar prices will probably bottom out between $1.20 and $1.30. At these prices, the M-W must move somewhere close to $11.00 before margins stabilize at a sustainable level. Tight milk supplies, especially in Wisconsin, would hold the bottom on the M-W above $11.00. If milk supplies come back strongly, the M-W will likely drop below $11 and could even go well into the $10.00 range.

Retail Product Prices

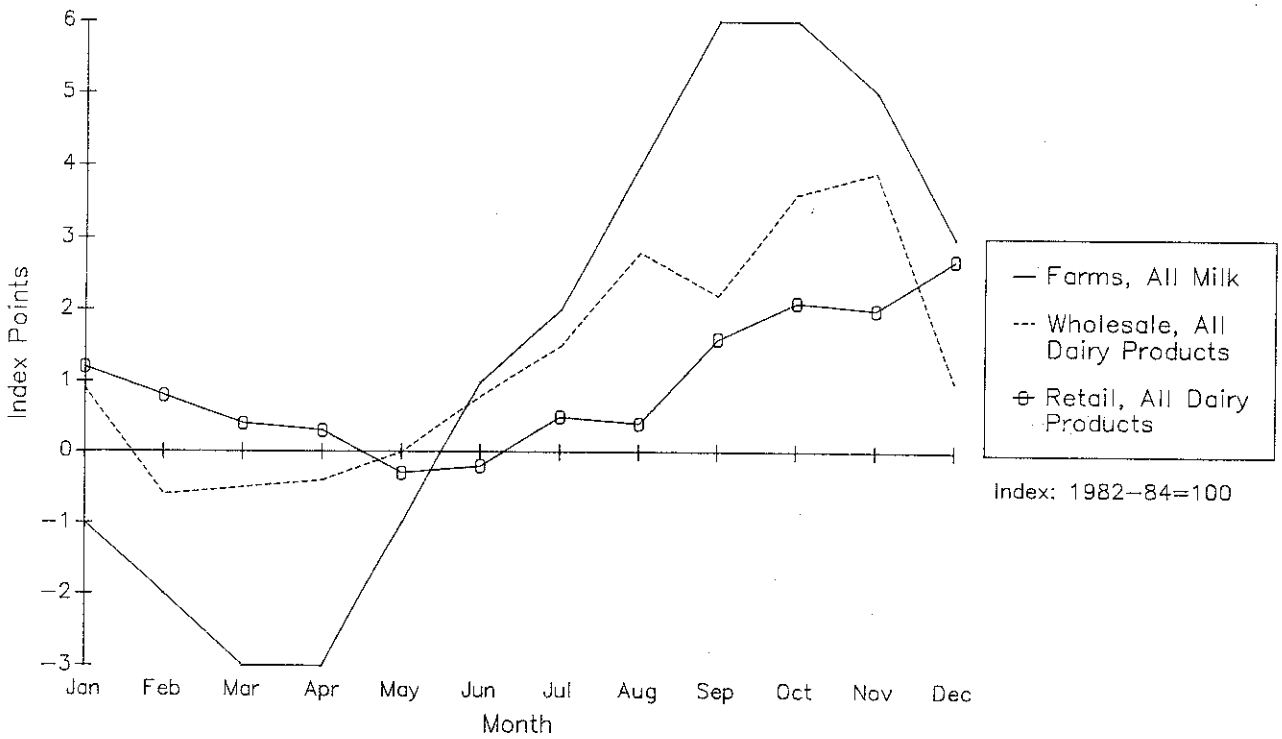
In past years, declines in farm milk prices have been reflected in lower wholesale prices for dairy products and retail prices that increased at less than half the rate of inflation for all consumer products. The nearly 10% average annual increase in farm prices pushed retail prices to higher levels toward the end of 1989. All dairy product retail prices are estimated to average about a 6.7% increase over 1988. Whole milk prices were up about 7.8% and cheese prices slightly more. Food price inflation increased about 5% in 1989, and the increase in the general Consumer Price Index was about 6%.

The conventional wisdom among farmers is that farm prices go up and down, but wholesale and retail prices only go up. There is some truth to this, but the whole story is not exactly what some believe. With such wide changes in prices in 1989, small wonder farmers and consumers are asking whose prices changed more.

Figure 7 illustrates changes in average farm, wholesale, and retail dairy prices from the beginning of 1989. The farm price is the average price reported by USDA for all milk. Actual prices were converted to a price index (1982-1984=100). The wholesale and retail prices are composite indexes of several dairy products. In all three cases the graph shows monthly changes in index values relative to the prior month.

The pattern suggested by 1989 data is that declines in farm prices are reflected in smaller declines in wholesale prices. Retail prices are less sensitive but not totally insensitive. For example, lower farm prices from January to April are associated with wholesale prices that declined from

Figure 7. Dairy Price Indexes at Three Market Levels, 1989
Change from Prior Month



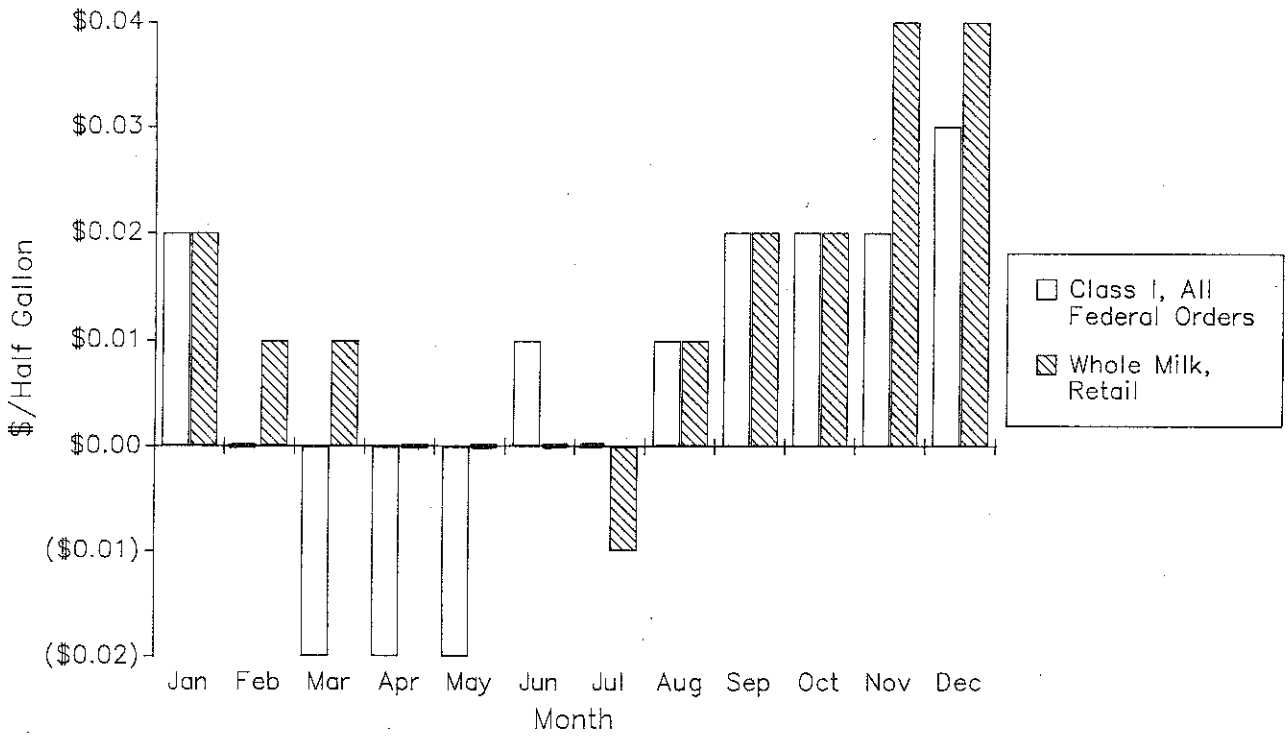
February to April and retail prices that decreased in May and June. Wholesale prices didn't decline as much as farm prices, but they also didn't increase as much. In fact, farm prices increased the most from the summer to the end of the year and retail prices increased the least.

The foregoing discussion referred to (1) price index changes for (2) dairy product averages. If we look at actual prices for specific products, some additional insights are gained.

For one thing, percentage changes probably are not a good way to compare farm, wholesale, and retail prices. When expressed in a common unit of measurement (e.g. dollars per cwt. of milk equivalent), the farm price will obviously be a smaller number than the retail price. For example, the U.S. average retail price of a half gallon of whole milk was estimated at $1.23 for January, 1989. The Class I price for all federal milk marketing orders averaged $0.64 per half gallon that month. It is simple arithmetic that 5% of $0.64 (3.2¢) is a smaller number than 5% of $1.23 (6.2¢). If we think that retail price changes should match farm price changes, surely that expectation is based on absolute, dollar changes, not percentage changes. Thus, if farm milk prices decline 3.2¢ per half gallon, which happens to equate to 5% of the farm price, we shouldn't expect retail prices to drop more than 3.2¢ per half gallon, a 2.7% drop in our example.

Figure 8 illustrates these sorts of price changes for fluid (beverage) milk. The retail price is for whole milk. The appropriate, corresponding farm price is not the all milk, U.S. average; the national average federal order Class I price is more nearly the best choice. An even more accurate

Figure 8. Farm and Retail Prices of Beverage Milk per Half Gallon, 1989
Change from Prior Month



farm price would include the net premium paid on all milk used to make fluid products, but that price is unavailable. A wholesale price is also not shown, because such a price is not reported.*

The pattern in Figure 8 is similar but not identical to Figure 7. Class I prices decreased more than retail prices in the first half of 1989 but they increased less in the second half. Two patterns are suggested by this diagram. First, retail milk price changes seem to lag Class I price changes by about one month in 1989. Secondly, retail prices seem to want to change by the amount of the farm price change plus about 1¢ to 2¢, and this is true on the up side as well as the down side. For example, Class I prices declined 1¢ per half gallon per month from March to May. Retail prices flattened out from April to June. (Thus, a -1¢ farm price change plus a 1¢ built-in retail change nets out to no retail price change.) The June Class I price increased 1¢, then held constant in July. The retail price declined 1¢ in July, apparently still influenced by the slide in Class I prices during the spring. From July to December, Class I prices rose, and it was generally true that if the Class I price rose 1¢ to 2¢ in one month the retail price rose 2¢ to 3¢ in the next month. Thus it is not quite right to say retail prices for whole milk are unaffected by declines in farm prices, but it appears to be quite true that retail prices have a built-in buoyancy relative to farm prices.

Cheese markets offer a slightly different picture in Figure 9 and also afford us a glimpse of wholesale price behavior. Retail price data pertain to natural cheeses. The wholesale price is the benchmark, National Cheese Exchange (NCE) price for 40 lb. block cheddar. The appropriate corresponding farm price is the M-W price. As with the Class I price, a more preferable farm price would have included net premiums paid for all the milk used to make cheese. Short of that, the M-W price is the best choice among the farm price data that are readily available.

The addition of wholesale price data reveals that in cheese markets during 1989, wholesale markets led price changes. The M-W price seems to lag NCE price changes by about one month. Retail markets seem to take two to four months before they begin to mirror wholesale price changes. In addition, retail price declines in the first half of 1989 seemed to be as great or greater than the declines in wholesale price, when the two to four month lag is taken into account. During this period of declining prices, farm prices declined after wholesale cheese prices turned up; because of the lagged response effect.

When wholesale prices began turning sharply upward in June, farm prices soon followed. Initially, cheese prices rose faster, but by the end of the year farm prices more than caught up. Retail cheese prices actually are estimated to have declined through the first seven months of 1989. As indicated earlier, retail prices lag wholesale price changes by a few months. The biggest increases in wholesale price began in May. Retail prices started taking off in August. By October, wholesale prices were increasing at a much more modest rate while retail prices were increasing by the largest amount.

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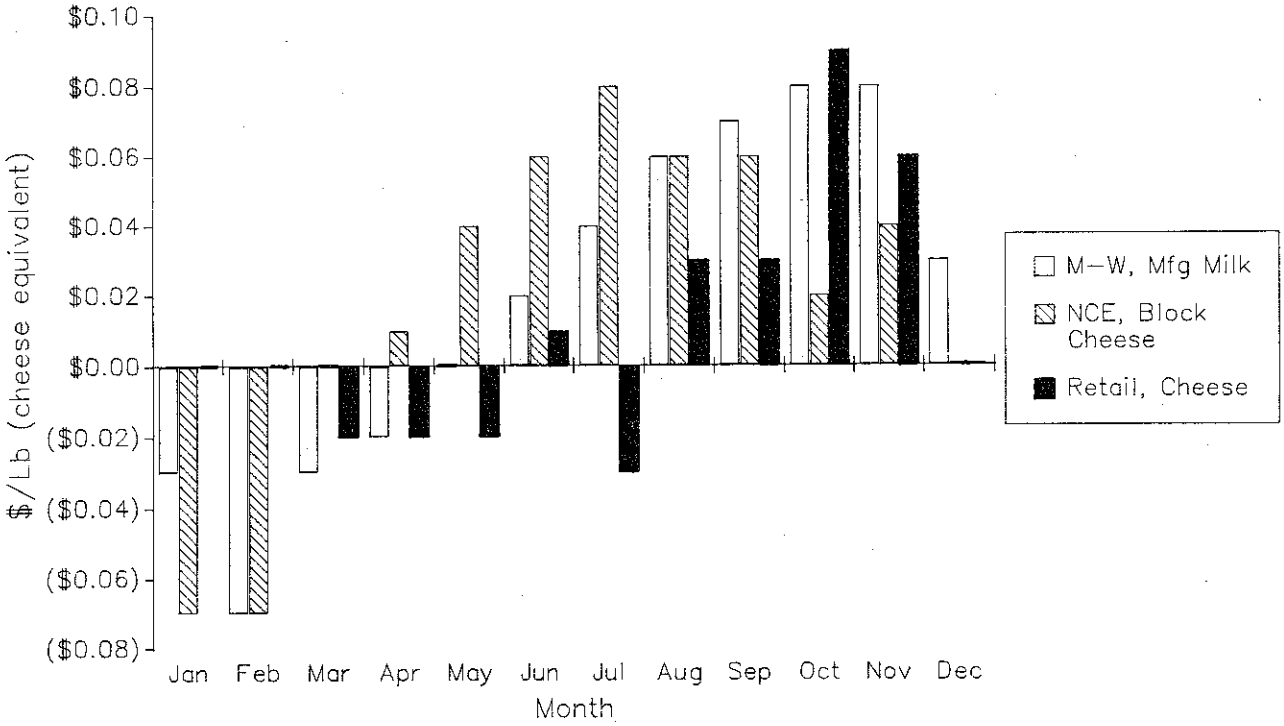
*USDA reports a price called the wholesale price of all milk. Besides being an all milk price, not a Class I price, this is not really a wholesale price. It is the price processors tell USDA they pay for farmer's milk. A price labeled "wholesale" would more logically reflect what fluid bottlers receive for the packaged milk products they sell.

Figure 9. Farm, Wholesale, and Retail Prices of Cheese, 1989
Change from Prior Month



wholesale prices that occurred prior to October. Also note that in the second half of the year, the increase in milk prices (expressed as dollars per pound of cheese equivalent) was substantially greater than the increase in retail prices.

Analysts will be watching dairy product markets, especially cheese, to see if the price increases that showed up in late 1989 affect sales gains in 1990. As farm prices fall, wholesale prices fall too. In fact, they start falling before farm milk prices. Hence, the critically important foodservice and food processing market for dairy products is not seeing high dairy product prices for long. Given the very large price swings that will occur at the farm and wholesale levels, it will be interesting to observe the response in retail prices over the next few months. The 1989 experience suggests that high retail prices of cheese should not be a problem, but retail fluid milk prices will respond less to farm price declines.

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