ESO 1590

Plant Costs of Milk Used for Manufactured Dairy Products in Selected Regions

A Report to the Wisconsin Milk Marketing Board

STUDY COMMITTEE:

Rondo Christensen, Utah State University
Jerome Hammond, University of Minnesota
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In 1988, approximately 62 percent of the 143 billion pounds of milk marketed by dairy farmers in the United States was used for manufactured dairy products. Manufactured dairy products can be made from either Grade A milk or manufacturing grade (Grade B) milk. Since 90 percent of all milk marketed in the United States is of Grade A quality, most manufactured dairy products (about five-sixths) are made from Grade A milk and only one-sixth are made from Grade B milk.

Almost all Grade A milk used for manufactured dairy products is subject to minimum pricing under Federal milk marketing orders or, in some cases, State milk marketing orders. Most of the one-sixth of the manufactured dairy products made from Grade B milk is manufactured in Minnesota and Wisconsin (55 percent of all Grade B milk in the United States is produced in those two states). Manufacturing grade milk prices are established on an unregulated competitive market basis and may vary from plant to plant, product to product, and region to region. Of course, the dairy price support program can have a substantial impact on the general level of the manufacturing milk price.

Even Grade A milk used for manufactured dairy products may show substantial variations in price, or costs to the plant. While there is a high degree of uniformity in Class III pricing provisions across the Federal milk order program, competitive conditions and procurement practices in different areas may introduce premiums that create variations in plant costs of milk used for manufacturing. Also, state market order pricing provisions are different from those used in Federal market orders. As a result, prices for

Grade A milk used for manufacturing in state orders may be substantially different from the Class III prices established in Federal milk orders.

Manufactured dairy products move in national marketing channels. The manufacturing process basically removes much of the water, perishability,and freight cost from milk. For example, 100 pounds of milk will produce about 10 pounds of American cheese; or 100 pounds of milk will produce almost 8 1/2 pounds of nonfat dry milk and 4 1/2 pounds of butter. Since manufactured dairy products are marketed on a national basis, they must compete price-wise on a national basis. We therefore observe wholesale prices for manufactured dairy products that generally show very little difference in different locations throughout the United States. One manifestation of this fact is that the purchase prices that the Commodity Credit Corporation establishes for butter, cheese, and nonfat dry milk are identical, regardless of location in the United States. Thus, the dairy price support program is operated as though a single national price prevails in this market.

A primary result of the situation where prices for manufactured dairy products show very little difference by location but price differences for the raw milk used to make these products show substantial differences is that some manufacturers and/or some areas/regions gain competitive advantages relative to other components of the industry. Some of the raw milk cost differences may reflect real efficiencies and actual market conditions; other difference may have been artificially introduced, particularly since the types of price regulation that extend to Grade A milk used for manufactured dairy products are ultimately arbitrary.

Project Objectives

The over-riding objective of this inquiry is to discover whether or not there are evident differences in plant costs for milk used to make manufactured dairy products at different plants and in different production areas of the United States. Specific objectives that are pursued in the study are:

1. To compare actual milk costs at plants with published prices for Grade B milk and for Grade A milk used for manufacturing.
2. To compare plant costs for milk as they may vary according to product.
3. To compare plant cost for milk as they might vary according to state (region).
4. To compare plant costs for milk as they might vary according to season (month).
5. To estimate plant margins as they would be affected by plant costs for milk.
6. To evaluate the competitive implications and potentials for regional shifts in milk production associated with different plants costs for milk.

Procedure

Nineteen milk manufacturing operations representing approximately thirty milk manufacturing plants in key dairy areas in the United States were surveyed to provide cost of milk data at the plant. The survey form is shown in the appendix. Monthly data on volume, price, premiums, test, and other factors were reported for the July, 1987 through June, 1988 period. Four

areas of plant location were surveyed including Wisconsin, Minnesota, the Utah-Idaho-Wyoming area, and the Ohio-Indiana-Western Pennsylvania area. Fifteen of the nineteen operations manufactured cheese--American, Swiss, or Italian--as their primary product. Three operations were primarily engaged in butter-powder manufacture and one operation was exclusively involved in condensing milk. Eleven of the operations were single product; six operations manufactured two products; and two operations had three products. Over 11.2 billion pounds of milk was manufactured at the surveyed organizations during the twelve month period. Eighty-seven percent, or 9.755 billion pounds of this quantity was Grade A milk; the other 1.460 billion pounds was Grade B milk.

Overview of Price Comparisons

The Minnesota-Wisconsin manufacturing grade milk price is the "benchmark" announced price that is used to measure and reflect the value of milk used for manufactured dairy products. It is a weighted average of the price many Grade B milk plants in Wisconsin and Minnesota pay for milk; it is announced on an f.o.b. plant basis; and it is a price standardized to a 3.5 percent butterfat basis. Various criticisms have been directed at the Minnesota-Wisconsin price. However, it is not among the purposes of this study to test the validity of the Minnesota-Wisconsin price; rather, one purpose is to compare what actual plant costs are for milk used for manufacturing in relation to the announced manufacturing milk (Minnesota-Wisconsin) price.

In the survey of plants conducted for this study, major emphasis in gathering data was directed at identifying and computing plant costs for milk

that could modify, up or down, the price per cwt. that plants presumably pay for milk. Therefore, explicit attention was given to (1) butterfat, protein, and SNF test; (2) butterfat, protein, and SNF payments; (3) volume payments; (4) quality payments; (5) hauling charges and subsidies; (6) producer inspection fees that may be paid by the plant; (7) service charges imposed by the seller; and (8) market service charges on non-member milk that the plant may pay.

In Table 1, three price series reported for milk used for manufacturing are reported by month for the July, 1987 through June, 1988 period. The first column is the announced Minnesota-Wisconsin price; the second column is the monthly plant costs per cwt. for Grade A milk used for manufacturing at the plants surveyed for this study; the third column is the monthly plant costs per cwt. for Grade B milk used for manufacturing, also at plants surveyed for this study. The movement of these prices through the twelve month period partly reflects the facts that prices in the second half of 1987 reflected the tighter supply period that occurred at the end of the Dairy Termination Program; lower prices in the first half of 1988 were related to decreases in the support prices and were also in place prior to the upward pressures stemming from the mid-1988 drought.

As the data in Table 1 indicate, both plant costs for Grade A milk used for manufacturing and for Grade B milk were higher than the announced Minnesota-Wisconsin price in almost every month during the July, 1987 through June, 1988 period. Grade A milk used for manufacturing averaged 55 cents per cwt. higher than the Minnesota-Wisconsin price for the twelve months; the lowest difference was 42 cents per cwt. in July, 1987, and the largest difference was 74 cents per cwt. in October, 1987.

TABLE 1. Minnesota-Wisconsin Manufacturing Milk Price and Plant Costs per Cwt. for Grade A Milk Used for Manufacturing and Grade B Milk, 3.5 Percent Butterfat, July 1987-June, 1988.

	Minnesota-Wisconsin Price	Survey Plant Costs for Grade A Milk	Survey Plant Costs for Grade B Milk
July, 1987	$11.17 per cwt.	$11.59 per cwt.	$11.16 per cwt.
August	11.27	11.76	11.38
September	11.42	12.05	11.78
October	11.35	12.09	11.81
November	11.34	11.99	11.73
December	11.12	11.82	11.50
January, 1988	10.91	11.52	10.83
February	10.60	11.19	10.81
March	10.43	11.02	10.75
April	10.33	10.86	10.61
May	10.34	10.83	10.53
June	10.34	10.88	10.42
AVERAGE	$10.89 per cwt.	$11.44 per cwt.	$11.09 per cwt.

Plant costs for Grade B milk at the surveyed plants averaged 20 cents per cwt. higher than the announced Minnesota-Wisconsin Grade B price. The range in differences in the two prices series was substantial, forty-seven cents per cwt., with the Minnesota-Wisconsin running one cent over the surveyed plants in July, 1987, to the Minnesota-Wisconsin running 46 cents under the surveyed plants in October, 1987.

It is also useful to note the milk cost differences for Grade A milk versus Grade B milk at the surveyed plants. For the twelve month period, plant costs for Grade A milk used for manufacturing averaged $11.44 per cwt., 35 cents higher than the $11.09 averaged recorded for Grade B milk. Differences in the Grade A and Grade B prices were highest in January, 1988 at 69 cents per cwt. Several months recorded differences of less than 30 cents with the lowest difference occurring in April, 1988 at 25 cents per cwt.

The California Price Comparison

A primary focus of this report is to compare prices/costs of milk used for manufacturing at plants surveyed with plant costs of milk used for manufacturing in California. The continuing increases in milk production in California up to the 18.7 billion pounds reported for 1988 have meant substantial increases in the production and marketing of manufactured dairy products. Grade A milk used for manufacturing in California is subject to the Class 4 a/b pricing provision of the California Bureau of Milk Stabilization. As a general rule, there are no other plant procurement costs for milk in California, and the Class 4 a/b price reflects the actual plant cost per cwt. for milk.[1] Therefore, it is possible to directly compare the California Class 4 a/b price with the plant cost data collected for this survey and with the announced Minnesota-Wisconsin price.

During the period for which the milk manufacturing plants were surveyed, July, 1987 through June, 1988, the California Bureau of Milk Stabilization used a butter-powder formula to establish the minimum monthly Class 4 a/b price. The Class 4 a/b price is the minimum price for Grade A milk used to manufacture butter, hard cheeses, and dry milk products. The factors in the butter-powder formula included (1) yield estimates of approximately 4.2 pounds for butter and 8.613 pounds for nonfat dry milk; (2) product prices that were the higher of either the support price or designated wholesale market prices for butter and nonfat dry milk in conjunction with specified make allowances;

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[1]Premiums on Class 4 a/b milk over the announced California minimum price were rare during the period of our analysis (July 1987-June 1988). However, premiums on milk used for cheese became more prevalent in the fall of 1988, when the National Cheese Exchange prices for block and barrel cheese rose rapidly due to drought-induced milk shortages in the Upper Midwest and resulting abnormal profits to California cheesemakers.

and (3) make allowances specified to be 11.6 cents per pound for butter and 18.32 cents per pound for nonfat dry milk (if the wholesale market price for butter was used rather than the CCC purchase price for butter, then a butter make allowance of 16.6 cents per pound was utilized).

For many years, the Commodity Credit Corporation has used and continues to use $1.22 per cwt. of milk as the make allowance in establishing purchase prices for butter and nonfat dry milk. The factors in the California butter-powder formula clearly have established substantially higher make allowances than those used in the dairy price support program and those that generally describe the milk manufacturing industry.

The composite butter-powder make allowance for California expressed on a hundredweight of milk basis can be calculated as follows: (butter yield of 4.2 pounds X 11.6 cents per pound) plus (nonfat dry milk yield of 8.613 pounds X 18.32 cents per pound) equals the make allowance. The calculation produces a make allowance of $2.06, 84 cents per cwt. higher than the make allowance used by the Commodity Credit Corporation.

Two major effects are produced by the high California make allowances. First, the price producers receive in California for milk used in Class 4 a/b products is relatively low (this would be overbase milk in the California program). Second, the plant costs for Grade A milk to handlers manufacturing butter, hard cheese, and dry milk products are very low, permitting those plants to enjoy wide operating margins and adopt advantageous price strategies in product markets.

In Table 2, monthly Class 4 a/b prices for California for the July, 1987 through June, 1988 period are recorded in relation to the Minnesota-Wisconsin

prices for that period and the plant costs of Grade A milk used for manufacturing at the nineteen operations surveyed in this study.

TABLE 2. California Class 4 a/b Price, Surveyed Plant Costs for Grade A Milk Used for Manufacturing, and Minnesota-Wisconsin Price, July, 1987-June, 1988.

	California Class 4 a/b Price	Survey Plant Costs for Grade A Milk	Minnesota-Wisconsin Price
July, 1987	$10.79 per cwt.	$11.59 per cwt.	$11.17 per cwt.
August	10.78	11.76	11.27
September	10.75	12.05	11.42
October	10.29	12.09	11.35
November	10.23	11.99	11.34
December	10.23	11.82	11.12
January, 1988	9.86	11.52	10.91
February	9.74	11.19	10.60
March	9.73	11.02	10.43
April	9.74	10.86	10.33
May	9.73	10.83	10.34
June	9.73	10.88	10.34
AVERAGE	$10.13 per cwt.	$11.44 per cwt.	$10.89 per cwt.

As the prices in Table 2 indicate, the Class 4 a/b prices established in California were substantially lower than the other prices/costs reported for milk used for manufacturing. The California Class 4 a/b price averaged $10.13 per cwt. during the July, 1987 through June, 1988 period, an average of $1.31 per cwt. lower than the costs for Grade A milk at the surveyed plants, and 76 cents per cwt. lower than the announced Minnesota-Wisconsin price. The differences between the monthly California Class 4 a/b price and the costs per cwt. at the surveyed plants were never less than 80 cents per cwt. and ranged as high as $1.80 per cwt. Similarly, the Minnesota-Wisconsin price for Grade B milk was higher in every month than the California Class 4 a/b price,

ranging from as low as 28 cents per cwt. higher to a high of $1.11 per cwt. more in November, 1987.

A hypothesis of this study is that costs of milk used for manufacturing are highest where competitive procurement conditions are most intense. Further, there is the premise that competitive procurement conditions are most intense in the upper midwest where excess capacity in milk manufacturing is a major factor. Competitive procurement conditions are not as acute in other milk manufacturing areas in the United States, and they appear to be at a minimum in California where the Class IV price is the effective plant cost for milk used for manufacturing.

In order to provide additional information on comparative costs of milk used for manufacturing, the California Class IV a/b price for the July, 1987 through June, 1988 period is used as a reference point as it was the lowest recognized cost of milk used for manufacturing during the survey period. The following eight comparisons of the California Class IV a/b price are made in relation to Grade A prices for milk used for manufacturing. (Note that these comparisons are for Grade A milk in order to make the comparisons more consistent and also because 87 percent of the milk at the surveyed plants was Grade A milk).

The specific comparisons are:

1. Cost of Grade A milk used for manufacturing at all nineteen operations versus California Class IV a/b price.
2. Cost of Grade A milk used for manufacturing at the Minnesota plants versus California Class IV a/b price.
3. Cost of Grade A milk used for manufacturing at the Wisconsin plants versus California Class IV a/b price.

4. Cost of Grade A milk used for manufacturing at the Utah, Idaho, Wyoming plants versus California Class IV a/b price.

5. Cost of Grade A milk used for manufacturing at the Ohio, Indiana, Pennsylvania plants versus California Class IV a/b price.

6. Cost of Grade A milk used for manufacturing at the butter-powder plants versus California Class IV a/b price.

7. Cost of Grade A milk used for manufacturing at the American cheese plants versus California Class IV a/b price.

8. Cost of Grade A milk used for manufacturing at the Italian cheese and Swiss cheese plants versus the California Class IV a/b price

In making the price/cost comparisons, it should be noted that 10.246 billion pounds of Grade A milk were subject to the California Class IV a/b price during the study period. At the surveyed plants during the same period, the 9.755 billion pounds of Grade A milk used for manufacturing is identified as follows:

1. Location - 81 percent was at Minnesota-Wisconsin operations; 6 percent was at Utah, Idaho, Wyoming operations; 13 percent was at Ohio, Indiana, Pennsylvania operations.

2. Product - 80 percent was used for American cheese; 11 percent was used for Swiss cheese or Italian cheese; 9 percent was used to manufacture butter-powder.

Table 3 reports the monthly cost/price data for California, for all of the surveyed plants, and then for the surveyed plants in each of the four areas where data were gathered. Figure 1 charts these data across the twelve month July, 1987 through June, 1988 period.

TABLE 3. Milk prices by regions.

Monthly Avgs.:	CA	All Plants	MN	WI	UT/ID WY	OH/IN PA
July	10.79	11.59	11.34	11.72	11.23	11.60
August	10.78	11.76	11.65	11.84	11.39	11.93
September	10.75	12.05	12.33	12.09	11.41	12.06
October	10.29	12.09	12.71	12.07	11.20	12.12
November	10.23	11.99	12.54	11.97	11.45	11.95
December	10.23	11.82	12.24	11.87	11.58	11.57
January	9.86	11.52	11.74	11.58	11.47	11.32
February	9.74	11.19	11.55	11.25	10.95	10.99
March	9.73	11.02	11.30	11.13	10.87	10.64
April	9.74	10.86	11.15	10.98	10.73	10.45
May	9.73	10.83	11.02	10.97	10.64	10.46
June	9.73	10.88	10.73	11.15	10.48	10.55
Wgt. Annual Avg.	10.13	11.44	11.66	11.54	11.09	11.21
Volume (mil #)	10,246	9,755	1,640	4,960	524	1,287

The highest plant costs for Grade A milk used for manufacturing were in Minnesota. Minnesota milk costs averaged $11.66 per cwt. during the July, 1987 through June, 1988 period, $1.53 per cwt. higher than the California Class IV a/b price. Wisconsin was next in line with milk costs averaging $11.54 per cwt. Plant costs for milk in Ohio-Indiana-Pennsylvania averaged $11.21 or $1.08 more than California; and the Utah-Idaho-Wyoming plants had the lowest milk costs among the surveyed plants at $11.09 but were still 96 cents per cwt. higher than the California price.

Table 4 reports the monthly cost/price data for California in comparison with plant costs for Grade A milk at butter-powder plants, at American Cheese plants, and at combined Swiss cheese-Italian cheese plants. Figure 2 charts the cost/price data through the study period.

FIGURE 1

Grade A Mfg Milk Price Versus Ca Class 4a Milk Price,1987-1988.

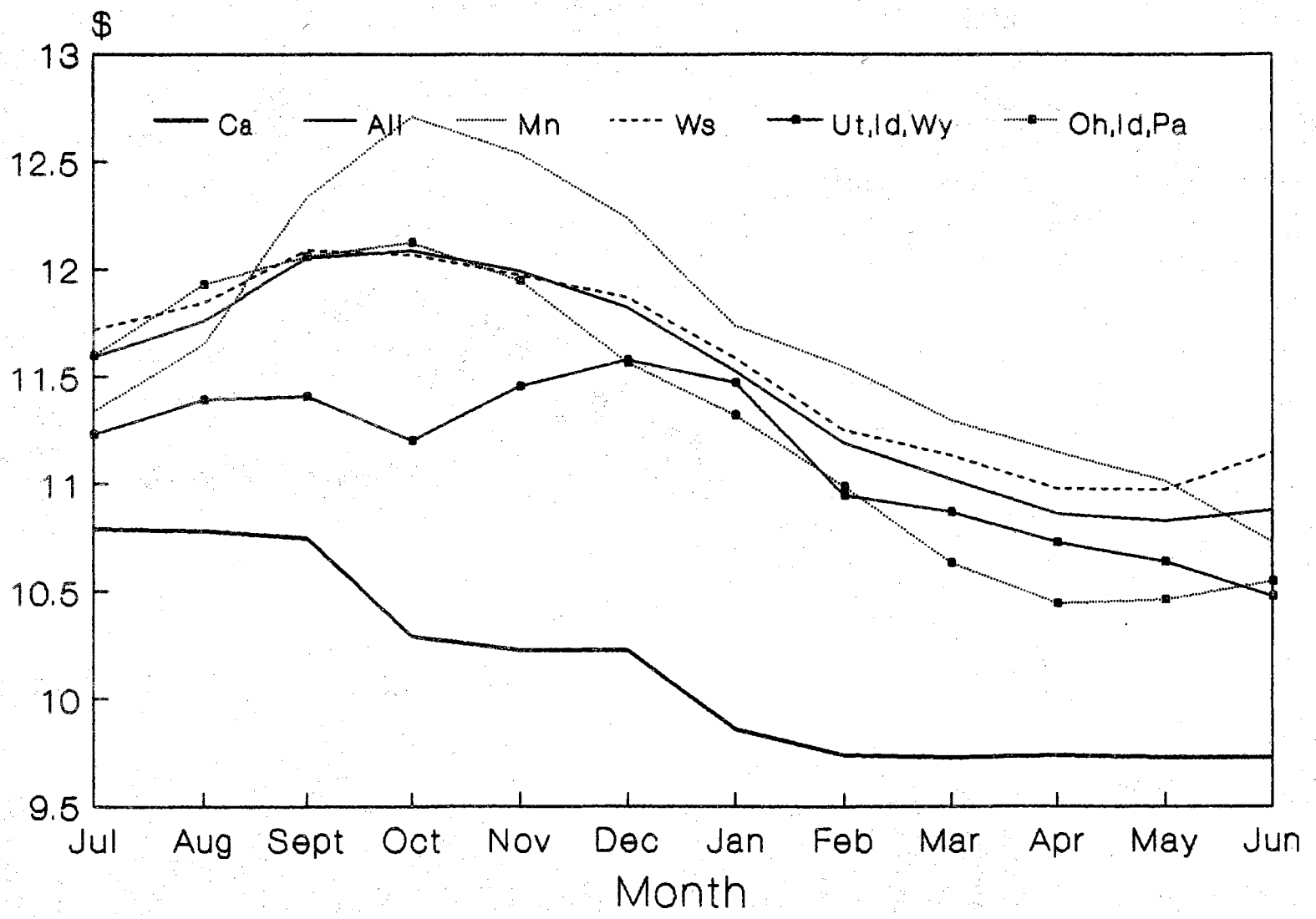


TABLE 4. California Class IV a/b Milk Price Versus Plant Costs for Grade A Milk Used for Manufacturing, According to Product 1987-1988.

Monthly Avgs.:	CA	BP	AC	SC IC
July	10.79	11.38	11.61	11.63
August	10.78	11.43	11.75	12.02
September	10.75	11.92	12.07	12.00
October	10.29	12.08	12.10	11.99
November	10.23	11.96	12.01	11.88
December	10.23	11.66	11.87	11.62
January	9.86	11.49	11.55	11.39
February	9.74	11.19	11.22	10.95
March	9.73	10.88	11.09	10.67
April	9.74	10.76	10.94	10.46
May	9.73	10.74	10.89	10.44
June	9.73	10.65	10.97	10.49
Wgt. Annual Avg.	10.13	11.28	11.49	11.22
Subgroup vol.	10,246	855	7,749	1,068

As the data in Table 4 indicate, costs for Grade A milk at the surveyed plants were highest at the American cheese plants. Costs averaged $11.49 per cwt. during the July, 1987 through June, 1988 period, $1.36 per cwt. higher than the California Class IV a/b price. Milk costs at the butter-powder plants averaged $11.28 per cwt., slightly higher than the $11.22 average at the Swiss cheese-Italian cheese plants. Again, plant costs for milk at the butter-powder and Swiss cheese-American cheese plants averaged $1.15 per cwt. and $1.09 per cwt. respectively higher than the California Class IV a/b price.

Comparisons of Derived Gross Margins for Processing Plants

The differences in pay prices for milk used in manufactured dairy products imply substantial differences in gross operating margins. To provide some data on margin differences, derived gross operating margins were computed

FIGURE 2

Grade A Mfg. Milk Price Versus Ca Class 4a Milk Price, 1987-1988.

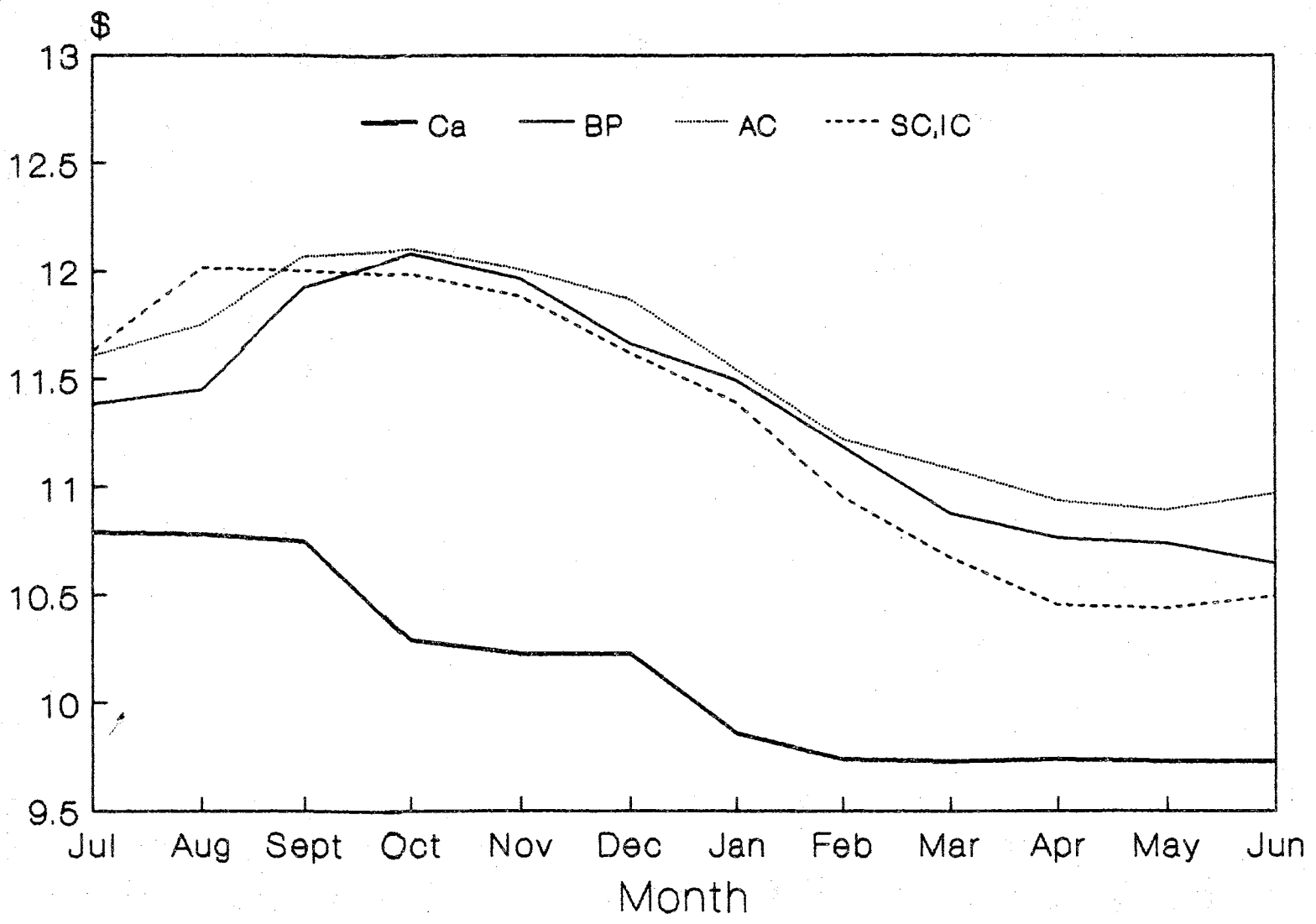
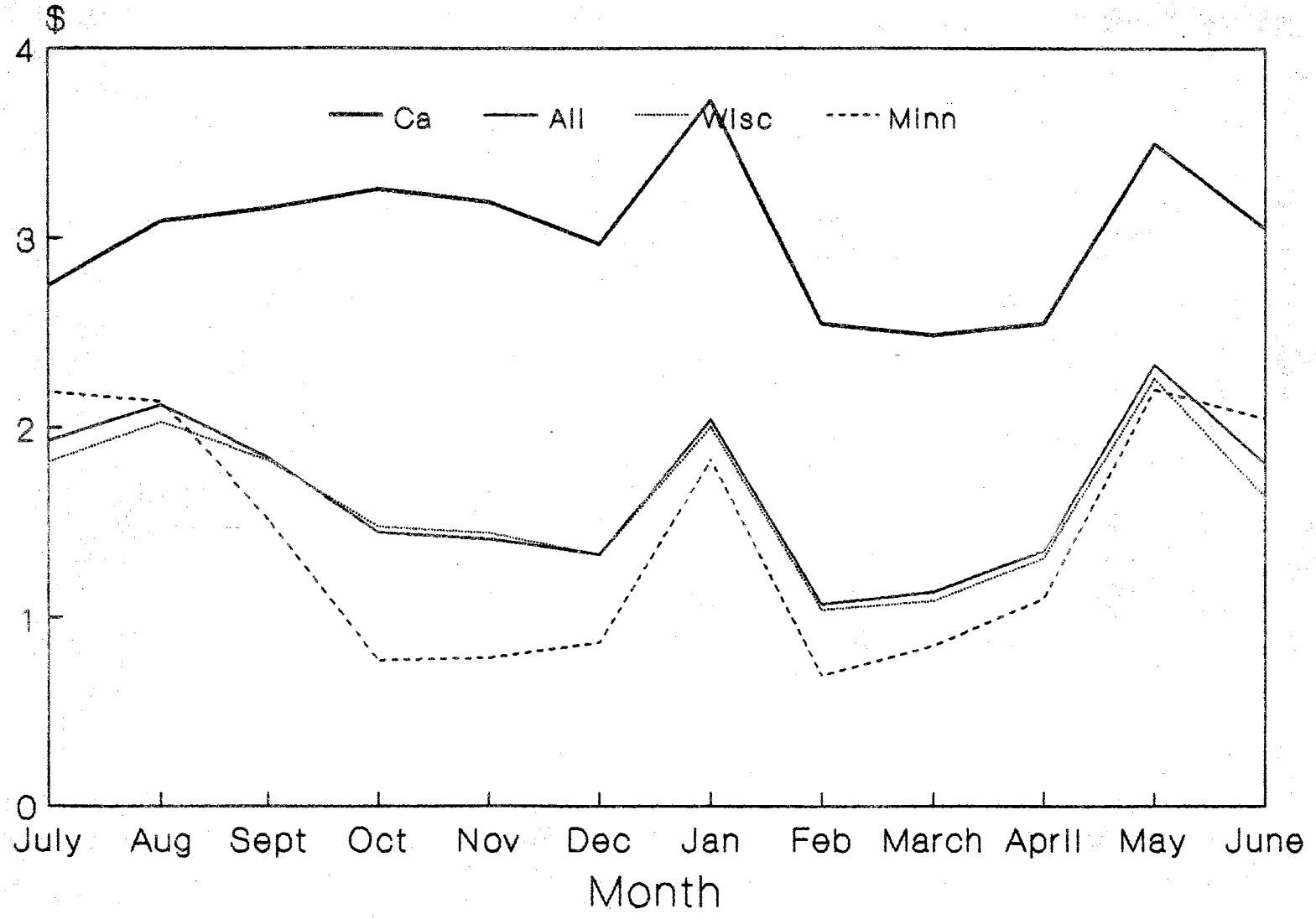


FIGURE 3

Gross Margins for Block Cheese Plants



for selected types of processing plants by state and region. These gross operating margins are simply the difference between a calculated gross value of product per hundredweight of milk and the pay prices reported previously. The margins are calculated for block cheese plants, barrel cheese plants and butter/nonfat dry milk plants in the different areas and compared with the apparent margins implied by the California Class IV a/b price.

The gross value of products per hundredweight of milk is determined by multiplying product prices by per hundredweight yields of the respective products. Ideally, the gross value of products per hundredweight of milk by state should be based on the average f.o.b. processing plants prices of the products. These prices were not made available in the survey nor are there any published prices by state. As an alternative, published prices for dairy products were used. The "Dairy Market News" (published by the Agricultural Marketing Service of the U.S. Department of Agriculture) reports weekly prices for almost all dairy products for the two commodity markets that trade dairy products, the Chicago Mercantile Exchange for butter and the National Cheese Exchange for cheese, and reports numerous other wholesale selling prices for all dairy products. Although the "Dairy Market News" reports prices by regions of the country for cheese, butter, and nonfat dry milk products, the prices are reported as ranges for non-standardized types of sales; e.g. the print butter price could reflect different packaging with delivery at various eastern cities. The weekly price ranges are very large. Consequently, selected price series for the most standardized product, for products sold on commodity exchanges, or for several of the central states wholesale dairy products were used. These include:

Cheese prices:	The National Cheese Exchange prices for block and barrel cheese in carlot units
Butter prices:	The Chicago Mercantile Exchange prices for Grade AA and A butter in carlot units
Nonfat Dry Milk prices:	The Central States price for extra grade high and low heat powder
Dry Whey:	The Central States price (listed as mostly paid) for non-hygroscopic whey
Dry Buttermilk:	The Central States price (listed as mostly paid) for sweetcream buttermilk powder

The monthly price was calculated as the simple average of the reported weekly price or midpoints of the weekly price range for each of these products. Prices for weeks in two different months were included in the month in which they had the largest number of days. These calculated monthly product prices are presented in Table 5 for the period July, 1987 through June, 1988. The prices reflect a seasonally short supply of milk and milk products in the summer and fall of 1987 with a decline to Commodity Credit Corporation support purchase prices in the fall and winter of 1988.

The gross value of products per hundredweight of milk were obtained by applying average yield factors to the product prices. The yield factors, except for dried buttermilk, were taken from a study by Jacobson, Hammond, and Graf (1978).[2] They are:

	Pounds per cwt. of Milk
American cheese plants	
American Cheese	9.66
Butter	.30
Dried Whey	5.50

[2]Jacobson, R.E., J.W. Hammond, and T.F. Graf, "Pricing Grade A Milk in Manufactured Dairy Products," Research Bulletin 1105, Ohio Agricultural Experiment Station, Ohio State University, Wooster, Ohio, December 1978.

	Pounds per cwt. of Milk
Butter/powder plants	
Butter	4.27
Nonfat Dry Milk	8.30
Dry Buttermilk	.42

The dry buttermilk yield was calculated for a plant that uses 40 percent cream to produce butter.

The gross values of products produced from milk were calculated for three types of dairy plants, barrel cheese plants, block cheese plants and butter/powder plants. These gross values by month from July, 1987 through June, 1988 are listed in the last three columns of Table 5. The gross values reflect average values for plants in the north central regions of the United States. Gross values for plants nearer the major consuming markets of the U.S. are likely to be higher by the differences in transportation costs between plants and delivery markets.

The gross operating margins for the three types of plants were computed as the difference between the gross values of products per hundredweight of milk and the standardized plant pay prices for milk used in manufactured dairy products.

The series of wholesale product prices reported in Table 5 are assumed to be the product prices available to all of the plants in this study, including the California plants. This assumption is based on the fact that manufactured dairy products are marketed in the national dairy market.

The gross values of block cheese, barrel cheese, and butter-powder made from 100 pounds of milk in relation to the assumed yields are reported in the last three columns of Table 5. For the twelve month period, as an average, gross values for block cheese were highest at $13.156 per cwt. of milk; gross values for butter-powder were second at $12.694 or 46.2 cents less than for

TABLE 5. Wholesale Dairy Product Prices by Month, July, 1987-June, 1988

	Product Prices: Butter Grade AA	Butter Grade A	Butter Grade B	NFDM	Cheese 40# Blocks	Cheese barrels	Dry Btrmilk	Dry Whey	Gross Value of Milk:/a Block Cheese Formula	Barrel Cheese Formula	Butter/ NFDM Formula
	Dollars/pound								Dollars/cwt.		
July	1.4985	1.4800	1.4400	.8100	1.2100	1.1730	.7640	.2365	13.543	13.186	13.442
August	1.4975	1.4725	1.4150	.8188	1.2288	1.1838	.7800	.2825	13.865	13.431	13.518
September	1.4635	4.4160	1.3595	.8320	1.2260	1.1710	.7745	.2985	13.910	13.378	13.480
October	1.3775	1.3575	1.2925	.8256	1.1900	1.1500	.7650	.2988	13.546	13.159	13.056
November	1.3775	1.3475	1.2700	.8175	1.1900	1.1500	.7575	.2763	13.419	13.033	12.985
December	1.3490	1.3120	1.2280	.8010	1.1900	1.1000	.7450	.2375	13.195	12.326	12.721
January	1.3050	1.3000	1.2038	.7447	1.1800	1.0980	.7131	.3275	13.590	12.799	12.053
February	1.3050	1.3000	1.1950	.7597	1.1425	1.0925	.6906	.1569	12.289	11.806	12.168
March	1.3050	1.3000	1.2450	.7593	1.1400	1.0920	.6785	.1483	12.218	11.754	12.151
April	1.3050	1.3000	1.2450	.7575	1.1400	1.0900	.7075	.1606	12.286	11.803	12.157
May	1.3050	1.3000	1.2525	.7600	1.1400	1.0913	.7256	.3322	13.229	12.759	12.185
June	1.3480	1.3380	1.3310	.7645	1.1510	1.1120	.7560	.2298	12.784	12.407	12.419
								x=	$13.156	$12.653	$12.694

Source: Dairy Market News, Agricultural Marketing Service, U.S. Department of Agriculture, Weekly issues, July, 1987 through June, 1988.

a/cheese formula 1 = 40 lb. block cheese price times 9.66 plus Grade A butter price times .3 plus dry whey price times 5.5

cheese formula 2 = barrel cheese price times 9.66 plus Grade A butter price times .3 plus dry whey price times 5.5

butter-powder formula = Grade AA butter price times 4.27 plus nonfat dry milk price times 8.3 plus dry buttermilk price times .42

block cheese; gross values for barrel cheese were slightly lower than for butter-powder (about 4 cents per cwt. of milk) at $12.653.gross values for block cheese were highest at $13.156 per cwt. of milk; gross values for butter-powder were second at $12.694 or 46.2 cents less than for block cheese; gross values for barrel cheese were slightly lower than for butter-powder (about 4 cents per cwt. of milk) at $12.653.

If an industry-wide normative make allowance was on some basis to be in effect, it could be determined at this juncture what the price/cost of milk used for manufacturing "should" be. However, such a make allowance is not

known, but it is possible to estimate margins on the basis of milk prices/costs that are known in relation to the average yield factors and the reported wholesale product prices.

Since some of the dairy products were not produced in some of the areas, the analysis of margins in relation to product and region is not as comprehensive as was the analysis of margins for regions separately and for products separately. Table 6 and Figure 3 reflect the gross margins at block cheese plants for Wisconsin, Minnesota, and the surveyed plays in all four areas as compared to the gross margins on block cheese in California. For the twelve month period, gross margins in Minnesota were the lowest at $1.42 per cwt. of milk, or $1.42 for 9.66 pounds of cheese, 0.3 pounds of whey cream butter and 5.5 pounds of dry whey. Gross margins were slightly higher in Wisconsin for block cheese at $1.61, and they were $1.66 at all surveyed plants making block cheese. In California, the low Class IV a/b price generated gross margins of $3.02 per cwt. of milk, almost twice as high as the gross margins for block cheese at the surveyed plants.

Gross margins for barrel cheese were substantially less than for block cheese. Presumably net margins for barrel cheese would be somewhat in line with net margins for block cheese because of lower make allowances on barrel cheese. The gross margins on barrels reflected the same patterns by areas as did blocks. The barrel cheese margin data are reported in Table 7 and are charted in Figure 4.

As the data in Table 7 indicate, gross margins for barrel cheese, as they were for block cheese, were lowest in Minnesota at 92 cents per cwt. of milk. Next lowest was Wisconsin at $1.11, and gross margins on barrel cheese

TABLE 6. Gross margin for Block Cheese Plants.

	CA 4a/b	WI	MN	All States
July	2.75	1.82	2.19	1.93
August	3.09	2.03	2.14	2.12
September	3.16	1.83	1.52	1.84
October	3.26	1.48	0.77	1.45
November	3.19	1.44	0.78	1.41
December	2.97	1.33	0.86	1.33
January	3.73	2.00	1.83	2.04
February	2.55	1.04	.069	1.07
March	2.49	1.09	0.85	1.13
April	2.55	1.31	1.10	1.35
May	3.50	2.26	2.20	2.34
June	3.05	1.64	2.05	1.81
	3.02	1.61	1.42	1.66
	10,246	4877	1344	7749

at the surveyed plants was highest in Utah-Idaho-Wyoming at $1.87. Again, all of these gross margins were substantially lower than in California where they averaged $2.53 for barrel cheese for the June, 1987 through July, 1988 period.

For butter-powder operations, gross margins were computed for Minnesota, Ohio-Indiana-Pennsylvania, all surveyed plants combined, and for California. These data are reported in Table 8 and charted in Figure 5. Butter-powder operations in Minnesota had the lowest gross margins at $1.23 per cwt. of milk, or $1.23 for the 4.27 pounds of butter and 8.3 pounds of nonfat dry milk used in the margin computation. Gross margins on butter-powder in the Ohio-Indiana-Pennsylvania area were $1.45, or 22 cents per cwt. of milk higher than in Minnesota. The $2.56 gross margin in California was almost exactly twice as high as the gross margin in Minnesota.

TABLE 7. Gross Margin Barrels.

Month	Gross Margin ($ per cwt.)				
	CA 4a/b	All Other States	WI	MN	UT/ ID/WY
July	2.40	1.58	1.47	1.84	2.10
August	2.65	1.68	1.59	1.70	2.17
September	2.63	1.31	1.30	.99	2.14
October	2.87	1.06	1.09	.38	2.19
November	2.80	1.02	1.05	.39	1.92
December	2.10	.46	.46	-.01	1.14
January	2.94	1.25	1.21	1.04	1.75
February	2.07	.59	.56	.21	1.22
March	2.02	.66	.62	.38	1.26
April	2.06	.86	.82	.61	1.36
May	3.03	1.87	1.79	1.73	2.36
June	2.68	1.44	1.27	1.68	2.08
Wgt. Annual Ave.	2.53	1.16	1.11	.92	1.87
Subgroup Volume	10246	7749	4877	1344	185

FIGURE 4

Gross Margins for Barrel Cheese Plants

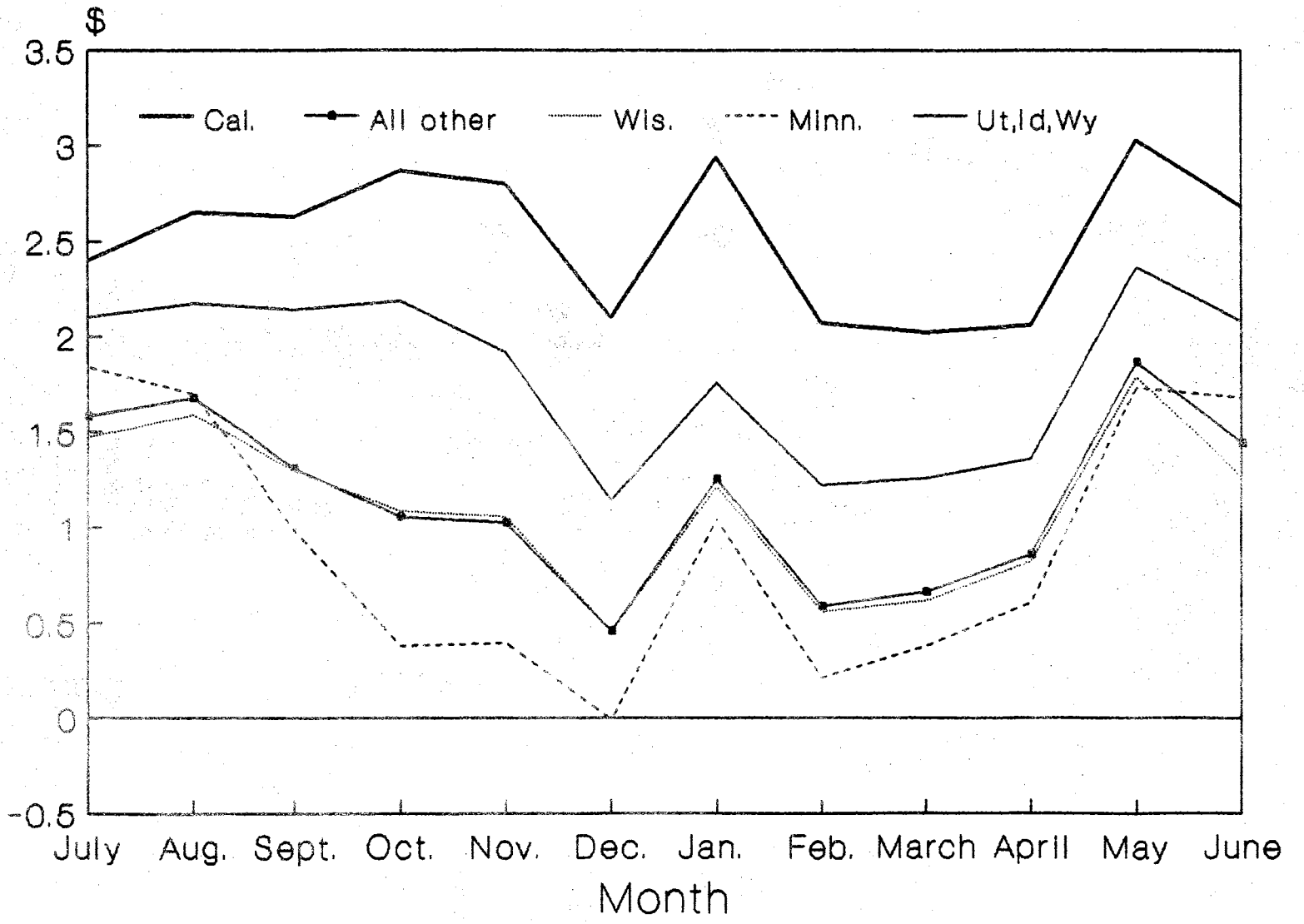


FIGURE 5

Gross Margin -- Butter/powder

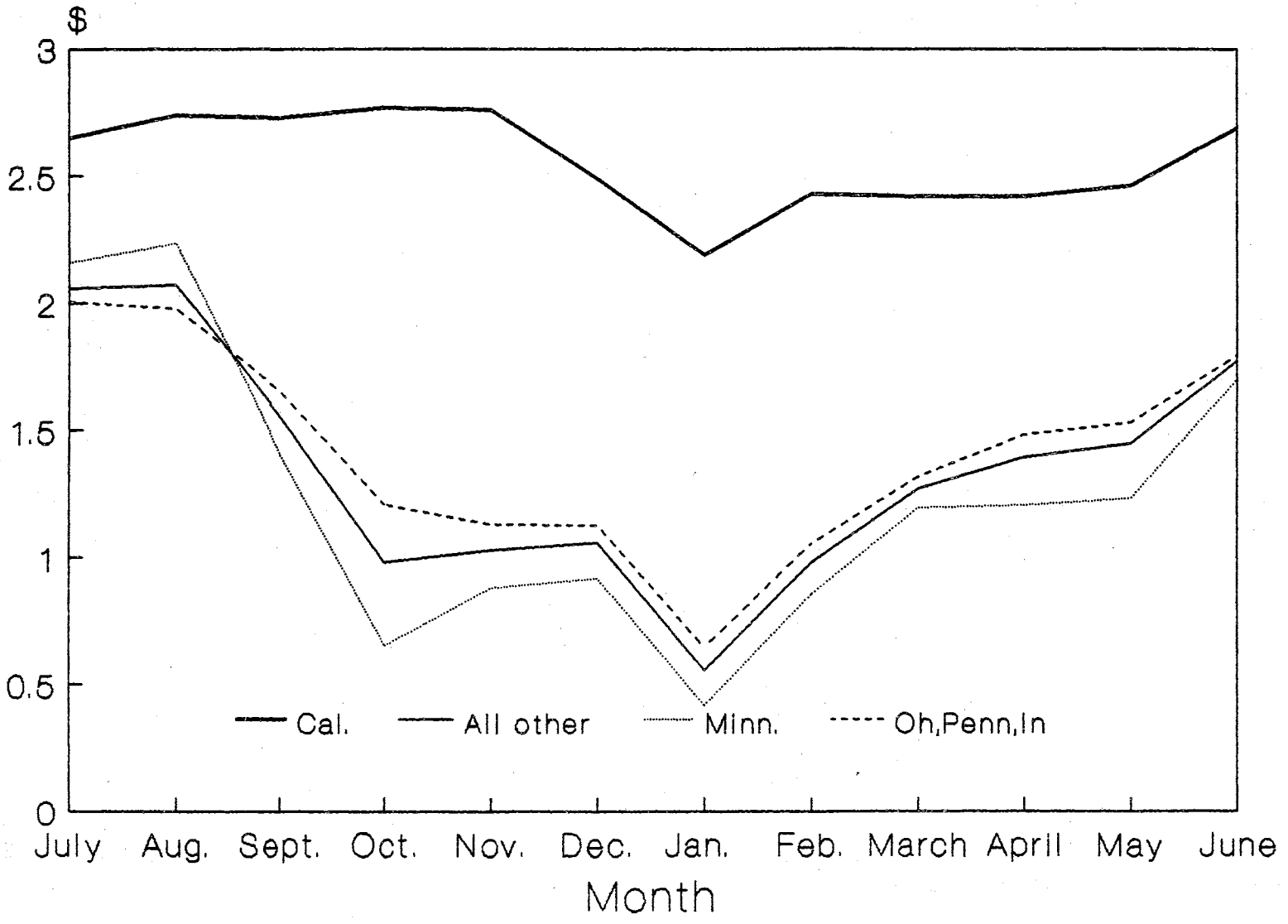


TABLE 8. Gross Margin--Butter/powder.

Month	Gross Margin ($ per cwt.) CA 4a/b	All Other	MN	OH PA/IN
July	2.65	2.06	2.16	2.00
August	2.74	2.07	2.24	1.98
September	2.73	1.56	1.41	1.65
October	2.77	.98	.65	1.21
November	2.76	1.03	.88	1.13
December	2.49	1.06	.92	1.13
January	2.19	.56	.42	.65
February	2.43	.98	.86	1.06
March	2.42	1.27	1.20	1.32
April	2.42	1.40	1.21	1.48
May	2.46	1.45	1.23	1.53
June	2.69	1.77	1.70	1.80
Wgt. Annual Ave	2.56	1.37	1.23	1.45
Subgroup Volume	10246	855	296	559

Some key observations relative to the gross margins analysis are as follows:

1. The patterns of change in the gross margins are essentially the same for all states or groups of states.
2. Gross operating margins, as would be expected from the pay prices for milk used for manufacturing, are consistently greater in California than for any other states or regions. The data show that California annual average gross margins for block cheese and butter/nonfat dry milk plants are almost two times higher than the margins for all other sites. For block cheese plants, the annual average gross margins for California plants is more than twice that of all other states, $2.53 versus $1.19 per cwt. of milk.

3. For cheese plants in the Utah-Idaho-Wyoming region, gross margins were closer to the California levels and were substantially higher than at cheese plants in the other surveyed areas.

These characteristics in the gross margin patterns may be the result of one or a combination of the following factors.

1. Competition for milk supplies appears to be more intense by dairy plants in regions outside of California.
2. Plant costs and efficiency may be greater in plants outside of California.
3. The margin differences may reflect the adjustment process of regional shifts of comparative advantage or competitive advantage in milk production. Once the situation stabilizes and the competitive situation is closer to equilibrium, differences in gross margins for processing will narrow.
4. The most obvious explanation for the wide disparity in gross operating margins between California and plants in the other areas is the acceptance and practice of an administratively determined low price for milk used for manufacturing in California versus competitive procurement situations which generate various price premiums in the other areas. Even without any price premiums in the areas outside of California, however, prices of milk used for manufacturing in the other areas would continue to be substantially higher than those in California.
5. Excess milk manufacturing capacity in most of the surveyed areas may be the key reason explaining the intense competition for milk supplies. In California, by contrast, milk production appears to

have increased faster than milk manufacturing capacity and plants have received all of the milk they required without having to bid up milk prices.

Summary and Implications

Manufactured dairy products are marketed on a national basis and are priced at essentially comparable levels throughout the United States in the wholesale market. Therefore, any significant differences in gross operating margins at milk manufacturing plants in different regions are due to the prices or costs that plants incur in procuring milk. Operating margins at individual plants should also be favored by lower price/costs for milk, or should be eroded by higher prices/costs for milk. However, operating margins at individual plants are also influenced by (1) possible differences in yield due to differences in characteristics of the raw milk supply, (2) differences in plant manufacturing costs or plant make allowances for any of a number of management/performance/institutional type reasons, and (3) minor differences in product prices associated with some type of product differentiation factor.

The focus of this report has been to measure gross operating margins at milk manufacturing plants in various regions of the United States as compared to California. Gross operating margins in California are substantially higher than in other regions, almost exclusively due to the low price California plants have to pay for milk used for manufacturing as compared to plants in other parts of the nation. Table 9 summarizes the gross operating margin differences.

TABLE 9. Average Gross Operating Margins Per Cwt. by Regions and Products, July, 1987 through June, 1988.

Region/Product	Block Cheese	Barrel Cheese	Butter-Nonfat Dry Milk
California	$3.02	$2.53	$2.56
All other regions	1.66	1.16	1.37
Minnesota	1.42	.92	1.23
Wisconsin	1.61	1.11	--
Minnesota & Wisconsin	1.57	1.07	--
Utah/Idaho/Wyoming	2.36	1.07	--
Ohio/Indiana/Pennsylvania	--	--	1.45

The higher gross operating margins available to milk manufacturing plants in California have been noted throughout this report. In order to translate those gross margins onto a product unit basis and provide some direct comparisons, the following two steps are pursued. First, California margins are compared only with margins with "all other regions," i.e., the nineteen operations in the four areas where milk price/cost data were collected. Second, the gross margin data per cwt. of milk are converted to pound of product by dividing the margin by yield. For example, for cheese, the gross margin is divided by the 9.66 pound yield factor. The total margin is imputed to the cheese without any adjustments for by-product values. For butter-powder, the gross margin is divided by the yield factors on butter (4.27 pounds) and nonfat dry milk (8.3 pounds). One fourth of the gross margin is imputed to butter manufacture and three-fourths to nonfat dry milk manufacture (consistent with cost allocations in producing butter and nonfat dry milk). Again no allowances were made for any by-product values. Results of these calculations are reported in Table 10.

TABLE 10. Gross Margins Per Cwt. of Milk and Per Pound of Product, California and Four Surveyed Areas, 1987-1988.

	Block Cheese	Barrel Cheese	Butter	Nonfat Dry Milk
			Butter/Nonfat Dry Milk	
CA gross margin per cwt. milk	$3.02	$2.53	$2.56	
CA gross margin per lb. of product	31.26¢	26.19¢	14.99¢	23.13¢
Gross margins in four surveyed areas/cwt. milk	1.66	1.16	1.37	
Gross margins in four surveyed areas/lb product	17.18¢	12.00¢	8.02¢	12.39¢

As the data in Table 10 indicate, the gross operating margins on block cheese at California plants is 31.26 cents per pound of cheese, 14.08 cents per pound higher than the 17.18 cent margin estimated for the surveyed plants. On barrel cheese, the California margin was 14.19 cents higher per pound than at the surveyed plants. The gross margin per pound of butter was almost 7 cents a pound higher for California plants and was 10.74 cents higher per pound of nonfat dry milk.

With relatively low transportation costs on manufactured dairy products, the substantially higher margins available to plants manufacturing milk in California can put the California operations in to a very favorable competitive position in national dairy markets.

Conclusion

There are no easy or obvious answers to the market problem situation defined in this report. Historically, the milk industry has operated on the premise that the price/cost of milk used for manufacturing was relatively uniform throughout the United States. To the extent that this was not the case, it did not matter very much because the quantities of dairy product manufactured in regions other than the upper midwest and the northeast were not large enough to have impacts in national dairy markets. More recently, the substantial increases in milk production in some regions relative to other regions, and California is noted specifically in this study, has brought new national competition to manufactured dairy products markets. As a result, regional competitive advantages and disadvantages have come under new scrutiny. The obvious price/cost advantage accruing to milk manufacturing plants in California is highlighted in this report.

While the California manufacturing plants enjoy a low price for milk, it is also true that California milk producers receive that same low (overbase) price for milk. Yet California milk producers have continued to increase milk output while receiving the lowest milk prices in the United States Efficiencies in milk production in California (lowest cost of milk production per cwt. in the U.S.) partly explain this phenomenon. In that sense, the California milk industry has a competitive advantage that should be reflected in the marketplace. However, the Class IV a/b price has been established at artificially low levels to accommodate the higher cost milk manufacturing plants in the state.

In the shortrun, it is evident that the present types of price-making rules for milk used for manufacturing will prevail in the different areas.

The milk industry obviously is operating in this situation, meaning that regional competition in production and marketing will continue to make adjustments in response to the different price signals. In the longer run, the California milk producer sector may react to their low overbase (Class 4 a/b) prices and press for lower make allowances in the State order or push for price provisions more consistent with those in the Federal milk order program.

There are probably other options that may be pursued, but the areas mentioned deal most directly with the situation.

In conclusion, the data that have been assembled on milk prices and margins clearly show substantial differences between California and other parts of the U.S., particularly, the upper midwest. Substantially lower milk prices in California lead to gross processing margins that are twice those of plants in the upper midwest. The differences are too large to be accounted for by problems in data collection. However, it is unclear why such differences exist. Differences in competition for milk supplies, differences in other costs of processing (labor, energy), differences in economies of scale, differences in product yields, and regulatory differences are possible explanations. A study of plant operations and competition in each of the regions would shed more light on the causes.

COSTS OF MILK FOR MANUFACTURING MILK PLANTS
WMMB PROJECT

Company Name: _____
Plant location: _____
Recorder: _____

Products produced and sold _____
_____
_____
_____
_____

	Month											
	July 1987	Aug.	Sept.	Oct.	Nov.	Dec.	Jan. 1988	Feb.	March	April	May	June
1. Total Payments to producers for all milk*												
Grade A ($)												
Grade B ($)												
2. Total volume of milk received from producers												
Grade A (cwt.lbs.)												
Grade B (cwt.lbs.)												
3. Total volume of milk shipped to fluid plants (cwt./lbs.)												
4. Total over-order payments generated by fluid shipments (cwt./lbs.)												
5. Total hauling costs assessed to fluid shipments** ($)												
6. Butterfat in producer milk												
Grade A (test/lbs.)												
Grade B (test/lbs.)												
7. Protein in producer milk (discounts and/or premiums and base for adjustments)												
Grade A (test/lbs.)												
Grade B (test/lbs.)												
8. Solids not fat in producer milk (discounts and/or premiums and base for adjustments)												
Grade A (test/lbs.)												
Grade B (test/lbs.)												
9. Federal Order blend price at Location ($/cwt.)												
10. Butterfat payment plan differential												
Grade A ($/point)												
Grade B ($/point)												
11. Net dollars paid for butterfat differential												
Grade A ($/point)												
Grade B ($/point)												

	July 1987	Aug.	Sept.	Oct.	Nov.	Dec.	Jan. 1988	Feb.	March	April	May	June
12. Protein or solids payment plan (describe)												
Grade A ($/point)												
Grade B ($/point)												
13. Net dollars paid for protein or solids												
Grade A ($)												
Grade B ($)												
14. Volume payment plan (describe)												
15. Total dollars paid for volume premiums												
Grade A ($)												
Grade B ($)												
16. Quality premium payments, net dollars paid												
Grade A ($)												
Grade B ($)												
17. Hauling charges to producers (describe if not a standard schedule of charges)												
Grade A ($/cwt.)												
Grade B ($/cwt.)												
18. Total hauling costs to plant ($)												
19. Total hauling revenue from producers ($)												
Grade A ($)												
Grade B ($)												
20. Producer inspection fees paid by buyer												
Grade A ($)												
Grade B ($)												
21. Service Charges												
M.A. fees for non-coop members ($/cwt.)												
Capital retains ($/cwt.) (specify repayment period)												
Grade A ($/cwt.)												
Grade B ($/cwt.)												
Coop service charge or marketing fee												
Grade A ($/cwt.)												
Grade B ($/cwt.)												
22. Promotion assessments $/cwt.												

* This total is to include all additions and deductions applied to producer milk as reported below.

** Receiving plant to processing plant hauling charges should not be included in this figure.