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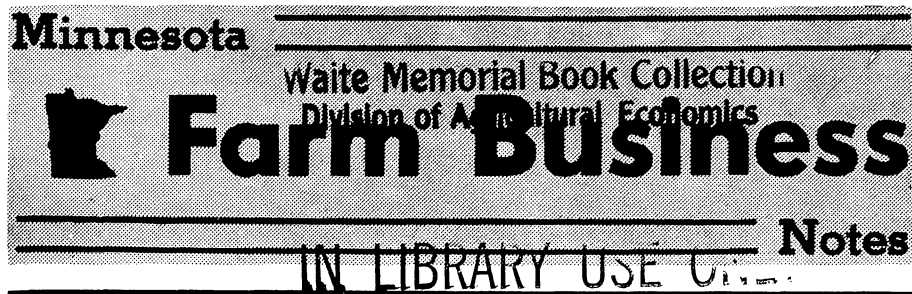
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Competition and Pricing in Minnesota's Fluid Milk Markets

Ronald D. Knutson and E. Fred Koller

During the past 30 years the fluid milk industry has undergone substantial changes in technology and market structure. On the seller or processor side of the wholesale fluid milk market, technological changes such as larger and more automatic processing equipment, improved roads, truck refrigeration, and paper packaging of milk have substantially increased the optimum or most efficient plant size.

Increases in plant size and changes in distribution technology have expanded milk distribution areas. As a result, fluid milk markets that were once relatively isolated from one another gradually are becoming subject to common market forces. Today, dairies located in cities 100 miles or more from each other may be active or potential competitors for wholesale buyers.

The advent of the chainstore has substantially changed the relative bargaining position of the buyer and seller. Previously, wholesale milk buyers were relatively small and had little or no bargaining or price making power. Today, large volume chainstores are a significant bargaining force.

The legal framework within which Minnesota fluid milk processors and retailers operate also has changed in the past 30 years. Both milk processors and retailers are directly affected by the provisions of the Minnesota Dairy Industry Unfair Trade Practices Act.

Changes in market structure—decreases in seller numbers, increases in chain buying, or changes in legislation—can have substantial impact upon the conduct and performance of fluid milk markets. The conduct or competitive practices used by firms in the market are of interest because they affect market performance or the prices, margins, and efficiency of firms in the market. Our study was conducted to determine what effect structural changes in Minnesota fluid milk markets are having upon market conduct and performance. Data for the study were collected in interviews with fluid milk distributors and chainstore buyers in five Minnesota fluid milk markets—Minneapolis-St. Paul, Rochester, St. Cloud, Duluth-Superior, and Fargo-Moorhead.

Structure of the Markets

Market structure refers to the organizational characteristics of the market that influence the competitive and bargaining relationship among and between milk sellers and buyers.

Number and Size of Buyers and Sellers

The number of fluid milk processing plants in Minnesota declined from 289 in 1956 to only 104 in 1966. While the number of plants has declined, average plant size has increased substantially. From 1950 to 1966, average plant size increased by 220 percent—from 3.5 to 11.2 million pounds of milk processed per year. During the same period the demand for milk in Minnesota increased by only 57 percent. This has made it necessary for many plants to discontinue operation.

The decrease in the number of processors has resulted in a relatively small number of firms and high seller concentration in some of Minnesota's fluid milk markets. The data in table 1 indicate that the number of distributors in the five markets studied varied from 4 in Fargo-Moorhead to 19 in Minneapolis-St. Paul. The market share of the four largest distributors in the five markets varied from 38 percent in Minneapolis-St. Paul to 100 percent in

Table 1. Number of milk distributors and market share of the four largest distributors and food retailers in five Minnesota fluid milk markets, 1963 and 1967

| Market | Number of milk distributors | Market share of four largest | |
|----------------------|-----------------------------|------------------------------|------------------|
| | | Distributors (1967) | Retailers (1963) |
| | | percent | |
| Minneapolis-St. Paul | 19 | 38.0 | 39.3 |
| Rochester | 6 | 93.6 | * |
| St. Cloud | 7 | 95.3 | * |
| Duluth-Superior | 8 | 95.3 | 34.5 |
| Fargo-Moorhead | 4 | 100.0 | 49.9 |

* Unavailable.

Source: Survey of competition and bargaining in the Minnesota dairy industry, January 1967, and Organization and Competition in Food Retailing, Tech. Study 7, National Commission on Food Marketing, June 1966, pp. 45-48.

Fargo-Moorhead. In four of the markets the four largest distributors sold over 90 percent of the market's fluid milk.

The principal buyers of milk in the wholesale fluid milk markets were food retailers. In Minneapolis-St. Paul the four largest retailers purchased 39.3 percent of the milk. This was about the same as the market share of the four largest distributors in that market. In Duluth-Superior and Fargo-Moorhead the market share of the four largest retailers was 34.5 and 49.9 percent, respectively. This was substantially lower than the market share of the four largest distributors.

We found that for most distributors in these markets, sales to the largest wholesale buyer constituted a substantial proportion of their total sales. For distributors selling milk to chainstores, sales to the largest customer averaged \$1 million per year or 19 percent of their total sales. Milk sales to the largest customer ranged from 2 to 74 percent of distributors' total sales. Distributors agreed that the loss of a million dollar account—about 20 percent of the average distributor's total sales—would result in serious financial hardship for their plants. This large volume of purchases has given chainstores substantial bargaining power in the market.

Barriers to Entry

When fluid milk prices in a market rise above cost and a reasonable return on investment, new distributors are attracted into the market. The ease with which new distributors can enter a market affects the extent to which excess seller profits can exist in the market over time. The pool plant requirements of the federal milk marketing orders in Minneapolis-St. Paul and Duluth-Superior tended to restrict outside distributors from entering.

In Duluth-Superior the resistance of a producer group to the distribution of milk purchased outside the market constituted an important barrier to entry. Other factors such as high capital requirements, excess processing capacity, distance, and the danger of retaliation by existing distributors also pose important barriers to entry.

Vertical Integration

A distributor's sales to chainstores often amount to well over \$1 million per year and may account for as much as 75 percent of his total sales. This large volume of purchases has made it possible for chains to operate their own milk processing facilities efficiently and profitably. This vertical integration by chains into processing already has taken place in Chicago and Detroit.

Although no chainstore integration into milk processing has occurred in the markets studied, representatives of three of the eight chains interviewed indicated that they had considered or were considering the possibility of such integration. They indicated that they would integrate into processing when they could process and distribute milk at a lower cost than the wholesale price.

Chain integration would be more likely in markets such as Minneapolis-St. Paul where store density and volume are high. The possibility of integration into processing as an alternative milk source has substantially increased the bargaining power of the chainstore in the wholesale market.

Product Differentiation

Product differentiation refers to the extent to which sellers attempt to create a consumer brand preference for their products. The most common method of product differentiation is advertising. We found that distributors spend only 0.8 percent of sales on advertising. This amount is low relative to other industries. Manufacturers of soap spend over 12 percent of sales on advertising.

Recently, retailers have developed their own brand names in order to differentiate the milk they sell. The retailer brand is referred to as a private label. In the markets studied, all private labels were packaged by independent milk processors rather than by the chain itself. Retailers feel that if they can develop in the minds of consumers a preference for their own milk, consumers will purchase their milk as well as other groceries at their stores. In addition to advertising, retailers frequently sell private label milk 1-2 cents below processor brands.

The 1-2 cent price differential frequently has been a sufficient sales incentive to make the private label the largest sales volume milk in a store. Thus, the effect of the private label has been to decrease the importance of processor brands and decrease the bargaining power of the processor relative to that of the retailer.

The Minnesota Dairy Industry Unfair Trade Practices Act

The Minnesota Dairy Industry Unfair Trade Practices Act is a structural element in the market. It is designed to directly affect the competitive and bargaining relationship among and between milk processors and retailers. The Act prohibits milk processors, distributors, and jobbers from engaging in 17 price and nonprice practices for the purpose or with the effect of injuring competition or a competitor. It also requires that milk distributors file all wholesale milk prices with the Department of Agriculture and adhere to them. A brief history of the Act and a

list of the prohibited practices appear in the article on page 4.

Market Conduct

Market conduct refers to the trade practices or strategies buyers and sellers use in the market. Market conduct is reflected in the pricing system and in the nature and extent of both price and nonprice competition that exist in the market. Nonprice competition includes all methods of competing other than direct manipulation of the price charged to retailers. As indicated previously, the type of conduct that exists in a market is expected to be related to the market structure. Therefore, a lower level of competition could be expected in highly concentrated markets.

Pricing Systems

A pricing system refers to the basic pricing schedule, including all discounts used by distributors to establish the price a retailer pays for milk. The Act requires that this price schedule be filed with the Department of Agriculture.

The simplest system of pricing is the flat pricing system where the same price is charged to all wholesale customers regardless of the volume of milk purchased. This was the prevailing pricing system used in Duluth-Superior. All wholesale customers in this market were charged a flat weighted average wholesale price of 45 cents per half gallon.

In Minneapolis-St. Paul, St. Cloud, and Fargo-Moorhead, a quantity discount pricing system was used. This pricing system gives a lower price to large volume buyers.

Quantity discounts are justified by the fact that distribution costs per unit generally decline as the volume of milk delivered increases. A quantity discount gives part of the benefit of this lower distribution cost to the large volume buyer. For example, during January 1967, prices in Minneapolis-St. Paul varied from a weighted average price of 39.9 cents for a customer purchasing \$50 worth of milk per month to 33.8 cents for a customer purchasing \$6,400 worth of milk per month.

In Rochester, a pricing system limiting the number of delivery days was used. This pricing system gives a lower price to buyers who are willing to accept a 3-day delivery week rather than the normal 6-day delivery week.

The effect of limited service pricing is to increase the average volume of milk delivered per delivery and thus reduce distribution costs. During January 1967, weighted average prices in Rochester were 40.8 cents per half gallon for a 6-day delivery week and 36.7 cents per half gallon for limited service delivery.

Price Competition

The Act requires that all distributors charge the prices they have on file with the Department of Agriculture. An indication of the extent of price compe-

Table 2. Weighted average fluid milk prices and margins per half gallon of milk for large volume wholesale buyers in five Minnesota markets, January 1967

| Market | Average wholesale price | Average producer price | Average processor gross margin |
|-----------------------------------|-------------------------------|------------------------------|--------------------------------------|
| cents per half gallon | | | |
| Minneapolis-St. Paul | 33.8 | 20.9 | 12.9 |
| Rochester | 36.7 | 20.8 | 15.9 |
| St. Cloud | 34.2 | 19.4 | 14.8 |
| Duluth-Superior | 45.0 | 21.6 | 23.4 |
| Fargo-Moorhead | 36.9 | 20.7 | 16.2 |

Source: Survey of competition and bargaining in the Minnesota dairy industry, January 1967.

tion can be obtained by analyzing the level of price variability in filed prices and deviation from filed prices in the five markets.

We found that statistically significant differences existed among the five markets in the weighted average price charged to large volume wholesale customers during January 1967. Prices varied from 33.8 cents per half gallon in Minneapolis-St. Paul to 45.0 cents in Duluth-Superior (table 2).

After price variation due to differences in producer prices was removed, processor gross margins varied from 12.9 to 23.4 cents per half gallon. In addition to a lower price level, there was considerably more variation in filed prices in Minneapolis-St. Paul than in the other four markets.

In January 1967, distributors in each of the markets were asked, "Do you believe that the prices which are filed in the Department of Agriculture are systematically followed in this market with respect to wholesale accounts?" In Minneapolis-St. Paul, 11 of the 12 distributors interviewed indicated that they did not think filed prices were being followed in that market. In Rochester, all of the processors interviewed indicated that they thought filed prices were not being followed. In St. Cloud, half of the processors interviewed thought filed prices were not being followed. In both Duluth-Superior and Fargo-Moorhead, all of the processors interviewed thought that filed prices were being followed. Thus, price competition in terms of price level, variation in filed prices, and deviation from filed prices appears to be more keen in Minneapolis-St. Paul, St. Cloud, and Rochester than in the other two markets.

Nonprice Competition

As an alternative to open competition in terms of price, distributors also can compete by giving special nonprice concessions. However, the Act prohibits many nonprice practices.

To give an indication of the extent to which the prohibited nonprice methods of competition were being used in the five markets, distributors were

Special Issue

Later this month, *Minnesota Farm Business Notes* will publish a 6-page special issue entitled, "The Minnesota Dairy Industry: Old Problems with New Dimensions." Seven staff members of the Department of Agricultural Economics are preparing this timely report on a crucial Minnesota farm industry.

asked whether they thought individual prohibited practices were being used in their markets during January 1967. For example, distributors were asked, "In your opinion, to what extent is equipment being sold to retailers at prices which are below cost?" Distributors were asked to answer whether they knew the practice was used, suspected that it was used, or did not know if it was used.

For simplicity, the 17 prohibited practices were condensed into 13.

Statistically significant differences were found among the markets in the extent to which distributors thought that loans to wholesale customers, extended credit to wholesale customers, free or below cost equipment, and price discrimination were being used. Distributors' responses indicated that these practices were used much more frequently in the Minneapolis-St. Paul, St. Cloud, and Rochester markets than in the Duluth-Superior or Fargo-Moorhead markets.

When all of the nonprice practices and responses were combined for each market, distributors in Minneapolis-St. Paul, Rochester, and St. Cloud responded 129 out of 221 times (66 percent) that they either knew or suspected that the 13 nonprice practices were being used in their markets. On the other hand, distributors in Duluth-Superior and Fargo-Moorhead responded only 9 out of 99 times (9 percent) that they either knew or suspected that the practices were being used.

We concluded that the level of both price and nonprice competition was higher in the Minneapolis-St. Paul, Rochester, and St. Cloud markets than in the Duluth-Superior and Fargo-Moorhead markets. This higher level of price and nonprice competition appeared to be related to the larger number of distributors and dissatisfaction of distributors with their market shares.

Market Performance

In this study, we viewed market performance as the end result of market activity in terms of wholesale prices, processor and retailer gross margins, costs, and production efficiency. Prices and margins in a market should reflect the costs that can be attained by a reasonably efficient processing and distribution operation in the market. When prices within a market become high relative to attainable costs, excess profits and/or inefficiency in production and distribution result.

As indicated previously, substantial differences existed among the five markets in the gross margins of processors selling to large volume wholesale buyers (table 3). In this study the performance question involved the extent to which these differences in margins among the five markets could be justified by differences in costs of reasonably efficient milk processors and distributors.

Table 3. Estimated attainable costs, gross margins, and attainable processor net margins per half gallon of milk for large volume wholesale customers in five Minnesota markets, January 1967

| Market | Processor gross margin | Attainable total cost* | Attainable processor net margin |
|----------------------|------------------------|------------------------|---------------------------------|
| | cents per half gallon | | |
| Minneapolis-St. Paul | 12.9 | 11.8 | 1.1 |
| Rochester | 15.9 | 12.2 | 3.7 |
| St. Cloud | 14.8 | 12.8 | 2.0 |
| Duluth-Superior | 23.4 | 12.2 | 11.2 |
| Fargo-Moorhead | 16.2 | 12.0 | 4.2 |

* Estimated processing, overhead, and distribution costs for reasonably efficient distributors.

Source: Survey of competition and bargaining in the Minnesota dairy industry, January 1967.

No statistically significant differences were found in either average plant size or plant input costs (wage rates, fuel costs, etc.) among the five markets. Thus, the average processing cost of 7.37 cents per half gallon and the average overhead cost of 2.54 cents, which were found for similar size plants in a study of costs and margins for Minnesota fluid milk processing plants, were accepted as estimates of unit processing and overhead costs for a reasonably efficient plant in each of the five markets.¹

Distribution costs were expected to vary among the five markets because of differences in average store size and average volume of milk delivered per store. On the basis of a California study, we estimated that distribution costs to large volume wholesale customers could be expected to vary from 1.84 cents per half gallon in Minneapolis-St. Paul to 2.85 cents in St. Cloud.

Processing, overhead, and distribution costs for reasonably efficient distributors were added together in each market to arrive at an estimate of attainable total costs for the five markets. Attainable total costs varied from 11.8 cents per half gallon in Minneapolis-St. Paul to 12.8 cents in St. Cloud (table 3).

To the extent that the attainable total cost estimates given in table 3 reflect actual attainable costs in the five markets, the difference between attainable total cost and processor gross margins is an estimate of attainable net margins. Out of the attainable net margin the firm must take a reasonable return on invested capital. Studies of capital requirements in dairy plants indicated that for the average size plant in this study, a longrun return of 1 cent per half gallon would provide a return on assets before taxes of 6-8 percent. Comparison with earnings on assets in other industries indicated that a longrun net margin of 1-2 cents per half gallon would provide dairy plants with a com-

parable return on invested capital.

It should be emphasized that actual net margins in the respective markets studied may differ from the margins shown in table 3 either because (1) the indicated attainable cost was not actually achieved, (2) higher prices in the market were subsidizing the cost of delivering milk from the market to other markets, or (3) some inefficiencies existed in the market.

If competition within a market does not adjust prices to a level consistent with costs, milk should move between markets to adjust these price differences. So arises the question of whether or not packaged milk could profitably be moved from one of the five markets to another. With Minneapolis-St. Paul used as the base market, we estimated that milk could have been delivered from this market to the other four markets for a transportation cost ranging from 0.6 to 2.1 cents per half gallon. When the costs of raw milk, processing, distribution, and overhead are added to this transportation cost, the total cost of delivering milk from Minneapolis-St. Paul to retailers in the other four markets varied from 33.8 to 34.9 cents per half gallon (table 4). This estimated delivered cost was less than the wholesale price charged to large volume buyers in the Rochester, Duluth-Superior, and Fargo-Moorhead markets.

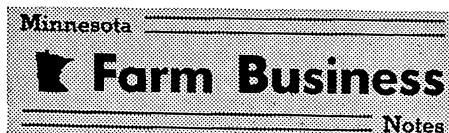
We concluded that in January 1967, wholesale milk prices in Rochester, Duluth-Superior, and Fargo-Moorhead were substantially higher than attainable costs. An analysis of price variation over time, however, indicated that the higher margins in Rochester had

(Continued on page 4)

Table 4. Wholesale prices and estimated total delivered cost per half gallon of milk shipped from Minneapolis-St. Paul to large volume wholesale buyers in four Minnesota fluid milk markets, January 1967

| Market | Total delivered cost* | Wholesale price |
|-----------------|-----------------------|-----------------|
| | cents | |
| Rochester | 33.8 | 36.7 |
| St. Cloud | 34.2 | 34.2 |
| Duluth-Superior | 34.4 | 45.0 |
| Fargo-Moorhead | 34.9 | 36.9 |

* Includes the cost of milk purchased from producers, processing, intermarket transportation charges, and distribution costs.



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¹ R. D. Knutson and E. F. Koller, *Costs and Margins in Minnesota Fluid Milk Plants*, Minn. Agr. Exp. Sta. Bull. 483, Apr. 1967.

In Review

The Minnesota Dairy Industry Unfair Trade Practices Act

Ronald D. Knutson

Agitation for the passage of this Act grew out of an intense competitive situation that developed during the early 1950's. This intense competition resulted from the same technological changes in the industry that have resulted in fewer but larger fluid milk processors. That is, larger and more efficient processing equipment, improved roads, truck refrigeration, and paper packaging of milk meant that fewer milk plants were needed in the industry.

Larger plants and fewer retailers resulted in an intense struggle among processors for the retailer's business. During this competitive struggle, trade practices such as giving retailers secret rebates, giving retailers refrigeration equipment, and extending credit to retailers at little or no cost were very common. In addition, price wars developed in several markets.

During this period when technology favored large volume plants, smaller more inefficient processors frequently were operating in the red, deteriorating their capital structure. Many of these firms eventually were forced out of the industry. From the late 1930's to 1956 the number of fluid milk processors declined from over 500 plants to 286.

Intense competition combined with a rapid decline in the number of processors resulted in agitation by milk and ice cream processors for legislation to curb the use of certain trade practices in the industry. The main backers of this legislation were two trade associations—the Minnesota Milk Council and the Northwest Association of Ice Cream Manufacturers. These organizations drafted a bill and introduced it into the state legislature. The bill was passed and became effective on April 27, 1957.

The Act's provisions apply only to fluid milk, fluid milk products, cottage cheese, and frozen dairy foods. One of the main sections of the Act requires that all milk processors, distributors, and jobbers file with the Commissioner of Agriculture a dated schedule of current wholesale prices. This schedule must show all discounts, refunds, rebates, and price differentials for the selected dairy products.

To prevent milk distributors from using other price or nonprice means of giving special concessions to milk retailers, other sections of the Act prohibit distributors from either directly or indirectly engaging in 17 different trade practices.

According to the statute, these practices are prohibited when performed "... for the purpose or with the effect of restraining, lessening or destroying competition or injuring one or more competitors or injuring one or more persons dealing in 'selected dairy products' or to impair or prevent fair competition in the sale of selected dairy products to retailers in this state" [Minn. Stat. sec 32A.04 (1965)]

The practices so prohibited are:

1. Having greater than a 5 percent hidden financial interest in retail outlets.
2. Providing real property to retailers at less than its value.
3. Giving secret valuable purchase inducements to retailers.
4. Having financial interest in retailers' outdoor signs.
5. Having financial interest in retailers' licenses.
6. Becoming bound for the repaying of retailers' financial obligations.
7. Extending retailers credit for more than 15 days beyond end of month.
8. Furnishing or maintaining retailers' inside signs.
9. Unduly contributing to cooperative advertising.
10. Paying retailers to place dairy signs in store.
11. Giving retailers return credits beyond value of returned products.
12. Giving retailers any type of gift or secret rebate.
13. Offering combined pricing of products to retailers.
14. Practicing price discrimination among retailers.
15. Selling products below cost to retailers.
16. Selling equipment below cost to retailers.
17. Selling equipment service below cost to retailers.

To prevent the use of milk as a loss leader, the Act also prohibits retailers from selling milk below cost. In addition, it prohibits retailers from inducing any type of concession from milk distributors in lieu of price. ■

Competition and pricing . . . (cont'd from page 3) not persisted for long. This indication suggests better overall market performance than existed in January 1967.

Margins higher than attainable costs had persisted in the Duluth-Superior and Fargo-Moorhead markets for a period of 3 or more years at the time of this study. These higher margins appeared to be related to the fact that there were fewer milk distributors in these two markets and that there were important barriers to new firms entering these markets. In addition, distributors in these markets appeared to be conforming closely with the provisions of the Act.

Conclusion

The trend in Minnesota's fluid milk markets is decidedly in favor of fewer but larger milk processors. The fact that larger volume plants have lower unit costs tends to both encourage and justify this trend.

A problem arises because fewer processors result in a higher proportion of milk sales concentrated in the hands of a few firms. Theoretically, in highly concentrated markets there is a tendency toward less competitive market conduct, wider margins, and thus higher wholesale and retail prices. Data in this study confirmed this relationship.

In the markets studied, the tendency toward wider processor margins and higher prices may be intensified by the Act. The provisions of the Act are consistent with the limitation of competition among distributors. In markets where structure is such that competition could readily be limited—where there are few firms and high barriers to entry of new firms—the Act may help to limit competition. It is in these markets that market performance was found to be less than desirable. So the question of whether or not this is the Act's objective arises. If it is, then was passage of the Act in the interest of producers and consumers? As fluid milk markets become more highly concentrated, there may be greater need for legislation designed to stimulate rather than limit competition. ■

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