Coordination and Exchange In The Dairy Subsector: Cooperative-Processor Relationships
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# Coordination and Exchange In The Dairy Subsector:

## Cooperative-Processor Relationships

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# Foreword

Society has certain expectations regarding performance of the dairy industry. When its performance does not meet the expectations attempts are made to alter the conditions which are believed to be bringing about the poor performance. This study is focused on the impact of market regulations and institutions which have been used in attempting to bring about desired performance.

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# Coordination and Exchange In The Dairy Subsector:

## Cooperative-Processor Relationships

By Robert D. Boynton and Glynn McBride[1]

### INTRODUCTION

Cooperatives and proprietary handlers[2] play a vital role in the U.S. dairy subsector.[3] Dairy cooperatives are first handlers for about three-fourths of farm milk production and increasingly are also manufacturing, processing and distributing milk and dairy products. Despite cooperative integration and growth, however, proprietary handlers still process and distribute at least three-fourths of the fluid and soft products sold in the United States. These two groups are parties to many varied, complex, and recurring transactions.

The primary unit of observation in this research is the bulk Grade A milk procurement transaction between cooperatives and proprietary handlers, and it assumes many forms. Since considerable public resources are devoted to influencing transactions in this subsector through price support, marketing orders, and Capper-Volstead legislation, it seems important to inquire into the milk procurement transaction and the relationships between the two participant groups. Much recent work on milk marketing has taken a macro economic approach to difficult performance questions and relied on secondary data (6, 12, 18).

The objective of this research is to analyze and evaluate the nature of exchange (the transaction) between cooperatives and proprietary handlers in the U.S. dairy subsector. The approach focused attention on the actual accomplishment of transactions through the eyes of those involved. Primary data were generated in the course of the project.

### RESEARCH FRAMEWORK

Human activities are coordinated in a society through three processes which are called status, administrative, and bargained systems by Schmid and Shaffer (19).[4] Allocation and distribution decisions made through a status system are based on an individual's or organization's position in the community. In the administrative system, transactions are governed primarily by authority. Traditionally, transactions within a firm or decisions made by government are administrative decisions. In a bargained system, transactions are governed primarily by a set of impersonal rules within which exchange rates are established by bargaining processes involving some type of market.

Our economy is characterized by a mixture of administrative and bargained exchange. In the dairy subsector, administered coordination of exchange occurs through government marketing orders, price supports, sanitation regulations, and antitrust interpretations to name a few. It also is accomplished within individual firms whose large size and integrated structure allows their management decisions to have a significant impact on the entire subsector. Bargained exchange involves the buying and selling activities of firms and the resulting price determination which typically occurs within markets. Bargained exchange operates within the boundaries created by administered coordinating mechanisms.

The emphasis of this research is on how the marketing-procurement decisions of individual cooperatives and proprietary handlers are coordinated. Coordination can be viewed at the level of the individual transaction where two parties determine the specific

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[2] The term "proprietary handler" includes both independent processors of fluid and soft products as well as food chains which operate processing plants. It does not include cooperative processors.

[3] The dairy subsector includes the individuals and firms engaged in milk production, hauling, manufacturing/processing, distribution and retailing as well as the suppliers of needed inputs, and the institutions affecting the marketing environment in which they operate.

[4] Boulding has identified three similar coordinating systems: prices, policemen and preachments (2).

terms under which exchange between them will occur. Here the requirements and rights of each party must be coordinated or harmonized.

When all transactions in a subsector are taken together, involving hundreds of different kinds of firms at different stages in the subsector, their synchronization is called vertical coordination. This can be viewed as a process by which the various functions in a subsector are brought into harmony regarding what is produced and marketed and how, when, and where it is produced and marketed.

The mechanisms through which coordination occurs consist of public and private, formal and informal vehicles affecting exchange. Contracts, agreements, vertical integration, personal relationships, interfirm communication, and the provision of services are examples of private mechanisms. Marketing orders, price supports, trade practice legislation, sanitation and inspection regulations, and antitrust laws belong to the set of public coordination mechanisms. Cooperative organization was facilitated by the Capper-Volstead Act (public) but has been developed privately into an important vehicle for exchange in the dairy subsector.

Exchange situations requiring coordination are not difficult to identify. At the level of the individual transaction, coordinating the physical movement of milk from farms to milk plants is critical if processing schedules are to be maintained, quality preserved, and transportation costs minimized. At a more macro level, matching quantities produced with those demanded within and between markets requires intricate coordination between farms, cooperatives, and proprietary handlers.

In an effort to generalize the coordination process, a conceptual framework is needed. The process of coordinating exchange at different stages (functions) in a subsector can be visualized as consisting of *flows of information* including price and other incentives, *flows of physical commodity*, with associated logistical services, and *flows of exchange rights* which assign rights and responsibilities through status, tradition, contracts, specification of rules for provision of services and vertical integration arrangements. These flows occur between exchange partners wherever two functions in the subsector meet.

To place the concept of coordination and the mechanisms involved into a workable policy framework, the industrial organization paradigm is useful. Through the efforts of a variety of researchers, this paradigm has been modified to provide breadth to the concepts of structure, conduct, and performance (4, 10, 13, 19). With new definitions, the paradigm can conceptually embrace bargained and administered coordinating mechanisms and a variety of policy objectives.

Market *structure* is defined to include more than number and sizes of firms and barriers to entry. Structure defines the environment for marketing. It includes the organization of firms and the rights and responsibilities held by subsector participants. It includes all the rules of the market, both implicit and explicit, formal and informal, public and private.

*Conduct* describes the behavior of participants represented by their strategies, plans, and decision-making processes. It involves more than pricing. It involves bargaining strategies and the mechanisms developed to facilitate exchange. It involves responses to public programs and interactions between exchange participants.

*Performance* refers to the consequences which flow from structure and conduct. Performance evaluation involves the appraisal of the extent to which the interactions of buyers and sellers—as influenced by structure and conduct—stimulate results consistent with stated criteria, called performance dimensions. Such evaluation involves judgments. These judgments should be explicit and the appraisal of performance as objective and comprehensive as possible.[5]

The conceptual framework used in this research is shown in Fig. 1. The specific elements of structure, conduct, and performance were chosen for their relevance to milk procurement and their role in coordination (15).

It is important to recognize that structure, conduct and performance interact. They are not static. Performance in one time period acts as the catalyst for a change in the structure in the next period. For example, a judicial decision in the Lehigh Valley Milk Case which from the farmers' viewpoint eroded market control and income, (private assessment of poor performance) prompted a structural response in the next time period by dairy cooperatives in the form of merger and federation activity.

[5] Schneider (20) suggests that structure is less important than the mode of behavior of market participants in determining the operation of an economic system. Since particular behaviors, according to Schneider, are not bound to particular forms of supply and demand, research is justified to treat the structure of supply and demand as being of secondary importance. This approach fails to consider the scope and dynamism of structure. Structure sets the marketing environment. It defines the set of possible conduct scenarios. Because structure is dynamic, major structural components are manifestations of the participants' interactions with it. These factors make study of both structure and conduct of prime importance.

King (11) envisions structure as a filter between conduct and performance outcomes. Structure operating as a filtering device allows certain behavior-performance pairs to form but prevents others from doing so by reflecting certain types of conduct. This model tends to assign a passive role to structure which distracts attention from participants' ability to modify structure to change behavior-performance outcomes. If the structural filter is modified a previously allowable behavior mode might still pass through but with a different performance outcome paired with it.

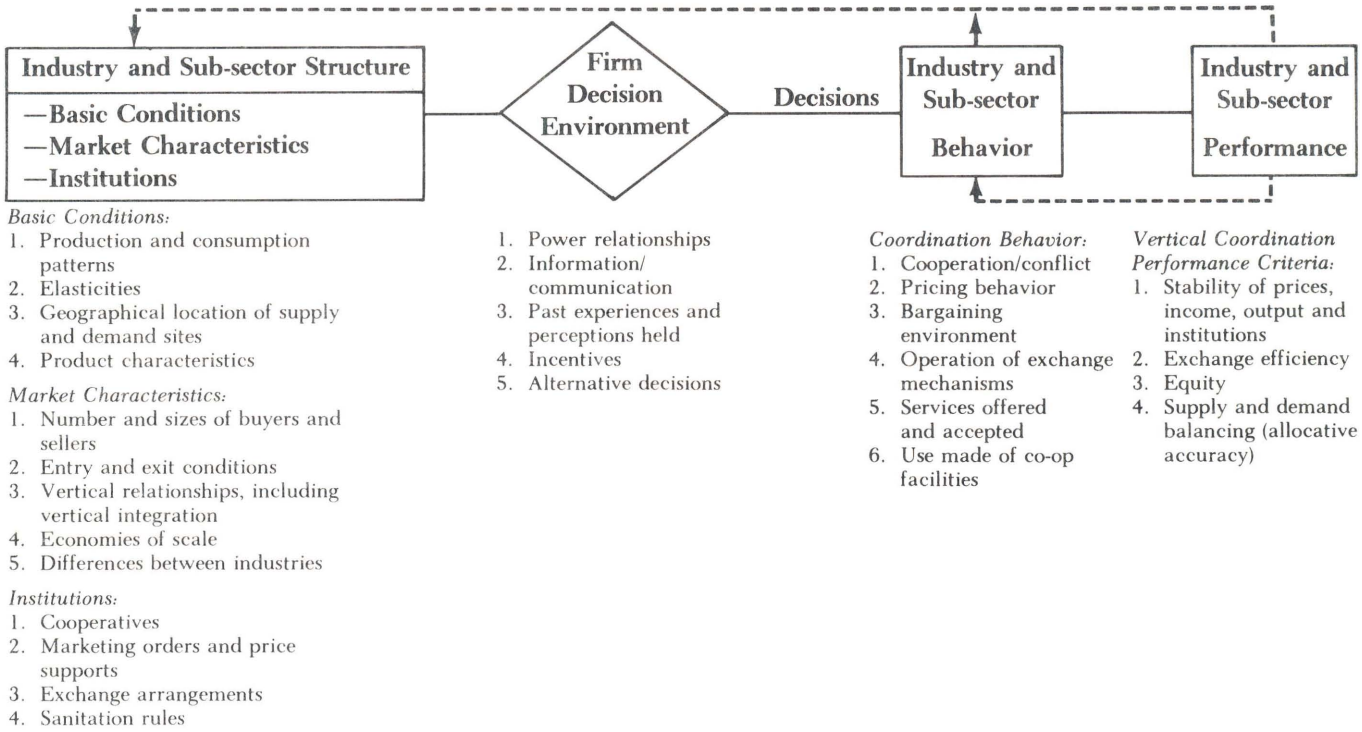


**Fig. 1. Subsector structure, conduct and performance framework with elements particularly applicable to the vertical coordination process.**

It is also true that an element of the structural vector in one time period may possess attributes which argue for its inclusion in the conduct vector in the next period. In the short run, federal orders are elements of structure, but in the longer run they are manifestations of the participants' conduct. This dual categorization is logical since cooperatives, among all the affected participants, have the most impact on marketing orders. The amended federal order structure stands as clear testimony to cooperative conduct and the cooperative's perception of desired performance in earlier time periods.

Four performance dimensions were used in this research. They are stability, exchange efficiency, allocative accuracy, and equity. These dimensions are considered particularly relevant to the coordination of cooperative-proprietary handler exchange but do not represent an exhaustive list of all possible dimensions. It is felt that these performance dimensions should be included in a dairy policy trade-off matrix.

### Stability

To the extent coordinating mechanisms encourage stability, they serve as a significant facilitator of efficient planning. Planning is essential and like coordination is never totally absent in an operating system. The quality of planning involved in resource commitments (time, personnel and money) to normal production, innovation, expansion and market development is markedly affected by levels of stability of output, prices, incomes, returns and institutions.

Although some evidence suggests that consumers are not better off with stable prices (23), major resource misallocations triggered by the instability of prices, incomes, returns, or institutions (or their unpredictability) can have short and intermediate run subsector costs some of which may have differential impacts.

Reducing or reallocating uncertainty within the subsector is related to subsector stability and can be affected by various mechanisms.

### Exchange Efficiency

Procurement-related activities should be instituted to reduce transaction costs for the system as a whole. Exchange efficiency can be defined as the efficiency with which goods are transferred among potential buyers and sellers (14). *Ceteris paribus* a reduction in transfer costs, improvement in information flows, and related changes increase exchange efficiency.

Data and information are absolutely critical in defining the character of exchange. Differential power relationships affect information flows and help to explain differences in participants' ability to utilize available

data. An effective coordinating mechanism should facilitate the flow of accurate, timely, appropriate, and non-repetitive information between exchange partners.

### Allocative Accuracy

This dimension is defined as the extent to which the supply offerings match demand preferences with respect to quantity, quality, timing, and location. In part, it depends upon the extent to which prices accurately reflect demand preferences and approximate average costs in the long run, and in part on non-price coordination such as through contracts, vertical integration, and government programs (8). In this sense, allocative accuracy includes pricing efficiency but extends the concept to include allocation signals conveyed by non-price means.

### Equity

Coordinating mechanisms can be expected to significantly affect equity within a subsector. Equity is defined as the distribution of rights, responsibilities, returns and costs (including risk and uncertainty) between subsector participants according to valuations expressed by the political process or alternatively the sharing of benefits in proportion to costs borne.

## DATA ACQUISITION

Since virtually no micro data existed on the nature of transactions in milk markets, two media for acquiring data from subsector participants were developed, mail questionnaires and personal interviews. Two national populations were identified—dairy cooperatives which handle Grade A milk and proprietary handlers who process Grade A milk. The population lists were carefully constructed to be as complete as possible, however, the proprietary handler population list while representative, unavoidably omitted some small processors.It is believed that the cooperative list contained all dairy cooperatives handling Grade A milk in the U.S.

All tabular data presented in this report come from the mail questionnaires. All data presented in these tables are statistically unbiased estimates for the respective populations, calculated from the samples drawn. Observations made and opinions expressed during the personal interview process are used in the text to elaborate on questionnaire findings or develop a different area of marketing-procurement behavior. To preserve the anonymity of the interviewees, no quotes are given for interview data.

### Mail Questionnaires

The cooperative list contained 304 organizations, while the proprietary handler population consisted of 389. Both populations were stratified by size before selecting the samples. Cooperatives were divided into three and proprietary handlers into two size groups. The large and medium size cooperative groups and the large proprietary handler group were sampled at a rate of 100 percent. The small groups for both cooperatives and proprietary handlers were sampled at a rate of 40 percent.

The small cooperative and proprietary handler groups were further arranged by region to insure that all parts of the United States were represented in this size category. The 50 states were divided into five geographical regions: West, Central, South, Midwest, and Northeast. These regional groupings were formed to maintain geographical integrity as well as common milk marketing characteristics and provide regions with a reasonable number of firms from which to sample. The samples drawn from the small cooperative and proprietary handler populations were selected on a random basis with the use of random number tables. The total cooperative sample size was 159 or 52 percent of the total population. The total proprietary handler sample was 187 firms, or 48 percent of the total population.

Following the technique of Purcell (17), approximately 80 percent of the queries on the two questionnaires were either identical in form or mirror images of each other. This format allowed for statistical comparisons of the responses of the exchange partners. The remaining questions involved descriptive data particular to one group or the other. Questions covered these seven areas:

1. Milk marketing activities engaged in and the size of various operations
2. The competitiveness of Grade A milk markets
3. Pricing behavior
4. Bulk milk supply arrangements
5. Attitudes of cooperatives and proprietary handlers toward each other; degree of understanding of the needs and concerns of one group by the other
6. Procurement services
7. Attitudes on certain types of marketing behavior.

As Buse recognized, motivating recipients of mail questionnaires is one of the major challenges in their use (3). Procedures were employed in this research to stimulate maximum response. Despite the length of the surveys and the sensitive nature of the information requested, a 41 percent response rate was obtained from the cooperative group and a 42 percent response from the proprietary handler group. This response rate fell within the anticipated range. Tables 1 and 2 characterize the origin of the completed cooperative and proprietary handler surveys, respectively.

**Table 1. Response patterns and rates of completed cooperative questionnaires, by size and region.**

| Region | Size: Number of Questionnaires Large | Medium | Small | Totals | Row Response Rate |
|---|---|---|---|---|---|
| West | 0 | 8 | 2 | 10 | 53% |
| Central | 0 | 5 | 2 | 7 | 37% |
| South | 1 | 2 | 1 | 4 | 27% |
| Midwest | 5 | 11 | 10 | 26 | 40% |
| Northeast | 4 | 5 | 6 | 15 | 48% |
| Totals | 10 | 31 | 21 | 62 | |
| Column Response Rate | 83% | 63% | 24% | | |

Non-response bias in mail surveys is an important factor in determining the reliability of the data collected. Information on the non-respondents was limited to a consideration of their location and size. Tables 1 and 2 indicate that all size and regional groups were well represented among completed questionnaires. This suggests that the bias by non-respondents by size or region would be low, however, little additional information about non-respondents was available.

### Personal Interviews

Cooperatives and proprietary firms were selected for personal visits. The populations from the cooperative and proprietary handler interviewees chosen were identical to those constructed for the mail questionnaires. No random process was followed, rather an effort was made to interview cooperative and proprietary firm personnel who were influential in their markets. All regions of the country were represented. Fifty-one appointments with cooperatives and proprietary handlers were accomplished in 18 states in 10 consecutive weeks.

**Table 2. Response patterns and rates of completed proprietary handler questionnaires, by size and region.**

| Region | Number of Questionnaires Large | Small | Totals | Row Response Rate |
|---|---|---|---|---|
| West | 5 | 5 | 10 | 53% |
| Central | 3 | 8 | 11 | 65% |
| South | 7 | 9 | 16 | 40% |
| Midwest | 8 | 15 | 23 | 47% |
| Northeast | 4 | 12 | 16 | 28% |
| Totals | 27 | 49 | 76 | |
| Column Response Rate | 52% | 38% | | |

The average interview lasted two hours. They were designed to gather the type of information not amenable to transmission by mail questionnaire.

## RESULTS

In the results which follow, cooperatives are identified by three characteristics: size, location, and type of cooperative. Proprietary handlers are categorized by size and location.

Cooperative size is designated as follows:

small co-op $< 500$ members
medium co-op 500-4,999 members
large co-op $\geq 5{,}000$ members

Proprietary handlers are divided into two size groups. Large handlers were those with two or more plant locations and small handlers had only one location.[6]

Three types of dairy cooperatives are identified: bargaining, marketing, and operating. A bargaining cooperative will typically physically handle members' milk. They may own or lease off-farm hauling equipment and may have some holding/storage facilities. They do no manufacturing or processing[7] of their members' production, however. A marketing cooperative does perform such functions but not as a primary business activity. Instead, a marketing cooperative uses the facilities to increase their members' bargaining strength and to handle excess Grade A production. In this study, a cooperative was classified as a marketing type by:

> processing no more than 10 percent and manufacturing no more than 40 percent of its received volume annually, and processing and manufacturing (combined) no more than 40 percent of its annual volume, but having facilities for processing and/or manufacturing.

An operating cooperative differs from a marketing cooperative by operating processing and/or manufacturing facilities as a primary business activity. It was identified in this study by:

> processing more than 10 percent or manufacturing more than 40 percent of its annual received volume or processing and manufacturing (combined) more than 40 percent of its annual volume.

[6] This size classification was the only one possible when the samples were drawn. A more refined scheme could have been subsequently developed, however, for consistency the previous classification was maintained.

[7] Manufacturing is here defined as the conversion of Grade A or B milk to hard dairy products such as butter, powder and cheese. Processing is the conversion of Grade A milk to fluid or soft dairy products.

### Characteristics of Cooperative and Proprietary Handler Operations

Data on the nature of dairy cooperative and proprietary handler operations are summarized for the total population, by size and regional groupings, and for cooperatives also by type (Tables 3 and 4). Several general observations can be made about dairy cooperatives. They are large organizations in terms of the size of their marketing area, number of members and volume of milk handled. They still handle a significant portion of Grade B milk but this varies considerably across the country. Dairy cooperatives are diverse organizations which in some cases have vertically integrated all the way through to the retail level. A major part of their manufacturing and processing is done under private label.

Some insights are obtained when the data in Table 3 are broken down by size, region and type of cooperative. West and Central cooperatives are smaller than those in the other three regions in terms of membership. Although Central cooperatives have larger membership than Western associations, the large farms and high output per cow in the West give those cooperatives more volume. Marketing cooperatives are by far the largest type of cooperative association.

Small cooperatives have proportionally more Grade B production than do larger cooperatives. The high percentages of manufacturing grade milk in Midwest and Central cooperatives reflects the concentration of Grade B production in the upper Midwest and Iowa, Montana and South Dakota. Little difference in the Grade A-B ratio is observed among the various types of cooperatives.

The percentage of cooperatives engaged in the various subsector activities is fairly constant across size, region and type categories. All large cooperatives find it necessary to contract for at least some of their off-farm hauling since their volume makes ownership of capacity sufficient to transport their total volume impractical. The same is true for marketing cooperatives. Although size is not a necessary condition for cooperative vertical integration, as data in Table 3 demonstrate, this tendency increases as the cooperative grows.

A significant number of proprietary handlers manufacture some dairy products in addition to their bottling activities (Table 4). The major item in this category is ice cream. Two-thirds of the milk used in manufacturing by a proprietary firm is procured from cooperatives. In the West, this percentage is 48 percent

**Table 3. Dairy cooperative operations reported by size, region and type of co-op, 1967-77 (a).**

| | Mean or Percent | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Size | | | Region | | | | | Type | | |
| | Population | Small | Medium | Large | West | Central | South | Mid-West | North-east | Bargaining | Marketing | Operating |
| * † No. of states in marketing area | 3 | 2 | 4 | 9 | 2 | 3 | 2 | 2 | 4 | 3 | 7 | 5 |
| *# † Number of members | 652 | 184 | 994 | 8597 | 211 | 308 | 1180 | 723 | 533 | 1014 | 6230 | 1828 |
| *# † Volume received from members, 1976 (mil. lbs.) | 304 | 73 | 506 | 4071 | 374 | 64 | 515 | 293 | 228 | 512 | 2844 | 915 |
| Received volume which was: | | | | | | | | | | | | |
| *# Grade A (%) | 60 | 54 | 84 | 82 | 88 | 10 | 100 | 50 | 77 | 75 | 75 | 81 |
| *# Grade B (%) | 40 | 46 | 16 | 18 | 12 | 90 | <1 | 50 | 23 | 25 | 25 | 19 |
| # Percent operating under 1 or more federal orders | 84 | 86 | 73 | 100 | 37 | 57 | 100 | 98 | 86 | 87 | 84 | 74 |
| # Percent operating under 1 or more state orders | 40 | 38 | 43 | 60 | 59 | 51 | 0 | 28 | 53 | 59 | 54 | 48 |
| Percent of co-ops which: | | | | | | | | | | | | |
| *# Sell farm supplies | 73 | 76 | 53 | 80 | 54 | 94 | 90 | 88 | 39 | 54 | 84 | 49 |
| Own equip. for off-farm hauling | 56 | 57 | 50 | 70 | 54 | 97 | 13 | 54 | 51 | 43 | 66 | 47 |
| *# † Contract for off-farm hauling | 64 | 57 | 87 | 100 | 63 | 14 | 90 | 83 | 42 | 64 | 100 | 95 |
| # Own receiving &/or pumpover stations | 49 | 48 | 50 | 70 | 9 | 11 | 90 | 47 | 74 | 33 | 77 | 53 |
| * † Manufacture hard products | 30 | 19 | 67 | 90 | 34 | 11 | 3 | 30 | 37 | 0 | 84 | 91 |
| * † Process fluid &/or soft products | 23 | 14 | 50 | 80 | 54 | 8 | 3 | 11 | 37 | 0 | 62 | 63 |
| *# † Distribute products | 33 | 29 | 47 | 60 | 54 | 8 | 3 | 43 | 16 | 0 | 50 | 64 |
| * † Own retail outlets or routes | 16 | 10 | 37 | 50 | 46 | 8 | 3 | 11 | 16 | 0 | 23 | 53 |
| For those co-ops which manufacture: | | | | | | | | | | | | |
| * † Percent of total received volume manufactured | 13 | 8 | 35 | 24 | 16 | 5 | 1 | 15 | 14 | 0 | 12 | 49 |
| Percent packaged under pvt. label | 48 | 55 | 20 | 28 | 33 | 3 | 90 | 62 | 40 | 0 | 25 | 21 |
| For those co-ops which process: | | | | | | | | | | | | |
| * † Percent of total received volume processed | 10 | 9 | 15 | 9 | 37 | 3 | <1 | 3 | 16 | 0 | 3 | 21 |
| Percent packaged under pvt. label | 56 | 60 | 45 | 35 | 63 | 37 | 1 | 38 | 53 | 0 | 30 | 45 |

(a) *# † indicate significance at the 10% level for size, region and cooperative type, respectively. In each case, the null hypothesis is that the mean of all sub-samples and the total sample are equal. Ratio scale variables were tested with an F test (ANOVA). a chi-square test was employed for non-ratio scale variables.

**Table 4. Manufacturing and processing activities of proprietary handlers, by size and region of proprietary handler, 1976-77 (a)**

| | Mean or Percent | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | Size | | Region | | | | |
| | Population | Small | Large | West | Central | South | Mid-West | Northeast |
| * No. of states in total marketing area | 3 | 2 | 8 | 3 | 5 | 3 | 2 | 4 |
| Firms operating under 1 or more: | | | | | | | | |
| *# Federal order (%) | 83 | 86 | 65 | 37 | 85 | 82 | 100 | 83 |
| *# State order (%) | 22 | 18 | 46 | 66 | 26 | 18 | 2 | 28 |
| # Firms involved in manufacturing dairy products (hard & frozen) (%) | 52 | 50 | 67 | 83 | 49 | 33 | 51 | 58 |
| *For those handlers who manufacture:* | | | | | | | | |
| * No. of plants | 2 | 1 | 5 | 3 | 1 | 2 | 2 | 1 |
| Percent milk used in mfg. procured from: | | | | | | | | |
| Co-ops | 67 | 69 | 55 | 48 | 94 | 94 | 70 | 58 |
| Independent producers | 28 | 26 | 36 | 50 | 3 | 6 | 24 | 35 |
| Other processors or mfrs. | 5 | 5 | 9 | 2 | 3 | 0 | 6 | 7 |
| Percent mfg. output which was: | | | | | | | | |
| Hard cheese | 9 | 7 | 25 | 1 | 23 | <1 | 16 | 8 |
| NFDM powder | 1 | 1 | 5 | 5 | 0 | 0 | 0 | <1 |
| Butter | 3 | 3 | 3 | 8 | 0 | 0 | 0 | 8 |
| Ice cream | 79 | 81 | 65 | 72 | 77 | 99 | 84 | 61 |
| Other | 8 | 8 | 2 | 14 | 0 | 0 | 0 | 23 |
| Percent packaged under private label | 24 | 25 | 20 | 13 | 42 | 8 | 37 | 17 |
| Firms involved in processing fluid & soft dairy products (%) | 100 | 100 | 96 | 100 | 100 | 100 | 98 | 100 |
| *For those handlers who process:* | | | | | | | | |
| * No. of plants | 2 | 1 | 4 | 3 | 2 | 2 | 1 | 1 |
| Volume of milk used in proc. in 1976 (mil. lbs.) | 240 | 207 | 447 | 332 | 65 | 621 | 117 | 67 |
| Percent milk used in proc. procured from: | | | | | | | | |
| Co-ops | 71 | 71 | 72 | 60 | 74 | 77 | 77 | 63 |
| Independent producers | 26 | 26 | 25 | 40 | 25 | 23 | 17 | 32 |
| Other processors or mfrs. | 3 | 3 | 3 | 0 | 1 | 0 | 6 | 5 |
| Percent packaged under private label | 21 | 20 | 26 | 12 | 27 | 19 | 21 | 21 |
| Percent of proc. products distributed by p. handler | 80 | 79 | 85 | 89 | 85 | 85 | 71 | 78 |
| # Firms operating retail routes or owning retail outlets (%) | 68 | 70 | 56 | 60 | 89 | 44 | 63 | 89 |

(a) * and # indicate significance at the 10% level for size and region, respectively. In each case, the null hypothesis is that the mean of all subsamples and the total sample are equal. Ratio scale variables were tested with an F test (ANOVA). A chi-square test was employed for non-ratio scale variables.

with 50 percent being acquired from independent producers. By contrast, in the Central or Southern regions, 94 percent of the milk is procured from cooperatives.

In processing fluid dairy products nearly three-quarters of the milk is obtained from cooperatives. This figure is fairly constant across regions. Study data show that 80 percent of processed products are distributed by the proprietary handler. In addition 68 percent of the proprietary firms operate some home delivery routes or own retail outlets.

Tables 5a and 5b provide some information on the procurement relationships existing between dairy cooperatives and proprietary handlers. The first table summarizes information on the characteristics of selling markets and sales transactions by cooperatives. Cooperatives indicated an average of 30 possible buyers of their bulk milk among the proprietary handler population. They sold milk to roughly one-fourth of this group.

It is important to recognize that as the cooperative gets larger it has more possible buyers because of its expanded geographical coverage. The response of large organizations may be misleading in this regard since they typically will subdivide their marketing area based on the location of their facilities, customers, or milk supplies. Therefore, it might be expected that the small cooperative most closely defines the relevant market size for analysis of feasible buying-selling alternatives.

Based on this, the most relevant measure of the number of buyers is given by the small cooperative category—26 possible buyers and the cooperative sells to about 20 percent of these. This represents a fairly large number of selling options for cooperatives.

Bargaining cooperatives indicated that they had fewer potential customers than either of the other two types. The inability of bargaining cooperatives to provide the full complement of services or volumes as large as other types of cooperatives helps to explain this. The large number of marketing cooperative customers may be due to the larger volumes handled and larger geographic areas served by these cooperatives.

When cooperatives were asked how many cooperatives they competed with, large cooperatives—again

because of their larger market area—indicated only nine. Based on the explanation in the paragraph above, the most relevant number of competitors may be near the lower value. The number of cooperatives with which each cooperative believes it competes is an indication of seller concentration and the competitive discipline imposed by other bulk milk sellers on the responding cooperative. Interestingly, the three types of cooperatives reported different numbers of competing cooperatives.

A bargaining cooperative is specialized in selling bulk milk and has limited marketing flexibility. Because of its more restricted nature it may have fewer competitors than either of the other types. The small size of most bargaining cooperatives may also help to explain this situation. Operating cooperatives, on the other hand, are more diversified and may view all types of cooperatives in their market as competitors.

Cooperatives in this study indicated that 47 percent of their proprietary handler customers purchased bulk milk under some type of full supply arrangement. Small cooperatives and bargaining cooperatives tend to have a higher percentage of their customers purchasing milk under full supply arrangements. This can be explained by the reduced flexibility of these smaller bargaining cooperatives and the necessity therefore, to reduce their uncertainty. Informal or verbal full supply arrangements are used most frequently (Table 5a).

These figures on formal and informal full supply arrangements do not convey any information on the number of such arrangements—only the percentage of cooperatives who have one or more of these types. If a cooperative had both types of arrangements, the survey instrument did not detect the relative importance of each type within the cooperative. In the West, more cooperatives use formal contracts than informal con-

**Table 5a. Cooperative sales relationships with proprietary handlers by size, region, and type of co-op, 1976-77. (a)**

| | | Mean or Percent | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Size | | | Region | | | | | Type | | |
| | Popula-tion | Small | Me-dium | Large | West | Central | South | Mid-west | North-east | Bar-gaining | Mar-keting | Operat-ing |
| * † No. possible buyers of bulk milk | 30 | 26 | 22 | 133 | 16 | 6 | 24 | 11 | 58 | 25 | 103 | 33 |
| *# † No. buyers co-op sells to | 8 | 5 | 8 | 79 | 6 | 2 | 14 | 5 | 12 | 14 | 69 | 12 |
| No. of co-ops each co-op competes with | 10 | 9 | 9 | 36 | 3 | 3 | 6 | 10 | 14 | 7 | 13 | 17 |
| † Customers buying under full supply arrangement (b) (%) | 47 | 52 | 26 | 40 | 74 | 88 | 67 | 5 | 48 | 61 | 38 | 17 |
| Percent of co-ops having 1 or more full supply arrangements which are: | | | | | | | | | | | | |
| Formal-written | 44 | 40 | 55 | 87 | 89 | 14 | 10 | 60 | 49 | 63 | 87 | 55 |
| Informal-verbal | 61 | 60 | 64 | 62 | 11 | 86 | 100 | 73 | 54 | 42 | 52 | 73 |
| Volume of co-op milk committed under full supply arrangements (b) (%) | 41 | 45 | 24 | 36 | 72 | 88 | 68 | 5 | 32 | 66 | 40 | 11 |

(a) * # † indicate significance at the 10% level for size, region and cooperative type, respectively. In each case, the null hypothesis is that the mean of all sub-samples and the total sample are equal. Ratio scale variables were tested with an F test (ANOVA). A chi-square test was employed for non-ratio scale variables.

(b) Written or verbal.

**Table 5b. Proprietary handler procurement relationships with cooperatives by size and region of proprietary handler, 1976-77. (a)**

| | Total | Size | | Region | | | | |
|---|---|---|---|---|---|---|---|---|
| | Population | Small | Large | West | Central | South | Mid-west | Northeast |
| P. handlers who buy from a co-op(s) (%) | 88 | 88 | 88 | 83 | 78 | 93 | 94 | 83 |
| Percent of usage purchased from co-op(s): | | | | | | | | |
| Manufacturing uses (hard products) | 67 | 69 | 55 | 48 | 94 | 94 | 70 | 58 |
| Processing uses (fluid & soft products) | 71 | 71 | 72 | 60 | 74 | 77 | 77 | 63 |
| # Percent of p. handlers paying premium prices for at least some of their supply | 70 | 71 | 63 | 6 | 74 | 62 | 100 | 65 |
| No. of co-ops selling bulk milk in p. handler's marketing area | 3 | 2 | 4 | 4 | 2 | 2 | 3 | 3 |
| # Percent of p. handlers buying under a full supply arrangement with co-op (b) | 44 | 43 | 52 | 48 | 33 | 30 | 56 | 53 |
| Percent of full supply arrangements which are: | | | | | | | | |
| # Formal-written | 60 | 62 | 50 | 58 | 60 | 100 | 29 | 55 |
| # Informal-verbal | 40 | 38 | 50 | 42 | 40 | 0 | 71 | 45 |
| Length of time p. handler had a full supply arrangement (yrs.) | 12 | 13 | 10 | 20 | 16 | 8 | 15 | 7 |

(a) * and # indicate significance at the 10% level for size and region, respectively. In each case, the null hypothesis is that the mean of all sub-samples and the total sample are equal. Ratio scale variables were tested with an F test (ANOVA). A chi-square test was employed for non-ratio scale variables.

(b) Written or verbal.

tracts; however, in the South, the situation is reversed. The average cooperative had 41 percent of its annual volume committed under some type of full supply arrangement. Large differences in volume committed can be seen across regions.

Almost 90 percent of all proprietary handlers purchase some milk from one or more cooperatives (Table 5b). Nearly three-quarters of the proprietary handlers pay premium prices above the federal order Class I minimum for at least some of their Grade A supply. Regional differences are great. In the West only 6 percent of the proprietary handlers pay over-order prices.

Proprietary handlers were asked to estimate the number of cooperatives who sold bulk milk in their marketing area. Proprietary handlers indicated an average of three potential cooperative suppliers of bulk milk. Small handlers indicated only two. These figures do not represent all of the alternatives open to a proprietary handler since independent producers and other proprietary firms may also provide bulk milk.

Forty-four percent of proprietary handlers indicated they purchased milk under some type of full supply arrangement. Data in Table 5b provide a clear picture of the distribution of full supply arrangements between the formal and informal type. The written or formal type of arrangement is used by 60 percent of the proprietary handlers who have entered into a full supply arrangement. The others use the informal or verbal type.

Among the larger proprietary handlers there appears to be little distinction made between the two types of arrangements. In the Midwest the informal type is preferred by a large margin while in the South the formal type dominates.[8] On the average, full supply arrangements have been maintained between proprietary handlers and cooperatives for more than 10 years.

## Exchange Relationships

### Types of Relationships

Three dominant types of cooperative behavior toward proprietary handlers were detected in the course of the interviews. They will be called "compromiser," "enforcer," and "acceptor" behavior patterns. While it is true that proprietary handlers behave in different ways toward cooperatives, their behavior patterns appeared to be more homogeneous than those of cooperatives.

The major reason for this, it is suggested, is that proprietary handlers developed into large organizations with significant amounts of economic power at least 10 years prior to the development of large cooperatives. For this reason, handler behavior represents that of an individual accustomed to market power. They do not feel as inclined to use it as those for whom power and control are new muscles to be flexed.

Cooperatives, on the other hand, seem to be exercising their newfound power more frequently and openly. As a result, it appears that the richest area for understanding procurement relationships is cooperative behavior.

**Compromiser behavior** is typified by cooperatives who consider proprietary handlers equal partners. Market power, represented by some threshold volume of Grade A milk with alternative outlets, elevates the cooperative toward an economic juxtaposition with major proprietary handlers. Managers of such cooperatives recognize the mutual reliance of each party on the other. Compromiser cooperatives typically use any improvement in their relative power position over handlers to relax the aggressive posture which cooperatives may have taken previously. They seek an ongoing sales relationship with proprietary handlers that endures through fairness and sound business practices.

The **enforcer type** uses its economic clout to the extent possible to obtain the terms it desires from the proprietary handler. While they may achieve their short run goals, the ill-will created may not serve their long run interest. The coordination environment is adversely affected by this type of exchange behavior.

In dealings between small cooperatives and proprietary handlers in local markets, the requisite relative power threshold can be reached by a small cooperative allowing it to exercise enforcer behavior. Typically, however, it was observed that the low level of absolute power spawned **acceptor behavior.** In these cases, the cooperative seems inclined to defer to the wishes of the handler.

At least half of the cooperatives interviewed could be characterized as compromisers. This may represent an important change from the late 1960's and early 1970's when cooperatives were growing rapidly and were anxious to exercise any power they could accumulate. During this period, enforcer behavior was exhibited by several large cooperatives as they achieved significant economic and political power for the first time. As these organizations have matured their behavior has changed.

Changes in the top management of many large dairy cooperatives during this period suggest that the type of

[8] These results differ from those reported by cooperatives (Table 5a) due in part to differences between the questions asked on the two surveys. Cooperatives were asked if they had any formal or informal arrangements. No indication of number or size was given. Proprietary handlers with a full supply arrangement, however, could have only one or the other. Therefore, their responses indicate the actual incidence of such arrangements. Other explanations include sampling differences—the strong possibility that cooperatives and proprietary handlers that responded did not represent normal exchange partners and inaccuracies in responses.

individuals necessary to organize a large cooperative is very different from that required to bring it through the maturation process. This process has been encouraged by government movements against some cooperatives and proprietary handlers' exercise of their power in response to cooperatives' behavior. Evidence gathered in the course of the interviews suggested that the most coordinated and harmonious markets are those in which cooperative compromiser behavior has evolved and neither party exercises power malevolently.

This environment is fostered by a relatively equal balance of power and corresponding assignment of exchange rights. For this reason, it is important to examine the power relationships that exist between cooperatives and proprietary handlers. Understanding these relationships can provide key insights into the nature of procurement exchange in the subsector.

### Checks on Economic Power

Proprietary handlers have historically enjoyed the dominant position in exchange due both to their relative power (economic) advantage and tradition. Policy in the dairy subsector has addressed itself to the power imbalance in exchange through marketing order legislation, antitrust activity in the 1960's, and the Capper-Volstead Act. Since the early 1960's, however, dairy cooperatives have been amassing larger amounts of economic power. Questions such as "What are current checks on the exercise of economic power by both groups?" and "What is the overall balance of exchange rights in procurement?" are particularly relevant now.

Proprietary handlers' exercise of the economic power conferred by their size is at the same time, hampered by this size. Large volume dealers cannot long tolerate the costs associated with long distance hauls, erratic quality, fluctuating quantities or unpredictable delivery schedules. As a result, they often choose to deal with a small number of cooperatives. Handlers in these cases relinquish some exchange rights normally conferred by size, status, and tradition. To work with more than two or three cooperatives can impose transaction costs on proprietary handlers almost as high as with a group of independent producers. Many chain processors and large independent handlers who require half a million gallons or more milk a day prefer no more than two sources for any one plant.

In addition to these checks, federal and state marketing order rules serve to discipline proprietary handlers' behavior toward cooperatives and dairy farmers in general by specifying exchange rules and minimum price provisions. The existence of competing processors, as evidenced by cooperative reports of several possible buyers (Table 5a), disciplines processor behavior with respect to retailers but not toward cooperatives unless supplies are short.

The major disciplining factor on cooperatives in bulk milk transactions is the availability of alternative supplies.[9] These alternative supplies can come from three sources: other cooperatives, independent producers, and non-traditional cooperatives. Included in the latter group are the National Farmers Organization (NFO) and the Farmer's Union Milk Marketing Cooperative (FU).[10]

Despite the fact that they may not be able to deliver a full supply to the buyer, both independent producers and non-traditional cooperatives are often a viable source of supply for many proprietary handlers. It does not require a large percentage of independent producers or a large share of the market held by a non-traditional cooperative before significant disciplining pressure can be brought to bear on cooperatives. Both types of suppliers discipline cooperative pricing behavior and force cooperatives to maintain competitive prices to their members lest they leave the cooperative. In addition, competition between dairy cooperatives in many markets is intense. This provides a disciplining effect of which proprietary handlers are often able to take advantage.

The number of suppliers that a proprietary handler maintains has implications for subsector performance. While many handlers maintain only one supplier for reasons previously discussed, some processors choose more for the bargaining leverage it affords.[11] If partial suppliers are being used, the ability to quickly and easily switch a greater portion of the business to one or the other of the cooperatives serves to discipline the bargaining demands of all the cooperatives.

A large proprietary handler described the strategy of diffusing cooperative power by maintaining at least two suppliers at each of their plants. If they were to buy their total needs from one cooperative they would be foreclosing an outlet for minor cooperatives. This foreclosure could force the merger of the smaller cooperatives with the larger one and further concentrate cooperative power.

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[9] Babb *et al.* (1) found a relationship between Class I premium prices and the cost of alternative supplies which lends some support to this notion. Furthermore, a U.S. District Court recently recognized that the existence of supply alternatives for handlers removed a necessary condition for the development of cooperative power (5).

[10] They are termed "non-traditional" because they are general farm organizations with goals, objectives, and strategies often different from single-commodity organizations.

[11] Proprietary handlers may choose to buy from more than one source to use a cooperative as their residual supplier. The cooperative involved bears all the supply balancing plus reserve and surplus disposal costs for the buyer. The other suppliers free ride. This buyer behavior has prompted some cooperatives to call for a supply arrangement which penalizes such buyers for disproportionate changes in purchased quantities among the several suppliers. An alternative plan would enjoin them from engaging in such conduct.

### Participants' Perceptions of the Marketing-Procurement Transaction

Cooperative and proprietary handler perceptions of the bargaining process and their relative power positions within that process are important indicators of the exchange environment and its coordinating potential. Both groups were asked to select one of six bargaining relationships which typifies their experience. As arrayed in Table 6, these relationships range from the cooperative having a relative power advantage over the proprietary handler to the other extreme where the handler has similar power over the cooperative.

**Table 6. Types of bargaining relationships when prices above the order minimums are sought, as reported by cooperatives and proprietary handlers. (a)**

| Type of Relationship | Percentage Indicating Existence of Each Type (b) | |
|---|---|---|
| | Co-ops | P. handlers |
| The co-op offers a price and a package of terms and the handler must take it or leave it. | 5 | 65 |
| Usually favors the co-op to some degree; some negotiation and compromise occur. | 6 | 14 |
| Balanced evenly between the co-op and the handler so that two-way bargaining does take place. | 61 | 13 |
| Usually favors the handler to some degree; some negotiation and compromise occur. | 28 | -- |
| The handler informs the co-op of what he will pay and related terms of trade and the co-op must take it or leave it. | -- | -- |
| Other | -- | 8 |
| | 100 | 100 |

(a) Cooperative and proprietary handler responses were significantly different at the 10% level based on a chi-square test for independence between "type of relationship" and "type of firm."

(b) Respondents were asked to select only one of the six choices.

Cooperatives indicated a balanced power relationship in the bargaining process, while proprietary handlers indicated that cooperatives had the advantage. These responses are significantly different at the 10 percent level. This is the most important discrepancy between the views of cooperatives and proprietary handlers found in these data. Proprietary handlers definitely feel that the cooperative enjoys an advantage. Evidence gathered in this research suggests that the advantage lies with cooperatives, but it is not as significant as proprietary handlers indicate.

### The Importance of Information

Without perfect knowledge and foresight and in the presence of heterogeneous products, communication and exchange of information between participants are critical to the exchange process. When exchange efficiency is poor it is often contended that the two parties are not communicating and they do not understand the motivations which govern the behavior of their exchange partner. This research studied the flows of information between the two parties.

Both cooperatives and proprietary handlers were asked to select from an array of characteristics of bulk milk customers those that were most important to cooperatives. The companion question assessed both groups' views on the most important supply attributes to proprietary handlers. The responses of both samples showed some significant differences. Nonetheless, each group demonstrated reasonable understanding of what each desired in an exchange partner.

Being a stable, solvent business enterprise was jointly identified as the most important attribute of cooperative customers (Table 7). Data in Table 8 suggest that a top quality milk supply was the most important service a cooperative supplier could provide, according to buyers. Sellers appear to have underestimated its importance to buyers while overestimating the importance of a steady flow of milk to the buyer's plant. Despite these differences, considerable agreement is evident.

Another area of interest in markets where over-order prices are paid is the degree of understanding which exists between the two groups in regard to pricing behavior. Both groups were asked to indicate those factors that were important to cooperatives as well as

**Table 7. Important characteristics of bulk milk customers of cooperatives as reported by co-ops and proprietary handlers.**

| Characteristic (a) | Percentage Indicating Characteristic is . . . | | | |
|---|---|---|---|---|
| | Important (b) | | The Most Important (c) | |
| | Co-ops | P. Handlers | Co-ops | P. Handlers |
| * A reliable stable solvent business | 99 | 72 | 90 | 51 |
| * Buying large volumes of milk | 14 | 50 | -- | 23 |
| * Easy to talk to; willing to share information in order to improve the efficiency of the marketing system | 44 | 15 | 1 | 5 |
| * Desires a full supply arrangement | 23 | 51 | 9 | 16 |
| A weaker bargaining participant | -- | 6 | -- | 5 |
| Other | 1 | -- | -- | -- |
| | | | 100 | 100 |

(a) An asterisk (*) at the left hand margin indicates cooperative-proprietary handler responses to whether a choice was important were significantly different at the 10% level based on a chi-square test.

(b) Respondents could designate more than one characteristic as important.

(c) Participants' responses to the question of the "most important" were significantly different at the 10% level based on a chi-square test for independence between "characteristic" and "type of firm."

**Table 8. Characteristics of the bulk milk supply important to proprietary handlers, as reported by cooperatives and proprietary handlers. (a)**

| Characteristic | Percentage Indicating Characteristic Is . . . | | | |
|---|---|---|---|---|
| | Important (b) | | The Most Important | |
| | Co-ops | P. Handlers | Co-ops | P. Handlers |
| * The assurance of a top quality milk supply | 78 | 92 | 33 | 77 |
| A competitive price (c) | -- | 67 | -- | 17 |
| * Supplies available on request | 33 | 46 | 9 | 5 |
| A steady flow to our plant | 84 | 37 | 46 | 1 |
| Not require us to deal with individual producers | 25 | 20 | 10 | -- |
| Not require us to manage hauling activities | 15 | 23 | -- | -- |
| Other | 2 | 1 | 2 | -- |
| | | | 100 | 100 |

(a) An asterisk (*) at the left hand margin indicates cooperative-proprietary handler responses to whether a choice was important were significantly different at 10% level based on a chi-square test.

(b) Respondents could designate more than one characteristic as important.

(c) This choice was inadvertently omitted from the cooperative questionnaire. This omission could be expected to affect cooperatives' responses to the "most important" characteristic, therefore no statistical test for independence of "characteristic" and "type of firm" was performed for the "most important" characteristic. Cooperative cognizance of the importance of a competitive price to proprietary handlers, however, was verified in personal interviews with cooperative managers and by several indicating this under the "Other" option on this question.

handlers in price determination under bargained exchange. Responses of the two groups deviated, although both recognized the impact of readily-available alternative supplies of bulk Grade A milk on pricing strategy (Table 9). Proprietary handlers believed that cooperatives' strategy was to get what the market would bear. Both groups readily identified prices paid by competitors as a crucial consideration in cooperative-handler transactions (Table 10).

The results of these four sets of questions demonstrate a reasonable degree of understanding of the needs of the other in their transactions given the inherent differences in the groups' perspectives. There appears to be some potential for educational efforts to improve exchange efficiency and facilitate vertical coordination in the subsector. Pricing strategy, however, is an area of some misunderstanding and animosity between cooperatives and proprietary handlers. These and other queries showed that handlers feel at a disadvantage over cooperatives in determining the terms of exchange. While buyers have some understanding of cooperatives' pricing process, they believe cooperatives have little knowledge or concern for the problems of milk processors.

With increased over-order pricing by cooperatives in markets throughout the U.S., proprietary handlers' concerns about the pricing process are not surprising. The federal order system with its minimum price provisions communicates a great deal of information to the proprietary handlers. They rely on the state and federal order systems to reduce any uncertainty surrounding prices paid by other handlers in their market. When relatively large premiums prevail, uncertainty increases among handlers because there is more room for special concession for certain customers. Direct communication between proprietary handlers, it was suggested, increases significantly.

While it is true that cooperatives are quite sensitive to the competitiveness of the price they charge, premiums do create an environment conducive to handler distrust of cooperatives. Inter-cooperative price coordination, a history of uniform pricing by a cooperative, and a demonstrated understanding of buyers' pricing concerns offer the greatest potential for improving exchange harmony.

**Table 9. Factors important to cooperatives in developing a price under bargained exchange, as reported by co-ops and proprietary handlers. (a)**

| Factor | Percentage Indicating Factor is . . . | | | |
|---|---|---|---|---|
| | Important (b) | | The Most Important | |
| | Co-ops | P. Handlers | Co-ops | P. Handlers |
| What the market will bear (c) | -- | 68 | -- | 48 |
| Cost of production | 24 | 35 | 1 | 13 |
| Current retail sales | 5 | 7 | -- | -- |
| * The potential for milk to move in from nearby markets | 65 | 31 | 59 | 10 |
| Local supplies available | 9 | 22 | 1 | 10 |
| Co-op member preferences/expectations | 4 | 7 | 1 | 2 |
| Other co-op's actions | 21 | 25 | 1 | 9 |
| * Long-term health of processors and the entire industry | 36 | 12 | 3 | 2 |
| * Cost of services rendered | 28 | 22 | 21 | 5 |
| Other | 14 | 1 | 13 | 1 |
| | | | 100 | 100 |

(a) An asterisk (*) at the left hand margin indicates cooperative-proprietary handler responses to whether a choice was important were significantly different at 10% level based on a chi-square test.

(b) Respondents could designate more than one factor as important.

(c) This choice was not given to cooperative respondents since it was believed they would not admit to this behavior. This omission would be expected, however, to affect cooperatives' responses to the "most important" factor, therefore no statistical test for independence of "factor" and "type of firm" was performed for the "most important" factor.

**Table 10. Factors important to proprietary handlers in developing a price to pay for bulk milk under bargained exchange, as reported by cooperatives and proprietary handlers. (a)**

| | Percentage Indicating Factor Is . . . | | | |
|---|---|---|---|---|
| | Important (b) | | The Most Important† | |
| Factor | Co-ops | P. Handlers | Co-ops | P. Handlers |
| Milk supplies available | 49 | 65 | 28 | 46 |
| *Retail demand | 18 | 7 | 2 | 2 |
| *Prices paid by competitors | 82 | 42 | 61 | 25 |
| *Value of services received | 23 | 5 | 4 | -- |
| *Availability of alternative supplies | 53 | 29 | 3 | 15 |
| Solvency of dairy farmers | 0 | 4 | -- | 2 |
| Your power relative to the co-op | 2 | 7 | -- | 2 |
| Other | 2 | 6 | 2 | 8 |
| | | | 100 | 100 |

(a) An asterisk (*) at the left hand margin indicates cooperative-proprietary handler responses to whether a choice was important were significantly different at 10% level based on a chi-square test. † indicates that their responses to the questions on the "most important" were significantly different at the 10% level based on a chi-square test.

(b) Respondents could designate more than one factor as important.

## Services

Two types of services necessary to milk procurement will be discussed in this section, handler services and marketwide services. Handler services are defined as those activities which are directly associated with delivering a particular quantity of bulk milk. The 10 handler services which are identified in this study include direct bulk deliveries off farms, diverting milk for manufacturing, providing supplemental milk on order, selling milk f.o.b. buyers' plant, delivering standardized milk, splitting a load between customers, writing member checks, writing non-member checks, paying haulers, and selling direct-shipped milk on the basis of tanker weights and tests. Marketwide services include balancing supply and demand for bulk milk between markets and the disposing of Grade A milk not needed in Class I products.

Marketwide services are not associated with supplies for a particular customer but rather are marketwide in scope. To an increasing extent, both handler and marketwide services are being performed by cooperatives for proprietary handlers. In the past proprietary handlers provided more of these activities themselves because cooperatives were smaller and less organized.

### Handler Services

Cooperatives were asked to indicate which handler services they provided. With the exception of standardized milk, splitting loads between customers, writing non-member checks, and selling on tanker weights and tests, almost 80 percent of all cooperatives provided the full complement of handler services (Table 11a). Significant differences were found in the services provided by different size and type of cooperatives.

In an attempt to learn more about what proprietary handlers understood about cooperatives, proprietary handlers were asked to indicate the availability to them of the same 10 services. They were also asked to indicate whether they received the service if it was available. Table 11b portrays their responses. There is a high level of agreement between cooperatives and proprietary handlers on the availability of these services. A very high proportion of proprietary handlers received the service if it was available.

To determine handler satisfaction with the services and cooperatives' satisfaction with compensation for them, several questions were asked about each of the 10

**Table 11a. Handler procurement services provided by cooperatives to proprietary handlers who are bulk milk customers, as reported by cooperatives, by size, region and type of cooperative, 1976-77. (a)**

| | Percentage of Co-ops Providing the Service | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Size | | | Region | | | | | Type | | |
| Type of Service | Population | Small | Medium | Large | West | Central | South | Mid-West | North-east | Bargaining | Marketing | Operating |
| * Direct bulk deliveries off farms | 96 | 100 | 79 | 100 | 90 | 100 | 100 | 95 | 98 | 96 | 100 | 74 |
| Divert milk for manufacturing | 86 | 86 | 86 | 100 | 85 | 100 | 100 | 60 | 98 | 87 | 100 | 85 |
| * † Provide supplemental milk | 67 | 62 | 82 | 100 | 29 | 11 | 100 | 57 | 98 | 73 | 100 | 79 |
| Sell milk f.o.b. buyer's plant | 77 | 75 | 79 | 100 | 95 | 100 | 23 | 93 | 70 | 84 | 100 | 79 |
| * † Deliver standarized milk | 7 | 0 | 32 | 40 | 20 | 3 | 3 | 7 | 2 | 0 | 13 | 54 |
| † Split load between customers | 23 | 20 | 33 | 30 | 20 | 0 | 10 | 48 | 11 | 44 | 44 | 22 |
| * Write member checks | 80 | 75 | 96 | 100 | 100 | 100 | 100 | 60 | 70 | 88 | 100 | 99 |
| Write non-member checks | 5 | 0 | 20 | 30 | 14 | 0 | 10 | 5 | 6 | 30 | 30 | 15 |
| * Pay hauler(s) | 97 | 100 | 81 | 100 | 90 | 100 | 100 | 97 | 98 | 92 | 100 | 84 |
| † Direct-shipped milk sold on tanker weights & tests | 48 | 43 | 65 | 70 | 23 | 93 | 23 | 38 | 96 | 31 | 57 | 73 |

(a) * # † indicate significant differences at the 10% level within size, region and cooperative type, respectively, based on a chi-square test. In each case, the independence of the categorizing variable and the incidence of the service is the null hypothesis.

**Table 11b. Availability and acceptance (a) of handler procurement services to proprietary handlers by cooperatives as reported by proprietary handlers, size and region of proprietary handler, 1976-77.**

| Type of Service (b) | | Total Population | Percentage Prop. Handlers Acknowledging Availability/Acceptance | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Size Group | | Region | | | | |
| | | | Small | Large | West | Central | South | Mid-west | Northeast |
| Direct bulk delivery off farms | Available | 94 | 93 | 100 | 79 | 100 | 91 | 94 | 100 |
| | Receive | 93 | 92 | 100 | 100 | 85 | 100 | 93 | 90 |
| Divert milk for manufacturing | Available | 89 | 90 | 86 | 94 | 85 | 91 | 91 | 89 |
| | Receive | 76 | 73 | 94 | 58 | 46 | 89 | 83 | 82 |
| Provide supplemental milk | Available | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | Receive | 92 | 92 | 86 | 100 | 82 | 95 | 93 | 85 |
| # Sell milk f.o.b. buyer's plant | Available | 89 | 89 | 91 | 79 | 100 | 100 | 87 | 78 |
| | Receive | 83 | 81 | 95 | 100 | 85 | 100 | 66 | 79 |
| Deliver standardized milk | Available | 34 | 37 | 19 | 52 | 45 | 30 | 22 | 39 |
| | Receive | ---------- insufficient observations (c) ---------- | | | | | | | |
| # Split load between customers | Available | 26 | 27 | 16 | 42 | 15 | 20 | 2 | 67 |
| | Receive | ---------- insufficient observations (c) ---------- | | | | | | | |
| # Write member checks | Available | 95 | 95 | 100 | 79 | 100 | 100 | 100 | 87 |
| | Receive | 87 | 87 | 83 | 100 | 61 | 95 | 89 | 82 |
| # Write non-member checks | Available | 34 | 35 | 27 | 42 | 45 | 0 | 48 | 0 |
| | Receive | ---------- insufficient observations (c) ---------- | | | | | | | |
| Pay the hauler(s) | Available | 97 | 97 | 91 | 97 | 100 | 100 | 98 | 89 |
| | Receive | 93 | 94 | 88 | 100 | 97 | 93 | 91 | 85 |
| # Direct-shipped milk sold on tanker weights and tests | Available | 75 | 76 | 67 | 55 | 82 | 86 | 54 | 90 |
| | Receive | 89 | 88 | 92 | 58 | 100 | 83 | 79 | 100 |

(a) Percentage accepting (receiving) the service is based only on those to whom it is available.

(b) * and # indicate significance at the 10% level for size and region, respectively, based on a chi-square test. The independence of the categorizing variable and the availability of the service is the null hypothesis.

(c) Due to the low availability, not enough firms answered this question to make percentages meaningful.

procurement services. These data will not be presented in tabular form because of the similarity of responses for each of the services. This study found no evidence of dissatisfaction among either group with the provision of handler services. Almost all proprietary handlers believed cooperatives could perform these services more cheaply than they could themselves and wished cooperatives to continue to provide them. Only half of the handlers felt they paid the cooperative for performing the services but almost all believed the cooperative was adequately compensated.

On the other hand, approximately two-thirds of the cooperatives felt they were adequately compensated. Cooperatives strongly concurred with the proposition that proprietary handlers recognized the value of the services to them. Virtually all proprietary handlers expressed a desire for cooperatives to continue to provide these services.

Some concern was expressed by proprietary handlers for the method in which cooperatives sought compensation for services provided to buyers. When separate charges are not established for these services, ascertaining the comparability of prices charged to different handlers is more difficult. Proprietary handlers favored the use of service charges rather than using over-order premiums to obtain compensation because separation of raw product costs and the costs of associated services is facilitated.

More than half of the cooperatives surveyed indicated the use of service charges to get compensation for providing handler services, while a third relied on over-order premiums. The remaining cooperatives employed both methods. Cooperatives may find buyers more willing to pay for services if a set of charges applicable to all buyers is established, announced, and carefully adhered to.

### Marketwide Services

Marketwide services are frequently provided by marketing and operating cooperatives. The benefits normally accrue to all in the market regardless of the intended recipients. Because of their nature, these services cause problems for the providers in covering provision costs and for the subsector in devising equitable cost-sharing plans. Cooperative providers of reserve and surplus disposal frequently claim that other subsector participants are free-riding on their efforts. This may mean that the cooperative is not being adequately compensated and/or there are some participants who are benefitting without sharing in the cost. Both these cases raise equity concerns.

Proprietary handlers were asked about balancing supply and demand and disposing of reserve and surplus supplies. Approximately three-quarters indicated that it benefitted them and that they did pay for it in some way. Almost 90 percent of these handlers felt that cooperatives should continue to provide these services.

Many operating and marketing cooperatives, in general, are not satisfied with the compensation for their marketwide service activities. If proprietary handlers expect to turn over more marketwide procurement responsibilities to cooperatives, they must be adequately compensated for successfully performing the required tasks. Compensation considered adequate by those cooperatives interviewed was payment for costs incurred in building, operating, maintaining, and often underutilizing the manufacturing facilities plus the associated transfer and handling costs.

There are many reasons to suggest that capturing compensation for marketwide services through over-order premiums is inappropriate or impractical. First, over-order premiums are not always charged or collected. In addition, handler services may have an initial claim on such revenues. Furthermore, such premiums may be economically justified to elicit desired on-farm production.

Other reasons discouraging the use of over-order premiums for capturing compensation for marketwide services can be cited. As was true with handler services, the use of premium financing for marketwide services conveys little information to buyers about their competitive position relative to other handlers. Perhaps the strongest argument against the use of Class I premiums to defray costs of marketwide services is based on a concern for equity.

If over-order premiums pay for marketwide services then only those who buy from cooperatives pay. Furthermore, compensation from premiums assesses each buyer equally on a hundredweight basis, regardless of the particular services needed or requested. In addition with a constant per unit premium, those who buy more of their milk supply from cooperatives pay more than those who buy less, creating an equity problem between cooperative customers.

If marketwide activities are paid for by a separate service charge, most problems associated with over-order revenue financing remain. Service charges still have to be collected and if collected, not all proprietary handlers have contributed, only those who buy from participating cooperatives. If service charges do not differentiate between full and partial supply customers, further inequities can result.

It became clear in the course of this research that the way in which the essential marketwide services are provided and paid for is crucial to the performance of this subsector. As a result of this research, some specific recommendations were developed to cope with the free-rider aspects of the most important marketwide services—disposal or the manufacture of extra Grade A supplies. In the section that follows, the background and details of the recommendations are elaborated.

**Marketwide Service Payment Plan**

To meet the demands of a fluid market a reserve above Class I requirements is needed to meet daily, weekly, and monthly fluctuations. In addition, shortened weekly processing schedules affect the required reserve. The reserve needed in most markets ranges from 20 to 40 percent of Class I sales on an annual basis. This quantity is necessary to insure that fluid demand is continually served. The amount of this reserve which cannot ultimately be utilized in fluid products must be manufactured. Since quantities of Grade A milk supplied and demanded in individual markets often do not match, even when necessary reserve supplies are considered, quantities in addition to the unused reserves must be manufactured as well. This amount can be called surplus milk production. Although some surplus is almost inevitable, its existence is unnecessary to meet demand. Both reserve and surplus supplies require disposal facilities.

Cooperatives have assumed more and more of this subsector responsibility with a mixture of willingness and reluctance. Proprietary handlers who formerly had most of the disposal capacity in the subsector, now more frequently prefer to have cooperatives do it. Also many cooperatives handle larger volumes than do most proprietary handlers which allows them to capture operating and exchange economies in disposal not available to other subsector participants.

The benefits of disposal activity accrue to the entire subsector, but typically cooperatives and their members bear a disproportionately large share of the cost. In the interest of equity some modification of the marketing order program is needed to improve this situation.

The recommended plan is designed to move the cost of supply balancing beyond the farm production stage of the subsector which has limited and sporadic ability to pass these marketwide costs through the system. It is designed to move toward an equalization of the supply balancing costs among all those who process and sell Class I dairy products—cooperative or proprietary. It is intended to provide these processors with the opportunity to do their own balancing, if it seems beneficial, or to shift this function to others. In either case, however, all processors would share in the disposal costs, directly by operating their own facilities or indirectly by contributing funds to offset the costs of those who do.

The plan presented here has an important feature which should be mentioned at the outset. Under this plan, supply plants (the plants that perform supply balancing) would not be compensated for surplus disposal but *only for reserve disposal* activities. Without such a limitation, a compensation plan would provide a disincentive for production control by subsidizing the manufacture of surplus supplies. The method of

distinguishing between reserves and surpluses is an important component of the institutional design.

It is suggested that this plan be instituted under the federal or state marketing order program on a market-by-market basis. By linking this plan to the marketing order machinery, free rider problems associated with this essential activity are minimized in the interest of equity.[12] The adoption of this plan would come on an individual market basis as producers, cooperatives and proprietary handlers interact to create a mechanism which will work under their own unique conditions.

The presentation of the proposed marketwide payment plan for the disposal of reserve supplies of Grade A milk is facilitated by the definition and labelling of some key terms.

$QAA_i$ = actual Grade A production in the designated market in month i.

$QCI_i$ = actual Class I sales in the designated market in month i.

$QA_i$ = expected necessary quantity of Grade A milk in the designated market in month i to meet *Class I demand and necessary reserves.*

$QAN_i$ = $QA_i - QCI_i$ = *the necessary reserve of Grade A milk in the designated market in month i.*

$QAM_i$ = $QAA_i - QCI_i$ = actual quantity of Grade A milk produced which is not needed for Class I purposes and must be manufactured in the designated market in month i.

Surplus = $QAA_i - QA_i$ = milk not needed for Class I or reserve needs in the designated market in month i.

$QAM_i^k$ = quantity of milk manufactured by supply plant k in month i.

$RR_i^k$ = $QCI_i^k/QCI_i$ = proprietary or cooperative bottler k's reserve disposal responsibility in month i, calculated as k's share of the Class I sales in that market in month i.

$RRQ_i^k$ = $RR_i^{k*} QAN$ = quantity of reserve milk for which fluid bottler k has disposal responsibility in month i.

$SM_i^k$ = $QAM_i^k/QAM_i$ = share of manufactured output in month i contributed by supply plant k.

$CRQ_i^k$ = $SM_i^{k*} QAN_i$ = supply plant k's contribution to the job of reserve disposal in month i.

Fig. 2 represents total production for a designated market for a particular month. The components of production are identified in conformity to the definitions previously given.

This plan would operate as described below. $QA_i$ would be set six to 12 months in advance following an automatic procedure incorporated into the marketing order. This procedure could be determined through the hearing process and would be amended in the same way. The Market Administrator would make the necessary calculations and announce the quantity at the earliest possible date. The availability of data on actual quantities, as defined earlier, would be subject to lags of one to two months.

For example, $QAA_i$ would not be available until month i + 1. This would not change the basic operation of this plan, but it would create lags not unlike those which currently exist in federal order machinery. For purposes of simplicity, the lags will be ignored in this presentation, although they would be important in designing the specific guidelines of this plan.

Once QAA and QCI are known, QAN could be calculated. It is the quantity upon which compensation will be paid for disposal. QAN will be referred to as the reserve supply and its manufacture called reserve disposal.

Responsibility for surplus disposal lies with *all* fluid bottlers. Their reserve responsibility, RR, is determined by their share of the market's Class I sales, $QCI^k/QCI$. RR * QAN determines the reserve quantity each bottler is responsible for manufacturing, RRQ. If the fluid bottler operates his own supply plant(s), his responsibility is reduced in proportion to the amount of disposal accomplished in this plant(s).[13]

Every supply plant's contribution to reserve disposal would be calculated from its share of manufactured output in the market, SM. SM when multiplied by QAN yields the supply plant's estimated contribution to the job of reserve disposal, CRQ. If a supply plant is not operated by a fluid bottler, RRQ = 0, CRQ > 0, and the supply plant is entitled to compensation for reserve disposal on the quantity, CRQ. For supply plants operated by fluid bottlers, the mechanics are slightly more complicated.

On the debit side, the fluid bottler has RRQ. On the other side of the ledger his supply plant(s) has earned him a credit of CRQ. If RRQ > CRQ, the bottler is assessed a disposal fee on RRQ − CRQ. If, on the other hand, CRQ > RRQ, the bottler is eligible for compensation on the excess disposal performed, CRQ − RRQ.

This plan would move toward equalizing the per unit costs of reserve disposal among all fluid bottlers while allowing each bottler several options. They could accomplish disposal themselves and not be assessed for it or choose not to operate such facilities and be charged for its accomplishment. Some combination is also possible. The processor would presumably make the disposal choice based on his own disposal costs, profitability of

[12] It should not be forgotten that such a mandatory scheme under the marketing order program solves the free rider problem but does create another one—the unwilling rider. However, it is recommended that in the best interest of subsector performance, all participants be legally obligated to take part in this payment plan.

[13] If a supply plant disposed of milk for another handler for which a fee or plant charge was assessed, the handler who incurred the cost could claim the quantity as Grade A milk disposed of.

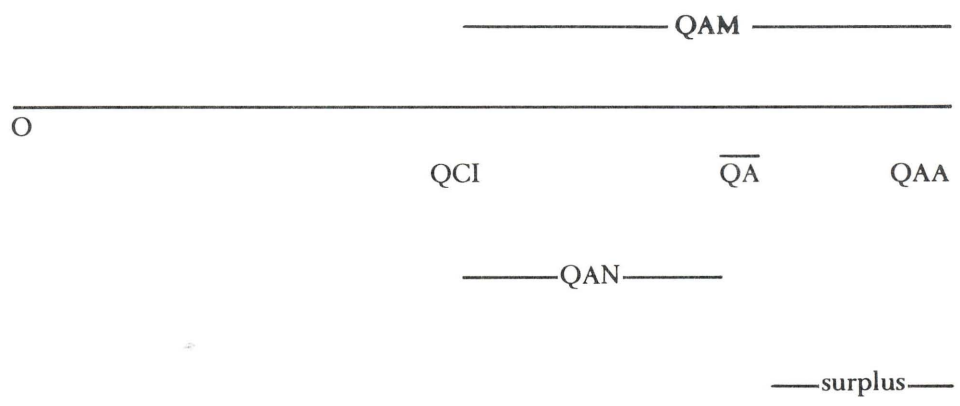


**Fig. 2. Total monthly Grade A production and its components in a milk market.**

sales therefrom, the degree and importance of market power conferred by the operation of balancing facilities, and the fee payable if no disposal is done.

Fluid bottlers without a supply plant(s) would be assessed a fee on $RRQ^k$. Bottlers with a supply plant(s) would be assessed the same fee on $RRQ^k - CRQ^k$ if $RRQ^k > CRQ^k$. These fees would go into a special fund created within the marketing order. These funds would be allocated to each qualified supply plant. Supply plants not operated by a fluid bottler would receive compensation on the quantity $CRQ^k$. Bottlers with a supply plant(s) would receive payment on $CRQ^k - RRQ^k$ if $CRQ^k > RRQ^k$.

The disposal assessment would be designed to yield a level of compensation for disposal sufficient to prevent losses on reserve disposal operations but not so high as to compensate for inefficient operations or encourage excess manufacturing capacity. A cost study could provide reasonable guidelines on this for each order. An annual review should be provided for.

### Supply Arrangements

Eighty-eight percent of the proprietary handlers surveyed indicated that they bought at least some of their milk supplies from cooperatives (Table 5b). Proprietary handlers say they buy some milk from cooperatives primarily because they have no other viable choice (Table 12). This response does not contradict prior reports of multiple cooperative suppliers available to proprietary handler. This represents the decision to purchase from cooperatives as a group, not the choice of an individual cooperative.

This response does suggest, however, that cooperatives are the most viable supplier for most processors due to the size of deliveries needed, transaction costs of procurement, quality control, and other factors previously discussed. Processors appear willing to relinquish some power by dealing with a reduced number of suppliers in return for perceived benefits in procurement performance e.g. cooperative services and lower procurement costs (transaction costs). It may have been true in the past, but the results of this question clearly demonstrate that the decision to buy from cooperatives is not made out of fear of recriminations.

**Table 12. Reasons given by proprietary handlers for buying bulk milk from cooperatives.**

| Reason | Important (a) (%) | Most Important (%) |
|---|---|---|
| For a particular service or group of services they provide. | 21 | 12 |
| For fear of recrimination by the co-op. | 3 | 2 |
| They are the only supplier(s) in the area. | 60 | 58 |
| We do not want to have to worry about individual farmer-shippers. | 23 | 10 |
| They have the most preferred shippers as members. | 3 | -- |
| The quality of their milk is consistently high. | 16 | 7 |
| Other | 15 | 11 |

(a) Respondents could choose more than one reason.

The reason for not buying from cooperatives, given by those few proprietary handlers surveyed who did not buy any milk from cooperatives, was satisfaction with independent producers as a supply source. There were so few who qualified to answer this question that the results are not reported in tabular form.

Supply arrangements between cooperatives and proprietary handlers can improve quantity, quality, and timing coordination by encouraging communication, defining responsibilities, and by reallocating and reducing risk. An important arrangement for the transfer of ownership is the full supply arrangement. Proprietary handlers prefer a full supply arrangement when sup-

plies (or expectations of supply) are short. Cooperatives, on the other hand, prefer flexibility when supplies are tight and supply commitment when quantities are abundant. These differences can explain much of the behavior toward full supply arrangements shown by the two groups.

Results of this study indicate that approximately 44 percent of all proprietary handlers in the U.S. purchase milk under a full supply arrangement with a cooperative. This percentage is fairly constant among all sizes and in all parts of the U.S. About 60 percent of these full supply arrangements are formal (written) contracts. The remaining 40 percent are informal (verbal) agreements.

Buyers' satisfaction with these arrangements[14] was high and evidence of cooperative abuse of power in this regard was virtually non-existent. Consider that in response to survey questions, 94 percent of those proprietary handlers purchasing their bulk milk needs under a full supply arrangement indicated satisfaction with it. Sixty percent reported general satisfaction and 34 percent have found them totally satisfactory.

Masson (16) suggested that full supply arrangements put proprietary handlers at a disadvantage since milk's non-storability precludes tapering-in new supplies. Discussions with industry participants, however, indicated that this argument is invalid. Proprietary handlers can make plans to develop their own supply in anticipation of terminating a full supply arrangement. Furthermore, if a cooperative is faced with terminating its full supply arrangement it typically will be willing to provide a partial supply rather than lose the customer completely.

The availability of supplies from other cooperatives, independent producers, as well as non-traditional cooperatives allows the development of alternative supply arrangements by full supply customers in many markets. Further, the contention that proprietary handlers are coerced into full supply arrangements by the availability of procurement services to full supply customers only, is not borne out by survey findings.

Virtually all cooperatives and proprietary handlers interviewed suggested that a supply arrangement was only as effective as the individuals involved in the transaction. The written document was not characterized as an instrument which transcended personal interaction and ongoing compromise. Although these arrangements are typically of one year duration, those cooperatives and proprietary handlers interviewed suggested that if a party's dissatisfaction could not be remedied, they would not hold the party to the contract. An unwilling partner trapped in a contract was to be avoided.

It appears that proprietary handlers are entering into these arrangements of their own choice typically to reduce both the transaction costs of procurement, including facilities cost, and the scope of management responsibility.

The provisions found in supply contracts formalize existing exchange rights and responsibilities as well as establish new ones. Despite the coordination advantages of a written contract and the relative certainty it creates for both parties, verbal contracts are frequently used. They may be used between parties who have developed mutual respect and trust and who are operating under a set of rules not unlike those formalized in a contract. It should also be noted that recent Justice Department and Federal Trade Commission interest in dairy cooperatives' use of supply contracts has discouraged their use.

The supply contracts examined in the course of this research offered several interesting provisions. Those particularly relevant to coordination will be summarized here.

**Quantity Involved**

Normally a delivery period is specified and the quantities to be delivered and accepted during this time are noted. The quantity specified is normally a minimum. Most contracts incorporate an average weekly or monthly quantity figure, although daily communication between buyer and seller is essential to coordinate any supply arrangement. Procedures for requesting amounts above the minimum quantity are typically included in the contract.

The cooperative may be required to furnish upon demand supplies in excess of the minimum, calculated as a percentage of the contractual minimum. Twenty to 30 percent of this minimum amount was frequently noted. For buyer requirements in excess of this buffer volume, a cooperative is not obligated but the buyer must procure it from the cooperative if it has the milk available. Under a full supply contract the buyer cannot procure any milk other than from the contracting cooperative unless the cooperative cannot provide the needed quantities.

Vertical coordination is best served by the most accurate estimates of anticipated demand available and the honest and timely communication of this information between buyer and seller. However, depending on the service charges for removing and supplementing normal contractual quantities, the buyer will have an incentive to under, over or as accurately as possible estimate needed volume. Buyers would prefer a reduced commitment if additional supplies bear no service

[14] Hirschman (9) offers one possible explanation for why satisfaction is high with full supply arrangements. Since the buying and selling options of handlers and cooperatives, respectively, are few, exit from the exchange relationship is more difficult. The use of the voice option, communicating dissatisfaction, causes the poorly performing party to change its behavior to reduce the discomfort it is experiencing as a result of the other party's discontent.

charge. This feature should be given careful attention in designing a supply contract.

### Transfer of Title

Title passes to the proprietary handlers under either of two rules. In cases where all responsibility for delivery rests with the cooperative, the buyer takes title at his plant when the hose is connected to the tanker and the valve has been opened. A different rule is needed for that milk hauled by or under the direction of the buyer. One contract specified that the title passed to the buyer at such time as it was signed for by a duly authorized employee or agent of the buyer in a truck operated by or on behalf of the proprietary handler.

### Delivery Terms

This provision includes the assignment of hauling responsibility and costs for direct and plant-shipped milk. Normally both parties pledge to accommodate each other's schedules and delivery preferences. The advanced notice required of the buyer as to timing and quantity of daily delivery is specified and penalties for short notice deliveries are included.

### Weights and Tests

Two means for establishing weights and butterfat tests of transferred bulk milk are in common use. This provision stipulates the method to be followed, who will administer it and the exact steps to be used in carrying it out. Procedures for cross-checking and reconciling differences are normally included.

### Quality

Quality provisions in supply contracts rely heavily on state and local health inspection regulations. In many cases the contract specifies that the cooperative's field staff will provide technical assistance on problems affecting milk quality. In every case the cooperative is responsible for maintaining quality through the transfer of title but the buyer may reject the milk after delivery if it does not meet legal requirements.

A provision was found in one contract which required the cooperative to indemnify the buyer and assume all legal responsibilities for claims against the buyer arising from failure of milk supplied by the cooperative to meet the quality standards contained in the contract. This provision is provided to protect the buyer from lawsuits resulting from the consumption of a product not meeting legal requirements and which could be attributed to the cooperative's failure to deliver milk in conformity with all quality terms in the contract.

### Damages for Failure to Perform

When both buyer and seller recognize that there are major costs imposed on one party by a breach of contract by the other, provisions are frequently included which specify fixed penalties to be paid by the party breaching the contract. Such payments are in lieu of any other damages and claims resulting from the breach. In the case of a breach, buyer (seller) is typically afforded a per hundredweight payment for any part of the contractual volume not delivered (accepted), although this is not a universal procedure.

Some contracts did not specify such indemnification in the event of a cooperative breach. Including fixed penalties in lieu of all others for breaches of the contract reduces the cost of extended legal action. It forces both parties during the negotiation process to rationally, and without the pressure of an actual breach, recognize each other's situation and assess the costs of, or suitable compensation for, a breach. The specification of an actual penalty is preferable to requiring compensation under a different set of rules which might require extended legal action to resolve.

### Most Favored Buyer Clause

This provision is inserted in many supply contracts in an effort to assure the buyer of the continuing competitiveness of the price and service charges being paid. The text of a typical "most favored buyer clause" is presented below:

> Seller represents that the terms and conditions, including price of this agreement, are comparable to the terms and conditions offered to other purchasers in the same market; and seller agrees that in the event any such other purchaser (including a member subsidiary or affiliate of seller's cooperative association) is offered terms and conditions different than those offered the buyer hereinunder, then seller shall offer buyer such terms and conditions.

## Vertical Integration: Cooperative Processing Activities

Dairy cooperatives process at least 12 percent of U.S. fluid milk products (22). Twenty-three percent of all cooperatives are engaged in processing activities (Table 3). The average processing cooperative only bottles 10 percent of its received volume, however. This vertical integration activity is increasing and frequently causes disharmony in traditional exchange relationships with proprietary handlers.

At first glance, the only significant disharmony that might be expected between proprietary handlers and these cooperatives would arise out of the normal competitive rivalry for retailers' patronage. The situation is whether or not cooperatives have a substantial advantage in processing and distribution over proprietary handlers.

Many proprietary handlers contend that by virtue of their ability to reblend[15] proceeds, dairy cooperatives can allocate processing and distribution costs within their organization in such a way that these costs are subsidized. This may occur indirectly through overhead, manufacturing or hauling operations, or directly by the membership (farm production enterprise) and, if premium Class I prices exist, by bulk milk customers of the cooperative.

At first it might appear that proprietary handlers are claiming that processing cooperatives are not charging themselves the same premium price and service charges that their bulk milk customers must pay. However, sufficient marketing order audit procedures exist to ensure that such competitive advantages are not directly available to processing cooperatives. The problem arises because, by virtue of reblending rights, cooperatives need not return the order blend price to their members, while proprietary handlers must pay the equivalent of the order blend price.

It can be argued that in the long run cooperatives cannot fail to return at least the order blend if they hope to retain membership,[16] but it is also true that members may continue to support an unprofitable enterprise for an extended period of time if they believe it serves their interests.

Proprietary handler reaction to cooperative involvement in processing and distribution depends on both how and why cooperatives undertake it. Suspicions of intra-cooperative cross-subsidization easily arise, especially if premium prices prevail, and the adverse effects on exchange harmony are normally significant regardless of whether the suspicions are justified.

If proprietary handlers in a market believe the cooperative is trying to drive them out of business through what they perceive to be unfair competition, costly price wars at the wholesale level can erupt. If on the other hand, the processing cooperative operates in a geographical area of the processing market where none of its major bulk milk customers distribute products, peaceful coexistence can prevail. Despite their concern for cooperative integration into bottling, survey results indicate that proprietary handlers do not dispute the cooperative's right, along with non-cooperative firms, to integrate.

There is another side to the issue of processing cooperatives which exists apart from the question of special competitive advantages enjoyed. Understandably, proprietary handlers resent competing in final product markets with the same organization from which they procure their raw product. Regardless of the nature of the competition, this combination of relationships often produces disharmony.

Cooperatives indicated several reasons for vertically integrating into processing and distribution. Although there is not a consensus among cooperatives on this point, many indicated that a cooperative may need to acquire processing and distribution facilities in order to guarantee their members a market. They argue that as independent proprietary handlers become fewer in number and food chains operate their own bottling plants, cooperatives may need to have their own processing capacity to ensure a Class I outlet for their members.

As potential buyers of bulk milk decline, it is suggested that their power will increase relative to cooperatives. Other cooperatives and some proprietary handlers disagree. They do not foresee any significant foreclosing of fluid markets to cooperatives. In fact, many argue that as more food chains integrate backwards, the availability of Class I bulk milk outlets increases for cooperatives.

Some cooperatives seek to fill niches in the wholesale and retail markets being abandoned by proprietary handlers in increasing numbers. Cooperatives feel they can serve the small grocery outlets, the institutional market and home delivery customers.[17] Still other cooperatives may integrate to offer their customers a full line of products and services and their members more direct access to consumer markets.

Some cooperatives in the event of buyer default assume ownership of processing facilities in payment for bulk milk receivables. Some proprietary handlers feel that cooperatives extend liberal credit terms in the hope of a takeover, but other proprietary handlers and most cooperatives believe that in most of these cases cooperatives step into an undesirable situation.

This method of integration normally produces no disharmony because these ventures offer little competition and represent only limited inroads into local

[15] Cooperatives reserve the right in their membership-marketing agreement to receive all proceeds from the sale of members' milk and related products and pay on a cooperative-wide basis, marketing, operating, and overhead costs and allocate the balance to their membership in any manner authorized by the Board of Directors.

[16] A few proprietary handlers observed that intra-cooperative cross-subsidization by reblending can be reduced by competition from other cooperatives or independent producers. If the opportunity cost of being a member of a processing cooperative relative to another cooperative or an independent producer reaches some critical threshold sufficient to overcome producer loyalty and transaction costs, the member will leave the cooperative. Under conditions such as this a processing cooperative cannot long operate an unprofitable enterprise.

[17] Another segment of the market which some cooperatives are filling is the manufacture of private label dairy products (hard and soft) for integrated food chains which do not have sales volumes in these products adequate to capture the economies of scale necessary to justify operation of their own plant.

markets. Aggressive cooperative integration by purchase of proprietary plants, cooperative merger of acquisition, or construction of new facilities is viewed as more of a threat by proprietary handlers.

Cooperatives offered several reasons against integrating into processing and distribution. Some did not anticipate adequate sales volumes to economically justify the investment. A few cooperatives doubted that it improved their bargaining position with proprietary handlers. Others have decided to not cast themselves in the role of their bulk milk buyers' competitor. Still others observed that in their area the processing industry was competitive enough without another entrant.

Either the potential profits appeared too meager or the existing bottlers needed no disciplining force to stimulate well-run operations. A few cooperatives felt that their organization was better off with as many potential proprietary bulk milk customers as possible and these cooperatives did not want to see processing cooperatives force some proprietary firms out of business.

What is the future of processing cooperatives? Barring Federal Trade Commission or Justice Department actions or any changes in Capper-Volstead legislation, cooperatives will continue to account for an increased proportion of processed dairy products but will not gain a majority of it nationally or in most local markets. The intensity of concern felt by proprietary handlers about unfair competition or competition at all by processing cooperatives, will ebb and rise.

It is expected that the discipline on reblending provided by other cooperatives and independent producers in conjunction with proprietary handlers' efforts to resist cooperative competition will keep processing cooperatives' inroads to a minimum. Processing cooperatives will survive and grow in areas isolated from significant proprietary handler marketing activity or when they choose to serve market segments largely abandoned by proprietary handlers.

## Farm Level Production Control

### Background

Federal and many state governments have created mechanisms to coordinate transactions in the dairy subsector. In the U.S. dairy subsector, government directly sets minimum producer prices (Grade A), supports manufacturing grade milk prices, and establishes rules for the exchange of milk between producers and first handlers. Government's role began in response to fluctuating supplies, low dairy farmer income, inequities between dairy farmers, and differences in power between farmers and processors.

Their corrective programs have been generally successful. This success, however, has spawned another problem—production control. Having made the conscious choice to protect consumers from shortages and improve dairy farmers' welfare through legislated improvement in farmers' income and security, the way was paved for chronic surpluses. With some of the production discipline gone from traditional market forces, the signals that reach producers need to be carefully designed so surpluses are minimized.

The production control problem in the U.S. dairy subsector can be easily documented (Table 13). When government expenditures on the price support program escalate as in 1976-77, concern among policymakers and the industry grows. In these two years, it cost the treasury almost $1.2 billion to support the dairy surplus. This public cost borne by taxpayers and consumers is not the only one. The cost to private processors in fluctuations in plant capacity utilization, private storage costs, product deterioration, and the like can be significant.

**Table 13. Government stockpiles, purchases, and the cost of the dairy price support program, 1965-77.**

| Year | Govt. Stocks, Milk Equiv. (million lbs.) | Govt. Removals from Commercial Market, Milk Equiv. (million lbs.) | Solids Content of Removals (as% of marketings) Milkfat | Solids-not-Fat | Net Govern. Expend. under Price Support Program FY Beginning (million $) |
|---|---|---|---|---|---|
| 1965 | 973 | 2,900 | 2.6 | 8.7 | 26.1 |
| 1966 | 538 | 2,700 | 2.4 | 4.4 | 283.9 |
| 1967 | 46 | 7,000 | 6.2 | 7.0 | 357.1 |
| 1968 | 3,994 | 4,800 | 4.4 | 6.0 | 268.8 |
| 1969 | 2,724 | 4,400 | 4.1 | 3.9 | 168.6 |
| 1970 | 1,447 | 7,200 | 6.6 | 4.9 | 315.4 |
| 1971 | 2,098 | 6,600 | 5.9 | 5.0 | 267.0 |
| 1972 | 1,539 | 5,000 | 4.5 | 2.8 | 135.8 |
| 1973 | 2,005 | 700 | .7 | .6 | 31.4 |
| 1974 | 476 | 2,400 | 2.2 | 4.3 | 485.8 |
| 1975 | 310 | 900 | .9 | 2.9 | 69.6 |
| 1976 | 124 | 3,400 | 2.9 | 2.1 | 709.8 |
| 1977 | 410 | 3,200 | 2.9 | 3.3 | 446.4 |

Source: "Dairy Situation," USDA-ESCS, DS-372 and DS-373, October and December 1978.

In times of surplus, raw milk can be wasted if facilities cannot be found for its manufacture. A large transportation bill often accompanies such a condition. All subsector participants are affected, from farmers to consumers to taxpayers. When stockpiles and government expenditures shrink, attention is directed away from the problem, but the costs of the instability of supply-demand matching remain to be paid.

Federal and state marketing orders affect Grade A milk price as a source of resource allocation information. Classified pricing systems which exist in all federal and state milk marketing orders, price milk based on its

value in various product uses. Manufactured product uses to which surplus Grade A milk is diverted, return farmers the lowest raw milk prices. Despite this, in most orders[18] the farmer sees and responds to a blend price which masks any marginal revenue information contained in the classified pricing system. This blended price represents a weighting of the value of his product in all uses and appears as a constant average revenue unaffected by output levels. He is insulated from a true marginal revenue signal.

The effect of federal and state milk marketing orders on resource allocation signals received by farmers is not limited to the blunting of marginal revenue information contained in classified prices, however. Federal and state marketing orders also reduce individual producer response to market price by creating pools for the sharing of high value Class I sales among producers. While this fosters equity among producers, reduces proprietary handler discretionary control over usage allocations, and promotes exchange efficiency it does protect the producer from market conditions and isolates him from the demand for his individual output. It does not matter to the farmer how this output was utilized by the buyer. Only the overall marketwide utilization by product classes affects him. The production discipline imposed by the needs of the individual processor for the individual producer's milk is lost.

The result of this has been the creation of a common property resource of most U.S. farm level milk markets (7). The effect of this is to create individual incentives to overuse (overproduce) the common property resource (milk sales). The socially optimum level is exceeded as individual producers attempt to maximize their own profit or otherwise satisfy some criteria function (such as achieving optimal cash flow patterns or utilizing family labor).

Cooperatives too have exacerbated the production control problem by guaranteeing a market for all member milk. As the share of U.S. milk production handled by cooperatives rises, their impact grows and the production control problem worsens. Cooperative principles embrace the right of farmers to a market for their product. The management of a dairy cooperative is loathe to suggest production cutbacks and helpless to refuse members' production. Cooperative managers are often unable to influence member production despite management's recognition of the effect of surpluses on prices (order minimums and over-order premiums), disposal costs, and the viability of the price support program.

According to cooperative survey data, many cooperatives do not attempt to influence member production levels. Most efforts that are made have little more than informational effect, although a small percentage of cooperatives discourage or refuse new memberships.

Often no individual incentive exists for the individual cooperative member to cut back. It may benefit the cooperative, the market or the individual member himself in the long run but due to the common property nature of production it cannot be argued that any individual producer should cut back output for reasons predicated on conditions outside the producer's farm. Cooperatives can only pass on market information to keep the members informed. If more aware of market conditions, members may make production decisions more consistent with the overall supply-demand environment.

The purpose of the dairy price support program is to maintain an acceptable level of farm income and ensure an adequate supply of milk, by guaranteeing a minimum farm level price for manufacturing grade milk. Due to the interrelationships between this program and the pricing provisions of the marketing order program for Grade A milk, the price support program places a floor under Grade A farm-level milk prices as well.

Price support levels do affect milk production levels, and since support level decisions are both economic and political in nature, they cannot always be counted on to relay timely production signals to farmers. Since low farm income and surplus production can, and often do occur together, the operation of the price support system can confound the supply-demand situation. Although this does not always occur, it does suggest that price support levels cannot be expected to consistently provide appropriate production control signals.

Strong production control incentives are needed for producers. This research supports the amending of market order producer pricing machinery to convey more precise marginal revenue signals to producers in an effort to improve quantity coordination. This research does not suggest that marketwide pooling or the price support program be eliminated. What is suggested is a modification of the marketing order pricing system reflecting the marginal aspect of producing extra milk.

### Producer Payment Plan

What is needed is a modification in the marketing order pricing system that would allow marginal revenue information to reach producers. This should reduce the size and frequency of surpluses. But that may not be enough. The content of that marginal revenue in-

[18] The federal order machinery in a small number of markets sets up a base-excess payment plan which has the effect of intensifying price signals. The excess price communicates marginal revenue information to producers more clearly than does the payment plan in the other orders.

formation also needs to be considered. Currently, the marginal revenue is the lowest classified price under the marketing order system. However as already suggested, the price support program can maintain the lowest class price at a level sufficient to call forth surplus Grade A production.

There may also be occasions when the lowest class price (unsupported) calls forth surplus production in some markets. A producer payment plan should convey price signals to producers which call forth Grade A production needed for Class I and reserve demands but discourage surplus production. The recommended plan provides a means to reduce the tendency of the lowest class price to stimulate surplus production.

The producer payment plan recommended here is similar to the base excess plan in use in some federal order markets, however, it has three major differences. It creates two separate production bases with three prices instead of one base with two prices. This is designed to convey more precise marginal revenue signals as well as to explicitly recognize the difference between reserve and surplus quantities. The second major difference involves the determination of base allotments. Under the recommended plan the two bases are computed separately for each month rather than being identical for every month. This change has the effect of creating a plan stressing year-round production control rather than seasonal adjustments. The other difference is perhaps the most important of all in facilitating quantity coordination. Provision is made in the proposed payment plan to pay a price for surplus milk *below* the lowest class price when the lowest class price would encourage surplus production.

A Class I base (IBASE) would allocate Class I sales among all qualified producers under the market order while a reserve base (RESBASE) would allocate rights to the reserve quantity. The details of base determination could be handled in several ways depending on the characteristics of the individual market, however, one possible method will be presented here to help explain the plan.

A Grade A producer selling milk in month i would receive two bases applicable for that same month one year hence. It would take one year for new producers to begin to receive payment under this proposed plan, however, in the interim they could receive a specially computed blend-type price as is currently done under the base-excess plan. To form bases for month i+12, a producer j selling Grade A milk in month i would have a share computed as

$$SHARE^{j}_{i+12} = QAA^{j}_{i}/QAA_{i}$$

where $QAA^{j}_{i}$ is defined as actual Grade A production in month i by producer j and $QAA_i$ is total marketwide Grade A production in the same month. Actual Class I sales in the market in month i ($QCI_i$) could be used as an estimate of sales for the same month one year hence or a different estimate could be made by the Market Administrator using procedures provided in the order. The chosen quantity of expected Class I sales in month i+12 ($EQCI_{i+12}$) could then be allocated between the Class I and reserve bases.[19] Assume 80 percent of $EQCI_{i+12}$ is allocated to IBASE, then producer j's IBASE in month i+12 ($IBASE^{j}_{i+12}$) would be calculated as $SHARE^{j}_{i+12}$ * ($EQCI_{i+12}$ * .80) and disclosed to him 10-11 months before it becomes effective. The Class I price, when determined for month i+12 by the present scheme,[20] would become the IBASE price ($P_{IBASE}$).[21]

The quantity $QA_i$, the expected necessary quantity of Grade A milk in a designated market in month i to meet Class I demand *and* necessary reserves, would be calculated each month by the Market Administrator according to automatic procedures specified in the order. It would be announced 6-12 months in advance and be based on historical usage data and anticipated market conditions. It might best be determined by a carefully designed formula.

An expected quantity of milk for reserve purposes (QAN) will be calculated next as $QA_i - QCI_i$ where QCI was actual Class I sales. $QAN_i$ * $SHARE^{j}_{i+12}$ gives producer j's reserve base (RESBASE) for month i+12 but again known to the producer several months in advance.

Any milk produced by farmer j in excess of IBASE + RESBASE would be called surplus milk. The price paid for surplus milk would be the lowest class price in that order less (when necessary) a per hundredweight amount designed to reduce the surplus price below average cost of production. The amount by which the lowest class price would be reduced should be large enough to discourage surplus production. It may be necessary in some cases to set the surplus price below average variable cost in that order. The procedure for acquiring cost of production data as well as the mechanism through which the size of the reduction would be determined would both be specified in the order.

After IBASE and surplus milk are paid for out of the marketwide revenue pool as detailed previously, the re-

[19] This allocation is important and should be tailored to conditions in the particular market. Some of the expected Class I sales will normally need to be allocated to the reserve base to ensure that the reserve price is greater than the surplus price when the surplus price is not reduced below the lowest class price as explained later. Furthermore, the assignment of a part of expected Class I sales to the reserve base serves to keep the Class I base price equal to the Class I price when expected Class I sales are over-estimated.

[20] The recommended plan proposes no change in the determination of classified prices although the recommended plan could accommodate most changes in procedures for setting the classified prices.

[21] Unless the actual Class I usage in month i+12 was less than total $IBASE_{i+12}$, in which case $P_{IBASE}$ would be less than the Class I price by virtue of the Class I milk needed to fill out the IBASE quantity.

maining funds would be divided by $QAN_i$ to yield the reserve price ($P_{RES}$). It is expected that this price would be slightly less than the IBASE price and considerably more than the surplus but market usages would affect this each month.

## SUMMARY

This research explored the exchange process between cooperatives and proprietary handlers in the dairy subsector. Each of these groups has been studied in the past but with little concern for their interrelationship in the transaction. In this study, data on the structure of exchange and participants' attitudes regarding it were collected in order to analyze exchange arrangements and their implications for subsector performance. A mail survey of randomly selected U.S. dairy cooperatives and proprietary handlers plus in-depth interviews with managers of cooperative and proprietary firms were used to describe and analyze marketing-procurement relationships for Grade A milk.

Dairy cooperative operations are large and complex. The average cooperative spanned a 3-state area, had 652 members and handled 304 million pounds of milk (1976). Many cooperatives sold farm supplies (73%), owned equipment for off-farm hauling (56%), contracted for off-farm hauling (64%), manufactured products (30%), processed products (23%), distributed products (33%), and owned retail outlets or routes (16%).

Proprietary handlers processed an average of 240 million pounds of Grade A milk into fluid and soft dairy products (1976). Over 70% of this volume was purchased from cooperatives. Fifty-two percent of these processors also operated manufacturing plants for butter, powder, cheese, etc. Proprietary handlers packaged 21% of their processed products under private labels. Sixty-eight percent of the handlers operated retail routes or owned retail outlets.

Each cooperative indicated 30 possible buyers for their members' milk, although each proprietary handler stated only three cooperatives sold milk in their area. The average cooperative sold to eight buyers. Cooperatives indicated that 47% of their members' milk is committed under these arrangements.

Forty-four percent of the proprietary handlers buy their bulk milk exclusively from one cooperative under a full supply arrangement. Of these, 60% were formal, written contracts and the balance were informal, verbal agreements. Respondents indicated satisfaction with full supply arrangements from both sides of the transaction. Handlers indicated they felt no coercion to accept a supply arrangement from a cooperative. Seventy percent of the proprietary handlers reported paying premium (over-order) Class I prices.

Both cooperatives and handlers demonstrated a reasonably clear understanding of what each other desired in an exchange partner. A significant lack of understanding, however, was found to exist with respect to pricing and service charges. A more harmonious atmosphere for exchange could be fostered by (a) cooperatives' efforts to establish and guarantee competitive prices across a buyers' marketing area and (b) handlers' recognition of cooperatives' role in providing marketwide services and willingness to contribute to the cost of these services in proportion to the benefits they receive.

Three types of cooperative behavior toward exchange were demonstrated. The manifestation of these behaviors was hypothesized to depend primarily on the cooperatives' evolving attitude toward any economic and political power it has acquired. This line of reasoning suggests that procurement exchange in the dairy subsector is moving toward a more harmonious equilibrium as cooperatives adjust to their growing role in the subsector.

The power of both groups is tempered by structural characteristics of the market. Cooperatives are disciplined by the availability of alternative supplies to handlers, survey results suggest. In a related manner, proprietary handlers find their flexibility and power in procurement reduced by their large size.

Proprietary handlers expressed satisfaction with cooperatives' accomplishment of marketwide services. Many cooperatives felt compensation for these services was inadequate.

A reserve of Grade A milk of 20 to 40 percent of Class I sales on an annual basis is needed in most markets. In addition, since quantities of Grade A milk supplied and demanded in individual markets do not often match even when necessary reserve supplies are considered, there are quantities in addition to the unused reserves which must be manufactured as well. These can be called surplus quantities. Both reserve and surplus supplies require disposal facilities.

Cooperatives have assumed more and more of the supply balancing responsibility with a mixture of willingness and reluctance. Proprietary handlers who formerly had most of the disposal capacity in the subsector, now often prefer to have cooperatives do it. But the current situation is less than equitable. The benefits of disposal activity accrue to the entire subsector but farmers through their cooperatives are the predominant financers of the costs of disposal. To move the costs of disposal through the entire subsector and create an atmosphere fostering equity, some modification of the marketing order program is needed.

In the plan recommended here, supply plants would not be compensated for surplus disposal but only for reserve disposal activities. Without such a limitation a

compensation plan would provide a disincentive for production control by subsidizing the manufacture of surplus supplies. A method for distinguishing between reserves and surpluses in a market is developed. The plan involves both cooperative and proprietary bottlers and supply plants. It would be instituted under the federal or state marketing order program on a market-by-market basis. The plan would assess bottlers based on Class I sales and compensate supply plants based on their share of the market's manufactured output.

The current milk marketing system has a tendency to stimulate surplus Grade A production. Marketing orders create a common property resource of Grade A markets while the price support program cannot be relied on to transmit supply control signals consistently. Cooperative principles preclude cooperative exertion of production discipline. The costs of overproduction are significant and can be reduced by modifications in the market order program. A payment plan that presents accurate marginal revenue information to producers as well as provides a sufficiently low marginal revenue value to discourage unneeded production should reduce the size and associated costs of the Grade A surplus.

## REFERENCES


1. Babb, E. M., D. E. Banker and G. L. Nelson (1976). Price relationships among federal milk marketing orders. Ind. Agri. Expt. Sta. Bul. 146.
2. Boulding, Kenneth E. (1978). Normative science and agricultural policy. Presented at Fourth J. C. Snyder Memorial Lecture in Dept. of Agri. Econ., Purdue Univ.
3. Buse, R. C. (1972). Motivating potential respondents in mail surveys. Univ. of Wis. Res. Rep. RZ 409.
4. Campbell, Gerald R. and Thomas S. Clevenger (1975). An institutional approach to vertical coordination in agriculture. NC-117 Working Paper No. 1.
5. District Court, U.S., Western District of Kentucky (1978). U.S. of A. v. Dairymen Inc.: findings of fact, conclusions of law and memorandum opinion. Civil Action 7634 A, pp. 6, 20-21.
6. Eisenstat, Philip, Robert T. Masson and David Roddy (1971). An economic analysis of the Associated Milk Producers, Inc. monopoly. U.S. Dept. of Justice.
7. Hardin, Garret (1968). The tragedy of the commons. Science Magazine 162:1243-48.
8. Henderson, Dennis R. (1975). Some thoughts toward a theory of vertical market behavior with special reference to beef subsector analysis. NC-117 Paper.
9. Hirschman, Albert O. (1970). *Exit, Voice and Loyalty.* Harvard College Press.
10. King, Richard A. (1970). Morphology, modes of behavior, and measures of market power. SJAE, Dec., pp.41-45.
11. King, Richard A. (1977). Personal discussion and written communication. N.C. State Univ. March.
12. Lenard, Thomas (1975). Government regulation of milk markets: discussion paper. CWPS.
13. Marion, Bruce W. (1976). Introduction to subsector analysis. Unpublished paper. Dept. of Agri. Econ., Univ. of Wis.
14. Marion, Bruce W. (1976). Some thoughts about efficiency elements of market and subsector performance. Unpublished paper from NC-117. Univ. of Wis.
15. Marion, Bruce W. and Charles R. Handy (1973). Market performance; concepts and measures. Ag. Ec. Rep. No. 244, USDA-ERS.
16. Masson, Robert T. (1976). Some issues of cooperative market power, centralization, and the Capper-Volstead Act. Dept. of Econ. Paper No. 130, Cornell Univ.
17. Purcell, Wayne D. and Terry L. Dunn (1970). Economic implication of goal conflict and operational inconsistency in the feeder-packer sector of the beef marketing systems. WAEA Proceedings, pp. 38-46.
18. Roberts, Tanya (1975). A PIE-C research report: review of economic literature on milk regulations. Prepared for CWPS by PIE-C.
19. Schmid, A. A. and J. D. Shaffer (1964). Marketing in social perspective. In *Agricultural Market Analysis*, V. L. Sorenson, ed. Bureau of Business and Economic Research, Mich. State Univ.
20. Schneider, Erich (1962). *Pricing and Equilibrium.* MacMillan Co., New York.
21. Shaffer, James D. (1968). Changing orientation of marketing research. AJAE 50:1437-1449.
22. Tucker, George C., William J. Monroe and James B. Roof (1977). Marketing operations of dairy cooperatives. Farmer Coop. Serv.—USDA, FCS Res. Rep. 38.
23. Turnovsky, Stephen T. (1974). Price expectations and welfare gains from price stabilization. AJAE 56 (4).