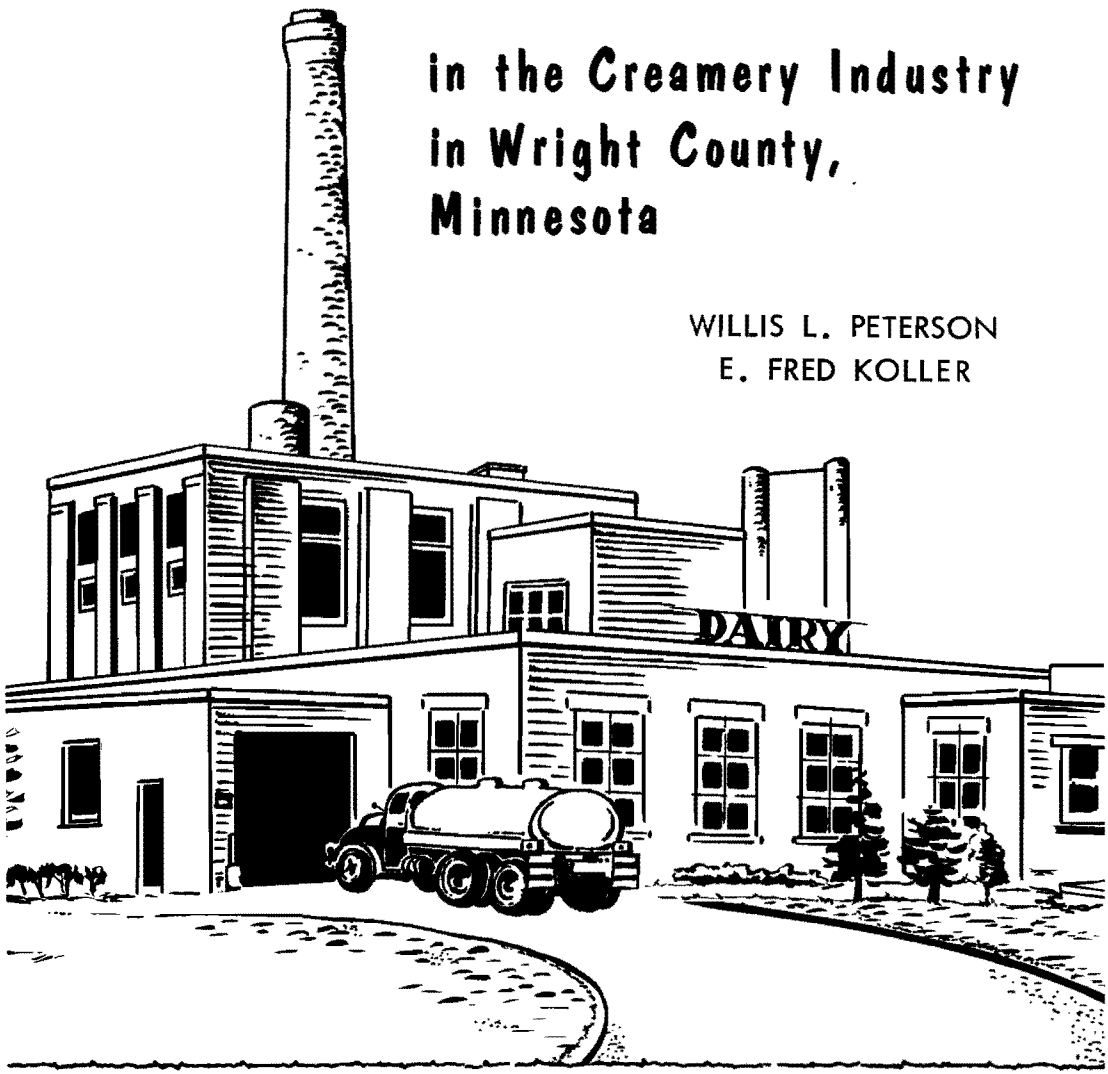
REPORT NO. 525 JUNE 1963

Market Organization and Competition in the Creamery Industry in Wright County, Minnesota

WILLIS L. PETERSON
E. FRED KOLLER



DEPARTMENT OF AGRICULTURAL ECONOMICS
UNIVERSITY OF MINNESOTA
ST. PAUL, MINNESOTA

MARKET ORGANIZATION AND COMPETITION IN THE CREAMERY INDUSTRY IN WRIGHT COUNTY, MINNESOTA

TABLE OF CONTENTS

MARKET ORGANIZATION AND COMPETITION IN THE CREAMERY INDUSTRY IN WRIGHT COUNTY, MINNESOTA

by Willis L. Peterson and E. Fred Koller[1/]

INTRODUCTION

During recent years the dairy manufacturing industry in Minnesota has undergone significant changes. Among these changes has been the trend towards fewer and larger dairy plants. From an economic point of view this trend has been generally accepted as a desirable thing. Studies have shown and it is generally conceded that large plants are able to obtain economies of scale and in consequence are able to lower their per unit costs.[2/]

The question arises whether the trend towards greater concentration of the dairy manufacturing industry is desirable from the standpoint of competition and overall efficiency in the market. Will milk flow from the producer, through the processing plant, and to the consumer in a more efficient manner than formerly? Will price at the farm level fully reflect supply and demand conditions? In the final analysis, which group will gain -- producers, processors, or consumers?

To answer these and other questions, a statewide study of the changing market structure of the Minnesota dairy manufacturing industry is being made. One phase of the study involves selection of several county areas in Minnesota for intensive analysis. The object is not only to observe changes in market structure but more specifically how these changes may affect the conduct of firms and performance of the market.

Wright County was selected as one of the study areas. The size and type of creameries and dairy marketing problems in this area appeared to be typical of a large part of the state. Wright County is located about 30 miles west of the Twin Cities; the county seat is Buffalo (figure 1). The

---

[1/] Willis L. Peterson was formerly a research assistant in the Department of Agricultural Economics. E. Fred Koller is a professor in the Department of Agricultural Economics, University of Minnesota.

The authors gratefully acknowledge the generous cooperation of dairy plant managers in the Wright County area who supplied much of the information for this study. Credit is due Harlan R. Stoehr, agricultural bulletin editor at the University of Minnesota, for editorial assistance.

[2/] A. C. Knudtson and E. Fred Koller, Manufacturing Costs in Minnesota Creameries, Minnesota Experiment Station Bulletin No. 442, June 1957.

county is located in the central part of Minnesota's dairy area which extends diagonally across the state from the southeast to the northwest.

The method of analysis, both in this report and in the statewide study, will center around the market structure -- firm conduct -- market performance approach.[3/]

Market structure refers to the aggregate of market characteristics which appear to influence strategically the nature of competition within the market. Such considerations as the size and number of firms, the ease with which firms can enter or leave the market, and the degree of difference between the products (or services) of firms in the market are called structural characteristics. It is likely that each market has certain relevant structural characteristics peculiar to itself; one of the purposes of a market structure study is to determine what these are.

Firm conduct refers to the patterns of behavior that firms follow in adapting themselves to the competitive conditions in the market. Methods of determining price and the various nonprice competitive practices used are two broad categories of firm conduct.

Market performance refers to the economic results that flow from the aggregate of firms comprising the market or industry. The performance of the dairy manufacturing industry might be measured in terms of its efficiency in procurement, processing, and distribution, its progressiveness in developing new products and techniques of processing, and the height of pay prices relative to average costs of production.

This report is concerned mainly with market structure and firm conduct. Final judgment on the performance of the industry will be deferred until the statewide study is completed.

The creamery industry of Wright County does not constitute a market in and of itself. Rather, it can be more accurately thought of as a segment of a statewide or national manufacturing milk market.

[3/] The following discussion of this approach is based on Bain, J. S., Industrial Organization, John Wiley and Sons, Inc., New York. 1959, pp. 7-13.

MARKET ORGANIZATION

Description of the Buyers

Number and Size of Creameries

Since the statewide study is concerned with the dairy manufacturing industry, only those creameries in Wright County which process manufacturing milk were included in the study.[4/] These included eight cooperative creameries and one independent or proprietary creamery which operated as a receiving station for a butter-powder plant (see figure 1). Three of the cooperatives manufactured butter and dried milk while the remaining five manufactured butter only. The three butter-powder creameries purchased milk from other plants and receiving stations as well as direct from farmers.

The trend towards fewer and larger creameries is much in evidence in Wright County. Table 1 indicates that during the past 10 years the number of creameries has decreased by almost one-half while average size measured in average annual volume of butterfat handled has increased over two times. Not all creameries grew at the same rate, however. The average size of the three largest creameries nearly tripled during the 10-year period. In contrast, the average size of the three smallest creameries (those that remained open during the 10-year period) only increased from 320,000 pounds of butterfat in 1950 to 363,000 in 1960. Although the small creameries did increase in absolute volume, they did not grow at nearly the rate of the large creameries.

Another way to show the increasing importance of the large creameries is to look at their share of the total butterfat processed in the county. In 1950, the three largest cooperative creameries processed 36 percent of the total butterfat purchased by cooperative creameries in Wright County. In 1960, the three largest cooperative creameries processed over 71 percent of this total. In summary, then, the trend

---

[4/] Two large dairy plants located at Delano and St. Michael which receive and process grade A milk were not included in the study. These plants were considered to be a part of a different market than the manufacturing milk market.

A large central milk drying plant located at Monticello also was not included in the analysis. This plant received only skim milk and buttermilk from local creameries. It had no direct farmer patrons so its competitive methods and problems were different than those of local creameries in the county which are the focus of this study.

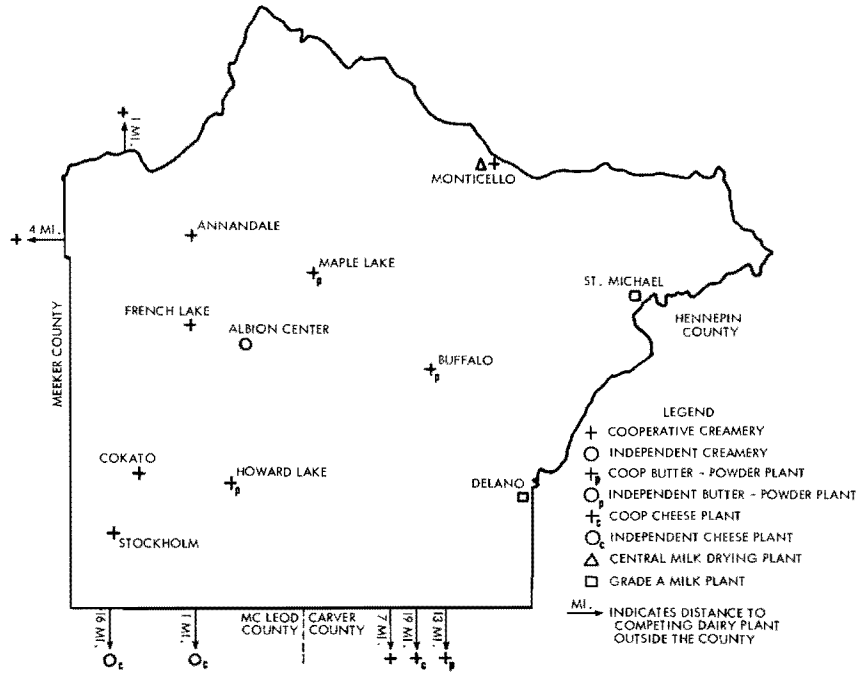


Figure 1. Location of dairy plants in Wright County, 1960

Table 1. Changes in number and size of creameries in Wright County, 1935, 1950, 1960

	1935	1950	1960	Percent change 1935-50	Percent change 1950-60
Total no. of creameries	24	15	9	-38	-40
No. of coop. creameries	20	14	8	-30	-43
No. of independent creameries	4	1	1	-75	0
Ave. bfat. volume of coops. (1,000 lbs.)*	-	451	1,186	-	+163
Ave. bfat. volume of 3 smallest coops. (1,000 lbs.)	-	185	363**	-	+96
Ave. bfat. volume of 3 largest coops. (1,000 lbs.)	-	763	2,267	-	+197

*Range in size (thousand lbs. of butterfat) -- 64 to 833 in 1950, and 270 to 2,885 in 1960.

**The three smallest creameries in 1960 were not the same plants as those shown in 1950. All of the three smallest creameries in 1950 had closed by 1960.

has been towards fewer and larger creameries, with the larger creameries growing at a more rapid rate than the smaller ones.

The closed creameries in Wright County also merit some attention. Table 1 indicates that six creameries discontinued operation during the 1950-60 period. Four of these creameries closed completely while two have discontinued processing manufacturing milk and have shifted to bottling Grade A milk. The average butterfat volume in 1950 of the four creameries that closed completely during the 10-year period was just under 225,000 pounds. All of the three smallest creameries shown in table 1 for 1950 had closed completely by 1960. It appears, therefore, that the smallest creameries are closing down, the middle size creameries are about holding their own, and the largest creameries are growing rapidly.

In addition to the nine creameries located within Wright County, seven dairy manufacturing plants located outside the county also obtained some of their milk there. This provided farmers with more alternative outlets for their milk and increased the degree of competition in the area. The largest of these outside buyers was an independent cheese plant which covered a large part of the county with its milk pickup routes and was a significant factor in the manufacturing milk market of the area. A second cheese plant which was a branch of a national dairy company obtained some milk in the

county.5/ A cooperative cheese plant located some distance outside the county also procured milk there.

Of the seven outside plants, four were cooperative creameries which operated milk pickup routes in various parts of the county.

While outside plants were buying milk in the county, it may be pointed out that several of the Wright County plants, in turn, also purchased some milk outside of the county.

Growth Methods

Analysis of the growth methods of these creameries helps to explain why the larger creameries are growing at a more rapid rate. A large source of the increased volume for the large creameries in the last 10 years has been the purchase of whole and skim milk from other plants and receiving stations.

As far as could be determined, in 1950 all butterfat receipts of creameries in Wright County came directly from farmers. In 1960, however, the three largest creameries received only 63 percent of their butterfat directly from farmers with the other 37 percent being received as whole milk from other plants or receiving stations. The remaining six creameries received 100 percent of their butterfat directly from farmers.

Achieving greater volume by purchasing milk from other plants points out a significant trend in the manufacturing milk industry. Small creameries with higher than average processing costs often find it more profitable to close down their processing operation and serve only as a receiving station for a larger creamery or milk drying plant. This practice seems to have resulted in mutual benefit for both the large and small creamery. The small creamery retains its identity while the large creamery lowers its per unit costs through greater volume. In case the creameries involved are cooperatives, the net savings which result are distributed to the farmer patrons in proportion to the volume of milk they have delivered to their creamery.

The question arises in case both creameries are cooperatives, whether net returns to farmers might be increased still more if the milk did not stop at the receiving station but was hauled directly to the larger creamery. If net returns to farmers are increased further by the elimination of the receiving station, then it appears that the receiving station represents only an intermediate stage between a small creamery and a closed one.

5/Since this survey was made, this plant has discontinued operations.

In some cases, a small creamery may not be converted into a receiving station but rather is closed completely. When this occurs there appears to be a tendency for most of the patrons of such a creamery to shift to a larger creamery in the area. Therefore, whether a small creamery closes or becomes a receiving station, the end result is the same. That is, the larger creameries tend to increase volume by adding a group of patrons at a time when a dairy plant change occurs in their area. On the other hand, smaller creameries, in order to increase volume, have to rely on the increased production of their existing patrons or occasional patrons that they might attract from other creameries.

Merger or consolidation did not appear to play a significant role in the growth of creameries in Wright County. In the past 10 years there is record of only one consolidation between two manufacturing milk creameries in the county. However, consolidation had been considered by various creameries in the county. Five out of the remaining nine creameries had at one time negotiated for a consolidation but had not gone through with it. Moreover, six out of the nine managers interviewed thought it would be a good idea if their creamery would consolidate with one or more other creameries. The principal reason given for this desire to consolidate was the savings in costs obtainable through greater efficiency in milk procurement and processing.

Type of Ownership

For several decades the cooperative has been the prevalent type of manufacturing milk creamery in Wright County. On the basis of the data in table 1, there does not seem to be any danger of their losing this position. Eight out of nine creameries in the county are organized and operated on the cooperative plan.

Products Purchased and Sold

Table 2 indicates that whole milk has become the most important source of butterfat for creameries in the county. Farm separated cream has declined to a negligible amount. Grade A milk has increased somewhat, but still accounts for a relatively minor proportion of total butterfat received from farmers.

For purposes of this study the creameries in Wright County were classified into size groups according to their 1960 butterfat purchases. The size groups were defined as follows:

Small	- less than 500,000 pounds	- 3 creameries
Medium	- 500,000 to 1,000,000 pounds	- 3 creameries
Large	- over 1,000,000 pounds	- 3 creameries

These definitions will be used throughout this report.

Table 2. Total butterfat purchased from farmers by eight cooperative creameries, Wright County, 1949 and 1960

Product	1949 B.F. recd. (1,000 lbs.)	1949 As a percent of total B.F. (percent)	1960 B.F. recd. (1,000 lbs.)	1960 As a percent of total B.F. (percent)
Manufacturing whole milk	3,397	83.9	6,613	94.6
Farm separated cream	591	14.6	74	1.1
Grade A milk	60	1.5	301	4.3
Total B.F. received	4,048	100.0	6,988	100.0

The composition of creameries' total receipts also has changed somewhat during the 1949-60 period (table 3). Butter sales, the largest single item in 1949, remained as the largest in 1960, although decreasing somewhat in relative importance. The installation of driers by the three largest creameries resulted in the addition of dry milk to total receipts in 1960. The relative decrease in other dairy products is primarily due to a decrease in the proportion of manufacturing whole milk sold. The increase in receipts from other sales and services is accounted for mainly by the increase in sales of feed, seed, and fertilizer. Increases in sideline operations appeared to be taking place among both large and small creameries.

Financial Characteristics

The financial structure of a business most often is described by use of the balance sheet. The balance sheet is a statement listing the assets, liabilities, and net worth of a business at a given date. Table 4 includes average balance sheets of the eight cooperative manufacturing milk creameries in Wright County by size groups for the years ending 1949 and 1960.

Current assets are those items that could most readily be converted into cash. The investment item in a cooperative creamery's balance sheet reflects mainly the amount that the association has invested in other cooperatives. These cooperatives usually are either large regional marketing associations or purchasing associations. Fixed assets are mainly buildings and equipment. Liabilities represent the claims of creditors on the firm's assets. Liabilities are classified according to current or long term depending on how soon they must be paid. Net worth represents the farmer owner's claim on the assets.

Table 3. Receipts from products sold by eight creameries in Wright County, 1949 and 1960

Receipts item	1949		1960	
	Dollar sales	As a percent of total sales	Dollar sales	As a percent of total sales
	(1,000 dollars)	(percent)	(1,000 dollars)	(percent)
Butter sales	2,247	59.8	6,550	55.6
Dry milk sales	-	-	2,152	18.2
Fluid skim milk sales	396	10.5	535	4.5
Other dairy products*	847	22.5	988	8.4
Total dairy products	3,490	92.8	10,225	86.7
Receipts from other sales and services**	258	7.0	1,447	12.3
Patronage refunds received	9	.2	119	1.0
Total receipts	3,757	100.0	11,791	100.0

*Includes mainly manufacturing whole milk, grade A milk, and buttermilk.

**Includes mainly feed, seed, fertilizer, and dairy supplies.

The financial condition of a business is generally described by the use of ratios. Two of the most commonly used are the worth-to-debt ratio and the current ratio. The worth-to-debt ratio is calculated by dividing the net worth by total liabilities. The resulting answer indicates how many dollars of assets are owned by the owners of the business per dollar of assets owned by its creditors. Financial analysts agree that a 2-to-1 ratio is a desirable standard. In 1960, the eight cooperative creameries in the county had a very favorable 2.5-to-1 worth-to-debt position (table 5).

The current ratio is calculated by dividing current assets by current liabilities. This ratio is an indication of the ability of a firm to pay its current debts when due. A 2-to-1 ratio is desired here although cooperative creameries can handle their current capital successfully with slightly lower current ratios.

Considerable improvement in both ratios is shown by the eight cooperative creameries in Wright County between 1949 and 1960. Much of the improvement has taken place among the small

Table 4. Average balance sheet of eight cooperative creameries in Wright County by size group, 1949 and 1960*

Items	1949 Large		1949 Medium		1949 Small		1960 Large		1960 Medium		1960 Small	
	Dollars	Per-cent	Dollars	Per-cent	Dollars	Per-cent	Dollars	Per-cent	Dollars	Per-cent	Dollars	Per-cent
Current assets:												
Cash	20,487	14.4	4,370	4.6	1,170	1.2	30,541	5.2	26,947	8.2	7,106	5.5
Receivables	26,563	18.7	20,510	21.8	6,943	6.9	81,259	13.9	37,269	11.3	14,300	11.0
Inventories	9,873	7.0	3,063	3.3	2,915	2.9	57,783	9.9	23,563	7.2	8,369	6.4
Total current	56,923	40.1	27,943	29.7	11,028	11.0	169,583	29.0	87,779	26.7	29,775	22.9
Investments	36,042	25.4	26,168	27.8	19,985	20.0	88,835	15.2	182,299	55.4	60,749	46.7
Fixed assets	47,295	33.3	38,950	41.4	67,692	67.6	325,228	55.7	57,631	17.5	39,047	30.0
Other assets	1,739	1.2	981	1.1	1,406	1.4	553	.1	1,356	.4	469	.4
Total assets	141,999	100.0	94,042	100.0	100,111	100.0	584,199	100.0	329,065	100.0	130,040	100.0
Liabilities:												
Current liab's	48,363	34.1	33,039	35.2	21,178	21.1	120,070	20.6	70,629	21.5	26,977	20.7
Long term liab's	3,410	2.4	1,544	1.6	35,498	35.5	69,211	11.8	7,606	2.3	65	.1
Total liabilities	51,773	36.5	34,583	36.8	56,676	56.6	189,281	32.4	78,235	23.8	27,042	20.8
Net worth	90,226	63.5	59,459	63.2	43,435	43.4	394,918	67.6	250,830	76.2	102,998	79.2
Total liabilities and net worth	141,999	100.0	94,042	100.0	100,111	100.0	584,199	100.0	329,065	100.0	130,040	100.0

*Classified according to size in 1960. Large and medium size groups each include three creameries; small includes two creameries.

and medium size creameries. The average worth-to-debt ratio and average current ratio in 1949 for the four creameries that closed completely during the period was 0.89 and 0.93, respectively, showing a weakness in their financial position.

Another financial characteristic that is relevant to the structure of the market is the ratio of fixed costs to variable costs. A fixed cost is defined as a cost that does not change as the amount of output changes. A variable cost, on the other hand, changes as output changes. The higher the ratio of fixed costs to variable costs, the more important it is for a creamery to keep its volume up. A drop in volume for a creamery with high fixed costs relative to variable costs would result in a smaller reduction in total costs than would be the case for a creamery with low fixed costs. The consequences would be a greater rise in unit costs for the high fixed cost creamery than for the low fixed cost creamery.

Table 5. Balance sheet ratios by size groups, eight cooperative creameries, 1949 and 1960

Size groups	Number of creameries	Worth-to-debt ratios		Current ratios	
		1949	1960	1949	1960
Small	2	.77	3.81	.52	1.04
Medium	3	1.72	3.21	.84	1.25
Large	3	1.74	2.09	1.18	1.41
Average, all groups*		1.44	2.50	.97	1.33

*Weighted averages.

The ratio of fixed costs to variable costs for the manufacturing milk cooperative creameries in Wright County, by size groups, for 1960 is shown in table 6.

These data indicate that the small creameries tend to have a higher ratio of fixed to variable costs than medium or large creameries. This means that per unit costs are likely to increase more rapidly in a small creamery than in a larger one, given a certain percentage reduction in volume in each.

The higher ratio of fixed to variable costs of creameries in the large group over the medium group is largely explained by a higher depreciation expense in the large group. Depreciation accounts for about eight percent of total expense in the medium size group but increases to 12 percent for the large

Table 6. Ratio of fixed to variable costs, eight cooperative creameries, Wright County, 1960*

Size group	Number of creameries	1960 ratio
Small	2	0.35
Medium	3	0.25
Large	3	0.30

*Fixed costs include mainly depreciation, insurance, taxes, and other miscellaneous expense not varying with output of the creamery. Variable costs include mainly wages and salaries, supplies, fuel and light.

size creameries.[6/] Thus, the addition of plant and equipment in large creameries makes it more important for them to keep their volume up.

Seasonality of Milk Receipts

Seasonality of milk receipts is an important factor affecting the manufacturing milk market since it influences the cost of operation. Creameries that are able to maintain an even seasonal flow of milk into the plant, thus eliminating periods of excess capacity, should be able to keep processing costs down. Plants with low processing costs are in a better position to pay top prices for milk. A measure of the degree of seasonal fluctuation in milk intake was constructed by calculating the percentage that the lowest monthly volume was of the highest monthly volume. A larger percentage indicates less variation between the low and high months than a smaller percentage.

Table 7. Indexes of seasonal variations — percent lowest monthly volume is of highest monthly volume, and percent of plant capacity utilized in the flush season, nine Wright County creameries, 1960

Size group	Number of creameries	Percent lowest month is of highest month (percent)	Percent of plant capacity utilized in flush season (percent)
Small	3	41.0	88
Medium	3	44.5	90
Large	3	45.8	95

6/The three large creameries have a large investment in milk drying equipment which explains the larger depreciation expense.

According to table 7, the difference in butterfat intake between the lowest and highest month was greater in the small creameries than in the larger ones. If the butterfat received from other creameries is excluded in the large creamery group, the percent the lowest month is of the highest is slightly greater (46.5 percent). Therefore, the practice of receiving milk from other plants and receiving stations did not serve to reduce variation in intake between the low and high months.

The percent of plant capacity utilized in the flush season ranged from 70 to 100 percent for the nine creameries.[7/] Table 7 also indicates that the large creameries tend to utilize a greater proportion of plant capacity in the flush season than the small creameries.

Marketing Channel Utilized

The price that a creamery is able to get for the products it manufactures also greatly affects the price it can pay to farmers and thus its ability to compete for milk in the market. Of the eight cooperative creameries studied, four sold the greatest share of their products through a regional cooperative dairy association, three sold mostly to one or more large national dairy companies and one sold mostly to the local trade. The average price received per pound of butter by size of creamery and by market outlet is shown in table 8.

The higher price received by the smaller creameries is due to the higher price received for butter sold to the local trade, including farmer patrons, local stores, and restaurants.[8/] This outlet accounted for a large share of the butter sold by the small creamery groups. Aside from the higher price received in the local trade, there did not appear to be a great difference in butter price received between size groups or between market outlets.

[7/] No attempt was made to define or measure capacity. The percent of capacity utilized was given as an estimate by each manager.

[8/] While higher prices were received for butter sold to the local trade there were some offsets in the way of extra packaging and handling expenses.

Table 8. Average price received per pound of butter by size group and market outlet, cooperative creameries, Wright County, 1960

Size group	Number of creameries	Price (cents)	Market outlet	Number of creameries	Price (cents)
Small	2	59.89	Regional cooperative*	4	58.23
Medium	3	58.41	National dairy companies	3	58.91
Large	3	58.78	Local trade	1	61.80

*The price of butter sold through the regional cooperative is not strictly comparable with the price received from other outlets because it does not include the patronage refund paid at the end of the year by the regional organization.

Description of the Sellers (Farmers)

The general trend of decreasing number and increasing size of firms also seems to hold true for the selling side of the market. According to U. S. Census data, farms in Wright County are becoming less numerous and larger. Some of the significant changes that have taken place on the selling side of the market during the past 10 years are shown in table 9.

Table 9. Changes in number of farms, size, and related characteristics, Wright County, 1950 and 1960

	1950	1960
Number of commercial farms	3,276	2,526
Number of milk cows	37,011	37,910
Number of dairy farms	1,971	1,650
Average number of milk cows per dairy farm	18.8	23.0
Average size of farms (acres)	113.8	154.4
Percentage of farms located on:		
Hard surfaced roads	16.7	24.2
Gravel, shell, or shale	66.5	67.4
Dirt or unimproved	16.8	8.4

The number of milk cows in Wright County increased slightly during the period despite the reduction in number of dairy farms. Another item of importance is the increasing percentage of farms located on improved roads. This is an important development since better roads enable dairy plants to

utilize larger trucks and thus reach out further for their milk supply. This is probably one of the prime factors responsible for the extreme competition for milk in many areas despite a reduction in the number of dairy plants.

The concentration of farms into larger units, although it is noteworthy, should not alter the structure of the market to any great degree. That is, farms are still relatively small compared to creameries and thus it is unlikely that any one farmer could influence the price or services offered by a creamery.

On the other hand, there is evidence of a widening difference in size of producers and this could well change the competitive practices of creameries. Not many years ago producers were somewhat of a homogeneous group. That is, each one kept a few cows as a source of regular cash income. Today it is not uncommon to find farmers, specializing in dairying, who keep upwards of 50 or 60 milk cows and sell over a ton of whole milk each day. The milk of these large producers is likely to be highly sought after by creameries because each adds a substantial amount to the total volume, each can be handled at lower unit costs than a small producer in terms of administrative expense and field work, cost savings in hauling are obtainable through large volume pick-ups, and for other reasons. In view of this, it is likely that creameries will adopt competitive policies that result in differential advantages to large producers. This will be discussed further in the milk hauling section of this report.

Description of Procurement Areas

Overlapping of Procurement Areas

One problem of the dairy processing industry that has caused much concern in recent years is the large amount of overlapping of procurement areas, particularly among cooperatives. The consequence of this is an excessive amount of cross hauling and duplication of collection routes. This, in turn, results in higher than necessary procurement costs for cooperatives and consequently less than maximum returns to farmers.

The extent of procurement area overlapping in Wright County is shown in figure 2. The procurement areas of plants within the county are shown as well as the areas of plants located outside of the county which procure some of their milk in this county. The number of plants procuring milk in any one area varied from one to five.

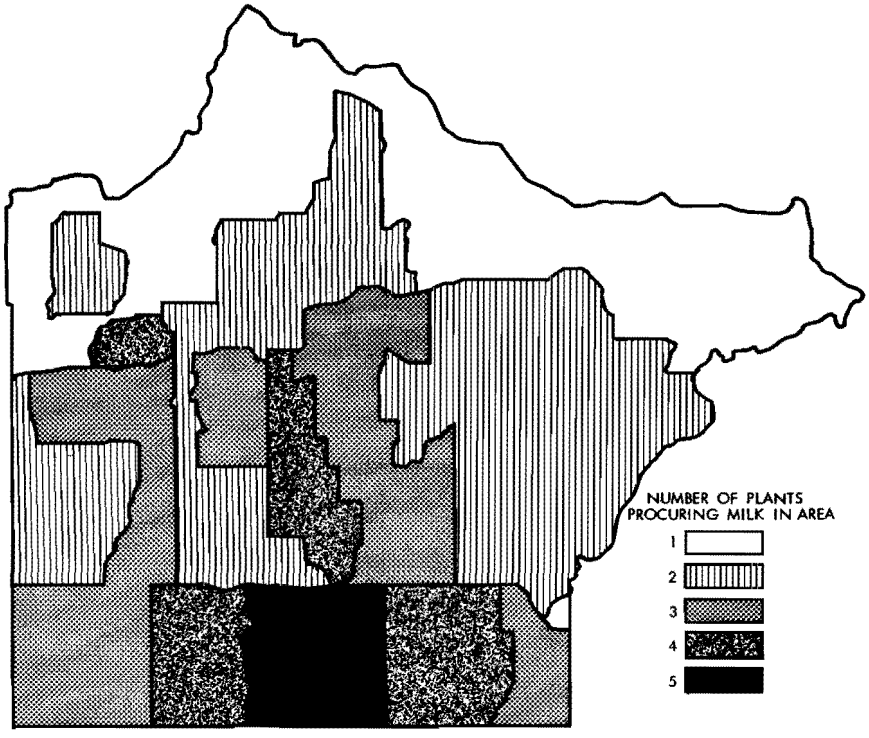


Figure 2. Extent of procurement area overlapping Wright County, 1961

Differences in Overlapping

It should be noted that there is a pronounced increase in overlapping as one moves from north to south in the county. This can be explained largely by two factors. First, the presence of the Mississippi River on the northern boundary of the county acts as a barrier for outside creameries located to the north. The second, and probably more important factor, is the difference in density of milk production between the southern and northern areas of the county. Although figures on milk production by townships are not available, it is generally agreed among informed sources within the county that milk production per square mile is higher in the south than in the north. It appears, therefore, that creameries concentrate their procurement efforts in areas of high milk production. An implication is that farmers living in high density milk producing areas tend to have more alternative marketing outlets for their milk than farmers living in areas of less dense production. The relationship between the number of creameries procuring milk in an area to the pay price in the area will be discussed in a later section.

It was also observed that there is a difference in the amount of overlapping in areas surrounding small creameries as opposed to areas surrounding larger plants. In the southern two-thirds of the county (approximately the area south of a line drawn straight west from St. Michael) there appears to be slightly more overlapping in the areas immediately surrounding the small creameries than in areas immediately surrounding the larger creameries. Table 10 indicates the amount of immediate area overlapping by size of creamery.

Table 10. Extent of overlapping in immediate milk supply area by size of creamery in southern part of Wright County, 1961

Size of creamery	Number of creameries	Average number of creameries overlapping
Large	3	2
Medium	2	2-1/2
Small	2	3

Although the existence of differences in amount of overlapping between the different size of creameries cannot be verified by this study alone, there does seem to be a logical explanation for it. It is unlikely that small creameries infringe upon the innermost procurement areas of large creameries to any great extent. This would seem to be the case since the

procurement areas of small creameries generally are restricted to close-in areas where patronage loyalty is the highest and where the danger of antagonizing a competitor and subsequent reprisal is the least.

The procurement areas of large creameries, on the other hand, tend to cover much larger areas. This is usually necessary if the large creamery is to procure sufficient volume for its plant. The net result is that large creameries tend to cover a large proportion of the heart of the procurement area of small creameries while small creameries usually do not penetrate to the heart of the large creamery procurement areas. This may be illustrated by a hypothetical situation as shown in figure 3.

The consequence of all this works to the disadvantage of small creameries. The small plants must meet the competition of the large ones in their most immediate procurement areas. However, large plants are likely to be spared the competitive pressure of small creameries procuring milk close to their plant.

Collection Routes

During 1960, the nine whole milk creameries in Wright County received 7,298,000 pounds of butterfat from their 1,569 patrons.2/ The contract hauler was the principal means of transporting this milk and cream from the farms to the creameries.

The contract hauler usually is an individual who owns one or more milk trucks and makes an agreement with a creamery to haul the milk from a certain route for a specified rate. The route is thought of as the right to haul the milk of a specified group of patrons.

For the nine creameries, over two-thirds of the butterfat was transported by contract haulers, with the remaining one-third being about evenly divided between the plant's own trucks and patrons themselves. For the small creameries, however, over half the butterfat was transported from farm to plant by the creameries' own trucks. The proportion of butterfat hauled and patrons served by the various methods for each size group are shown in table 11.

2/ Includes grade A, manufacturing milk, and cream (bulk and can).

Figure 3. Hypothetical situation showing differences in amount of overlapping between large creameries and surrounding small creameries.

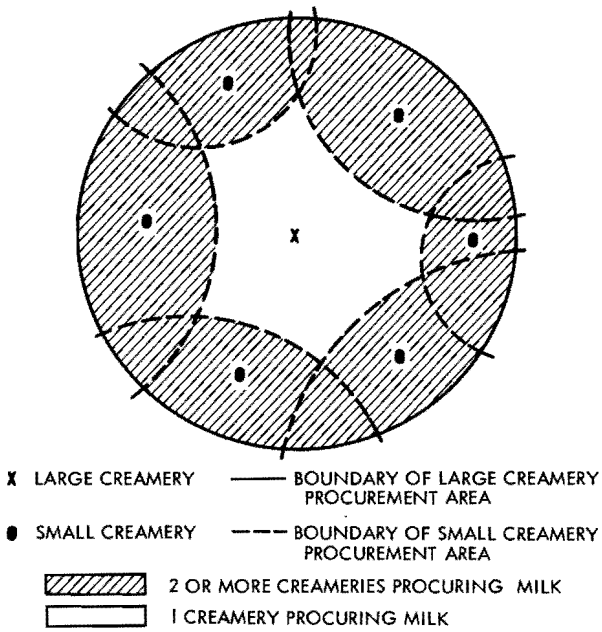


Table 11. Proportion of butterfat hauled and patrons served by the various means of hauling, 1961

Creamery size group	Contract haulers		Plants' own trucks		Patrons themselves	
	B.F. hauled	Patrons served	B.F. hauled	Patrons served	B.F. hauled	Patrons served
	(percent)					
Small	22	24	51	52	27	24
Medium	64	65	23	24	13	11
Large	81	84	3	2	16	14
Average all groups	69	70	15	16	16	14

Density of Routes

Can route data collected from eight of the creameries indicate that there is substantial variation between creameries in the average number of miles driven per patron, and pounds of butterfat picked up per mile. Averages for these

characteristics by size group and by area are shown in table 12. Creameries were divided into either the northern or southern area of the county according to whether the largest part of their procurement area fell to the north or to the south of State Highway 55.

On the basis of these characteristics, there appear to be greater differences between creameries in the two areas than between creameries in the three size groups. This seems logical since the southern half of the county is generally regarded as a more intense dairy area. Creameries procuring milk in the northern part of the county find their patrons more widely scattered and as such must travel further per patron and per pound of butterfat.

Table 12. Can route characteristics by size group and by area, Wright County, 1961

Classification	Number of creameries	Average number of miles driven per patron (miles)	Average lbs. of butterfat per mile (pounds)
Creamery size group:			
Small	3	1.73	6.60
Medium	3	2.08	5.94
Large	2	1.65	6.84
Area:			
North	3	2.34	5.14
South	5	1.58	7.18

Milk Hauling Rates

The milk hauling rate also is an important consideration in the structure of the market since it influences the net price that the farmer receives for his milk. Hauling rates on contract routes were determined in a number of ways. The rate was set exclusively by the hauler in three creameries, exclusively by the manager and/or board of directors in two creameries, and in two creameries the rate was set jointly by the creamery and the hauler. The two creameries that used their own trucks tried to set the rates so that the route paid its expenses.

In most instances the rate decided upon was the going rate in the area. There did not appear to be much concern among managers with regard to truckers setting the rate too high. As one manager put it, "Haulers compete with each other so their

rates can't be far out of line if they expect to keep their patrons." Can hauling rates ranged from 16 to 25 cents per hundredweight with an average of 18 cents. The hauling rates on four bulk routes ranged from 10 to 15 cents per hundredweight. The distribution of hauling rates for the 46 can routes is shown in table 13.

Table 13. Hauling rates for 46 can routes in Wright County, 1961

Hauling rate (cents per cwt.)	Number of routes
16	7
17	12
18	11
19	5
20	3
21	1
22-25	7
Total	46

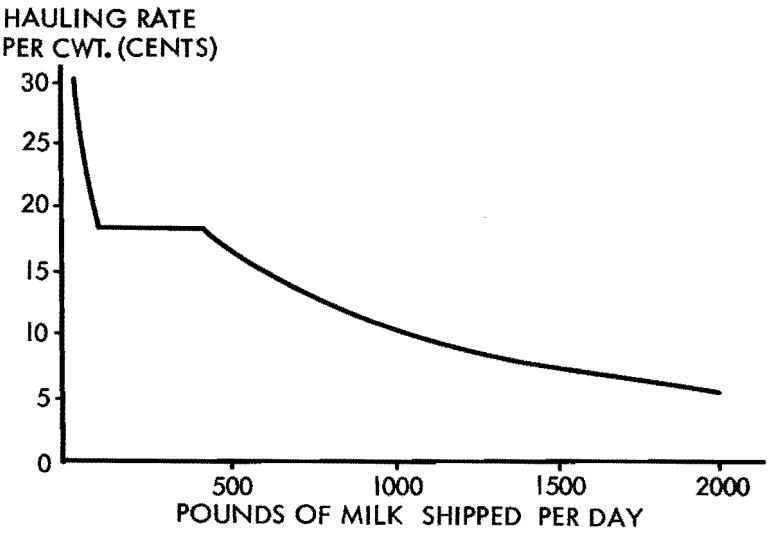
The hauling rate was not used as a competitive device to any great extent. Eight of the nine managers interviewed indicated that the hauling rate was not used as a selling point for the plant, and the other manager said they only used it occasionally. Rates were changed very seldom and when they were it was not advertised.

As one manager expressed it, "We raised our hauling rate last spring (about 3 months ago) and the farmers don't know it yet." Apparently, farmers don't watch milk hauling rates very carefully.

In recent years there has been increasing use of maximum and minimum milk hauling charges. All of the 46 can routes had a minimum charge; these ranged from $4 to $9 per month. Twenty-five of the can routes had some kind of a maximum charge. These ranged from an absolute maximum of $30 for the month (14 routes employed this) to a scaled down rate such as 5, 10, or 15 cents per hundredweight after a certain amount of milk had been shipped for the month. None of the manufacturing milk bulk routes had a maximum or minimum charge.

Questions arise as to the justification for these maximum and minimum charges. If these charges are used to compensate for differences in cost of hauling due to differences in volume between patrons, they are justified. That is, it is likely

Figure 4. Comparison of average milk hauling rates to various size patrons*



*Based on an 18-cent-per-hundredweight rate with a $5 minimum and a $30 maximum charge for a 30-day month.

that the cost per hundredweight to pick up milk for a 100-pound-a-day shipper is greater than that for a 1,000-pound-a-day shipper. Apparently, the minimum charge is made in an attempt to bring the hauling rate in line with costs for the small shipper while the maximum charge is designed to reward the large shipper for savings obtained because of the large volume pickup.

There is a good possibility, however, that the absolute maximum of $30 for the month rewards the large volume patron more than is justified by cost savings. If the differences in hauling rates to the various size patrons are not commensurate with the differences in costs, price discrimination occurs. With a $30 maximum charge per month, the cost per hundredweight to a 1,000-pound-per-day patron is 10 cents; this declines to 5 cents for a 2,000-pound-per-day shipper. Figure 4 shows differences in hauling rates resulting from the use of maximum and minimum hauling charges.

Creamery Assistance to Haulers

In some areas of the Midwest dairy plants have been known to subsidize their contract haulers so that they may offer very attractive rates to farmers. In such cases the hauling rate is used as a competitive device to attract patrons.

None of the managers interviewed in this study, however, indicated that the creamery gave any direct financial aid to haulers. Three of the managers said that they gave their haulers an occasional hauling job, but in most cases it benefited the creamery as much as the hauler. In a few cases creameries would obtain tires at wholesale for their truckers. However, it appeared that haulers were mostly on their own.

MILK PROCUREMENT -- COMPETITIVE PRACTICES AND POLICIES

During and immediately preceding the period of the survey, spring and summer 1961, the competition for milk and cream in Wright County was quite severe. Prices paid for manufacturing milk and cream were among the highest in the state and in some instances even exceeded the blend price paid for grade A milk in the area. In addition to the price inducement, creameries employed a large number of nonprice services designed to attract patrons.

Price Competition

Price Determination

Since the cost of the milk and cream purchased is the largest single item of cash outlay for a creamery, the price paid to farmers is an important consideration. Generally, each creamery is confronted with the task of determining a pay price each period. In other words, the creamery is cast in the role of the price maker while the farmer is the price taker.

All nine creameries used the "gross receipts less cost" method of determining the pay price for No. 1 manufacturing milk at least as a first approximation.[10/] With this method, the total sales of milk products processed or manufactured from the milk and cream received during the pay period was determined. This information was usually available because payment to farmers was not made until 15 to 25 days after the close of the pay period.[11/] Then, on the basis of past experience and available cost data for the period in question, the total cost of manufacturing or processing these products was calculated. Creameries then tried to pay out the excess of receipts over costs for the period. However, if competition was not too severe, cooperative creameries tried to hold back a small amount to be paid as patronage refunds at the close of the fiscal year.

10/ All creameries in the county price No. 2 and undergrade manufacturing milk at 3 and 10 percent respectively below No. 1 manufacturing milk.

11/ All creameries in the study paid once a month.

It was found that the prices paid by competing creameries also were an important factor in determining a creamery's pay price. The managers indicated that the prices paid by their competitors in the current or previous pay period had an influence on the price they set. This was particularly true among the smaller creameries. All of these managers said that they tried to keep their prices "in line" with competition rather than consistently pricing above or below competitor's prices.

In order to determine a pattern of price leadership in the area, managers were asked what plant or plants they watched the closest when they set their price. It was found that small and medium size plants typically watched a nearby large creamery. Of the three large creameries in the county, two indicated that competitors' prices did not influence their price. The other large plant, located in an area of high pay prices, watched the price of a large cheese plant in a neighboring county.

On the basis of these observations, it appears that the ability of a plant to be a price leader depends on two factors. First, size is important. In Wright County, the size of the price leader exceeded or equalled the size of its followers. All of the large plants appeared to serve as price leaders to surrounding smaller creameries. The second factor is the price that a creamery is able to pay. What it is able to pay is heavily dependent on the relative prices received for its major products. At the time of the study cheese prices were high relative to butter and powder prices; consequently cheese plants were in a position to pay high prices to farmers. Because of this several small and medium size plants together with one large one found themselves following the price of a large cheese plant. In summary, a large efficient dairy plant manufacturing relatively high value products appears to be the one most likely to emerge as a price leader in an area.

In order to keep their prices in line, four of the managers indicated that their creamery was forced to operate at a loss during certain periods. Usually this happened in periods of short milk supply when per unit costs were high, competition for milk was keen, and prices paid were high.

Creameries that are faced with high costs throughout the year find it very difficult to stay in the competitive race. Often they are forced to draw on their net worth reserves or omit depreciation allowances in order to stay in the black. Such practices, of course, cannot be carried on for long; sooner or later such a creamery is forced to close.

Creameries with high unit costs have been known to pay higher prices than justified for some time. This can be done in several ways. One method is to allocate a portion of the creamery costs to sideline enterprises such as feed or farm

supplies. Among cooperative creameries a misallocation of savings occurs if the patrons of the sideline enterprises and the milk patrons are not the same. The misallocation benefits the milk patron by way of a higher-than-justified butterfat price at the expense of the feed patron, for example, who does not receive his full patronage refund. This practice, of course, is contrary to cooperative principles.

Methods of Price Quotation

Two methods of quoting pay prices to farmers were used by the creameries in this study. These were: (1) price per hundredweight of 3.5 milk[12] and (2) price per pound of butterfat plus a price per hundredweight of skim milk, calculating the skim as 80 percent of the whole milk received. Two plants used the former method while seven used the latter method.

Another less commonly used pricing plan called the Froker plan was not used by any of the creameries in the county. The Froker pricing plan takes account of the changes in the content of milk solids-not-fat that occur with changes in the content of butterfat. A change of 0.1 pound of butterfat is accompanied by a change of .04 pound of milk solids-not-fat. With this plan, the price differentials from 3.5 percent milk are set to account for changes in value of solids-not-fat as well as butterfat.

Prices Paid

The average prices paid to patrons in Wright County for No. 1 manufacturing milk ranged from $3.14 to $3.30 per hundredweight in 1960. In 1961 the average pay price ranged from $3.34 to $3.42 per hundredweight. The majority of the creameries, six plants, paid between $3.14 and $3.21 in 1960 and between $3.34 and $3.41 in 1961. Pay prices averaged substantially higher in 1961 than in 1960 (table 14). The principal factor in this change was the increase in government support prices for manufacturing milk by 16 cents per hundredweight in September 1960, and by another 18 cents in March 1961.

It should be recognized, however, that the pay price per hundredweight of milk is usually not the same as what the farmer actually receives for his milk. In order to determine the net return per hundredweight of milk to the farmer, such considerations as hauling charge and cash patronage refund must be taken into account. The net price per hundredweight to farmers in Wright County was calculated by subtracting the hauling charge from the quoted pay price and adding any cash patronage refund.

12/ With adjustment for each 0.1 percent change in butterfat test.

Table 14. Average prices paid for 3.5 percent No. 1 manufacturing milk in cans, nine creameries, Wright County, 1960-61

Average quoted pay price			Average net price to farmers*		
	Number of creameries			Number of creameries	
Price	1960	1961**	Price	1960	1961**
$3.10-3.15	2	0	$2.95-3.00	3	0
3.16-3.20	4	0	3.01-3.05	2	0
3.21-3.25	2	0	3.06-3.10	3	0
3.26-3.30	1	0	3.11-3.15	0	0
3.31-3.35	0	2	3.16-3.20	1	3
3.36-3.40	0	3	3.21-3.25	0	3
3.41-3.45	0	3	3.26-3.30	0	2

*Quoted pay price plus cash patronage refund less hauling charges.

**Eight creameries reporting.

Since hauling rates and cash patronage refunds did not differ greatly between creameries, there was not a great change in the relative position of each creamery with regard to net pay price as compared to quoted pay price. That is, farmers shipping to creameries quoting a high pay price tended to receive a high net price for their milk and vice versa.

Six out of eight cooperative creameries in the county paid a patronage refund in cash on their 1960 business. One manager said this practice had been followed for the history of the creamery. The other five creameries started it fairly recently, ranging from three to 12 years. One other cooperative sent out notices of patron credits to evidence net margins retained in the business and to be repaid at some future time. The cash refunds ranged from one-half to two percent of farmers' sales to the creamery. The most frequent rate was one percent.

It appeared that farmers served by the creameries in Wright County were quite responsive to the cash refund. Of the six managers following this practice, four thought that it attracted patrons. This seemed to be particularly true if the cooperative creamery was in close competition with an independent dairy plant. One manager said that the cash refund at the end of the year was his main selling point over his independent competitor. Moreover, if the check was mailed out just before Christmas, farmers seemed to appreciate it just a little more.

Needless to say, the cooperative did have an advantage over the independent creamery in this respect. Of course,

there is nothing that prevents an independent from paying out a cash refund at the end of the year also, if it so chooses. During periods of severe price competition, however, cooperative creameries may be forced to pay out all they can and thus operate close to the break-even point throughout the entire year. In this case it becomes difficult for a cooperative to make a cash patronage refund at the end of the year.

Yet, during times of severe price competition, the pressure on a cooperative creamery to pay out a cash refund in order to retain patrons or replace those lost is usually great. In such instances, the cooperative creamery should be careful not to jeopardize its asset or net worth position by paying out excessive cash refunds. Also there is the possibility that farmers' returns would be increased in the long run if patronage refunds were invested in the cooperative and revolved out at a later date.

In order to gain a better picture of price behavior in Wright County, a comparison was made between prices paid for milk and four different categories of creameries. These included: (1) size of firm, (2) amount of overlapping in creamery procurement areas, (3) financial position, and (4) seasonality of milk intake (table 15).

A cross-classification between pay price and size of creamery indicated that no particular size group tended to pay exceptionally high or low prices. This was true for both quoted and net pay prices.

On the other hand, the number of creameries procuring milk in an area did appear to be related to the quoted and net pay price. Creameries competing with three or four other creameries in the largest share of their procurement area tended to pay higher prices than creameries competing with only one or two other creameries. The level of pay price by areas is shown in figure 5. Comparing this figure with the amount of overlapping by areas as shown in figure 2 (page 16) serves to further illustrate this point. Therefore, it might be concluded that, at least in this market area, the intensity of rivalry in an area is directly related to the number of firms procuring milk in the area. That is, the greater the number of firms, the greater the rivalry. A more intense rivalry could then be taken to explain, at least in part, higher pay prices in certain areas.

In addition, there appeared to be a relationship between the financial position (worth-to-debt ratios) and pay prices. Those creameries with a higher worth-to-debt ratio of 3.01 to 5.00, that is, in a better financial position, tended to pay lower prices than creameries with a low worth-to-debt ratio. Whether creameries have a low worth-to-debt ratio because they pay high prices or have a high worth-to-debt ratio because they

Table 15. Prices paid for 3.5 percent, No. 1 manufacturing milk by size of creamery, amount of overlapping in creamery's procurement area, financial position, and seasonality of milk intake, Wright County, 1960-61

	No. of creameries*	Average quoted pay price		Average net pay price	
		1960	1961	1960	1961
		(dollars per cwt.)			
Size of creamery					
Small	3	3.17	3.37	3.02	3.21
Medium	3	3.21	3.37	3.07	3.22
Large	3	3.19	3.40	3.02	3.22
	9				
Number of competing firms overlapping					
1 or 2	5	3.16	3.35	2.99	3.19
3 or 4	4	3.23	3.41	3.09	3.27
	9				
Worth-to-debt ratio**					
1.00 to 3.00	4	3.22	3.39	3.08	3.25
3.01 to 5.00	4	3.16	3.36	2.99	3.20
	8				
Seasonality of milk intake** (percent lowest month is of highest month)					
30.0 to 42.0	4	3.19	3.38	3.04	3.22
42.1 to 52.0	4	3.17	3.38	3.00	3.22
	8				

*Classified on the basis of 1960 data.
**Only eight creameries reporting.

pay low prices and retain more of their net margins in the business is a question that is yet unanswered.

The degree of seasonality of milk intake did not appear to be correlated with pay prices.

Nonprice Competition

In milk procurement nonprice competition is a term used to denote the many service and convenience functions performed by creameries for farmers. There is a general belief among creamery managers that there is something inherently dangerous about price competition. The fear of retaliation by competitors is probably the principal underlying factor for this belief. Price is an objective thing; competitors usually know of price changes

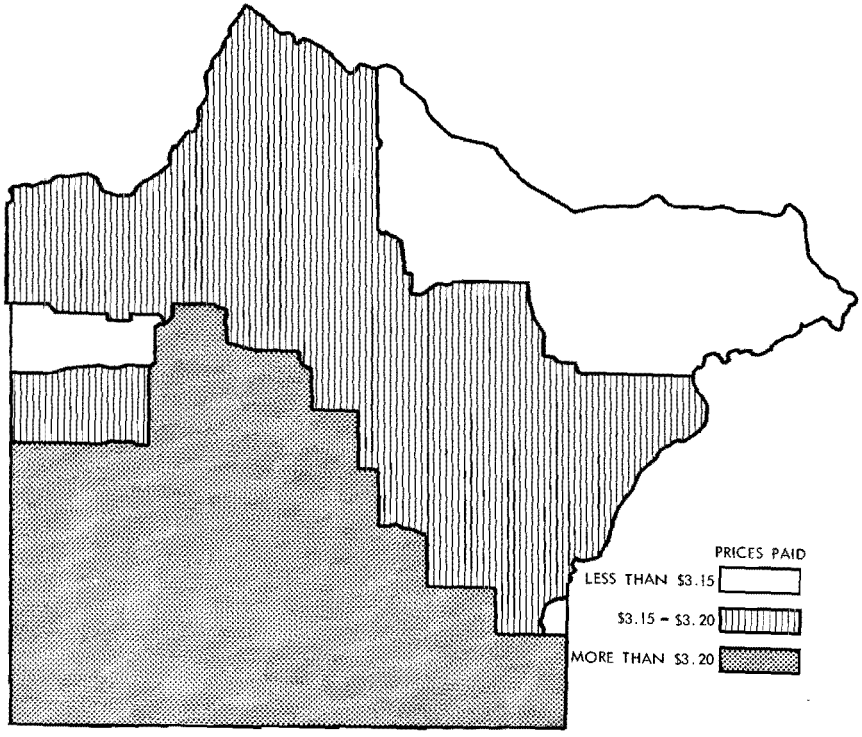


Figure 5. Average price paid for No. 1 manufacturing milk in cans, nine plants, Wright County, 1960*

*It should be recognized that the price areas shown in this map will change over time. For instance, this may occur as prices of butter and dry milk change relative to the prices for cheese.

and in most cases are capable of duplicating it or going one step further without much delay.

Nonprice competition, on the other hand, is somewhat of a nebulous consideration; since it often cannot be quoted in exact terms it generally takes competitors a longer time to evaluate it. Furthermore, competitors frequently cannot duplicate the service provided, at least not in a short time. For these reasons most managers like to compete with nonprice services instead of on a price basis.

In addition, many creamery managers expressed the belief that patrons obtained through price are not to be desired because they will likely leave as soon as another creamery offers them a little more money. Rather, managers would prefer patrons who come to the plant because they were pleased with the personnel and services of the plant. They maintained that these are the patrons who will remain with them in the long run.

This is not to say that price is unimportant. Most managers agreed that price has to be "up there" before farmers could be influenced by nonprice services. This view is substantiated by the observed practice of "average pricing." That is, where creameries attempt to price about the same as their competitors, but differentiate themselves in the minds of farmers by means of services performed and public relations work.

There is, however, a drawback to using nonprice competitive services too extensively; they tend to be irreversible. A creamery that initiates a new service to farmers, free milk cans for example, may enjoy a period of increased patronage. Before long, however, other creameries also begin furnishing milk cans in order to hold their patrons. After a time virtually every creamery in the area is giving this service and farmers come to expect it. Now a creamery which might wish to discontinue the service, perhaps because it might be inefficient or abused by farmers, cannot for fear of losing patrons and goodwill in the community. The point is, services tend to keep building up; they are easily added but not easily dropped. A situation may develop where creameries are bogged down by services to farmers that might be more efficiently provided by farmers themselves or some other institution.

Nonprice Practices

Creameries in Wright County provided farmers with a number of nonprice services (table 16).

1. Advance Money on Next Check. This practice probably has arisen because of the approximate 3-week interval between the end of the month in which milk was delivered and the

Table 16. Nonprice competitive practices as reported by nine creameries in Wright County, 1961

Practice	Number of creameries using practice
Advance money on next check	9
Withhold assignments out of check	9
Sale of dairy farm supplies	9
Make group insurance available to patrons	9
Creamery ownership of cans	9
Provide daily weight slips	7
Sponsor community projects	4

creamery's payment to the farmer. Moreover, since all of the creameries in the study paid for milk only once a month, some farmers frequently were hard pressed for cash just before the payment date.

Generally, managers did not object to advancing money to patrons. In the words of one manager, "It's the farmer's money so he is entitled to it." Furthermore, the practice appears to be preferred by most managers over twice-a-month payment.

All of the managers said that the practice has been carried on for years, ranging from the life of the creamery in five cases down to 10 years in one case. The proportion of patrons taking advantage of the service in each creamery ranged from 5 to 30 percent. Usually it was the same patrons who came in for advances each month.

The cost of providing this service was considered to be negligible in most cases. The maximum time required to carry out the extra clerical work for any one creamery was given as two hours per month.

2. Withhold Assignments from Patrons' Checks. The practice of withholding certain assignments from patrons' checks has been provided by creameries in Wright County for many years. With this practice a creamery agrees to make installment payments for its patrons for machinery, equipment, and many other purposes, deducting the amount paid each month from their checks. Six of the managers reported that the practice had been followed by the creamery ever since its organization. The other three creameries had provided the service for 20, 15, and 12 years. The proportion of patrons using the service in each creamery ranged from five to 35 percent. It might be expected that this service will gain in importance if farmers shift toward more installment buying.

The cost of providing the service was again measured in terms of extra hours of clerical time required. The maximum reported by any one creamery was four hours per month.

Two managers reported that this service probably attracted a few patrons but the general consensus of opinion was that its main value was in pleasing farmers.

3. Sale of Dairy Farm Supplies. Dairy farm supplies (feed, fertilizer, washing powder, filter disks, etc.) were sold by all nine creameries. This nonprice service seems to work to the mutual benefit of both farmers and creameries. Since cleaning supplies were usually delivered by the milk haulers, farmers were relieved of the task of purchasing these supplies in town. Creameries gained because farmers were less likely to go without needed supplies such as washing powder if they were delivered; this probably helped keep the quality of the milk up.

Only one creamery, however, sold these supplies to farmers at less than retail. Eight of the managers said that the sale of these supplies was a source of profit for the creamery; the other said that the creamery came out about even.

This practice also appeared to have been carried on by creameries in the county for many years. The range was from nine to 15 years. Managers said it was started and continued mainly to provide this service for farmers and to keep milk quality up. Two managers thought it attracted patrons at the present time.

4. Group Insurance for Patrons. All of the creameries in the county made it possible for their patrons to belong to a group insurance plan. A group medical and hospitalization plan was available to all patrons while patrons of six of the creameries had life and accident insurance available to them also. Data were not collected on the exact number of patrons covered by group insurance in each creamery, but most managers indicated that a large proportion of the creamery's patrons took advantage of at least one form of the group insurance.

All of the managers said that the premiums were paid wholly by the patrons; the main service of the creameries was in keeping the records and withholding premiums from the patron's check. Managers of the various creameries indicated a wide range in time required to carry out this service. Six managers reported that the time required was negligible while two said that it took about 20 hours per month to keep the records straight. In one case the patrons paid the creamery 10 cents per policy each month.

Making group insurance available to patrons was a newer service of creameries than those previously mentioned. The

length of time creameries have given this service ranged from 20 to 6 years, with five of the creameries initiating it within the last 10 years. In most creameries the service was started because patrons requested it. Usually this came about because a neighboring creamery was providing the service.

Two managers thought that the group insurance service attracted patrons. The feeling was that the creamery could not very well attract patrons from other creameries providing this service if they did not provide it also. Since only two insurance companies prevailed in the area, patrons could often change creameries without changing insurance companies.

5. Creamery Ownership of Milk Cans. Eight of the creameries owned all of the milk cans used by their patrons. In the other creamery ownership of the cans was split between the patrons and the creamery. Rent per can per month ranged from 0 to 15 cents, with 10 cents being the most frequent charge.

There appeared to be some difference of opinion among managers regarding the cost of providing cans. The manager of a creamery charging a 15-cent-per-month rate said that this covered about half the cost of the cans. Managers of two other creameries charging 10 cents per can per month said that their creameries came out about even on cans. All in all, five managers said their creameries lost money on cans, two said they came out even, one indicated a net profit, and the other didn't know. Variation in the amount of retinning and replacement of cans between creameries probably accounted for much of the variation in cost.

The data obtained from those creameries incurring a loss on cans indicated that providing milk cans at less than cost was the most costly service of these creameries to farmers. Loss on cans in 1960 ranged from $2,800 to $150 for these five creameries.

Much variation also existed between creameries in the length of time cans were owned by the creamery. This ranged from the life of the creamery in two cases down to one year in another case. Four creameries owned the cans less than 10 years.

Maintaining cleanliness of the cans was the most frequent reason given by managers for owning the cans. Managers generally thought that if the creamery owned the cans, instead of the farmers, a closer watch could be kept on their cleaning and repair. No doubt competition is still an important factor explaining creamery ownership of cans. The less trouble farmers have with quality the less likely they are to become unhappy and change creameries.

Three managers thought that creamery ownership of cans did serve to attract patrons. However, since this practice was common among creameries in the area, its greatest benefit probably came in the area of retaining patrons.

6. Daily Weight Slips. Another long time service of creameries to patrons was giving daily weight slips. Of the seven creameries providing this service, four had done it for the life of the creamery and the length of time for the remaining three ranged from 12 to 20 years. The general feeling among managers seemed to be that the patrons had a right to know the amount of milk shipped each day. Competition was given as the primary reason for starting the service in one creamery, but the other six indicated that it was started as a courtesy to farmers mainly to help them keep better records. None of the managers thought that giving daily weight slips attracted new patrons.

Six managers said that it took a very small amount of time to provide this service for farmers, in most cases it was given as negligible. However, one manager thought that it took about an hour a day. The difference may have been due to a difference in scales used. Creameries with automatic electric scales generally found it quite convenient to provide daily weight slips.

7. Sponsor Community Projects. Four of the managers said their creameries were actively supporting community projects. One sponsored a youth group. Another provided athletic uniforms and was active in promoting sporting events. A third took the lead in organizing summer recreational activities for the children and young adults, while the other creamery assumed leadership for fund raising drives in the community.

The amount spent for these activities ranged from $50 to $300 for the year 1960. The return to the creamery on time and money invested in community projects is seldom immediate and usually not measurable. As a result, creameries may hesitate to stress this form of nonprice activity. This is probably evidenced by the relatively small proportion of the creameries studied engaging in such activity.

However, creamery sponsored projects, if carried out successfully, should enhance the goodwill of the creamery in the community and as such should increase patron loyalty. This area of activity also offers the creamery an opportunity to differentiate itself from competing creameries, especially in the minds of patrons in their immediate supply area. The reason is that creameries located outside of the community cannot easily duplicate community projects carried on within the immediate area nor can they easily provide facilities for local events.

8. Other Services. Other less frequently mentioned services included: (1) repair of milking machines for farmers, (2) publish church announcements and calendars, (3) serve coffee for farmers in creamery office, (4) rent out cow clippers, (5) assist farmers with soil sampling, (6) rent out food lockers, (7) spread commercial fertilizer for farmers, and (8) provide small loans to farmers.

Cost of Services

The cost of providing these nonprice services is often as difficult to determine as the benefits derived from them. In addition, some services, such as selling dairy farm supplies and renting food lockers, are a source of revenue and as such their cost may be zero or may actually result in a profit to the creamery.

An attempt was made to measure the cost of those nonprice services that resulted in an expense to the creamery. The cost of four of the services was obtained indirectly by multiplying the number of hours required to provide the service times the wage rate.[13/] These include: (1) advances on next check, (2) withholding of assignments, (3) administrative cost of group insurance, and (4) providing daily weight slips. The cost of providing milk cans at less than cost and the cost of community projects were measured by the actual cash outlay for these items. The distribution of expenditures for creamery nonprice practices is shown in table 17. Total expenditures for nonprice practices ranged from none in one plant to nearly 1 cent per hundredweight of milk in another.

With regard to the indirect expenditures, it should be pointed out that the cost of these items was calculated on the basis of additional labor required. However, in actual situations some doubt might be expressed as to whether this is the case. In other words, could a creamery decrease its labor costs if these four nonprice practices were discontinued? The maximum number of man hours required per week to provide these four services by any one creamery in the group was given as 8.5. Six creameries indicated less than 2.5 hours per week was required. In view of this, it is likely that few creameries require additional administrative help in order to provide these services.

It should also be mentioned that the data on number of extra hours required to provide these four services were, for the most part, estimates on the part of managers. Further studies will have to be undertaken before generalizations can be made.

13/ $1.25 per hour was used as the wage rate in calculating this cost.

Table 17. Expenditures per hundredweight of milk for nonprice practices in manufacturing milk creameries, Wright County, 1960

Indirect expenditures*		Direct cash expenditures**		Total expenditures	
Cents per cwt.	No. of creameries	Cents per cwt.	No. of creameries	Cents per cwt.	No. of creameries
0 - .20	7	0 - .20	5	0 - .20	3
.21 - .40	0	.21 - .40	2	.21 - .40	2
.41 - .60	1	.41 - .60	1	.41 - .60	1
.61 - .80	1	.61 -1.00	1	.61 -1.00	3

*Includes: (1) advances on next check, (2) withholding of assignments, (3) administrative cost of group insurance, and (4) providing daily weight slips.

**Includes: (1) community projects and (2) providing milk cans at less than cost.

The practices of providing milk cans at less than cost and contributing to community projects resulted in somewhat greater cost than the first mentioned group of four services. Providing milk cans at less than cost was the more costly of the two.

The Role of the Hauler

The role of the hauler in the procurement process is twofold. First, the hauler furnishes the labor and facilities with which milk is moved from the farm to the creamery. In this respect, the contract hauler is a businessman. His revenue is derived from services performed, the size of which depends on the hauling rate charged and the volume of milk hauled. From this revenue he must pay operating expenses such as gas, oil, repairs, taxes, depreciation, and wages paid to hired drivers. The excess of revenue over expenses, if it exists, is considered either as wages to the route owner, or profit. In the case where the creamery owns the routes and trucks the situation is similar, although in this case the route can be thought of as an enterprise within the creamery instead of a separate business.

The milk hauler, however, whether he is a contract hauler or on the payroll of the creamery, serves one other important function. He is, in fact, a liaison or connecting link between the farmer and the creamery. The hauler is usually the farmers' most accessible source of information about the creamery. Farmers may call upon haulers for advice when milk quality or production problems arise. When farmers are

disturbed about some action of the creamery, the hauler must often bear the brunt of their feelings.

In addition to these things, haulers are often called upon to do special errands such as bringing out machinery parts or groceries from town, telling the gas man to deliver gas, or taking batteries to town for recharging.

In the future, as creameries become larger with more widespread procurement areas, the relationship between farmers and their creamery is likely to become more impersonal. Because of the greater geographical distance between farm and creamery patrons are likely to find it increasingly difficult to make frequent visits to the creamery. Managers will no longer be able to know each patron personally. These things point to the fact that the role of the hauler as a connecting link between the patron and the creamery will become more important in the future. In other words, the creamery is likely to become more dependent on the hauler as a means of holding patrons.

This is not to say, however, that managers did not recognize the importance of haulers as a means of holding patrons. Six out of the seven managers of creameries that employed contract haulers said that their best haulers would take patrons with them if they switched to another creamery. Estimates as to how many patrons on each route that would leave with the hauler ranged from 5 percent to all.

The importance of good hauling service also might be expressed in terms of its substitutability for price. Seven managers thought that a good hauling service could substitute for price to some extent. How much it is able to substitute for price is hard to determine and quite likely varies between patrons. The opinions of managers on this question ranged from "a small amount" to "a lot."

In view of the importance of haulers in the procurement process, it behooves managers and boards of directors to select new contract haulers very carefully. Managers were asked to give those characteristics that they thought were most indicative of a good hauler. Being on time and dependable was the characteristic of a good hauler most frequently given. Other characteristics mentioned included a pleasing personality, courteous, careful, clean, and honest. Five of the managers said that their haulers were doing a good job and had no general complaints to make against them. Complaints that were made by the other four managers included such things as carelessness, forgetfulness, excessive drinking, and dishonesty.

Four managers complained of unethical practices being carried out by haulers of competing creameries. Three of the complaints centered on price cutting among haulers. In two

cases the charge was made that some haulers offer to haul a farmer's milk free of charge for a few months if he would come over to the hauler's creamery. One manager said that a competing hauler frequently offered to haul the milk of some of his larger patrons for less than what the hauler charged his regular patrons. One other manager said that haulers of a competing creamery tried to persuade farmers to switch plants by saying that their plant was not particular on quality and that the farmers' milk would be No. 1 grade at their plant.

None of the managers thought that either of these practices were widespread, however. Price cutting by haulers seemed to be a sporadic thing, appearing in localized areas. Moreover, most of the managers thought that the use of unethical practices by haulers had decreased in the county during recent years.

The Role of the Fieldman

The role of the fieldman in the procurement process is also many-sided. His primary function in most creameries is to assist farmers on quality problems. This is no small task. The fieldman must have, first of all, a thorough knowledge of the technical aspects of his work. He must be able to pinpoint the causes of a problem and then be able to formulate lines of action that will bring about its solution.

Above all, the fieldman must be able to communicate with the farmers. He must show enough authority so that farmers will respect him and heed his advice. On the other hand, he must not show so much authority that farmers will dislike him and rebel at his advice. In other words, the fieldman, in order to do a good job, needs to have the technical knowledge of a milk sanitarian and the tact of a diplomat.

For most full time fieldmen the job does not end with quality control work. Soliciting new patrons and general public relations work also take up a portion of the fieldman's day. The managers of five of the creameries indicated that these activities were part of the fieldman's duties. The proportion of time spent by fieldmen on soliciting and public relations work ranged from 10 to 50 percent with the major portion devoted to soliciting.

All of the creameries in the study carried on a field service, although under a number of different arrangements. Each of the three large creameries employed a full time fieldman of their own. On the average, the fieldmen for these creameries spent about 80 percent of their time on quality control work with the remaining 20 percent going to soliciting and general public relations work. Two creameries had a man from the plant work as a part time fieldman. In two other creameries the manager provided the field service. There did

not appear to be a great difference in the division of time between quality work, soliciting, and public relations between these creameries and the large plants. The two remaining creameries contracted for field service with a large affiliated dairy plant. In these cases, 100 percent of the time was used for quality work.

Information on the cost of providing a field service was obtained from only four creameries. For these creameries the average cost per hundredweight of milk for providing a field service ranged from .96 to 1.94 cents with an average of 1.51 cents. Generally, managers appeared to be satisfied with their field service and all agreed it was necessary for a successful creamery operation. Moreover, none of the managers thought a higher pay price in a reasonable range could substitute for a field service.

A few managers charged that some fieldmen in the area were using unethical practices to gain patrons for their respective creameries. In one case the fieldman told farmers with lower quality milk that their milk would grade No. 1 at his plant. Another fieldman was said to have the habit of stretching the truth quite far during his sales talk to a prospective patron.

SUMMARY AND CONCLUSIONS

The changing market structure of the dairy processing industry in Wright County is evidenced by the trend towards fewer and larger firms. During the past decade the number of creameries receiving manufacturing milk from farmers has decreased from 15 to 9, or 40 percent. The three largest plants now process about 70 percent of the county's total volume of manufacturing milk compared to 36 percent in 1950.

Growth methods varied with size of firm. A large source of the increased volume of the largest creameries in recent years was from the purchase of whole and skim milk from other creameries and receiving stations. The cooperative was the predominant type of creamery in the county although two large independent plants located outside the county provided considerable competition. Manufacturing whole milk has become the most important source of butterfat for creameries in the county while the amount received as farm-separated cream is now negligible. Sales of farm supplies, especially feed, seed, and fertilizer, made up a larger proportion of total sales in 1960 than in 1949.

Financial statement analysis indicated that Wright County creameries have strengthened their financial standing during the 1949-60 period. Creameries that discontinued operations during the period were found to have had a weak financial standing in 1949.

Changes in structure also were observed on the selling side of the market. As is the case with creameries, farms in Wright County have become larger and less numerous. However, there is little chance that farms will become large enough in the foreseeable future such that any one farm could influence the price or services of a creamery.

Much overlapping of procurement areas, especially among cooperatives, was observed in Wright County. The number of plants procuring milk in any one area ranged from one to five. Overlapping was more pronounced in the southern area of the county where density of milk production was highest.

The largest share of manufacturing milk in Wright County moved from farms to plants in cans transported by contract haulers. Milk hauling rates for cans ranged from 16 to 25 cents per hundredweight. Maximum and minimum charges for the month were used extensively. There is a danger that the use of these charges, particularly the absolute maximum, will result in hauling rates not commensurate with costs.

Competition between creameries for milk was classified under two general forms: (1) price competition and (2) nonprice competition. Creameries determined their monthly pay prices by the gross receipts less cost method and/or by watching the price of a close competitor. Generally each creamery tried to keep its price in line with the going price in the area. This is not to say that price was not used as a competitive device. A creamery's price had to be "up there" if it was to attract and hold patrons.

There appeared to be a positive relationship between the average quoted pay price in an area and the amount of procurement area overlapping. This indicates that the intensity of competition in an area is related to the amount of procurement area overlapping rather than strictly on the number of creameries in that area. Thus, competition in an area can be maintained or even intensified with a decrease in the number of creameries if the procurement areas of the remaining creameries are enlarged.

Average net pay price to farmers was calculated for each creamery by subtracting hauling charges from quoted pay price and adding any cash patronage refund. Creameries quoting high pay prices also were found to pay high net prices and vice versa.

Creameries provided various nonprice services for their patrons. Services most frequently provided included: (1) advancing money on the next check, (2) withholding assignments from patrons' checks, (3) selling dairy farm supplies, (4) making group insurance available to patrons, (5) providing milk

cans at cost or less, (6) providing daily weight slips, and (7) sponsoring community projects.

Nonprice services appeared to be most valuable as a device to keep patrons satisfied and consequently keep them from switching creameries. This was especially true for those services provided by the majority of the creameries in the county. It was apparent that managers preferred to gain patrons on the basis of the overall merits of the creamery rather than strictly on price.

At the present time, none of the managers thought that nonprice services were getting out of hand in their respective creameries. However, since nonprice services are much easier to initiate than to eliminate, there is a danger that in the future the amount of services provided by creameries may become excessive. That is, a point may be reached where some of the services may be provided more efficiently by other institutions or by farmers themselves.

The importance of the fieldmen and hauler in a creamery's procurement operation should not be underestimated. Because of their direct contact with patrons they are in an excellent position to influence patron loyalty. Moreover, in the future their importance is likely to increase as creameries become larger and further removed from farmers.

No attempt was made at this stage of the study to draw final conclusions regarding the performance of the market. However, some questions can be posed at this time regarding certain aspects of the market where improvement in performance is a possibility.

First, is the market operating at highest possible efficiency? It appears that efficiency in procurement could be improved by less overlapping of procurement areas among cooperative creameries. Less overlapping among cooperatives could be attained by the consolidation of two or more associations with the processing being done in one large plant. Another alternative would be to form a federation of a number of local cooperatives. Under this method the local plants would remain in operation but would be under the control of one management. This would permit reorganization of hauling routes so that cross-hauling would be reduced with each patron's milk going to the nearest member creamery.

It is likely that greater efficiency in processing also could be attained through consolidation. That is, with larger plants, economies of scale may be obtained. In addition, a reduction in excess capacity should increase efficiency in processing.

A question might be raised also regarding the amount of information available to farmers. That is, do farmers have accurate and sufficient information on such considerations as price, test, hauling charges, patronage refunds, and services? A farmer must have knowledge of these things in order to make a rational decision as to which creamery to patronize. It is likely that farmer knowledge of the market could be increased if creameries would publish their pay prices, hauling rates, and patronage refunds in an independent publication such as a local newspaper.

The publication of such information would seem to be beneficial to creameries and farmers alike. Creameries would benefit because there would be less chance of losing patrons because of being misinformed by a solicitor of another creamery. Farmers would gain because they could more accurately determine which creamery would serve to maximize their returns in the long run.

These observations on market performance have been preliminary in nature. The completion of the statewide study will permit a more detailed evaluation of market performance which, in turn, will permit more definite conclusions to be drawn.