THE DAIRY SUBSECTOR OF AMERICAN AGRICULTURE: ORGANIZATION AND VERTICAL COORDINATION

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FOREWORD

During the last decade, the topics of subsector organization and vertical coordination have become increasingly recognized as important factors in the organization and performance of the U.S. food system. However, little research has been conducted on these topics, in part because the methodology and conceptual framework for subsector analysis is not fully developed.

The North Central Regional Research Project NC 117 is examining the organization, coordination and performance of several commodity subsectors. Monograph 5 provides a comprehensive analysis of the U.S. dairy subsector. Future monographs will analyze the egg, beef and selected fruit and vegetable subsectors.

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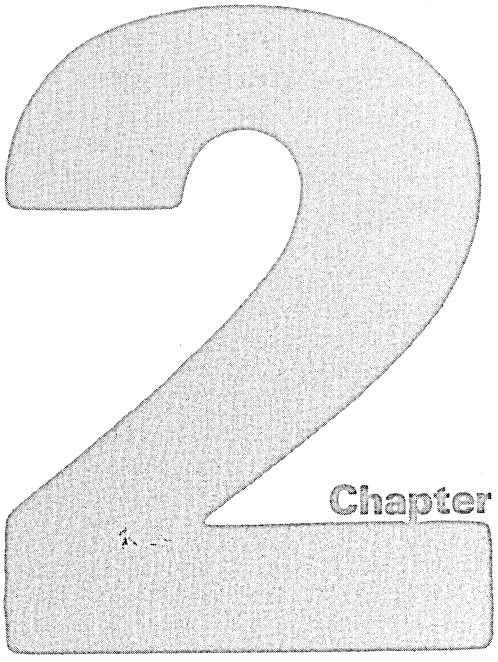
Subsector Organization



Chapter two deals with organization of the dairy subsector. It will describe the marketing channels and analyze some of the market structures. It will treat a few of the most important parts of the dairy subsector as industries rather than try to deal with a "dairy industry".[4] These are the fluid milk and ice cream processing industry, the butter industry, the nonfat dry milk solids industry for industrial use, and the American cheese industry. Although canned evaporated milk could be dealt with as a separate industry, it is declining so sharply it will not be considered. Others are minor, such as nonfat dry milk solids for household use, which is a separate industry in most respects.

Marketing Channels for Grade A Milk

The stages involved and the functions performed at each stage differ for milk that has been inspected for fluid use (Grade A) as compared with milk that has not been inspected for fluid use (Grade B). Grade A milk makes up about 80% of the total supply. The stages and functions performed for Grade A and Grade B milk are: farm production, procurement, processing, distribution, and retailing (Figure 2-1).

PROCUREMENT

Farmer cooperatives and their members dominate in the production of Grade A milk and in the performance of all functions of procurement up to what is called the processing level (see Glossary). In the New York federal order nearly half of the milk goes directly from farmers to private handlers and the proportion ranges from there downward in most federal order markets, being about 5 or 6% in Chicago, for example. However, the percentage of federal order producers belonging to cooperative associations is high in every region (Table 2-1).

The functions performed by Grade A milk marketing cooperatives may be summarized as follows: [13]

(1) Those which benefit cooperative members directly including checking weights and tests; field services and quality improvement; guaranteed market and payment; purchases of feed, equipment, and supplies; low cost financing; and insurance.

(2) Those which benefit individual handlers in a market, for example, providing milk in a given quantity, at a specified butterfat content at a specified time; preparing and mailing producers' checks; and field services and quality control.

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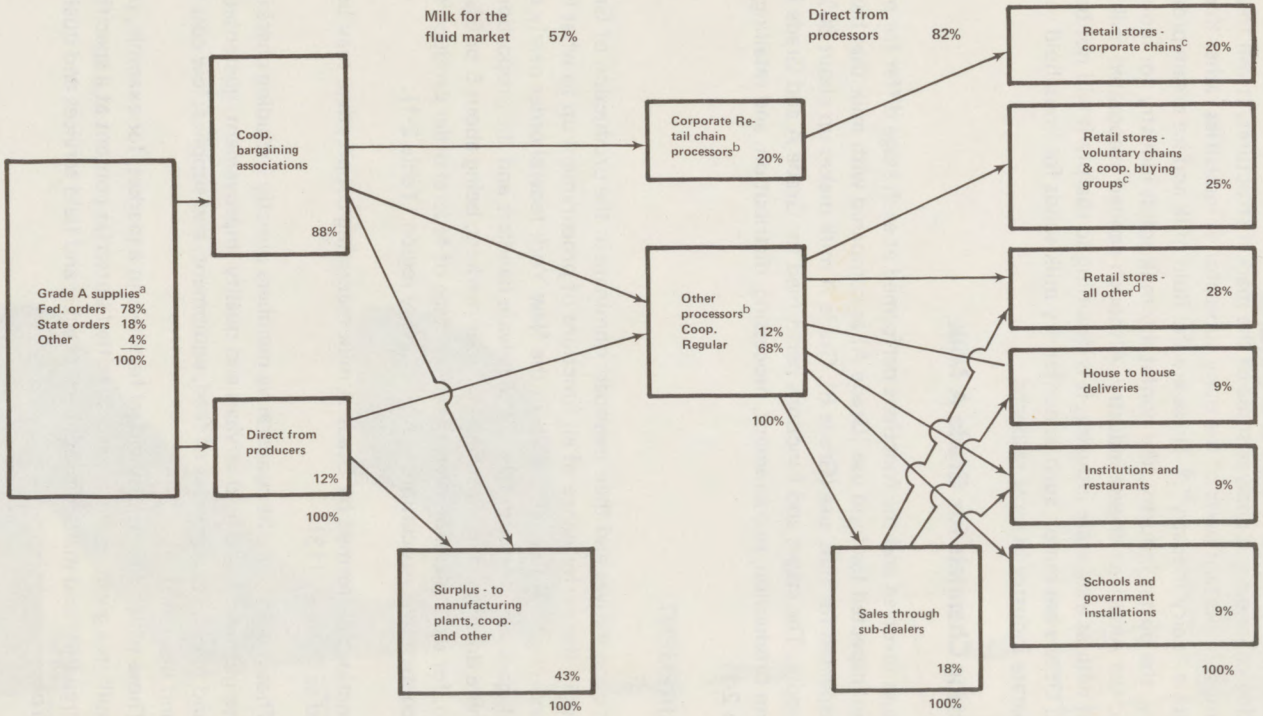
4 The parts of this report which analyze market structures draw substantially from the following source: Williams *et al.* [79].

Figure 2-1. Flow Chart for Grade A Milk from Farmer Producers through Bargaining Associations and Processors to Retailers or End Users.



a 80% of U.S. supply.
b Four largest of *all* processors had 18.8% of fluid milk shipments in 1972. Fifth through eighth had 8.5%.
c Largely private label.
d Convenience stores, dairy stores, vending machines, independent supermarkets, etc.

(3) Those which might be considered marketwide in scope, and which tend to benefit all producers, including those who are not members of a cooperative. Some make the market operate more efficiently and others improve demand. This group includes bargaining, handling reserve supplies, including surplus manufacturing and balancing supplies in a market; preparing and offering testimony at hearings; sales promotion; analyzing milk marketing problems; conducting informational, educational, and market research programs; representing producers in regulatory and legislative matters; and general quality programs, such as the work Interstate Milk Shippers do with Public Health Service. To the extent that improved efficiency results these tend to benefit all producers, handlers, and consumers.

Table 2-1. Percentage of Federal Order Producers Belonging to Cooperative Associations, by Region, December 1974

Federal Order Region	Cooperative Members (Percent)
New England	90.3
Middle Atlantic	75.1
South Atlantic	96.0
East North Central	90.9
West North Central	92.7
East South Central	92.4
West South Central	94.7
Mountain	98.3
Pacific	76.7
All Federal Order Markets	**87.9**

Source: March [43]

Although some cooperatives own the trucks which haul the milk to the receiving stations or receiving plants, perhaps over 75% of the milk is hauled by contract haulers. In general, these are engaged by the cooperative and the hauling charge is deducted from the farmer's milk check. The charge may or may not reflect the full cost of hauling since hauling subsidies are one of the methods of competing for milk supplies.

PROCESSING

Most fluid processing is performed by proprietary handlers. The cooperatives process about 12% of the total packaged milk and soft products. These handlers are usually regulated under federal or state milk marketing orders. Federal orders regulate prices paid to producers on about 78% of the Grade A milk sold to plants and dealers, and the states regulate an additional 18% leaving only about 4% of the Grade A not under federal or state regulations. The functions performed under processing consist of packaging fluid milk, and making the soft products, especially when they must be made from inspected milk which is priced under the order. The kinds of handlers will be described at a later point.

DISTRIBUTION

Handlers are usually integrated into distribution. Distribution is chiefly at wholesale since less than 10% of the total milk packaged is now home delivered. A substantial amount of home and small store distribution is now performed by independent distributors (variously called subdealers, vendors, or bobtailers), who pick up the milk at the dock of the plant and distribute it to smaller retailers or house-to-house and schools. Many of the former small handlers have closed their plants and gone into this business for some other handler.

Nearly one-fifth of total packaged fluid milk products appears to be packaged by retail food chains in their own integrated plants. Another one-fourth of the total goes to nonintegrated supermarkets, including corporate and voluntary chains and cooperative buying groups. Institutional outlets including schools may account for about 18%. The balance would include convenience stores, dairy stores, vending machines, and other, as well as house-to-house.

Structural Characteristics in Grade A Milk Markets

The first market situation to be identified is the one in which the farmer makes his choice among alternative buyers for his milk. These include different types of cooperative buyers as well as private plant buyers. In Wisconsin, the area of heaviest milk production, it is not unusual for several haulers to pass by the front gate of a dairy farmer, each hauling to a different buyer. In most other parts of the country, the density of milk production is not as great and a producer may have access to only one or two market outlets.

From an individual producer standpoint, the primary marketing decisions focus on whether to join a marketing cooperative, which has a basic purpose of guaranteeing the producer a market, or whether to establish a direct selling relationship with a buyer and maintain a nonmember status. If the decision is made to become a cooperative member and have the cooperative act as marketing agent, the producer must decide which cooperative to join, probably based on his perception of which has the most effective marketing program. Some cooperatives have more extensive service and marketing programs than do other cooperatives.

Recent research has shown that a direct relationship exists between the size of the cooperative and the number of services it performs for producers, for the market and nationally [23]. These are services the cost of which cannot be recovered by a specific charge to the processing plant. Costs of these services vary from 5 cents for the smallest cooperatives to 15.0 cents for those with 2 million pounds or more annual receipts. Many of these services benefit all producers, whether members of that specific cooperative or not. These services may result in a higher producer pay price in the entire market. Some producers may choose to belong to no cooperative

or a smaller cooperative, pay the lower service cost and get the benefit of the higher general price.

In some areas substantial competition exists among cooperative marketing associations in terms of merchandising their program, improving services to producers, and adjusting producer pay prices as conditions permit. This is a new element in competition which has grown up along with the formation of regional bargaining cooperatives, and may be added to the several methods of competition that existed before, such as hauling subsidies.

Even though the procurement radius has been greatly extended since the advent of the bulk tank, the procurement market still may be considered the most local of any of the market situations for Grade A milk. The nature of competition in procurement markets that existed before the late 1960's and continues to exist to some extent has been well described by R.L. Clodius [17] and others.

The sales of milk by cooperatives to the handlers who package and otherwise process Grade A milk could be viewed as another type of procurement market situation. This is only now receiving attention by analysts due to the national attention being given to the regional bargaining or milk marketing cooperative. The relevant market in this situation cannot be conceived of as the local milk shed or even the local federal order. Instead the market is broad and covers nearly the entire region including but not necessarily limited to the entire area in which the regional cooperative does business. If the operations of the standby pool (described under contractual arrangements, p. 100) were taken into account, the scope of the market could be viewed even more broadly.

Concentration of producers in bargaining cooperatives appears high in some federal order markets. As of December 1974, in half of the 61 federal order markets, 70% or more of the producers belonged to the largest cooperative serving that market (Table 2-2). In two-thirds of the markets, the largest cooperative had around two-thirds of the producers, which is enough to approve or disapprove the order in a referendum. However, for purposes of bargaining for over-order premiums with handlers even a fairly small percentage of producers who are determined to be "free riders" (nonmembers who benefit from the bargaining of the cooperative), either in a rival cooperative outside any cooperative, often can prevent effective bargaining by the principal cooperative if the former sells to aggressive small handlers.

At least in the longer run, when considering the number of alternative firms with whom the metropolitan dealers must deal, the following groups of sellers must be included: (a) the large regional cooperative; (b) other cooperatives; (c) private country plants; (d) Grade A producers who belong to no cooperative; and (e) Grade B producers who can come on the market at most any time, at least in substantial parts of the milk shed.

Table 2-2. Frequency Distribution of Markets According to the Percent of Producers Belonging to the Largest Cooperative Serving the Federal Order Market, December 1974

Members of Largest Cooperative (Percent)	Number of Federal Order Markets	
	Number	Cumulative Number
100.0	7	7
90.0 - 99.9	10	17
80.0 - 89.9	6	23
70.0 - 79.9	7	30
60.0 - 69.9	10	40
50.0 - 59.9	8	48
40.0 - 49.9	3	51
30.0 - 39.9	5	56
20.0 - 29.9	5	61
10.0 - 19.9	0	61
0 - 9.9	0	61

Source: [43]

MARKET CONCENTRATION OF PROCESSORS

Table 2-3 was computed by Alden Manchester. It shows concentration ratios among handlers or dealers (who are the buyers in procurement markets), based on the universe that included the total sales of some small and all large fluid milk plants within a 250-mile radius of a central city, regardless of whether particular plants shipped their milk to the city in a given period of time.[5] Dairy marketing experts generally agree that relevant economic markets are larger than most individual metropolitan markets because of the relative ease of shipping fluid milk for substantial distances. Reasoning thus, some economists feel that potential as well as actual supplies to a particular city should be used in computing market concentration ratios, and this is what Manchester has done.

Using this approach, the table summarizes for 1969-1970 the four-firm concentration ratios of 144 central cities.

Reference to the above table will show that the smaller the market size based on volume per month, the larger the average market share of the four largest firms. This market share of the four largest is nearly 80% in the markets that average 6 million pounds a month and declines to about 23% in the markets that average 315 million pounds per month. In all the markets, which average 93 million pounds per month, it is nearly 47%.

5 Plants located between 51 and 250 miles from the market center were excluded if they had monthly sales of less than one million pounds of fluid milk products and their actual sales adjusted by a factor representing transportation costs of the market if they sold more than a million pounds. Manchester, [41] p. 9.

Table 2-3. Structural Characteristics of 144 Fluid Milk Markets, by Market Size, 1969-70

Market Size, Mil. Lbs. Per Month	Markets (Number)	Average Plants (Number)	Average Market Share 4 Largest Firms (Percent)
3 - 9 (av. 6)	8	10	79.9
10 - 19 (av. 15)	13	16	72.2
20 - 29 (av. 25)	19	22	60.8
30 - 49 (av. 38)	23	29	53.3
50 - 74 (av. 57)	19	47	46.7
75 - 99 (av. 87)	14	58	39.5
100 - 199 (av. 148)	34	100	30.1
200 - 474 (av. 315)	14	137	23.3
All Markets (av. 93)	144	58	46.9

Source: [41] p. 11

The relevant market for a fluid milk plant and its distribution area is most nearly the one conceived of by Manchester in putting together the data in the table just described. That is, the market extends out for some 250 miles from the metropolitan area and includes both actual and potential competitors. In the following analysis, this concept of a market is used. However, federal order data are frequently the easiest to come by and will be used in some instances. Some tables will show national data which are useful for several purposes including discussions of scale economies, merger policies and trends, and the like. There follows some tables taken from W.F. Mueller, *et al.* (primarily Chapter 3) in a current study of public policy towards mergers, which has been issued as part of the NC-117 studies [48]. Table 2-4 shows the number of fluid milk processing plants in the U.S. in 1950 and selected years since. It shows that the number of plants has declined from 8,185 in 1950 (exclusive of producer distributors) to 1,552 in 1975.

Table 2-5 shows the number of companies operating "viable" packaged milk plants by type of company in 1971. Viable refers to companies with at least one 40,000 quart or larger plant. This table shows only the 364 plants which the FTC report viewed as viable.

Table 2-4. Number of Fluid Milk Processors, U.S., 1950-1975

Year	Number of Processors	Annual Rate of Decrease Over 5-Year Period
1950	8,195	
1955	6,726	3.9%
1960	5,328	4.6
1965	3,743	6.8
1970	2,216	9.9
1975	1,494	7.6
1976	1,439	3.7

Note: Excludes producer distributors
Source: [41]

The table illustrates the industry's organization by showing the number of plants operated by those companies by size groups for proprietary, cooperative, and vertically integrated food retailers.

Table 2-6, national table, shows the eight largest dairy processors' share of fluid milk products sold in 1958 and 1970. Added to these are Southland, Safeway and Dairylea Cooperative. As of 1970, the top four had 18.8% share of U.S. sales of fluid milk products, the fifth to the eight largest at 8.5%, and the eight largest had 27.3% combined. Data on the operation of several of the regional chains are likewise presented in the Mueller report on public policy toward mergers.

Typically, a market area of say a million population, will have two or three national handlers, a couple of regional handlers, and a competitive fringe of smaller plants all totaling 16-20 handlers.

No reasonably current study is readily available to show the numbers and size distribution of buyers in a particular market area as defined here. However, typical situations may be described. The larger companies, both the national dairies and the regional concerns, tend to compete for the larger food chain accounts. They may supply and service these large food chain accounts over a substantial geographic area which could include several markets. They will service these accounts with their own labels to the maximum extent possible, but usually must pack private labels for chain store accounts in order to get some of their own label into the stores.[6]

The smaller dealers usually hold on to as much of the house-to-house business as they can, and pick up as many of the smaller store and independent supermarket accounts as possible. All sizes of dealers generally compete for the accounts of government installations, schools, and the larger institutional accounts. The smaller dairies have a very minor proportion of their total sales with retail food chains. Thus there is a tendency for dealers of various sizes to compete "at the margin." Larger dealers compete with smaller for independent supermarket accounts. They compete for subdealers and for contract business (government installations, schools, hospitals) and some restaurants. The largest dealers do not seek smallest store accounts and house-to-house business, but they range over a multistate area for the others. Small dealers cannot get the large food chain accounts, and their customers are essentially local. Regional concerns (medium-sized) cover several counties geographically and compete for all the more profitable accounts with dealers of all sizes. Thus a large area becomes a market over which dealers compete directly for various accounts at the margin.

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6 For more on central milk programs see: Fallert, R.F., *A Survey of Central Milk Programs in Midwestern Food Chains,* MRR-944, ERS, USDA, December 1971.

Table 2-5. Number of Companies Operating Viable Packaged Fluid Milk Plants by Type of Companies, 1971

Types of Companies	Number of Companies	Number of Plants		
		Processing Quarts a Day		Smaller Plants
		40,000-80,000	80,000 and Over	
All Companies Operating At Least One 40,000 Quart or Larger Plant	364	255	361	85
Proprietary	*289*	*210*	*269*	*35*
4 Largest National Companies	4	37	83	23
Other Multiplant	16	27	63	12
Single Plant	269	146	123	--
Cooperative	*37*	*28*	*42*	*28*
Large Bargaining Cooperatives	6	10	17	8
Other Multiplant	14	11	15	20
Single Plant	17	7	10	--
Vertically Integrated Food Retailers	*38*	*17*	*50*	*22*
Supplying Own Stores	36	8	38	11
Also Selling to Others	2	9	12	11

Source: [52]

Table 2-6. Eight Largest Dairy Processors' Share of Fluid Milk Products Sold in 1958 and 1970

Company	Share of U.S. Sales	
	1958	1970
Borden	9.2%	6.3%
Kraftco	8.9	6.3
Foremost	4.3	2.6
Beatrice	3.4	3.6
Top 4	**25.8%**	**18.8%**
Carnation	2.3	2.0
Arden	1.4	1.1
Fairmont	0.9	1.9
Pet	0.6	1.3
Southland	N.A.	2.2
Safeway	N.A.	2.2
Dairylea Cooperative	N.A.	2.1
5th to 8th largest	**5.2%**	**8.5%**
8 largest	**31.0%**	**27.3%**

Sources: 1958 represents shares of processed fluid milk shipments as reported in *The Matter of Beatrice Foods,* Docket No. 6653, Commission decision, March 2, 1964, p. 16. 1970 market shares of companies' share of Class I milk sales, FTC, *Dairy Report, op. cit.,* p. 61. All sales figures are for physical volume of sales rather than the dollar value of such sales. Mueller *et al.* [48].

Table 2-7 (from the Mueller study) shows the percentage of package milk sales sold through various accounts in 1960 and 1970 for 121 small independent dealers. These are classed into six different size groups based on 1970 sales. Several relationships are apparent from this table. For example, the largest percentage of total sales of this group of independents is home retail sales, followed by sales to individual retail stores, sales to government installations, schools, and so on, sales to retail food chains, and sales to distributors. As a group, these independents have kept their small proportion of sales to retail food chains since 1960 (except for the very smallest of the group). Their sales to affiliated independent food retailers and wholesale buyers have greatly increased since 1960, a trend which has been apparent in most size groups. They have increased their sales to government installations, schools, and so forth, and have increased their sales to distributors. Their own retail sales have declined rather sharply which appears to have been the trend with all size groups.

PRODUCT DIFFERENTIATION

Product differentiation is any action taken by a seller to induce customers to view his product as being distinctive from his competitor's product, with the purpose of insulating himself from the actions of competitors. Many of these actions can be

Table 2-7. Percent of Packaged Milk Sales Sold Through Various Accounts in 1960 and 1970, 121 Independent Firms Classified by 1970 Sales Volume

1970 Sales (Thousands of Dollars) (1)	Number of Firms[a] (2)	1970 Average Sales (000) (3)	Retail Food Chains (4)		Affiliated Independent Food Retailers and Wholesale Buyers (5)		Individual Retail Stores (6)	
			1960	1970	1960	1970	1960	1970
0-499	6	$ 243	22.5	11.5	.3	2.3	8.8	10.7
500-999	21	763	9.1	9.7	1.2	3.3	15.2	18.3
1,000-2,499	37	1,649	11.1	13.9	1.4	.7	25.2	26.2
2,500-4,999	28	3,628	16.4	17.2	2.5	2.4	23.9	24.3
5,000-9,999	14	7,396	11.0	12.0	6.4	8.6	25.6	27.8
10,000 or More	15	16,092	8.1	12.2	6.9	14.1	24.5	23.3
Totals	**121**	**$4,339**	**12.2**	**13.4**	**2.8**	**4.2**	**22.3**	**23.4**

[a] These were the firms that provided account distribution data for 1960 and 1970. Packaged fluid milk represented over 80 percent of these firms' total sales.

Note: Percents may not sum to 100 percent due to rounding error.

Source: Mueller *et al.* [48].

viewed as forms of nonprice competition. Although there is a tendency to think of fluid milk products as quite homogeneous because of the limitations imposed by sanitation regulations, definitions of identity and other legal constraints, product differentiation does exist among fluid milk processors, and is important in determining market conduct and performance.

Examples of the various forms of product differentiation are: (1) *physical product differentiation* - fat content, level of milk solids, color, flavor (ice cream), overrun (ice cream); (2) *container differences* - size (quart, half gallon, gallon, dispenser), type (glass, paper, plastic), deposits; (3) *branding and advertising* - brand (processor's regular brand, private label, processor's competing brand), advertising (newspaper, radio, television, billboards, signs), promotion (in store, general); and (4) *differentiation of services,* which could be called *enterprise differentiation* - wholesale delivery services (full service, drop, tailgate, dock), service to consumer (store, doorstep, vending machine), dairy store service (hours open, credit). Quality of service is also important, e.g., less leakers, more prompt deliveries.

Forms of product differentiation with the most effect in recent decades have been container differences, private labels, and differentiation of services. The introduction of new types of containers has been an important competitive device; new

Sales to Government Installations, Schools, etc. (7)		Home Retail Sales (8)		Sales to Distributors (9)		Sales to Own Milk Depots or Convenience Stores (10)		Sales to All Other Outlets (11)	
1960	1970	1960	1970	1960	1970	1960	1970	1960	1970
11.8	23.0	49.5	39.7	.8	.8	.8	1.3	5.3	10.7
10.5	11.8	52.6	41.7	7.1	9.2	.9	3.6	3.2	2.4
10.6	15.1	43.4	32.7	2.9	4.8	3.3	4.2	2.1	2.3
9.1	13.9	41.6	30.8	5.2	8.2	.7	1.6	.6	1.7
8.7	12.6	30.2	19.4	16.6	14.8	.3	2.6	1.2	2.2
7.9	8.0	36.5	22.8	4.3	5.2	6.8	8.1	5.1	6.3
9.7	**13.5**	**42.5**	**31.4**	**5.8**	**7.4**	**2.3**	**3.7**	**2.4**	**3.1**

strategy and new pricing policies and indeed a change in the relevant market area often accompanied their introduction. Containers received much attention as a method of differentiation with the advent of paper single-service containers which did away with the bottle return problem for both sellers and consumers, reduced weight and bulk of loads and was strategic in expansion of market areas. These particularly were demanded by chain stores as they went heavily into milk distribution. The chain store also demanded the quantity container. The gallon glass jug, the gallon paper carton, and more recently the plastic gallon jug have received much attention among fluid milk sellers as means of product differentiation. Service differentiation was also associated with each of these. Container policy may affect operating costs, because there are important economies of scale in packaging milk. Small firms specializing in one type and size of container may achieve economies which are not available to a much larger firm, if a larger firm offers a wide variety of container sizes and types. This is because specialized packaging equipment is often needed for some sizes and types of containers. Quite recently the inplant fabricated returnable gallon jug has come into prominence. This equipment is quite expensive and it is reported that a plant must be able to package and distribute a minimum of 25,000 gallons a day in order to afford to install one of these prefabricators. However, these prefabricators can reduce costs per container to a very low level and they may have doubled the minimum optimum size for a plant that intends to compete with this type of container.

The dramatic effect of the private label is well known. Corporate chain stores, cooperative chains, and voluntary buying groups have demanded that these labels be packed for them and usually have paid substantially less for products so packaged than they would have paid for the dealer's regular brand. Some observers say that the margin between private label and regular brands has narrowed in recent years. National dairy concerns strongly resisted packaging private labels as long as they could, but finally consented. (Kraft recently discontinued private labeling.) Often the large corporate chains would succeed in getting a private label because of the threat to vertically integrate backwards into their own packaging operations if the private label were not packed for them. Many of the chains have vertically integrated backwards into their own packaging anyway in recent years, and so this proved to be only a delaying action on the part of the dairies. This private labeling has had many far-sweeping effects, including the part it played causing the national dairy concerns sharply to reduce advertising their own brands.

Examples of differentiation of services, or enterprise differentiation are dock, drop, tailgate, and full-service delivery, vending machines, special dairy stores, and new types of services on home delivery routes. Each of these methods of distribution represents significant differentiations in services.

Under dock delivery, the wholesale buyer purchases the product f.o.b. the processor's plant. Under drop delivery, the wholesale routeman places the product on the platform, in the back room, or storage cooler at the store. Under tailgate delivery,

the wholesale routeman simply delivers the product to the back of the truck while store employees move it into the store. It is very important that the labor unions have gradually altered their delivery contracts in such way that each of these types of deliveries can be made at much lower per unit costs than full service wholesale delivery or house-to-house delivery.

As to new home delivery service, some distributors now offer a much broader product mix on the route than has traditionally been done, some going so far as to make the home delivery route a sort of convenience store. Some offer price discounts based on volume, some furnish special home dispensers of various types. Even so, it remains to be seen whether the trend towards eliminating home delivery will continue as it has for decades. Home delivery is really a high cost service which many dealers feel they cannot afford if they can replace it with other kinds of business.

Of course, many of the above actions serve to increase sales only for the early innovators. After the early ones, the other dealers find that failure to do these things makes them lose sales, but doing them does not gain new sales. Therefore, those with capital will constantly seek new types of containers or other devices for differentiation.

BARRIERS TO ENTRY

Barriers to entry are generally viewed as advantages which existing firms have over potential entrant firms, often expressed as the cost differences among firms of the two types. They result from absolute costs, advantages, product differentiation, economies of scale or size, and institutional barriers. Clearly, expensive advertising of packer brands makes it difficult for a firm to enter and establish a packer brand. On the other hand, the rapid development of private label brands, including the general consumer acceptance of private label brands of many food products, has tended to erode the value of product differentiation. Similarly, private label brands in some instances may have eased entry of the smaller processing firms by allowing access to large volume outlets without extensive brand advertising. However, we'll see later that the larger corporate chains with units spread out over a wide area require that their private label brands be packed by a firm large enough to furnish consistent quality in the quantities needed at the several locations. Service and container specialization also may ease entry for firms wishing to specialize in those respects. A small, highly specialized firm may be able to achieve costs roughly equal to a larger firm which offers a variety of services and containers.

Among the more important institutional barriers to entry affecting the fluid milk industry are sanitation ordinances, state milk control laws and, to a lesser extent, the established relationships in markets between existing sellers and buyers. Court rulings and efforts to promote greater uniformity in sanitary regulations and product specifications have sharply reduced the extent to which they serve as barriers

to entry. Also, in some instances outside firms have overcome barriers of this type by merging with firms already in the market.

ECONOMIES OF SIZE

Important economies of scale in the processing, distribution, and promotion of fluid milk products constitutes an important barrier to entry.[7] A concern with a relatively small plant could be quite efficient in servicing an individual supermarket. However, corporate food chains prefer to do milk business with dairy concerns large enough to service an entire division, in order to achieve uniformity in product and service, as well as economies in central billing. Perhaps more importantly, if the chain can get the volume of several stores considered in the discounts of one dealer, it may be eligible for larger volume discounts. A plant or plants to serve such corporate chain accounts might need capacity of one to two million quarts per day and could cost $8 to $10 million. The study by Mueller, *et al.* argued that plants that can process around 80,000 quarts per day can service satisfactorily all but the large corporate chain accounts. Such a plant may be built for an estimated $2 million investment. The barriers to entry to the corporate chain accounts is so high that only the national dairy concerns and the more effective regionals can get and hold them anyway. But, as Manchester points out, over two-thirds of the total packaged milk business is accounted for by outlets other than the large corporate food chains. Some concerns of small size appear to survive satisfactorily but much of this is small town business based on personalities. The barriers to building up such personal relationships may also be high, although difficult to evaluate in monetary terms.

Economies of size in promotion and distribution are not so well established on empirical grounds as are economies in plant size. Williams, *et al.* cited evidence from Padberg that important economies of size exist in promotion. Those authors also cite studies to show the relationship between units costs of delivery or distribution and the volume of individual deliveries. Those studies suggest that there is no necessary relationship between size of the plant and economies of distribution.

Marketing Channels and Structural Characteristics for Grade B Milk

Generally, manufacturing milk is produced and handled similarly for all products up to the procurement stage. Although cooperatives process and manufacture a large part of the manufacturing milk, they are not as prominent in Grade B handling as they are in the handling of Grade A milk. The Farmer Cooperative Service reports that cooperatives marketed 55% of manufacturing grade milk in 1973 compared with 81% of the Grade A [57]. Both of these percentages vary widely by region.

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7 In this report "economies of size" and "economies of scale" are used interchangeably, even though some economists distinguish between the meaning of the two terms.

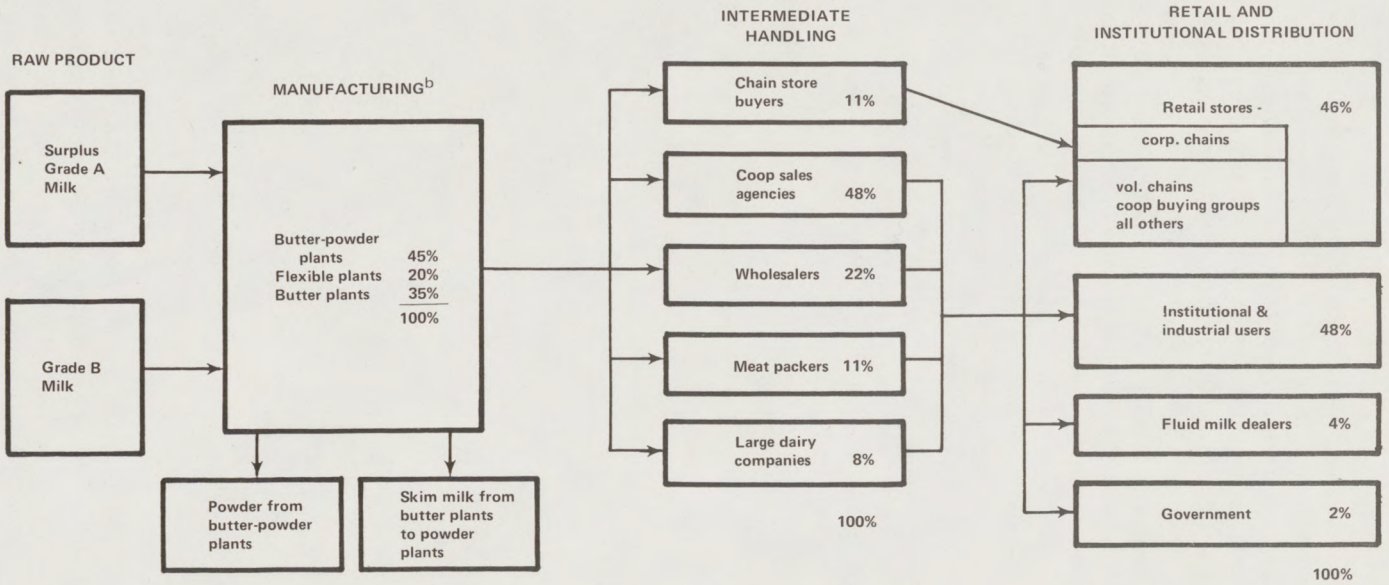
BUTTER CHANNELS

Most butter and nonfat dry milk solids are manufactured as joint products from whole milk supplies brought in directly from farms to the plants. In states where there is significant Grade B production such as Wisconsin, Minnesota, and Iowa, these are typically large, flexible plants, which have both Grade A and Grade B intakes. The Grade A intakes are usually regulated under the federal order. Surplus not required for the federal order is manufactured into butter and powder or American cheese along with the Grade B supplies, without leaving the original plant. Sometimes the cheese milk may be moved to a specialized plant in the same organization. Sometimes the whole milk will be separated into skim and butterfat and the butterfat will be manufactured into butter in one place and the skim supplies assembled for drying in another within the same organization. Data to show whether there may be a trend toward specialization in manufacturing are lacking, as explained at a later point. However, the continuous churn may be bringing about specialization because of the high volumes of fat that the technology makes economical. Also since cheese demand is increasing so rapidly, nearly every cooperative needs a cheese factory, where economies of scale seem to be increasing rapidly.

The functions that must be performed for butter that is marketed for retail or institutional uses include assembling, grading, storage, sorting lots, printing, usually branding, research and development, promotion and advertising, exchange operations (in some instances), and delivery to retail buyers, institutions, and such (Figure 2-2). There is a great deal of integration involved in performing these functions, particularly in cooperatives such as Land O'Lakes, AMPI, Mid-America Dairymen, and other regional cooperatives. Land O'Lakes, for example, still has about 100 member creameries, a small number of which have a large continuous churning operation which will finish the product in printed form, pack it under the Land O'Lakes brands, and move it as directed by Land O'Lakes. For the rest of these member cooperatives, Land O'Lakes assembles the butter in 60 pound boxes at the central plant in Minneapolis where it is graded by a federal grader located at the plant, sorted into lots depending on grade, storability, and so on, printed, stored, and then distributed as needed directly to retail outlets. These outlets are carefully serviced by Land O'Lakes to see that the stocks are rotated and fresh. Land O'Lakes maintains laboratories which do research and development work, and has specialized staffs to carry on promotion and advertising. Land O'Lakes also maintains a seat on the Mercantile and National Cheese Exchanges.

A substantial proportion of the butter is printed and branded under the labels of the retailers, particularly the labels of the corporate and voluntary chains, and cooperative buying groups. Private labeling is now performed by almost every butter printing agency, including the large national dairies, the cooperative federations and the fully merged central cooperatives.

Figure 2-2. Product Flow of Creamery Butter[a]



a Most data are estimates from earlier studies, adjusted for apparent trends.
b Four largest manufacturers had 45% of all butter shipments in 1972. Fifth through eighth had 13%.

Relevant markets are the procurement market, manufacturers and their first point of sale, intermediate handlers and retailers. The procurement market for Grade B or manufactured milk is essentially local, primarily because the price of finished products will not bear the cost of shipping it for long distances. Milk for manufacturing is usually hauled no more than 40 to 50 miles, in dense production areas, though, there are sparse production areas such as parts of Oklahoma and Texas where surplus milk may be hauled 150 miles or more to manufacturing plants.

Much of the manufactured dairy products is made from the surplus Grade A supplies and those markets have been described. Even with the surplus Grade A supplies, an attempt is made by the procuring organization, be it cooperative or private concern, to schedule the bottling requirements in such way that the surplus above those requirements will be manufactured as close to the point of procurement as possible. Even though the manufacturing milk procurement markets are quite local, there frequently are several alternative buyers for this milk, particularly in the heavy manufacturing regions of Wisconsin, Minnesota, and Iowa.

Since the wholesale markets for manufactured dairy products are national in character, the prices for those products are determined by national supply and demand conditions. Demands for butter, nonfat dry milk solids, and cheese are perfectly elastic at the price support level, since the government will buy any amount of qualified product offered, anywhere in the country at the prices specified, at any time during the year following the price support announcement. Consequently, the government in effect assures the manufacturing margins for average plants. Competition for milk supplies at country points is very keen; the manufacturers have considerable overcapacity and each plant would like to procure as much milk as possible to run through its plant so as to reduce per unit costs. Most years this tends to drive up the price of milk for manufacturing to or above the price support level, although some of the competition takes nonprice forms, such as hauling subsidies.

STRUCTURE OF BUTTER MANUFACTURERS

For several decades before the 1960's, butter was manufactured by the batch process and packed in 60-64 pound fiberboard boxes. However, for about a decade and a half, the continuous churn has been prominent in the manufacture of butter, and a substantial part of the total volume (perhaps as much as 70-80%) is now churned in this way. Where large volumes of the butterfat can be assembled in one place for manufacture, it is said to cut the cost of manufacture to as little as one-fourth to one-third of the cost of the batch process. The comparison is probably between the cost of churning and printing in each of the two types of operations. From the continuous churn, butter may be printed, boxed, and moved directly into the freezer with a nominal amount of labor per unit involved, whereas in the batch process, churning and printing are often separate operations.

Table 2-8. Market Shares of 4, 8, 20, and 50 Largest Dairy Manufacturers, Company and Plant Numbers and Value of Shipments, U.S., 1967 and 1972

Industry[a]	Year	No. of Cos.	No. of Establish-ments	Value of Shipments				
				Total (mil. $)	Percent Accounted for by:			
					4 Largest Companies	8 Largest Companies	20 Largest Companies	50 Largest Companies
2021 Creamery Butter	1972	201	231	808.3	45	58	78	92
	1967	510		958.8	15	22	36	60
2022 Cheese, Natural and Processed	1972	739	872	3,195.0	42	53	65	77
	1967	891		2,175.7	44	51	61	71
20221 Natural Cheese	1972			1,400.0	36	46	63	77
	1967			829.0	38	44	55	68
20222 Processed Cheese	1972			1,134.0	60	74	86	96
	1967			362.5	72	84	94	99
2023 Condensed and Evaporated Milk	1972	172	263	1,667.0	39	58	76	92
	1967	179		1,263.0	41	56	74	90
20231 Dry Milk	1972			880.3	45	59	73	90
	1967			632.0	35	45	57	73
20232 Canned Milk	1972			427.7	69	83	98	100
	1967			475.5	62	81	95	100
2024 Ice Cream and Frozen Desserts	1972	561	697	1,244.7	29	40	58	75
	1967	713		1,059.4	33	43	68	73
2026 Fluid Milk	1972	2,024	2,507	9,395.7	18	26	42	56
	1967	2,988		7,826.0	22	30	42	51

[a] Four digit on an industry basis; five digit on a product basis.

Source: "Concentration Ratios in Manufacturing," 1972 Census of Manufactures, Special Report Series MC72 (SR)-2, U.S. Department of Commerce, Washington, D.D.

Creamery butter manufacturing has become relatively concentrated in recent years, probably as a result of the formation of large, fully merged regional cooperatives, much of which took place after 1967. In 1972, the percent of shipments by the four largest, eight largest, and 20 largest was 45, 58, and 78, respectively. These data may be compared with 1967, which showed 15, 22, and 36, respectively. Butter manufacturing thus changed from the least concentrated of the dairy industries to one of the most concentrated (Table 2-8). Meanwhile, the number of companies declined by about 60% from 1967 to 1972 and the value of shipments fell by nearly 20%.

STRUCTURE OF BUTTER BUYERS (INTERMEDIATE HANDLERS) AT COUNTRY POINTS

There are relatively few large buyers of butter at country points. The most important buyers include integrated cooperative sales agencies, specialized jobber wholesalers, meat packers, large dairy companies, and some chain store buyers. These buyers (or intermediate handlers, as they will be called) assemble, transport, store, print, package, and distribute butter to retailers and institutional users. Some butter also is distributed to other food processing firms. Intermediate handlers brand butter under their packer brands or package butter under private labels for retail chains. In earlier times, intermediate handlers also provided grading to a much greater extent than presently, but the operation of the price support program and the growth of the large cooperative sales federations tended to shift the grading point to its manufacturing level.

Table 2-9 shows that the percent of butter marketed by cooperative sales organizations increased dramatically between 1951 and 1965, and that the percent marketed by the large dairy companies declined in almost equal proportion. The percent marketed by meat packers also declined sharply. The decline in sales of farm separated cream and in centralized production of butter contributed to the reduced importance of the large dairy corporations and meat packers, while the price support programs strengthened the positions of small butter plants,

Table 2-9. Butter Marketed by Cooperatives, Large Dairy Companies, and Meat Packers, 1951, 1965

Type of Firm	1951 %	1965 %
Cooperative Sales Organization	15	48
Large Dairy Companies	24	6
Meat Packers	23	11
Wholesalers	22	22
Food Chains	16	11
All Types	100	100

Source: [79]

and doubtless there were other factors. Analysis of shipments from 542 manufacturing plants by the National Commission on Food Marketing showed that in 1965 the share sold to the four largest intermediate handlers was 38%, the eight largest, 50%; and the eighteen largest, 62% (Technical Study No. 3, p. 280).

AMERICAN CHEESE CHANNELS

Although a substantial amount of the Grade B milk procured from farms for American cheese manufacture goes into the large flexible plants with dual intakes that were mentioned above, there still remains a substantial number of specialized cheese factories (perhaps 100-150 in Wisconsin) usually of around two to four vats in size. Even though perhaps half of these in Wisconsin might be classified as cooperative, the classification is not clear-cut. Frequently farmers will form a cooperative which owns the building and arranges with a contract hauler to assemble the milk. Actual manufacturing will be done by an independent cheesemaker who owns his own cheesemaking equipment.

In various other parts of the U.S., there are specialized cheese factories of various sizes, a few of them owned by the large cheese companies such as Kraft.

After manufacturing, the functions performed for American cheese are similar, in many respects, to the functions performed for butter (Figure 2-3). The functions consist of assembling from country plants, grading, storing, sorting lots, processing, cutting and wrapping, branding, research and development, promotion and advertising, exchange operations, delivery to retail buyers, institutions, coordination with retailers to assure that the product is kept fresh and to assure that the individual handler finds his product adequately displayed. Most of the intermediate handlers are integrated into the performance of all the functions named above.

Generally, the intermediate handlers cut and wrap their cheese into consumer size packages and brand it, or they convert it into processed cheese products. Right after World War II many firms entered the cheese processing business. Most of them disappeared in a few years, because it was necessary to have scrap from cutting and wrapping operations and lower grades of cheese to go into the processed cheese mix or into the cheese food mixes in order to be profitable. Also it was necessary to develop a brand name.[8] Almost no cheese factories do any processing; a number do carry on some cutting, wrapping, and branding operations, usually for only a small proportion of their cheese. Most American cheese now manufactured is either rindless block or barrel cheese. The traditional sizes, such as cheddars, daisies, flats, and so on, have almost disappeared from the industry, although some longhorn and midget sizes still remain.

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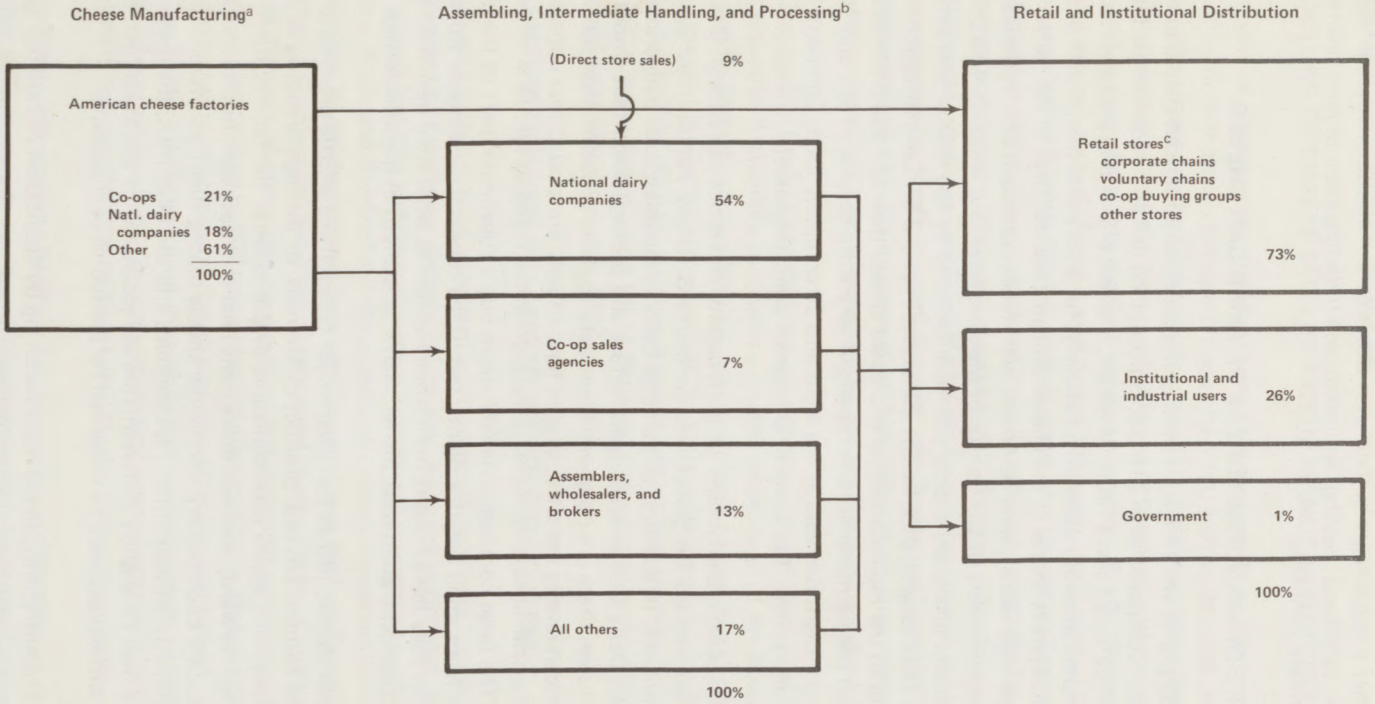
8 In other words, to be profitable making and selling process cheese consists of much more than melting down a formula of purchased ingredients, molding, and packaging it. Instead, processing must be integrated into several other operations to be profitable.

Figure 2-3. Product Flow for American Cheese



a Four largest manufacturers had 42% of all cheese shipments in 1972. Fifth through eighth had 11% of all cheese shipments.

b Four largest processors had 60% of shipments in 1972. Fifth through eighth had 14%.

c A large percent is private labeled, probably 35%.

Some years after the rindless block process became general, the major chain organizations followed the practice of cutting, wrapping, and weighing the rindless blocks into consumer size packages in their own stores or warehouses. Although some of this remains, in general, cutting, wrapping, and branding seem to have reverted to the intermediate handlers.

STRUCTURE OF MANUFACTURERS OF AMERICAN CHEESE

In 1975, 567 plants were engaged in the production of American cheese in the United States, compared with 816 plants producing in 1967. Most cheese plants are operated by single plant firms. However, the few plants that are operated by multiplant companies or cooperatives account for a very substantial part of the total output. Market shares in the cheese industry are less than in the butter industry, although they were higher up to the most recent census, 1972. American cheese is not shown separately in the Census of Manufactures, but in 1972, 42% of the total natural and processed cheese was manufactured by the four largest companies, 53% by the eight largest, 65% by the 20 largest (Table 2-8). Concentration is considerably higher in the manufacture of processed cheese than of natural cheese. Concentration for all cheese manufacturers changed very little between 1967 and 1972, showing a very slight decrease at the eight and 20 company level. Company numbers fell moderately (17%). The value of shipments almost doubled.

Kraft is the leading manufacturer of both natural and processed cheese. Other important manufacturers are Borden (Lakeshire-Marty Division), Armour, and Swift (Pauly Cheese Company). In addition to the large dairy companies, such cooperatives as Lake to Lake Dairy Cooperative manufacture and package important amounts of cheese. Although there are no good recent data to show concentration specifically in the American cheese industry, studies have usually concluded that concentration is less in American cheese manufacturing than in the manufacture of all cheeses combined. The large companies named above buy a substantial part of the cheese they handle from small country plants, but in the census their share of shipments includes what they have bought from others as well as what they have manufactured, thus making concentration look higher than it actually is in manufacturing.

For American cheese, just as for other major types, there is little product differentiation in the form of physical product differences, or through branding at the manufacturing level, which is recognizable by consumers. The factory itself, unless it is integrated forward, does not make consumer-size packages, but instead chiefly barrels or blocks. Each factory does make cheese having slightly different flavor, color, salt content, solids content, fat content, and the like. Thus, the output of each factory may be slightly differentiated as recognized by the assembler, and these slight differences may be rewarded by premiums or discounts.

The barriers to entry into cheese manufacturing by traditional technology generally are low, with raw milk supply being the most important. Vertical integration among

manufacturing firms, intermediate handlers of natural cheese, and cheese processors is very important, with virtually all of the largest manufacturing firms fully integrated into each functional level of the market.

STRUCTURE OF CHEESE BUYERS AT THE MANUFACTURING LEVEL

The buyers of cheese at the manufacturing level have traditionally been the assemblers. Functions included in assembly are receiving, grading, waxing, and storing or aging the cheese purchased from manufacturers. However, the largest assemblers are now integrated forward into wholesaling and processing, and assembling may be viewed as part of the intermediate handler operation. Kraft, the largest single manufacturer of natural cheese is also one of the largest buyers of natural cheese. Other large buyers include Borden, also an important producer; Armour; Swift; L.D. Schreiber Company, a specialized intermediate handler of cheese and butter; and several cooperative firms including Land O'Lakes and retail food chains. The National Commission on Food Marketing found that four of the largest national companies, Kraft, Borden, Armour, and Swift, purchased 54% of American cheese sold by U.S. manufacturers in May 1965. These large integrated buyers purchase much of the cheese assembled by the smaller nonintegrated assemblers.

The Commodity Credit Corporation is an important buyer of natural cheese in some years, although it generally purchases a smaller proportion of the cheese than of the butter and nonfat dry milk. The CCC purchases both natural and processed cheddar; during the past few years a large part of the total purchased has been processed cheese. During the 1950's, the CCC purchased about 14% of the American cheese; during the 1960's, it purchased about 8% of the total output; during the 1970's, it has purchased relatively little until 1977.

INTERMEDIATE HANDLING AND PROCESSING OF CHEESE

The key to the structure of intermediate handlers of American cheese is found in the development of the cheese processing industry. At times in the past, lack of know-how, special facilities and perhaps access to patented processes have been barriers to entry. Kraft and Borden held the patents to process cheese until they expired, for example. When the intermediate handler combines the handling of natural cheese with the production and handling of processed cheese, he has a supply of the lower quality cheeses and trim of his own cutting and wrapping operations. In most cases, he buys cheese packed in 500 pound barrels for processing, likewise. He is able to take the higher quality natural cheese and convert it into cut cheese, package and brand it. Product differentiation through branding is important to both the natural and the processed product. There are important economies available in branding and in distribution when the two are handling the same operation.

The dominant intermediate handlers and processors are the same as the dominant assemblers. They include Kraft and Borden who had the original processing patents,

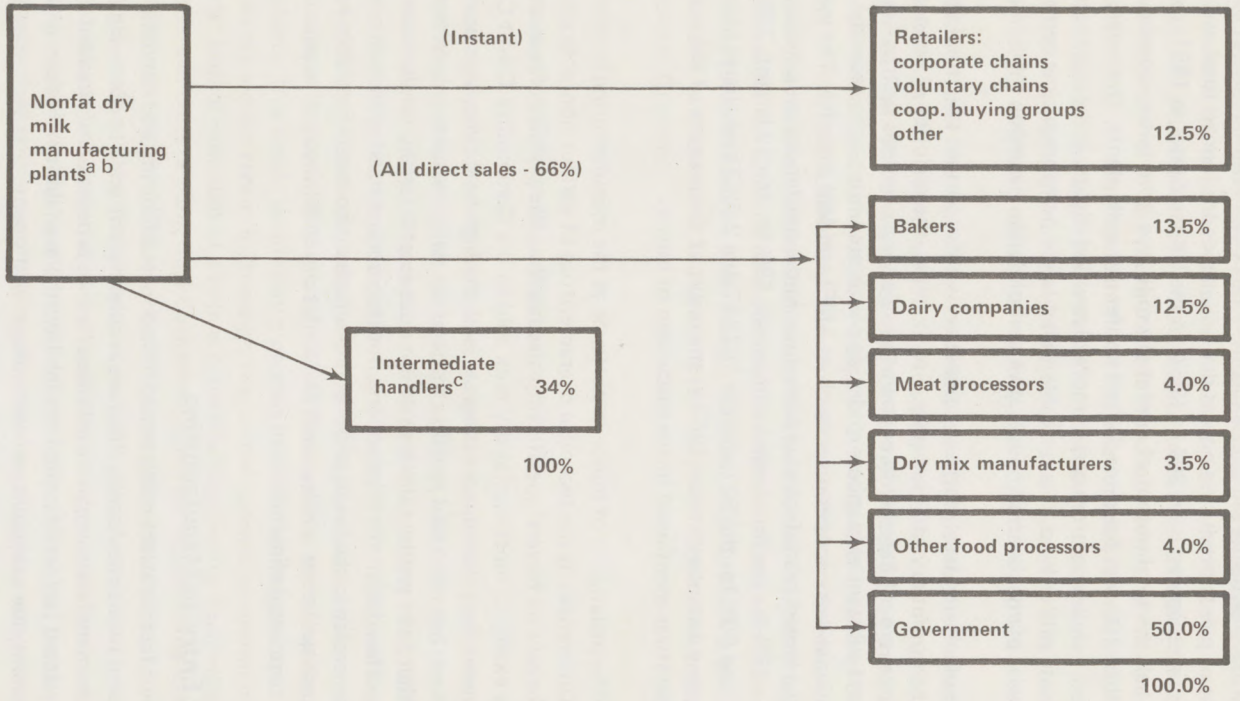
as well as firms such as Armour, Swift, Pauly and Pauly, and so on. Williams *et al.* estimated that the four largest companies sold between 60% and 80% of the total cheese at this level. The processed cheese industry is even more highly concentrated than intermediate handling of natural cheese. Kraft dominates the production and distribution of processed cheese and related products with its sales accounting for about a half of the total, according to the Federal Trade Commission. A look at the cheese display case of almost any chain store suggests that the major competition faced by Kraft is first the chain store private brands and secondly the brands of the larger cooperatives. Kraft seems to be holding its market share but is not gaining. Kraft has discontinued private labeling of cheese in recent years, first for the corporate food chains and then for all food companies. However, all other intermediate cheese handlers including cooperative sales agencies do carry on private labeling. Kraft buys between one-half and two-thirds of its cheese from factories under contract (or sales agreement). It manufactures the balance in Kraft factories or (for special types) in joint venture factories. Borden also is a producer and seller of processed cheese, with Armour, Swift, and several specialized cheese firms among the more important other sellers. Product differentiation is the major barrier to entry for a firm attempting to sell a packer labeled product over an extensive area.

Intermediate handlers sell to retailers of all types and to institutional users. Though building a brand name probably incurs the highest cost, there also is considerable investment required to prepare cheese for retailing, even under a private label. This makes the entry barrier moderately high to compete as an intermediate handler, even when the cost of developing a prominent brand name is not part of the barrier.

NONFAT DRY MILK CHANNELS

The functions performed for nonfat dry milk solids are directly shaped by its sales channels (Figure 2-4). As much as half of the total output is sold to the government under the price support program, even in years when the government is buying very little butter and American cheese, such as the years 1973 through the first nine months of 1976. For these purchases the government sends a grader directly to the manufacturing plant, and the product in car lots is shipped from the manufacturing plant to the warehouse designated by the government. Most of the rest of the product (except that which is manufactured as instant powder) is either shipped directly from the manufacturing plant to the end user or goes through a cooperative sales agency directly to the end user. Generally, only the smallest plants sell through brokers and only the smallest users buy through brokers. Aside from the instant product (which is packaged for retail sales directly to household consumers) the principal users are bakers, sausage manufacturers, candy manufacturers, and fluid milk processors. They buy on specifications as a rule and in large lots.

Figure 2-4. Product Flow for Nonfat Dry Milk (Including Instant)



a Skim milk supplies may be either Grade A or Grade B, and are received chiefly from butter factories or flexible operations.

b Four largest manufacturers had 45% of shipments in 1972. Fifth through eighth had 14%.

c Land O'Lakes, Sugar Creek Foods, Weldon Farm Products, etc.

STRUCTURE OF DRY MILK MANUFACTURERS

The nonfat dry milk industry includes a smaller number of plants and firms than other dairy manufacturing industry except the evaporated milk industry. In 1975 the number of plants producing nonfat dry milk solids for human food was 153, which may be compared with 304 in 1967. In the United States in 1961, somewhat over half the total output of nonfat dry milk was from butter-powder plants while less than 10% was from specialized nonfat dry milk plants. The balance of the nonfat dry milk was produced in more diversified plants. Although there are no recent data of this kind, it is probable that a larger percentage now comes from butter-powder plants, because cooperative consolidation has made them larger.

At the manufacturing level, vertical integration is an important structural characteristic of the nonfat dry milk industry. For example, the majority of cooperative manufacturers are affiliated with cooperative sales organizations such as Land O'Lakes, and substantial numbers of drying plants are units of the recently merged regional dairy cooperatives, such as AMPI and Mid America. The market shares of the largest manufacturing companies in the nonfat dry milk industry are fairly high—45% for the four largest companies, 59% for the 10 largest, 73% for the 20 largest, and 90% for the 50 largest in 1972 (Table 2-8). These shares have increased quite substantially since 1967 as the result of the mergers of the regional dairy cooperatives mentioned in the discussion of butter.

Product differentiation is of minor importance at the manufacturing level of the industry. Differences in the technical characteristics of various nonfat dry milks are based largely on buyers' specifications rather than the policies of manufacturers. For example, most nonfat dry milk sold to the Commodity Credit Corporation under the price support program is of the high heat type, as is powder sold to bakers; but most sold to other firms in the dairy industry is low heat powder. What little product differentiation does exist is largely on the basis of services offered with the product and not the product itself, although many buyers may prefer to deal with larger manufacturers who can offer stable supplies and perhaps better quality control. Nonfat dry milk does not require cold storage in temperate climates.

Exit and Entry to Manufacturing

A number of factors affect entry and exit into manufacturing and handling of manufactured products. Among these are: economies of scale in obtaining raw materials, in manufacturing, in distribution, and in promotion of branded products; related factors of capital availability, the availability of labor, and in some situations, the availability of technology, in the sense that technology may not be equally available to all potential entrants, due to patents, trade secrets, and the like. Extent and success of product differentiation also markedly affect ease of entry into dairy manufacturing industries at the stage at which

branded products are produced. However, most manufactured products are commonly differentiated at the intermediate handler level.

Two factors rather generally inhibit entry into the manufacture of dairy products. One of these is the large and generally increasing amount of capital needed for an operation of optimum size. The heavy capital investments needed tend to limit prospective entrants to large corporations and cooperatives. On the other hand, the sunk capital in many comparatively inefficient plants retards exit. Most of these plants are of no appreciable value for alternative uses. Owners frequently are reluctant to write off the investments in them and may be able to continue in business for extended periods of time by depleting their capital.

The second factor is competition for milk supplies. This was mentioned above in the description of relevant markets, particularly the price and nonprice nature of this competition. This competition may be further intensified in the areas where some former manufacturing milk producers have been able to obtain Grade A markets for their milk. One form the competition has taken, for example in Wisconsin, has been a plan to establish both Grade A and Grade B intakes and to pay a premium for Grade A to those larger and better producers who appear to be converting toward Grade A, even though the plant does not have a good market for Grade A. In those cases, the Grade B side may be "robbed" in order to pay a premium to Grade A.

Economies of Size in Manufacturing

In Wisconsin and Minnesota, it is rather generally said among dairy manufacturing people that a minimum size for technically efficient butter-nonfat dry milk solids plant is around 200,000,000 pounds of milk at the intake per year. The minimum size for efficient procurement would require less milk than this, and the minimum size for efficient operations performed by the intermediate handler would require much more milk than this. The sizes named above are for the technology used by most plants. This would be the batch process in butter manufacture; on the other hand, where a more recent technology, that of the continuous churn, is used the butterfat from a minimum of a billion pounds is required for a technically efficient operation and costs per unit might actually decline up to something like three or four billion pounds. By 1976 several continuous churns are known to be in use, though no exact count of the number is available. Some are said to have less than optimum supplies of butterfat, but all together are accounting for a substantial part of the butter supply. In the usual butter-powder operation, that is, with a batch process of butter manufacture and a good spray-drying operation in the same plant, the cost function would tend to fall rapidly in the earlier volume ranges, then tend to level out gradually, perhaps on up to 750 million pounds of milk or maybe further.

Some characteristics of cheese manufacturing costs are shown in Lilwall and Hammond [40]. They estimate that costs decline from 64.34 cents per hundredweight to 35.75 cents with different technologies and increased volume (Table 2-10). Two of their main findings are:

(1) For plants with a peak daily milk capacity of a quarter of a million pounds, the addition of a further 100,000 pounds of capacity can cut costs by about 5 cents per hundredweight of milk processed. The economy to size diminishes rapidly once the peak daily supply exceeds 500,000 pounds.

(2) The choice of a least-cost technology depended mainly on the available milk supply. For plants processing a peak milk supply of less than 100,000 pounds a day, a standard vat system with manual hooping was best. Between 100,000 and 180,000 pounds peak supply, a two-tier system with automatic hooping gave the least cost solution. And for plants receiving 180,000 pounds or more a day, the fully automated system was best.

Shortening the work week, decreasing the number of shifts, and increasing the wage rate each had important effects on costs, but little compared to the effects of volume. It is no purpose of this report to show what costs of cheese manufacture may be in 1976. The CCC includes a make allowance of $1.07 per cwt. of milk in its buying price for cheese to support milk prices, in 1976-77 and again the following year.

Table 2-10. Budgeted Costs for Four American Cheddar Plants, 1970

	Technological System			
	Standard Vat Manual Hooping	**Two-Tier Automatic Weighing and Hooping**	**Automatic Cooking and Cheddaring**	**Automatic Cooking and Cheddaring**
Vat Number	2	2	2	7
Vat Size	25,000 pounds	30,000 pounds	30,000 pounds	30,000 pounds
Operational System	7 day week; 3 shifts	7 day week; 3 shifts	7 day week; 3 shifts	7 day week; 3 shifts
Peak Daily Capacity	94,500 pounds	228,900 pounds	228,900 pounds	1,373,400 pounds
Annual Volume Processed	28.3 million pounds	68.5 million pounds	68.5 million pounds	411.1 million pounds
Total Initial Capital Cost	$199,849	$296,055	$395,779	$1,190,557
Cost Per 100 Pounds Milk Processed	64.34¢	48.05¢	47.11¢	35.75¢

Source: Lilwall and Hammond [40]

Expected Competitive Behavior

From the above analysis of structural characteristics of the principal industries within the dairy subsector, something can be said as to the competitive behavior that would be expected. All of the four parts of the dairy subsector that we have called industries are moderately concentrated oligopolies with a competitive fringe. As a general matter, the competitive fringe includes a few middle tier sellers that are fairly strong. In all but regular powder, product differentiation is still important though declining because of the private label. In each of the four, there is considerable vertical integration of the largest firms. In each of the four, the barriers to entry are moderate to fairly high because of the capital requirements for the more advanced technology for manufacturing and distribution and in some instances because the costs of building brand names.

In fluid milk distribution the sellers who have the brand name and differentiate the product and service are chiefly the processors (the so-called subdealers or bobtailers being an exception). Some of their expected behavior is regulated by government. Generally, the prices that processors must pay to the producers are regulated by federal and state marketing orders which establish minimum prices to producers, based on the use value of the milk. The cooperatives that procure the milk directly from the farmers and handle it at country plants may exert an upward pressure on the prices that must be paid by these processors to producers.

The medium size dealers, such as Dean's, Hawthorne-Mellody, and Knudson, have grown in size and market shares while the "Big 8" dealers have not. FTC policy has prohibited them from growing by merger. With one exception, all of the Big 8 now have less than 30% of their sales from dairy products. They have conglomerated into other lines and have sharply reduced the amount they spend on advertising and promotion of dairy products. Small independent fluid milk processors have rapidly declined in numbers, about 8% or so per year since 1950.

In the nonfat dry milk markets intermediate handlers are of minor importance because (a) as much as half the product is sold to the CCC at minimum support prices, and (b) two-thirds of the commercial sales are made direct from factory to end users, who are the industrial food processors buying on specification. Prices are usually near support levels because government stocks are usually heavy and anyone can buy from the CCC.

In butter and cheese the intermediate handlers and not the country manufacturing plants have held the market power. It was they who have done the printing (or cutting and processing), packaging, advertising to develop the brand names, serviced the retail outlets, and so on. These intermediate handlers include the large dairy companies such as Kraft and Borden who buy the major part of the product they handle from country manufacturing plants, even though they have some manufacturing capacity. The intermediate handler group also includes the federated cooperative sales agencies such as Land O'Lakes.

From the structural characteristics of dairy subsector markets, it would be expected that there would be a general lack of price competition among sellers and moderate to extensive nonprice competition through advertising and other activities. The expected price and output results would be prices slightly above and outputs slightly below the competitive level.

However, the expected profit maximizing behavior is usually frustrated by the organization of the buyers. The critical group of buyers in these markets is chiefly the corporate food chains who have vertically integrated into fluid milk processing and also demand private labels on their manufactured products. There is a competitive fringe of smaller buyers which include unaffiliated grocery wholesalers and retailers, other dairy firms and industrial users such as bakers. The general result from this situation is that these likewise demand private label, although they are not usually involved in vertical integration into their own processing or manufacturing. Price and output appear to be at or near competitive levels for the industries in the subsector taken as a group, though a few large intermediate sellers appear to get premiums above competitive levels. Their profits appear to be less than they realize in the other lines into which they have merged in forming conglomerates. The rate of exit is high and entry is low in all four of the dairy industries examined here.

Degree of Specialization and Diversification

At the manufacturing stage, the great majority of the plants producing butter, nonfat dry milk solids, and American cheese were either specialized plants or joint product plants based on past studies. Numbers of plants manufacturing any major dairy products are reported annually by the U.S. Department of Agriculture, but these data provide no information about product combinations of dairy manufacturing establishments. This type of data for 1944 and 1961 is available from studies of flexibility and the operation of dairy manufacturing plants in those years [14, 21].

The study by Carley and Cryer showed that 72% of the butter was produced in either specialized butter plants or butter-powder plants. Seventy-three percent of the American cheese was in specialized plants. For powder, only 9% was made in specialized plants, while 44% of the total was produced in butter-powder plants in which butter was the principal product. The balance of each of these products was made in diversified plants. Such products as cottage cheese curd, condensed whole milk, condensed skim milk, ice cream mix, and frozen products are produced in plants which are either partially diversified or fully diversified.[9]

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9 *Partly diversified plants:* plants other than butter-powder in which the value of the principal product comprised between 50% and 90% of the value of all products.
Fully diversified plants: plants making at least four products with any one product having a value of less than 50% of the value of all products.

Fluid milk processing plants, as distinguished from manufacturing plants, make a variety of products for the so-called fluid product line such fluid milk companies distribute. This includes a considerable variety of packaged fluid milk and drinks such as chocolate milk, yogurt, cottage cheese, ice cream, sherbert, and so on. Even highly specialized manufacturing plants can put out a variety of unfinished products which require little special equipment. For example, since they already have condensing pans, they can put out condensed whole milk and condensed skim milk, although they do not have the equipment for canning it in consumer sized cans. They can make ice cream mix or plastic cream. With the addition of a couple of vats, they can make cottage cheese curd which will be sold in bulk to a fluid milk processor. The fact that even a specialized butter-powder plant can flex among a variety of unfinished products serves to keep the prices of various dairy products closely aligned most of the time.

Flexibility of Resource Use

Most of the resources used in the dairy industry are not very flexible. Producers in general are highly committed to dairying and have heavy investments in specialized buildings, equipment, cattle and land. Dairy cattle will bring only about one-third of their value for meat. In some regions the land used for permanent pastures can be used only for dairy, beef, or horses. Only the land used for grain and some of that used for hay has viable alternative uses. The dairy farmer himself, after he passes about 40 years of age, would be much less productive at other employment. Dairy farms have become increasingly specialized in recent years according to census data. From 1959 to 1969 the specialization ratio for dairy farms increased from 73 to 86, a greater increase than for any other type farm shown. This ratio is the value of primary products sold (milk) as a percent of the value of all products sold by that type farm (dairy). This trend toward specialization could make the dairymen even more dependent than now on the price support and federal order programs because of the increased risk exposure.

In general, fixed assets in the dairy manufacturing industry can only be used in the manufacture of dairy products. Two examples bear on this point. None of the 40 or so large-scale milk canning plants closed in Wisconsin between the years 1946 and 1960 or so were converted to use for any other purpose. After World War II there were a number of large-scale nonfat dry milk solids drying plants that had been built with lend-lease funds, and the U.S. Department of Agriculture made studies to see if these could be used for something else, such as drying eggs or drying fruit juices, but for a variety of reasons they were not found to be convertible to other uses.

Financing and Credit Characteristics

Control of the dairy farming operation is with the producer who is usually the owner. Although there are many dairy farming corporations, these are usually

family corporations. In general, dairy farms are not used as a tax shelter by non-agricultural interests. Dairy producers do borrow money from Production Credit Associations or local banks for working capital and fixed assets. Most of the younger and some of the older producers are heavily mortgaged, but this financing does not take control away from the producer-entrepreneur.

Cooperatives are able to obtain financing for constructing new plants or for modernizing existing ones by borrowing at the Bank for Cooperatives or by retains from patrons. It is often easier to obtain capital for construction of plants or modernization of plants than for less tangible though often desirable programs that the cooperative might want to undertake. The cooperative bank will lend a given amount for plant construction or improvement so long as about 60% of it is covered by the value of existing facilities.

The nature of the cooperative business is helpful in raising capital for new plants and for modernizing. Farmer directors may choose to keep up to 80% of the net savings in the cooperative to help finance the above. They also may choose to make capital retains up to an amount authorized by the bylaws. Since the plants belong to the patron-producers, only the patrons are required to pay income tax on savings of the cooperative provided it complies with specific sections of the Internal Revenue Code.

Fluid milk cooperatives sometimes find themselves in the unwelcome position of financing small bottling plants, in that they must keep these customers "alive" by furnishing milk even when they cannot pay promptly. Cooperatives may also take part in joint ventures with food chains, corporate or other.

Joint ventures have been used to some extent in the dairy industry, and occasionally by cooperatives. Examples are: (a) six or so which Kraft has with cheese factories for special types of cheese or special new technologies (e.g., Falls City); (b) ventures with food chains in California such as those of the Knudson Dairy Company. These could be viewed as a new dimension of vertical integration. In the California joint venture, a distributor (processor or dealer) who is actively selling its proprietary brand products organizes an affiliated company and joins with selected retailers to form a separate method of distribution. Fluid milk carrying the distributor's own label can then be purchased by the select joint venture member at a price lower than nonmembers can purchase the same labeled fluid milk directly from the distributor. The joint venture is thus a way of legally avoiding the minimum wholesale prices formerly established by the State of California. These joint ventures are described in recent reports of the California Milk Control Board.

Merger and Acquisition Board

Much of the change in dairy subsector organization over the past three decades has been due to merger and acquisition activity. This has been true of both cooperative and noncooperative forms of organization, as well as of firms of various sizes and types of enterprise. The nature of this activity and some of the forces that have shaped it are described below.

DAIRY COOPERATIVES

Predecessor Activities

The first major flurry of merger activities involving agricultural cooperatives occurred after World War II among community butter churning cooperatives. These took place for efficiency reasons emerging out of a series of major technological developments. One was paving and upgrading roads and improving trucks. This made access to larger geographic areas possible. Another was discontinuing feeding skim milk to livestock. This resulted in deliveries of whole milk instead of cream. A third was the development and adoption of spray dryers to handle skim milk. However, a spray dryer was not economical to operate at the volumes of most cooperative creameries. The result was extensive consolidation of local producer cooperatives into larger operations that produced both butter and nonfat dry milk. Operating efficiency considerations motivated consolidations of cooperative plants through the 1950's and early 1960's and became part of the incentive for forming regional milk marketing cooperatives with surplus milk processing facilities in the late 1960's.

The Development of Regional Milk Marketing Cooperatives

After the innovations in processing and distribution, came large regional milk marketing cooperatives. Distributors of fluid milk found that economies of scale in processing and distribution provided incentive for expanding bottling operations, while wider acceptance of Grade A ordinances, the development of lightweight, one-way paper containers and the adoption of farm bulk tank procurement all made larger scale operations possible. Small dealers disappeared while those that remained were expanding in volume and territory served.

Local cooperative producers began to find themselves depending upon relatively few customers, many of whom were branches or divisions of regional or national organizations. They then found their customers had expanded distribution territory to the point where they were competing directly with milk dealers served by cooperatives in neighboring cities. Conflicts of interest began developing between cooperatives. Cooperative A could not successfully hold its Class I price, its service charges, or its sales volume if Cooperative B was not offering the same terms to their customers. It did not matter that Cooperative B did not have milk to serve both markets.

All that mattered was that customers of Cooperative B did not receive a price or service charge advantage not available to their competitors, the customers of Cooperative A. It became common for cooperatives to be in direct confrontation with each other every time a price change was considered.

At the same time, adjustments were taking place on the dairy farm. New technology in the form of mechanical milking machines, milking parlors, bulk tanks and pipeline milkers had enabled farmers to greatly increase their production per cow, per farm, and per manhour of labor. Increased production capability per farm without corresponding increases in demand led to an acceleration in the rate that dairy farmers went out of business. More than 75% of the number of farmers selling milk and cream in 1950 were lost in the following years. Cooperative managers could no longer solve income problems of their producers.

The first inclination of producers and their cooperative leaders was to look more diligently to government programs for answers. But administrators of both the Federal Milk Marketing Order Program and the Price Support Program cited only the "supply-demand" criteria of the Acts as guides to their decisions. This led producers to believe that the income improving objectives spelled out in the Acts had been completely abandoned. Producers couldn't believe such language would have been included if the sole price standard was intended to be the supply-demand relationship of the past period. They felt that in some way they were being let down by the administrators of these programs. So the apparent nonresponsiveness of government helped to stimulate the cooperative merger movement.

A major spur that turned cooperative leaders toward searching for forms of self-help was a Supreme Court decision in the Lehigh Valley Case declaring compensatory payments unconstitutional.[10] The initial reaction by administrators of federal milk order programs was that no restraints would be placed on movement of unregulated milk into a milk marketing order area. Producers were upset, believing that government intended to foster and encourage even more ruthless competition between milk sheds, and concluded that they would have to rely solely on their own efforts to solve their problems.

The first step was the formation of federations of local cooperatives. One of the most notable was Associated Dairymen formed in 1964. It was a loose federation of Midwest and Southern cooperatives whose number of members eventually reached 33, representing 61,000 dairy farmers (Table 2-11). It represented dairy farmers in 17 Midwestern and Southern states extending from Canada to the Gulf of Mexico. This group was responsible for getting alternatives to the compensatory

10 A compensatory payment was a payment that had to be paid into the federal order pool of the local producers by any outside handler who shipped milk into that market. The purpose was to compensate local producers for loss of Class I sales in that amount, so the payment was frequently the difference between Class I producer prices and the surplus price. Not all markets had these.

payment provision accepted. The group can also be attributed with much of the effort that resulted in increased Class I differentials, in eliminating individual market seasonal and supply-demand adjustors, in raising funds to supplement and expand ADA and Dairy Council work and in establishing the standby pool.

A number of other important federations of local cooperatives were formed. Great Lakes Southern Marketing Federation was organized in 1960, and began major marketing activities in 1966. By 1969, members of this federation extended from Lake Superior to the Gulf of Mexico and east of the Atlantic Seaboard and represented 35,500 dairy farmers and 12.5 billion pounds of milk. In the East, a New York-New England Dairy Cooperatives Coordinating Committee was organized in 1966 representing 25,000 farmers. During 1968 and 1969, other federations of local cooperatives included Central Milk Producers Cooperative in the Chicago area with 15,000 dairy farmers, Federated Milk Producers in the Midwest with 10,000 dairy farmers, Penn-Marva Dairymen's Cooperative Federation in the Philadelphia-Baltimore-Washington, D.C. area with 5,000 dairy farmers, Mountain Milk Incorporated in Colorado, Wyoming, Idaho, Utah, and Arizona with 2,400 members, and Florida Dairy Farmers Federation with 500 members.

Though encouraged by the initial success of these federations, some members had experienced difficulty with federated organizations in the past and preferred more permanent ties. After about three years, a number of mergers and consolidations began taking place. Principal consolidations within the membership of Associated Dairymen became Milk Producers Incorporated of San Antonio, Texas in 1967 and Mid-America Dairymen of Springfield, Missouri in 1968. Another major consolidation became Dairymen Incorporated of Louisville, Kentucky in 1968. In 1969, MPI joined with 11 northern cooperatives, the largest being Pure Milk Cooperative of Chicago, to form AMPI (Associated Milk Producers Incorporated). Mid-America Dairymen also joined with others later including Twin Cities Milk Producers Association of Minneapolis and Nebraska-Iowa Association of Omaha.

Other local cooperatives outside the area of Associated Dairymen also were joining together into larger regional cooperatives about this time. These included Consolidated Milk Producers in the Northeast in 1967, Northwest Dairymen's Association in 1968, and Milk Incorporated of Ohio in 1969.

Energies and attentions of midwestern cooperative managers and employees were directed away from efforts to improve the lot of the producer and toward justifying what they had already done in early 1972 when the Justice Department filed a complaint against AMPI, and later against Mid-America Dairymen of Springfield, Missouri and Dairymen Incorporated of Louisville, Kentucky.

Little has happened since then in the way of further merger or consolidation. Associated Dairymen was disbanded after its membership dwindled from a high of 33 down to three as a result of mergers or consolidations of the members. About this time, a new federation called Central America Cooperative Federation was formed whose principal members included AMPI, Mid-America, and Dairymen, Inc. This organization has since become inactive. However, the remaining federations continue to function.

Table 2-11. Principal Dairy Co-op Mergers and Federations During Period 1964-70, U.S.

	Mergers or Consolidations	Year Formed	No. of Producers (Number)	Annual Volume (Billion lbs.)
(a)	A.M.P.I	1969	42,000	13.0
(b)	Mid-America Dairymen	1968	18,595	5.8
	Dairymen Inc.	1968	9,000	4.0
	Central States Dairy Coop	1968	5,000	1.1
	Consolidated Milk Producers Assn.	1968	1,800	1.0
(c)	Milk Inc.	1969	8,000	2.4
(c)	Northwest Dairymen's Assoc.	1968	6,000	2.0
	Totals		**129,725**	**29.3**
	Federations			
(d)	Assoc. Dairymen Inc.	1964	61,000	18.8
(e)	Great Lakes Southern Milk Marketing Fed.	1969	35,500	12.5
	New York New England Dairy Coop. Coordinating Com.	1966	25,000	10.0
	Central Milk Producers Coop.	1968	15,000	6.0
	Federated Milk Producers	1968	10,000	3.0
	Penn-Marva Dairymen's Coop. Federation	1968	5,000	3.0
	Mountain Milk, Inc.	1968	2,400	1.8
(c)	Florida Dairy Farmers Federation	1969	500	1.0
	Totals		**176,000**	**56.1**

(a) Report from Cooperative
(b) "The Merging of Mid-America, etc.," Mid-America April 1970
(c) Wm. H. Alexander "Mergers and Federations, etc.," 1970 (typed)
(d) It understates the volume of milk and number of producers since AMPI and Mid-Am became members after they merged.
(e) "Great Lakes-Southern Milk Inc.," Annual Report, as of July 31, 1969.
Source: Unless otherwise stated, S. Johnson "Dairy Coop. Mergers" in Dairy Marketing Connecticut Cooperative Extension Service Market, 1969 Mimeo.

DAIRY PROCESSORS

Mueller, *et al.* in *Public Policy Toward Mergers: A Case Study in Fluid Milk Processing* thoroughly described merger activity in recent years. That study considered the effects of FTC merger policy on channeling merger activity away from the big eight national dairy concerns (such as Kraftco, Borden, Foremost, Beatrice) and toward medium-sized regionals (such as Dean, Hawthorne-Mellody). Each of the nationals and most of the regionals manufacture and/or handle a full line of dairy products both in the fluid line and in the hard products line. However, the FTC interest was chiefly in the fluid products line, for which markets are local or regional and where sales concentration may pose more problems in competitive behavior than would be found in the national markets for butter, powder and cheese.

The merger data in the Mueller study are satisfactory for fluid milk and ice cream concerns other than the very small ones, but would not reflect much of the merger activity among specialized hard product manufacturers of butter-powder and cheese.

Impact on Large Dairy Processors

According to Mueller, *et al.* [48] the most direct effect of the FTC policy was to channel the direction of merger activity away from the leading four firms to medium-size and independent firms. In the five years (1951-55) before the FTC first challenged fluid milk acquisitions by large firms in 1956, the top eight dairy processors acquired an average of 71 dairy processors annually. Between 1956 and 1961, before the FTC issued its first decision in one of these cases,[11] these firms' merger activity slowed to 27 acquisitions annually. In the 13 years (1962-74) following this decision, the top eight dairies averaged only four acquisitions annually, most of which were very small. The most apparent result of this policy was to stop the largest companies from expanding their share of the fluid milk industry. Between 1950 and 1958, when the largest companies were pursuing an unrestrained growth by merger policy, they expanded their share of national fluid milk sales by over one-third, from 17% to 23%. Since 1958, which essentially marked the end of these firms' growth by merger, their market share has declined steadily, until by 1972 it was back to the 1950 level, 17%.

Although these companies virtually stopped making dairy acquisitions after 1961, they participated actively in the great conglomerate merger movement that swept across American industry in the 1960's. During 1961-74 the top four companies acquired at least 278 companies for which they paid at least $1,344 million.

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[11] In December 1960 an FTC Administrative Judge issued an initial decision in Foremost. In March 1962 the FTC issued a final decision ordering substantial divestiture and prohibiting Foremost from making further acquisitions for 10 years without prior FTC approval.

Beatrice Foods was the most active acquirer, with 174 acquisitions for which it paid over $575 million. By 1974 it had become widely diversified into a host of food and nonfood products, so that only 27% of its sales were in dairy products.

Impact on Medium-Sized Firms

Despite the sharp curtailment of dairy acquisitions by the industry leaders after 1956, the *relative* merger rate of all other dairy processors actually increased. Analysis of seven medium-size firms reveals that all but the largest made more acquisitions during 1961-74 than during 1950-60, and that these acquisitions contributed substantially to their post-1960 growth. One of these, Farmbest, Inc., was a direct progeny of FTC policy, as it was created when Foremost Dairy was compelled to divest itself of its Southeast Dairy Division. After making several acquisitions of its own, Farmbest, Inc. had sales of $104 million in 1974.

Southland Dairy was the most active acquiring medium-size dairy, acquiring at least 29 dairy processors, which were primarily responsible for the growth in its dairy sales of $28 million in 1960 to $174 million in 1974. Other medium-size dairies making multiple acquisitions in the 1960's were Fairmont, Dean, Knudsen, and Hawthorne-Mellody. As a group, the fluid milk and related product sales of the seven medium-size dairy processors studies grew by 191% between 1960 and 1974, or more than five times as rapidly as total industry sales.

By 1974, the medium-size dairies studied had substantially larger industry than dairy product sales. This reflected in part the diversification of several dairies outside of dairy products and, even more importantly, the acquisition of two medium-size dairies by conglomerate enterprises. Perhaps most importantly, however, only one of the leading medium-size dairies was acquired by another dairy after 1961, Bowman Dairy by Dean. As a result of an FTC challenge of this acquisition, part of Bowman's properties subsequently were sold to smaller dairy processors.

Additionally, a number of firms joined the ranks of medium-size dairy processors after 1960. By 1973, there were about 65 firms with annual fluid milk sales between $20 million and $100 million, which was more than twice as many as in 1960. In conclusion, it appears that to date the FTC policy objective of encouraging an environment conducive to the survival and growth of medium-size dairy processors has been at least partially successful. The result is a less centralized fluid milk distribution system than may otherwise have been the case.

Impact on Independents

The *relative* rate of merger activity among independent dairies (defined as firms with annual sales below about $25 million) increased after 1956, the year the FTC first

challenged acquisitions of the largest firms.[12] Analysis of the growth of mergers of a sample of independent firms showed that 137 firms reporting this information made 183 acquisitions with combined sales of about $100 million. For many firms, acquisitions appeared to account for most of their growth.

MERGER OF MANUFACTURING FIRMS AND SMALL FIRMS

To supplement the above, data are cited from Hammond and Cook, which show more of what was happening to smaller firms and to manufacturing firms in two of the major dairy states. Though these data are not recent, they probably reflect trends which have continued [34]. Thirty-eight percent of the firms that were in business in Wisconsin some time during 1940 to 1960 had entered during this time period, and 75% of the firms in business exited from the industry during this time period.

Comparison with another midwestern state, Minnesota, showed some important differences. In Minnesota, of 610 firms exiting during 1940-60, only 38 merged and operated; 57 merged and closed. Only 179 new firms entered.

For Wisconsin the largest proportion of exits included both decision units and capacity, 46.3%. Sale to someone not previously in the industry and merger accounted for 24.6% and 29.1%, respectively, of the total.

The importance of the three types of exit may vary from one industry segment to another. The dairy operations in Wisconsin that accounted for the largest number of exits were the cheese firms and the fluid milk firms. Merger has been the form of exit in from one-fifth to one-half of the firms in each type.
In all, 493 Wisconsin dairy mergers during the 1940-60 period were found, involving approximately 750 firms. The acquiring firms in these mergers were classified into three groups; (1) national dairy concerns;[13] (2) cooperatives; and (3) local or regional proprietorships, partnerships, state and regional corporations. It was found that 9.5%, 22.1%, and 68.4%, respectively, of the mergers were accounted for by these classes of firms.

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[12] The relative increase in acquisitions by firms other than the top eight occurred even after subtracting acquisitions by medium-size firms.

[13] The national dairy concerns operating in Wisconsin were: Borden, Fairmont Foods, Beatrice Foods, National Dairy Products, Foremost Dairies, Pet Milk Company, and Carnation.