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

	Total	Mean or Percent						
		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		
	Population	Small	Medium	Large	West	Central	South	Mid-west	North-east	Bargaining	Marketing	Operating
* † 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.

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."

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