Cooperative Mergers: Their Objectives, Success, and Impact on Growth

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Contents

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Introduction

Cooperatives are an important factor in American agriculture. In 1966 the value of farm production marketed through cooperatives was estimated to be nearly 29% of total cash receipts from farm marketings. Also, it is estimated that farmers obtained about 15% of their production supplies and equipment through purchasing cooperatives in 1966. These values reflect modest increases from 1955 estimates. However, the importance of cooperatives by major product lines marketed or handled varies greatly (Table 1).

Table 1. PROPORTION OF TOTAL VALUE OF VARIOUS FARM PRODUCTS AND SUPPLIES HANDLED BY AGRICULTURAL COOPERATIVES, UNITED STATES, 1964[1]

Marketing cooperatives:		Supply cooperatives:	
Commodity[2]	Percent	Commodity[2]	Percent
Whole milk, all	60	Farm supplies, all	15
Dry skim milk	75	Fertilizers	23
Dry buttermilk	70	Petroleum	23
Creamery butter	60	Seed	19
Cheddar cheese	23	Insecticides	19
Condensed milk	14	Feed	18
Lemons	90		
Fresh oranges	50		
Cranberries	85		
Almonds	70		
Vegetables, all	15		
Grain	40		
Rice	40		
Wool	20		
Livestock	13		
Turkeys	17		
Eggs	10		
Lint cotton and cottonseed	20		

[1] Source of data: John H. Heckman, Cooperatives in World Trade. In *1964 Yearbook of Agriculture*, USDA, pp. 346-357.
[2] Includes bargaining cooperatives.

Agricultural supply, marketing, and bargaining associations represented only 38.8% of the U. S. agricultural cooperatives in 1965 (Table 2). Agricultural service associations such as artificial breeding associations, dairy herd improvement associations, grazing associations, and irrigation associations comprised almost half of the total number of agricultural cooperatives. Other important agricultural cooperatives are agricultural credit and mutual fire insurance organizations.

Despite the modest increase in business volume, the number of marketing cooperatives declined by 23.4% between 1949-1950 and 1964-1965. Memberships in these associations decreased by 7% during this period. However, the number of supply cooperatives declined by only 28 in total from 1949-1950 to 1964-1965. Over this period, business volume rose 130.9% while memberships increased nearly 30%.[1]

In relation to the declining number of farms, the decrease in cooperative marketing associations and memberships does not appear disproportionate. In fact, the number of farms declined by 40.8% from 1950 to 1964,[2] a larger percentage decline than in marketing cooperative numbers and memberships.

According to the Farmer Cooperative Service, the decreases in memberships and in the number of marketing cooperatives reflects the reorganizations of cooperatives by merger, acquisitions, and consolidations as a result of the declining number of farms. Since a farmer may be a member of more than one cooperative, an area consolidation or merger may reduce the combined memberships of new organizations considerably. To a lesser extent, some cooperatives have extended their scope of operations into marketing or purchasing, thereby lessening the need for multiple memberships.

DeLoach believes that "even though aggregate statistics of growth are not now a basis for concern, it is increasingly apparent that many small cooperative businesses, like many small farms and profit-type firms in almost all kinds of processing and distribution, are in trouble. Likewise, some medium-size and large cooperatives are under competitive pressure, not because they are cooperatives, but because competition with profit-type firms is increasingly severe."[3]

To meet this competition, Mueller[4] has suggested that growth among cooperatives, like other corporations, can

[1] Sources: Statistics of Farmer Cooperatives, USDA, Farmer Cooperative Service, General Report 31, 1954-1955, and General Report 143, 1964-1965.

[2] 1964 U. S. Census of Agriculture, Volume 11, Chapter 1, p. 12. By USDA estimates, the decrease was 39.1%.

[3] D. B. DeLoach, Growth of farmer cooperatives: Obstacles and opportunities. Journal of Farm Economics, 46:489, 1962.

[4] Willard F. Mueller, The Role of Mergers in the Growth of Agricultural Cooperatives. Calif. Agric. Expt. Sta. Bull. 777, 1965.

Table 2. NUMBER OF AGRICULTURAL COOPERATIVES AND COOPERATIVE MEMBERSHIP, UNITED STATES, 1964-1965[1]

Type of cooperative	Number of cooperatives		Cooperative memberships
Agricultural bargaining		352[2]	390,000
Agricultural credit		1,852	1,180,117
Banks for Cooperatives	13		2,500[3]
Credit corporations	21		——[4]
Federal Land Bank Association	703		374,292
Production Credit Association	466		544,633
Rural credit unions	670		258,692
Agricultural marketing		5,305	3,790,915
Agricultural services		11,359	867,056
Artificial breeding	36		360,388
Dairy Herd Improvement Association	1,344		64,123
Grazing	1,436[2]		31,071
Irrigation	7,729		161,679
Miscellaneous	814		249,795
Farmers' fire mutual		1,450	3,000,000
Farm supply cooperatives		3,085	3,250,840
Fishery marketing		87[2]	10,673
Indian enterprises		219[2]	12,520
Total		24,430	[5]

[1] Source: Statistics of Farmer Cooperatives, 1964-1965, USDA, Farmer Cooperative Service, General Report 143; Table 10.
[2] Source: E. P. Roy, *Cooperatives: Today and Tomorrow.* (Danville, Ill.: Interstate Press, 1968).
[3] These 2,500 cooperatives serve 3,673,583 farmers.
[4] Data not available.
[5] Memberships cannot be added because of duplications.

be achieved readily via merger. The need for growth is a recognition of the need to achieve economies of size in plant processing, distribution, and management, to enhance bargaining power, to improve cooperative effectiveness in the market place, and to provide a stronger financial base.[5]

This publication reports research findings on factors important in cooperative growth, the extent and profitability of recent cooperative mergers, the amount cooperatives have grown by merger, the extent to which farmer cooperatives have achieved their merger objectives, and the future role of mergers in the growth of agricultural cooperatives.

In this bulletin, growth by merger, acquisition, and consolidation are considered under the broad category of external growth. References to merger include all of the above forms of external growth. In contrast, internal growth refers to growth a cooperative achieves by constructing its own facilities, by increasing membership or business volume, or by developing its own markets.[6]

Motives for Cooperative Mergers

Cooperatives merge for a variety of reasons, but growth is a major objective as cooperatives seek to achieve economies of large size in production and dis-

tribution. Other motives for growth are to decrease procurement and field service costs, achieve vertical integration, diversify product lines, and achieve market power.[7]

Motives for growth through merger are: (1) to avoid disturbing market pricing patterns, (2) to acquire facilities and markets more cheaply than by building, (3) to obtain technical and management personnel and broaden a firm's financial base, (4) to adjust more rapidly to changing economic pressures, and (5) to break into markets or industries with high barriers of entry, such as those with highly advertised brands.

Financing a firm with a business history is normally easier than financing strictly internal expansion. Projections of future sales and earnings are more readily available from existing firms, but they are difficult to project when internal growth is used. Marketing cooperatives have an incentive to integrate horizontally to assure a source of supply, whereas noncooperative firms integrate vertically for this purpose.

Cooperative Merger Activity

Data on agricultural cooperative mergers before 1940 are incomplete. One study indicated there were 473 mergers among cooperatives from 1905 to 1939.[8] However, since the information on discontinuing cooperatives in this study was not complete, Mueller[9] suggests an ad-

[5] Jerome W. Hammond and Hugh L. Cook, Wisconsin Dairy Firm Mergers: Extent, Causes and Results. Wisc. Agric. Expt. Sta. Research Bull. 249, 1964.
[6] Internal and external growth are not synonymous with internal and external financing. Our definitions are not concerned with the origin of the funds to finance growth.

[7] Willard F. Mueller, *op. cit.*, pp. 24-25.
[8] W. W. Cochrane and R. H. Elsworth, Farmer's Cooperative Discontinuances, 1875-1939. USDA, Farm Credit Administration, Miscellaneous Report No. 65, 1943.
[9] *Ibid.*, p. 9.

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Table 3. Mergers Among Agricultural Marketing and Purchasing Cooperatives by Commodity Types, United States, 1909-1964[1]

Type	1909-1939[2]		1940-1955[3]		1956-1964[3]		1909-1964	
	No.	%	No.	%	No.	%	No.	%
Dairy	74	15.6	190	39.2	170	43.5	434	32.2
Elevator and grain	64[4]	13.5	61	12.5	45	11.5	170	12.6
Fruit and vegetable	120	25.4	60	12.4	31	7.9	211	15.7
Livestock	67	14.2	18	3.7	26	6.7	111	8.2
Miscellaneous marketing	79[5]	16.7	28[6]	5.8	20[7]	5.1	127	9.4
Supply	69	14.6	128	26.4	99	25.3	296	21.9
Total	473	100.0	485	100.0	391	100.0	1,349	100.0

[1] Source of data: Willard F. Mueller, *op. cit.*, pp. 8-10; Bruce L. Swanson, *op. cit.*
[2] Mergers among agricultural cooperatives classified according to type of commodity of acquired cooperatives. Most of these mergers are believed to be horizontal mergers.
[3] Mergers among agricultural cooperatives classified according to type of commodity of acquiring cooperatives.
[4] Includes some rice and dry bean associations.
[5] Includes 18 cotton, 15 egg and poultry, 10 wool, 3 nut, 2 tobacco, and 31 unclassified marketing associations.
[6] Includes 10 poultry, 7 cotton, and 11 unclassified associations.
[7] Includes 5 cotton, 5 nut, 5 poultry, 1 rice, 1 wool, and 3 unclassified cooperatives.

ditional 162 cooperatives might have been acquired by other cooperatives during these years. Between 1940 and 1955 there were 485 mergers among farmer cooperatives, and between 1956 and 1964, 391 mergers. In total, from 1909 to 1964, there were 1,349 reported mergers among farmer cooperatives (Table 3).

There has been an increasing trend in the number of mergers among cooperatives per year, but a decreasing number of noncooperatives has been acquired by cooperatives (Table 4). Before World War I, there were few mergers among cooperatives, averaging only 1.6 per year. This number increased steadily to 27 per year during the 1930-1934 depression years. Following this period the number of mergers fell to 16 per year, but increased to 41 per year during the 1940's. Merger

Table 4. Average Number of Mergers per Year of Agricultural Marketing and Purchasing Cooperatives in the United States (1905-1064)[1]

Time period	Average number of mergers per year	
	Noncooperatives with cooperatives	Cooperatives with cooperatives
1905-1909	......	.2
1910-1914	......	1.6
1915-1919	......	5.4
1920-1924	......	15.2
1925-1929	......	19.2
1930-1934	......	27.4
1935-1939	......	16.0
1940-1944	32.2[2]	30.6
1945-1949	38.0[2]	41.2
1950-1954	31.0[2]	20.2
1955-1959	18.4[3]	28.0
1960-1964	11.8[3]	55.2

[1] Source of data: Willard F. Mueller, The role of mergers in the growth of agricultural cooperatives, Calif. Agric. Expt. Sta. Bull. 777, 1961, pp. 8-10; Bruce L. Swanson, Statistics of Farmer Cooperatives, 1963-1964, USDA, Farmer Cooperative Service, General Report 134, 1966.
[2] Twenty-four noncooperatives which merged with cooperatives during the period 1940-1955 were unknown as to the date of the consummation.
[3] Original data collected from Mueller's sources, *op. cit.*, pp. 8-10.

activity among cooperatives declined again during the 1950's, but reached a record number of 55 mergers per year in the 1960-1964 period. Significantly, the acquisition of noncooperative firms by cooperatives has declined steadily since the 1945-1949 period. They numbered 38 per year in 1945-1949, but dropped to 11.8 per year in 1960-1964.

Figure 1 shows the relationship of mergers among cooperatives as compared with all industrial mergers. Four periods of high merger activity have occurred in U. S. history. Three of the cycles are shown in Figure 1 (the largest merger movement, occurring in 1894-1896, is not shown). The merger movements shown are those of the late 1920's, the late 1940's, and the present time. The simple correlation coefficient between cooperative mergers and all industrial mergers is .542, indicating that many factors influencing all industrial mergers also may influence cooperative mergers.[10]

Methodology

To analyze the objectives and results of specific mergers among agricultural cooperatives, a sample was taken of marketing, bargaining, and purchasing cooperative mergers occurring between 1956 and 1960. Basic data on discontinued cooperatives was obtained from Farmer Cooperative Service files. This file was compared against cooperative mergers reported by the 12 Banks for Cooperatives.

The population contained 99 agricultural cooperatives that participated in one or more mergers between 1956 and 1960, and remained in operation in 1963. Classification of the 99 cooperatives along product lines were: 46 dairy, 34 purchasing, 10 grain, 5 fruit and vegetables, 3 miscellaneous marketing, and 1 livestock.

Seventy percent of the cooperatives in the population were small cooperatives, each with an annual sales

[10] See section on Statistical Analysis of Factors Influencing Cooperative Mergers, page 14 of this bulletin.
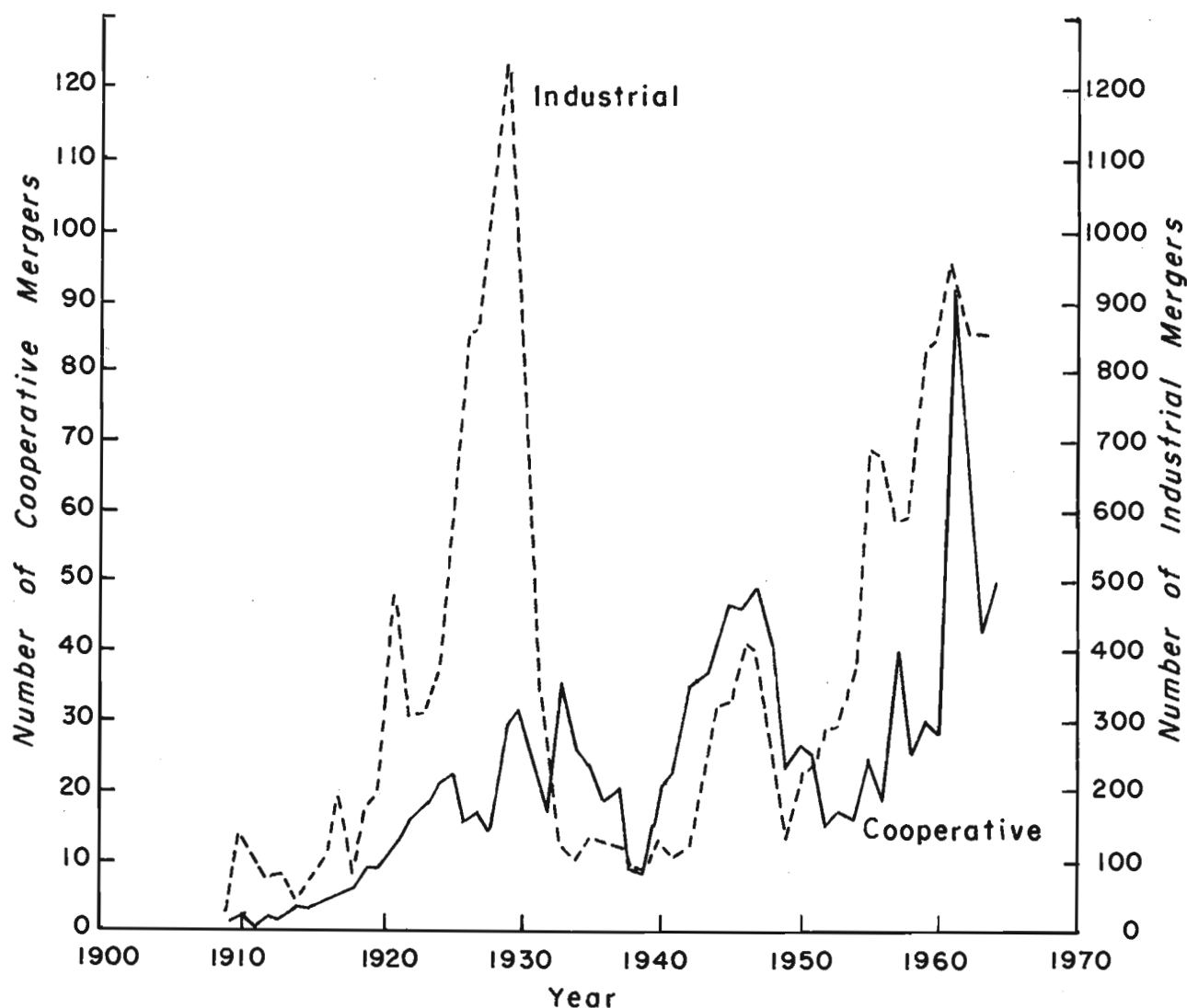
Figure 1. Number of cooperative mergers and industrial (manufacturing and mining) mergers, United States, 1909-1964.

volume of less than $10 million in 1965. Only 11.1% of the cooperatives in the population had sales volumes of over $50 million. A 10.1% statistical sample was selected from the population for detailed analysis.

The 10 cooperatives selected in the sample had annual sales volumes ranging from $590,000 to $228 million. They consisted of six marketing cooperatives and four purchasing cooperatives. Six cooperatives in the sample were local cooperatives, three were federated regional associations, and one was a centralized regional bargaining association.

Data collection

A case analysis was made of each of the 10 cooperatives. Data on pre-merger objectives and post-merger operating results were obtained by in-depth interviews with key employees and members of the boards of directors of the surviving cooperatives. Financial and other records were analyzed.

Accounting data were used for determining economies of size. Audited financial and operating statements were obtained for the year prior to merger, approximately two years after merger, and for the most current year. Additional audit reports of the acquired cooperatives were analyzed for the year just preceding the merger. Efforts were made to avoid years of abnormal operations.

To insure reliable cost classifications in multi-product cooperatives, fixed or overhead costs were allocated to individual product operations with the assistance of the manager or the accountant. For cooperatives handling a primary commodity and having by-product sales, direct

costs were allocated with the accountant. Indirect or fixed costs were allocated to the primary product and the by-product on a finished product equivalent basis. Although changes had occurred over time in product mix sold by supply cooperatives, the amount of change was so small that this factor was not considered in determining costs.

Depreciation costs vary with changes in allowable rates by tax regulations. Therefore, depreciation rates were adjusted to those used by the cooperatives at the time of merger. To correct the problem of rising price levels and to make costs comparable over time, all cost data were deflated by appropriate indices to the price level existing one year prior to merger.

Merger Objectives and Their Realization

Most cooperatives in the survey had more than one objective for growth by merger. Cooperatives in the sample had multiple objectives for merging, but one objective (economies of size) prevailed for all of the cooperatives.

The following objectives were pursued by one or more of the 10 sample cooperatives: (a) to achieve economies of size, (b) to provide improved services to member patrons, (c) to increase barriers to entry, (d) to gain market and bargaining power, (e) to achieve product diversification, (f) to assure a source of supply, and (g) to obtain facilities (Table 5).

Table 5. Growth and Merger Motives of Ten Sample Acquiring Cooperatives, United States, 1956-1960

| Growth motive | Responses of acquiring cooperatives[1] | |
	Number	Percent of all replies
Economies of size	10	47.5
Improved services	3	14.3
Barriers to entry	3	14.3
Market and bargaining power	2	9.5
Product diversification	1	4.8
Source of input supply	1	4.8
Facilities	1	4.8
Total number of replies	21	100.0

[1] Replies add to more than the number of cooperatives interviewed because some gave more than one reply.

Economies of Size

Each of the 10 cooperatives analyzed sought to achieve economies of size through merger. Regardless of size, each cooperative desired to reduce average unit costs of operations by handling a larger volume of output. Achieving economies of size was the primary motive for growth with 7 of the 10 cooperatives. Eight of the cooperatives desired growth to achieve technical or production economies, while two sought distribution as well as technical economies of size. Accounting costs were

used to determine whether economies of size were obtained following merger.

Two years after merger, average variable costs (or costs as a percent of sales) decreased for the acquiring cooperative in two mergers, remained fairly constant in six cases, and increased sharply in two cases (Table 6). By the most recent year, which ranged from 5 to 12 years after merger, four acquiring cooperatives reduced unit variable costs, five cooperatives' unit variable costs increased, and one cooperative's unit variable costs remained constant. Even though few of the *acquiring* cooperatives were able to reduce their per unit variable costs after merger, the resulting variable cost structure was below that of the *acquired* cooperatives at the time of merger. For five of the *acquired* cooperatives for which accounting data were available, variable costs following merger were substantially below their pre-merger costs. For the other acquired cooperative for which accounting data were available, unit variable costs remained at their pre-merger level.

Average fixed costs (or fixed costs as a percent of sales) of acquiring cooperatives two years after merger, decreased in five cases, increased in four, and remained unchanged in one (Table 7). By 1965, only two cooperatives experienced unit fixed costs below the levels existing prior to merger. Unit fixed costs increased in seven acquiring cooperatives, and remained constant for one cooperative from one year before merger to the most recent fiscal year. However, from two years after merger and 1965, only three cooperatives had higher unit fixed costs, two lower, and five nearly unchanged. Thus, data for the sample cooperatives indicate that merger is not likely to spread overhead for the acquiring cooperative.

On the other hand, overhead costs for the combined cooperatives were less after merger than existed prior to merger for the six "undersized" acquiring cooperatives for which accounting data were available. This result can be expected, as the rate of output is increased because the acquired cooperatives had small scale operations with high overhead costs due to low volumes of output.

Although few cooperatives reduced individual variable or fixed costs after merger, average total costs for the acquiring cooperatives were reduced in five of the

Table 6. Summary of Average Variable Costs and Total Variable Costs as Percent of Sales of Sample Cooperatives

| Cooperative | One year prior to merger | | Two years after merger | Latest fiscal year |
	Acquired cooperative	Acquiring cooperative	Combined cooperatives	Combined cooperatives
I Supply[1] (%)	......	2.75	6.99	6.99
II Citrus packing ($)	.558	.445	.406	.400
III Citrus packing ($)	......	.431	.439	.460
IV Dairy processing ($)	.091	.030	.032	.032
V Grain and supplies[1,2] (%)	19.56	......	12.40	19.64
VI Dairy processing ($)	.062	.020	.021	.019[3]
VII Fruit marketing[2] ($)	.076	......	.058	.050
VIII Regional supply[1] (%)	1.97	1.49	2.00	3.35
IX Milk bargaining ($)	......	.040	.042	.040[3]
X Grain ($)	......	.011[4]	.013	.006[3]

[1] These cooperatives are purchasing cooperatives; others are marketing cooperatives.
[2] Costs for the acquired cooperative only.
[3] Includes cooperatives that made additional acquisitions between two years after the merger and their latest fiscal year.
[4] Combined cost of the acquired and acquiring cooperative, since one cooperative provided a selling function and the other cooperative provided a selling and storage function.

Table 7. Summary of Average Fixed Costs and Total Fixed Costs as Percent of Sales of Sample Cooperatives

| Cooperative | One year prior to merger | | Two years after merger | Latest fiscal year |
	Acquired cooperative	Acquiring cooperative	Combined cooperatives	Combined cooperatives
I Supply[1] (%)	......	9.16	11.91	12.51
II Citrus packing ($)	.119	.097	.118	.117
III Citrus packing ($)	......	.057	.068	.069
IV Dairy processing ($)	.030	.018	.014	.011
V Grain and supplies[1,2] (%)	7.22	......	2.28	12.07
VI Dairy processing ($)	.028	.005	.009	.009[3]
VII Fruit marketing[2] ($)	.019	......	.017	.029
VIII Regional supply[1] (%)	2.48	1.75	1.82	3.48
IX Milk bargaining ($)	......	.051	.046	.046[3]
X Grain ($)	......	.011[4]	.011	.011[3]

[1] These cooperatives are purchasing cooperatives; others are marketing cooperatives.
[2] Costs for the acquired cooperative only.
[3] Includes cooperatives that made additional acquisitions between two years after the merger under study and their most recent year.
[4] Combined unit costs of the acquired and acquiring cooperative.

Table 8. Summary of Average Total Costs and Total Costs as a Percent of Sales of Sample Cooperatives

| Cooperative | One year prior to merger | | Two years after merger | Latest fiscal year |
	Acquired cooperative	Acquiring cooperative	Combined cooperatives	Combined cooperatives
I Supply[1] (%)	......	11.91	18.90	19.50
II Citrus packing ($)	.677	.542	.524	.517
III Citrus packing ($)	......	.488	.507	.529
IV Dairy processing ($)	.121	.048	.046	.043
V Grain and supplies[1,2] (%)	26.78	......	14.68	31.70
		11.49	17.50	16.46
VI Dairy processing ($)	.090	.025	.030	.028[3]
VII Fruit marketing[2] ($)	.095	......	.075	.079
	......	5.32	5.30	6.37
VIII Regional supply,[1,2] (%)	4.45	3.24	3.82	6.83
	......	6.65	6.53	9.40
IX Milk bargaining ($)	......	.091	.088	.086[3]
X Grain ($)	......	.022[4]	.024	.017[3]

[1] These cooperatives are purchasing cooperatives; others are marketing cooperatives.
[2] Because of different services provided by the acquired and acquiring cooperatives, they are listed separately.
[3] Includes cooperatives that made additional acquisitions between two years after the merger under study and their most recent fiscal year.
[4] Combined average total costs for the acquired and acquiring cooperative.

cooperatives two years after merger (Table 8). By 1965-1966, unit total costs of acquiring cooperatives were lower than pre-merger costs in only four of the cases studied. However, much of the increased costs of operation resulted from additional member services.

If total unit costs of the acquired and acquiring cooperatives are weighted by their sales or volume of output, depending on whether they are a supply or marketing cooperative, the analysis shows that two thirds of the acquiring cooperatives achieved some economies of size after merger (Table 9). Data show the acquiring firms reduced costs more than they could have had they operated as separate entities, assuming that the cost structure would have remained unchanged had the cooperative not merged.

Profitability of Cooperative Mergers

Savings to net sales

Assuming economies of size exist, mergers should reduce unit costs which would be reflected in the combined profits of the participants in the merger. To test this hypothesis, three indications of profitability or rates of return were applied: (a) ratio of savings to net sales, (b) ratio of savings to members' equity, and (c) ratio of savings to earning assets. It is assumed that pricing policies remain unchanged over time when applying the above ratios. Otherwise, comparisons of ratios over time will be affected by whether a cooperative operates with a wide margin and large dividend policy, or whether it shifts to a lower margin policy, thereby affecting the amount of savings or earnings. There was no evidence that such a shift in policy had occurred with the sample cooperatives.

Table 10 summarizes the ratio of savings to net sales for the 10 cooperatives in the sample. Only four cooperatives increased this ratio two years after merger (Cooperatives II, V, VII, and IX). Cooperatives II, VII, and IX also achieved economies of size over the same period. Cooperative IV achieved economies of size, but did not increase its rate of return after merger. Although cooperative V increased its returns, it did not achieve economies of size.

Most acquiring cooperatives were more profitable before merger than after merger. By 1965-1966, only three cooperatives, (VII, VIII, and IX) increased their savings expressed as a percent of sales above the pre-merger level. Cooperatives VII and VIII had not achieved economies of size by 1965-1966. Thus, there appears to be no consistent relationship between economies of size and earnings to sales ratio after merger. Apparently a number of factors influence this ratio, including the nature of the industry, its competitiveness, the quality of management decisions, and government price policies (CCC). Thus, the surviving cooperatives may have experienced a lower rate of return, even if they had not made a merger.

Table 9. Average and Weighted Average Total Costs and Total Costs as Percent of Sales of the Acquired, Acquiring, and Combined Cooperatives

| | | Average total costs | | Weighted average total costs of separate entities | Average total costs |
| | | One year prior to merger | | One year prior to merger[1] | Two years after merger |
	Cooperative	Acquired cooperative	Acquiring cooperative	Combined cooperatives	Combined cooperatives
II	Citrus packing ($)	.677	.542	.596	.524
IV	Dairy processing ($)	.121	.048	.053	.046
V	Grain and supplies (%)	25.55	11.49	21.23	17.50
VI	Dairy processing ($)	.090	.025	.033	.030
VIII	Regional supply (%)	4.45	3.24	3.42	3.82
X	Grain ($)	.046	.011	.022	.024

[1] Purchasing cooperatives' average total costs prior to merger are weighted by net sales. Marketing cooperatives' average total costs prior to merger are weighted by their volume of output handled.

Table 10. Savings as Percent of Sales for Sample Cooperatives Prior and Subsequent to Merger

| | | One year prior to merger | | Two years after merger | Latest fiscal year |
	Cooperative[1]	Acquired cooperative	Acquiring cooperative	Combined cooperatives	Combined cooperatives
I	Supply (%)	(loss)[2]	8.58	.05	(.86)[3]
II	Citrus packing (%)	8.71	16.11	17.63	7.37
IV	Dairy processing (%)	(2.07)[3]	1.03	.52	(.30)[3]
V	Grain and supplies (%)	(4.47)[3]	12.38	21.70	5.21
VI	Dairy processing (%)	(1.80)[3]	6.15	3.00	.35[4]
VII	Fruit marketing (%)	(6.03)[3]	2.89	3.49	5.61
VIII	Regional supply (%)	.56	2.78	2.44	3.31
IX	Milk bargaining (%)	.90	.10	.39	1.11[4]
X	Grain (%)	......[5]	.97	.23	.13[4]

[1] Cooperative III was excluded from this analysis because accounting records were kept on a cost basis.
[2] Reported by the past manager of this association.
[3] Figures in parentheses are net losses for the fiscal year under consideration.
[4] These cooperatives made additional acquisitions between two years after merger and their latest fiscal year.
[5] Data available were not comparable with that of the acquiring cooperatives.

Table 10 suggests that although the acquiring cooperatives generally did not increase their profitability over the time period considered, seven of the eight *acquired* cooperatives did. However, five of these were operating at a loss one year before merger.

Savings to members' equity

Five of the nine acquiring cooperatives increased their rate of return[11] on owner investment two years after merger (Table 11). However, by 1965-1966 only three were able to maintain this position.

Only six of nine *acquired* cooperatives increased their rate of return on members' equity two years after merger. However, since all of the acquired cooperatives owned less than 50% of their assets, any savings would show a large rate of return on equity.

[11] It is possible for this ratio to increase merely as a result of a decline in member equity relative to earnings, by the cooperative assuming a larger amount of debt. However, analysis of financial statements did not reveal this to be a factor in the cooperatives studied.

Savings to total assets

Only four of the acquiring cooperatives increased their returns to total assets two years after merger and by 1965-1966. However, seven of nine *acquired* cooperatives had substantial increases in returns to total assets (Table 12).

Services to Member Patrons

Improved services to members was an objective of three purchasing or supply cooperatives. Two of these cooperatives had expanded into the operating area of the acquired cooperative prior to merger.

Indications used to measure improved services to members were: (a) increases in inventory, (b) increases in numbers of services provided, and (c) improvement in the quality of existing services. While additional services may increase average costs of operation, they also may generate more than proportional increases in sales, and hence greater earnings.

Table 11. Savings as Percent of Members' Equity for Sample Cooperatives Prior and Subsequent to Merger

| Cooperative[1] | One year prior to merger | | Two years after merger | Latest fiscal year |
	Acquired cooperative	Acquiring cooperative	Combined cooperatives	Combined cooperatives
I Supply (%)	(loss)[2]	31.21	.21	(4.17)[3]
II Citrus packing (%)	24.08	18.34	21.07	13.06
IV Dairy processing (%)	(36.81)[3]	9.72	5.20	(3.55)[3]
V Grain and supplies (%)	(15.51)[3]	22.32	25.40	8.21
VI Dairy processing (%)	(10.33)[3]	38.49	16.84	1.81[4]
VII Fruit marketing (%)	(20.35)[3]	9.17	16.51	26.57
VIII Regional supply (%)	15.43	10.00	12.36	12.44
IX Milk bargaining (%)	35.46	3.34	5.55	8.35[4]
X Grain (%)	46.94	19.34	8.39	8.67[4]

[1] Cooperative III was excluded from this analysis because accounting records were kept on a cost basis.
[2] Reported by the past manager of this association.
[3] Figures in parentheses are net losses for the fiscal year under consideration.
[4] These cooperatives made additional acquisitions between two years after merger and their latest fiscal year.

Table 12. Savings as Percent of Total Assets for Sample Cooperatives Prior and Subsequent to Merger

| Cooperative[1] | One year prior to merger | | Two years after merger | Latest fiscal year |
	Acquired cooperative	Acquiring cooperative	Combined cooperatives	Combined cooperatives
I Supply (%)	(loss)[2]	21.13	.12	(1.35)[3]
II Citrus packing (%)	6.67	6.80	8.49	7.12
IV Dairy processing (%)	(10.29)[3]	6.11	2.57	(1.84)[3]
V Grain and supplies (%)	(11.04)[3]	20.91	17.74	5.70
VI Dairy processing (%)	(5.20)[3]	28.63	11.03	1.45[4]
VII Fruit marketing (%)	(18.81)[3]	7.50	9.91	10.31
VIII Regional supply (%)	5.91	9.99	10.43	10.14
IX Milk bargaining (%)	16.49	.33	2.61	3.67[4]
X Grain (%)	......[5]	5.56	2.02	2.07[4]

[1] Cooperative III was excluded from this analysis because accounting records were kept on a cost basis.
[2] Reported by the past manager of this association.
[3] Figures in parentheses are negative rates of return for the fiscal year under consideration.
[4] These cooperatives made additional acquisitions between two years after merger and their latest fiscal year.
[5] Data were not comparable with that of the acquiring association.

Two cooperatives added financing as a service, and two increased the value of inventories following merger. One cooperative integrated vertically into the marketing of farm products in addition to supplying members with production inputs. Other services added as a result of this merger included more field men to provide production information to farmers, and a market news publication.

None of the three cooperatives with a service improvement objective achieved economies of size by 1965-1966. However, all three increased their earnings on members' equities. In addition, these cooperatives maintained the number of members despite a decline in the number of farms in their operating area. Thus, these cooperatives did achieve the objective of profitably improving member services.

Barriers to Entry

In three cases, cooperatives merged to restrict entry of another firm into their operating area. In all three mergers, however, the acquired cooperatives initiated merger negotiations with the surviving cooperative.

Barriers to entry refer to the advantage which established firms possess over a potential competitor who may wish to enter a given market. Bain[12] suggests three types of barriers: (a) product differentiation, (b) superiority in production efficiency, and (c) size of firm relative to industry output. Absolute cost advantages may result from the second or third type of barrier (b or c) or a combination of the two.

In one case, a local dairy cooperative merged with another cooperative to preclude a national dairy firm from acquiring the smaller cooperative and competing for the surviving cooperative's milk supply.

In another case, a regional cooperative in financial difficulty initiated merger negotiations with another regional also affiliated with the same national farm organization. When negotiations failed, the cooperative in difficulty approached another cooperative affiliated with

[12] Joe S. Bain, Economies of scale, concentration, and the condition of entry. American Economic Review, 46:15-39, 1954.

Table 13. Volume and Price of All Producers' Class One Milk Received by Bargaining Associations as Compared to Volume and Price of Class One Milk Classified Under Federal Marketing Order, Prior and Subsequent to Merger

Year	Average negotiated price[1]	Average minimum federal order price	Average price differential	Volume of milk handled by associations	Volume of milk handled under marketing order	Percent of marketing order milk handled
	Cwt.	Cwt.	Cwt.	Pounds	Pounds	%
1957[2]	4.84	4.75	+ .09	311,127,114	321,610,151	96.7
1960[3]	4.95	4.81	+ .14	356,115,571	319,010,363	100.0[5]
1966[3]	5.34	5.29	+ .05	612,390,790[4]	543,928,816	95.0[5]

[1] Source of data: U. S. Statistical Reporting Service, Fluid Milk and Cream Report. Washington, D. C., 1957, 1960, and 1966.
[2] Before merger.
[3] After merger.
[4] About 19% processed in association plant.
[5] Part of the producers' milk was marketed under the Denver federal marketing order.

another farm organization. However, before this merger was consummated, negotiations were resumed with the regional with the same farm organization, and this merger was completed.

Two of the surviving cooperatives achieved economies of size two years after merger, and one maintained this position by 1965-1966 following additional mergers. However, only one of the three cooperatives increased its earnings in relation to investment as a result of merger.

All three cooperatives that merged to restrict entry achieved this objective.

Market and Bargaining Power

The two largest cooperatives in the sample merged to achieve market and bargaining power.[13]

A milk bargaining cooperative in the sample attempted to gain bargaining power through merger with another bargaining cooperative operating in the same area, since processors in the area had weakened the bargaining position of the two bargaining cooperatives.

One indication of the bargaining strength of a dairy bargaining cooperative is its ability to negotiate price differentials above the minimum federal order price. One year before merger, the cooperative handled 96.7% of the milk marketed under the federal order, and obtained a nine cent price differential for Class I milk (Table 13). Approximately two years after merger, this cooperative handled all of the milk marketed under the order and obtained a 14 cents per hundredweight price differential for Class I milk. However, because of supply response by producers in the area and shipments of milk into the market area from the outside, price differentials above the order price declined to five cents per hundredweight by 1966.

[13] Bargaining power is the ability to negotiate with influence to bring about a desired change. Market power is a broader concept. While bargaining power is often measured by supply control, market power is measured by strategic market structure variables such as supply control, barriers to entry, product differentiation, and the degree of buyer and seller concentration. See George W. Ladd, Agricultural Bargaining Power. (Ames: Iowa State University Press, 1964).

The data suggest that monopoly power was strengthened after merger, but the movement of milk into the area from the outside in recent years left the cooperative with a lower price differential over the order price than it had before merger. Thus, what monopoly power the cooperative once gained has subsequently been dissipated.

A large grain cooperative attempted to gain market power by merger. One of the participants in the merger operated as a grain storage and sales organization, and the other as a grain sales cooperative only. Before merger, the surviving cooperative sold 33 million bushels, compared with 9 million bushels handled and sold by the acquired cooperative. With subsequent acquisitions, the cooperative handled and sold 153 million bushels in 1966.

The surviving cooperative has received no price premium for its grain sales, which are generally made in the highly competitive national and international markets. Also, product differentiation is impossible because the cooperative sells on the basis of uniform grades and standards prevailing in the industry. The cooperative earned grain storage income under the CCC program when storage stocks were high, but this income was dissipated by the subsequent reduction in CCC stocks plus the additional elevator capacity built by this cooperative. Thus, this cooperative did not achieve its desired market power.

Other Objectives

Product diversification, source and reliability of raw materials, and facility acquisition were secondary objectives of three mergers. Cooperatives involved in these mergers achieved these objectives. A dairy cooperative acquired five processing cooperatives and one noncooperative firm to assure an adequate supply of milk. Volume handled increased from 102 million pounds prior to merger in 1958 to 162.8 million pounds in 1965, or by 60%. Another cooperative diversified to lessen income variations. The percent of savings to members' equity increased from 9.17% before merger to 26.57% in 1965. Savings as a percent of sales were 2.89% before merger, and increased to 5.61% in 1965.
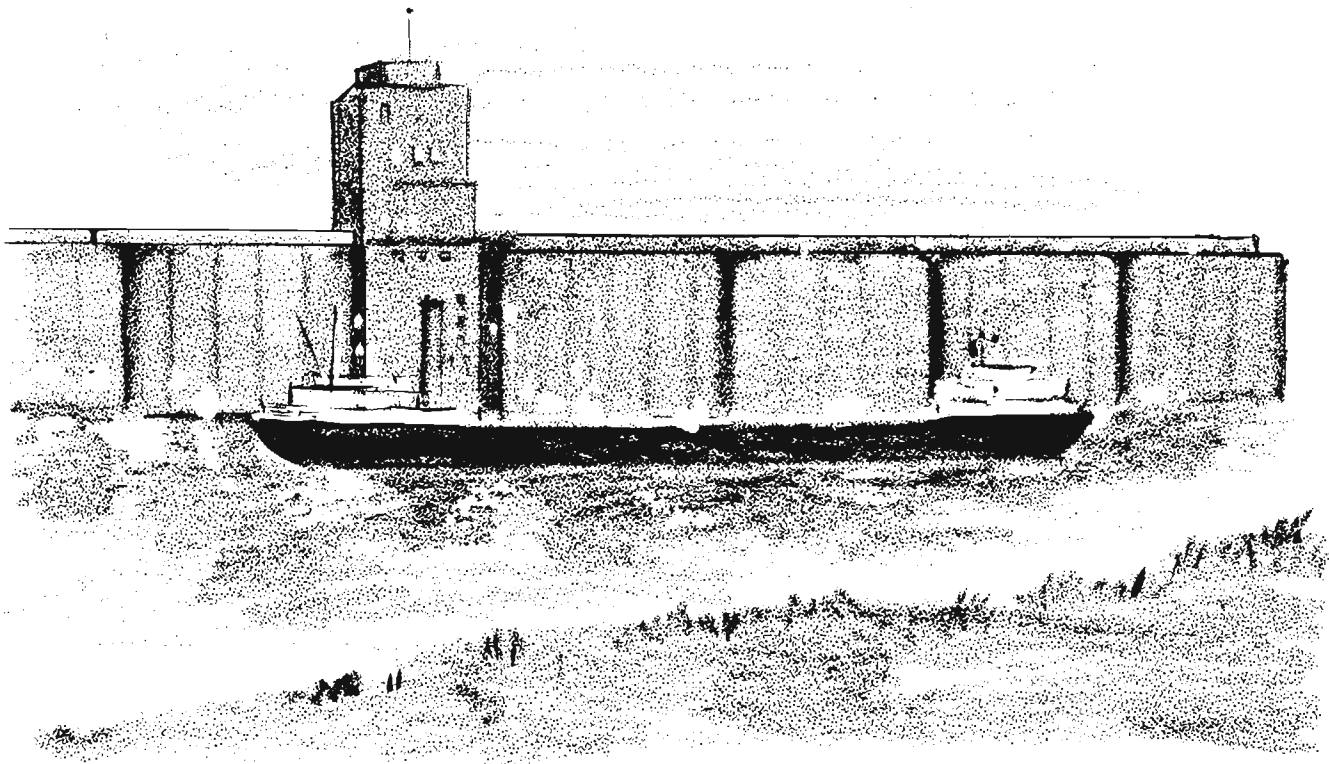
Factors Affecting Merger Objectives

The data presented indicate that although most of the cooperatives achieved their primary objectives by merger, the effectiveness of the merger on the cost structure of the surviving cooperative left 60% of these cooperatives operating at higher total unit cost than before merging. To examine reasons for this, the analysis included a study of the motives of the acquired cooperatives in seeking merger or initiating merger negotiation.

Seven of the acquired cooperatives merged with larger cooperatives because of financial problems or because of the need for additional financial strength to compete effectively. Also, seven of the acquired cooperatives merged to gain economies of size. The two problems may be related. Absence of adequate scale of operation may have left the cooperatives as high cost operations, and thereby unable to compete effectively. In turn, loss in volume could have resulted, leading to financial difficulties.

Although 50% of the *acquired* cooperatives achieved economies of size by merger, 90% of the *acquired* cooperatives gained substantially in cost reductions and increased earnings for their members. This implies that the acquiring cooperatives may not have planned their growth strategy and readily accepted mergers presented to them. Evidence from the interviews showed that only one of the ten cooperatives made an economic feasibility study of a merger prior to engaging in negotiations.

Members of nine of the acquired cooperatives received certificates of equity in the surviving cooperative equal to their net book value equity in the acquired co-

operative. Only one cooperative was appraised to determine its current marketable value, because it was a brokerage cooperative owning limited tangible assets. While accepting full book value speeds up the negotiation period, there can be important consequences to the surviving cooperative if the assets of the acquired cooperative have been impaired or are overstated.

Effect of maintaining facilities acquired by merger

Two cooperatives did not acquire assets in their merger. Of the remaining eight, five surviving cooperatives did not dispose of any of the assets of the merged cooperative. These five cooperatives did not achieve economies of size two years after the merger, and only one of these cooperatives increased its savings by internal expansion after merger. The three cooperatives that sold the assets of the merged cooperative achieved economies of size two years after merger and achieved additional economies through 1965-1966.

Thus, cooperatives that retained memberships but disposed of facilities were more likely to attain economies via merger. This result is consistent with *a priori* expectations. Those cooperatives that can reduce their average cost below the level it would be if both plants were operated are induced to dispose of the acquired facilities.

Changes in memberships as a result of merger

It is evident that competitors react to mergers. During merger negotiations, four cooperatives noted that competitors made membership raids, especially among mem-

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bers of the acquired cooperative. Local cooperatives are vulnerable during the negotiation period because of possible management conflicts and uncertainty among members due to the absence of communication. Significantly, most of the tactics of competitors, i.e., increased services, price advantages for marketed products, and lower prices on production inputs, are discontinued shortly following the merger.[14]

Cooperative memberships in marketing cooperatives have declined in recent years because of the declining number of farms and duplicate memberships caused by mergers. Five cooperatives in the sample experienced a drop in membership of between 21 and 60% from the time of merger through their latest fiscal year. One of the cooperatives lost members because of vigorous recruiting by another cooperative. Three of the five cooperatives experienced a decline because of shifting land use out of agriculture. However, two of the five were able to compensate the loss in members with substantial increases in nonmember patronage. Only those cooperatives able to maintain membership and volume were able to achieve some economies of size.

Statistical Analysis of Factors Influencing Cooperative Mergers

Because mergers among cooperatives have shown a cyclical pattern similar to all industrial mergers, it was first attempted to determine if the same factors influence both industrial and cooperative mergers.

Weston[15] identified three aggregate economic variables, on strictly logical grounds, that tend to occur simultaneously with industrial mergers: (1) industrial production, (2) stock prices, and (3) the wholesale price index. He found all variables significant at the 5% level, but stock prices, the most significant variable, have not always exhibited influence in the same direction.

Weston[16] believed that the dominant reason for merger was to achieve economies of large-scale production. Emphasis on cost reduction, however, should be during periods of cyclical contractions. From this tenet, one would expect an inverse relationship between mergers and general business activity. Similar logic should apply to cooperatives. Therefore, one would expect an inverse relationship between cooperative mergers and the level of general business activity.

A priori, farm income should influence cooperative mergers. During periods of low farm income, one would expect cooperative growth to improve the position of farmers. The impetus to the rapid expansion of agricultural cooperatives during the 1920's was to improve the economic well-being of their members. Therefore, one could hypothesize an inverse relationship between cooperative mergers and farm income.

As previously noted, the majority of the acquired cooperatives in our sample apparently merged to improve their weak financial position. To approximate factors influencing local business conditions, the business failure rate was used as a proxy variable. One would suspect a direct relationship between the business failure rate and cooperative mergers.

Another variable expected to explain variations in cooperative mergers is farm output. Farm output should vary inversely with the number of annual cooperative mergers, because as farm output falls, merger could be used to increase plant utilization.

The relationship between cooperative merger activity and the above five independent variables was analyzed, using regression analysis, for the 1920-1964 and 1947-1964 periods.

The multiple regression equations for the post-World War II period are: (Note: numbers under coefficients are student's t values. An asterisk (*) denotes $.05 < p < .10$; (**)$.01 < p < .05$; and (***) $p < .01$, two-tail test.)

$$\hat{Y}_1 = 137.53 + .194X_1 + 2.388X_2 + 10.291X_3 + 1.685X_4 \quad (1)$$
$$\phantom{\hat{Y}_1 = 137.53} (.196) \quad (3.149)^{***} \quad (2.941)^{**} \quad (1.861)$$
$$-3.166X_5$$
$$(-2.095)^*$$

$S_{y.x} = 14.18$
$R^2 = .64$

$$\hat{Y}_2 = 122.15 - .133X_1 + 2.075X_2 + 8.957X_3 + .523X_4 \quad (2)$$
$$\phantom{\hat{Y}_2 = 122.15} (-.110) \quad (2.244)^* \quad (2.101)^* \quad (.474)$$
$$-2.184X_5$$
$$(-1.131)$$

$S_{y.x} = 17.28$
$R^2 = .43$

$$\hat{Y}_3 = 429.74 - 1.275X_1 + 17.012X_2 + 3.086X_4 \quad (3)$$
$$\phantom{\hat{Y}_3 = 429.74} (-.224) + (4.105)^{***} \quad (.955)$$

$S_{y.x} = 95.85$
$R^2 = .90$

where $\hat{Y}_1 =$ number of agricultural cooperative mergers with other cooperatives per year,
$\hat{Y}_2 =$ number of agricultural cooperative mergers with other cooperatives and noncooperatives per year,
$\hat{Y}_3 =$ number of industrial mergers per year,
$X_1 =$ nondurable industrial production index (1957-1959 = 100),
$X_2 =$ Standard and Poor's Industrials (425 stocks: 1941-1943 = 100),
$X_3 =$ farm income from farm sources in billions of dollars,
$X_4 =$ business failure rate per 10,000 firms, and
$X_5 =$ total farm output of crops and livestock and products (1957-1959 = 100).

[14] Jerome W. Hammond and Hugh L. Cook, *op. cit.*, p. 29.
[15] Fred J. Weston, *The Role of Merger in the Growth of Large Firms.* (Berkeley: University of California, 1953), p. 80.
[16] *Ibid.*, p. 79.

Multiple regression equation (1) shows that 64% of the variation in the number of mergers among co-operatives is explained by the variation in the five independent variables. Stock prices, farm income, and farm output are significant variables at the 1, 5, and 10% significance levels, respectively. The signs on the regression coefficients are consistent on logical grounds except for industrial production and farm income; industrial production is an insignificant variable, so little reliability can be attached to the sign of the regression coefficient. *Ceteris paribus,* as farm income increases by one billion dollars, 10 additional cooperative mergers occur.

In equation (2), the same five exogenous variables explain 43% of the variation in the number of noncooperatives and cooperatives merged or acquired by cooperatives. The signs are consistent with the tentative hypotheses, but the sign on farm income is positive rather than negative. Farm income and stock prices are the only significant variables, but only at the 10% significance level.

Industrial mergers are highly correlated with stock prices (equation 3). Industrial production, stock prices, and the business failure rate explain 90% of the variation in the number of all industrial mergers. The signs on the variables are consistent, but the only significant variable in the equation is stock prices, which is significant at the 1% significance level.

For the postwar period, the equations indicate that mergers do not occur generally during difficult times in agriculture to obtain cost reductions, but occur during periods when business expectations appear good and farm income is high. However, it is observed from the equations that stock prices and farm income do not explain the majority of the variations in the number of cooperative mergers. Other factors not associated with the variables included in the regression equations may be important. Other possible variables may be of local significance only. Stock prices alone, however, explain 82% of the variation in industrial mergers.

Multiple regression analysis based on the same exogenous variables, but for a longer time period, 1929-1964, shows results similar to those for the postwar period. Thus, in summary:

1. Industrial production is not significant in any of the regression equations. This indicates that the hypothesis that economies of scale should be evident during periods of contracting business activity must be rejected. Although the 10 sample cooperatives listed economies of size as a merger objective, few acquiring cooperatives achieved this objective. The statistical evidence supports these empirical findings.

2. Cooperative mergers are not highly correlated with the business failure rate. Although the sign of this coefficient is generally positive, indicating that cooperative mergers generally increase with the business failure rate, this variable was not significant. The coefficient suggests that most mergers occur during prosperous periods. Perhaps this variable would have been significant if the data on cooperative mergers had been lagged for a year or two, since observation suggests farmers tend to move conservatively with regard to decisions affecting cooperative terminations.

3. Cooperative mergers appear to occur during periods when expectations (stock prices) and farm income are high. This conclusion is contrary to Mueller's finding.[17]

4. Farm output is negatively correlated with cooperative mergers (equation 1). As farm output decreases, one would expect the number of mergers to increase. However, the cost studies and the regression analyses question the existence of significant economies of size via merger.

The aggregate economic variables and aggregate farm variables explain some of the variations in the number of cooperative mergers, but it is possible for local conditions such as restricting entry and duplicate memberships to have effects that are not correlated with aggregate variables.

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[17] Willard F. Mueller, *op. cit.,* p. 12.

Impact of Merger on the Growth of Agricultural Cooperatives

The absolute numbers of mergers among cooperatives give an indication of the extent of merger activity. But the full impact of mergers on cooperative growth can be analyzed only by examining the relative amount that cooperatives have grown by external means.[18] Even though the measures of the relative impact of mergers on the growth of cooperatives are not very precise, they are useful to provide a general indication. In this section, we examine the amount of external cooperative growth, and the rate of growth of these cooperatives. Growth was measured by sales and total assets.[19] Data on the growth of agricultural marketing and purchasing cooperatives were made available from the History and Statistics Branch of the Farmer Cooperative Service.

A complete enumeration was taken of all cooperatives that merged between 1940 and 1964, as recorded by the Farmer Cooperative Service. This enumeration included 434 local cooperatives and 139 regional cooperatives,[20] which is only about one-half of the number of mergers recorded by Mueller[21] and the Farmer Cooperative Service between 1940 and 1964.[22] The method used to isolate the merger component of growth tends to minimize the effects of the lack of data on all cooperatives. It has been minimized by taking the average size of all acquisitions or mergers as a percent of the average growth of all cooperatives between 1940 and 1964. This procedure measures only the direct effects of merger and does not take into account the acquired cooperative's impact on future growth. Table 14 shows estimates of the extent to which the overall growth of agricultural cooperatives was due to external growth.

The direct effect of cooperative mergers with cooperatives between 1940 and 1964 was to increase the size of all cooperatives by 6.9%. Cooperative mergers accounted for 8.6% of the growth of marketing cooperatives, but only 1.5% of supply cooperatives.[23]

The number of noncooperatives acquired by cooperatives has fallen sharply since 1955. Mueller estimated that noncooperative mergers between 1940 and 1955 contributed 6.6% of total cooperative growth; for marketing cooperatives, 4.1%, and for supply cooperatives, 15.2%.[24]

Therefore, if mergers among cooperatives between 1940 and 1964 account for 6.9% of cooperative growth, and Mueller's estimate of noncooperative growth from acquiring noncooperatives remained at 6.6% since 1955, external growth would have contributed 13.5% of cooperative sales.[25] Thus, cooperatives have relied mainly on internal rather than external growth.

Of the local cooperatives that grew by external means, the proportion of external growth to total growth was 31.7% in terms of deflated sales, and 61.1% in assets (Table 15). The data in Table 15 are somewhat less reliable than sales because some cooperatives may retain membership volume, but dispose of part or all of the acquired assets in a merger. The negative growth percentages shown in Table 15 for dairy and livestock cooperatives suggests that these cooperatives have experienced a decline in assets between 1940 and 1964, reflecting possible excess plant capacity and facilities.

Acquiring regional cooperatives experienced only one-eighth of their sales volume and assets through mergers between 1940 and 1964 (Table 16), considerably less than local cooperatives did. This may be explained by greater excess capacity or more obsolete facilities at the local level, whereas at the regional level many mergers are for purposes of acquiring distribution or processing facilities.

Relative Growth of Merging Versus Nonmerging Cooperatives

Comparisons were made to determine whether the 434 local cooperatives that had been involved in mergers grew at a different rate compared with a 10% sample of all local cooperatives (with 732 local cooperatives in the sample). These comparisons show that cooperatives engaged in external growth grew at an average annual

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[18] In this bulletin internal growth refers to expansion by the cooperative's construction of its own facilities, by increasing membership or business volume, or by developing its own markets. External growth refers to expansion by merger, aquisition, or consolidation. Internal and external growth are not synonomous with internal and external financing. Our definitions are not concerned with the origins of the funds to finance growth.

[19] For an excellent discussion of the measures of firm growth, see Fred J. Weston, *op. cit.*, pp. 122-125; and Gertrude G. Schroeder, *The Growth of Major Steel Companies, 1900-1950* (Baltimore: Johns Hopkins University, 1952), Studies in Historical and Political Science, ser. 70, No. 2.

[20] For the definition of local and regional cooperatives, see Bruce L. Swanson, Statistics of Farmer Cooperatives, 1963-1964. USDA, Farmer Cooperative Service, General Report 134, p. 68.

[21] Willard F. Mueller, *op. cit.*

[22] In this study only mergers recorded by the Farmer Cooperative Service were used because sales volume data were available from this source. Had we supplemented FCS records, such data would have been incomplete. This explains the difference in numbers of mergers reported by Mueller for his analysis.

[23] Mueller estimated that between 1940 and 1955, mergers among cooperatives accounted for 4.1% of all cooperative growth, 3.6% of marketing cooperatives' growth, and 5.9% of supply cooperatives' growth. *Ibid.*, p. 31.

[24] *Ibid.*, p. 31.

[25] Mueller's estimate is probably an overestimate of cooperative growth from acquisitions of noncooperatives for use between 1960 and 1964 because of the declining number of noncooperative acquisitions that have been made in these years.

Table 14. Relative Importance of Acquisitions in the Growth of Cooperatives, United States, 1940-1964[1]

| Type of cooperative | Gross sales of cooperatives | | Growth in sales 1940-1964 | Amount of acquisitions 1940-1964 | Amount of growth due to merger |
	1963-1964[2]	1939-1940[2]			
	Mil. dollars	Mil. dollars	Mil. dollars	Mil. dollars	%
Marketing[3]	15,437	4,186	11,251	964	8.6
Supply[4]	4,266	762	3,504	54	1.5
All cooperatives	19,703	4,948	14,755	1,018	6.9

[1] These data are for cooperatives acquired by cooperatives only.
[2] Sales data between 1939-1940 and 1963-1964 are not comparable since figures prior to 1950-1951 were neither net nor gross sales.
[3] Deflated by prices of farm products 1957-1959 = 100.
[4] Deflated by prices paid by farmers 1957-1959 = 100.

Table 15. Relative Importance of Acquisitions in the Expansion of Local Agricultural Cooperatives, United States, 1940-1964[1]

| Commodity | Number of cooperatives | Total growth due to acquisitions | |
		Sales[2]	Assets
		%	%
Cotton	6	12.16	99.97
Dairy	83	18.27	−434.55[3]
Fruit	31	67.29	772.09
Vegetable	7	26.89	45.24
Grain	139	9.48	14.83
Livestock	11	71.61	−520.21
Wool and mohair	5	−6.13	−953.53
Miscellaneous marketing[4]	1	.12	.10
Farm supply	146	24.32	34.66
Total, all local associations	......	31.71	61.13

[1] These data do not include service cooperatives. Also, these data are for mergers among cooperatives only.
[2] Sales figures are deflated by the wholesale price index for each commodity class.
[3] A negative growth rate as measured by total assets implies that the average growth rate of cooperatives in these commodity groups between 1940-1964 has been declining even though they have acquired additional assets.
[4] Miscellaneous marketing includes flax, flowers, fur, hay, seed, and tung oil associations.

Table 16. Relative Importance of Acquisitions in the Expansion of Regional Agricultural Cooperatives, United States, 1940-1964[1]

| Commodity | Number of cooperatives | Total growth due to acquisitions | |
		Sales[2]	Assets
		%	%
Cotton	5	5.78	18.67
Dairy	53	15.20	11.03
Fruit and vegetable	5	30.59	25.51
Fruit	11	97.16	15.82
Vegetable	3	1.73	.12
Grain	7	4.30	2.22
Livestock	7	2.20	1.70
Poultry	2	−71.11	83.50
Dry bean and pea	1	.94	.31
Rice	1	15.09	30.88
Sugar products	1	.46	1.25
Farm supply	38	7.30	16.42
Total, all regional associations	......	12.80	12.05

[1] These data include mergers among cooperatives only.
[2] Sales figures are deflated by the wholesale price index for each commodity class.

rate of 5.64% between 1940 and 1964, compared with a 3.58% growth rate in sales for local cooperatives growing only internally (Table 17). If total assets are used as a measure of growth, merging cooperatives grew at an average annual rate of 9.94%, compared with 8.99% for nonmerging cooperatives. Thus, cooperatives that have used external means of growth have experienced more rapid growth than cooperatives that have relied only on internal expansion.[26]

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[26] A one-tailed t-test was used to test the hypothesis that, on the average, merging cooperatives do not grow faster in sales volume than nonmerging cooperatives. At the 5% significance level, the critical region is t > 1.714. The computed t-value is 2.302, which is in the critical region. Therefore, the hypothesis is rejected.

Since mergers occurred over the period of analysis, some internal growth is included between 1940 and the time of merger. By eliminating the internal growth of those cooperatives that merged, the average rate of growth after merger dropped to 5% annually between 1940 and 1964. This infers that cooperatives that grow by merger were growing at a faster rate internally before merger than after merger.

Regional cooperatives involved in mergers grew in sales at an average annual rate of 4.65%. Regionals that grew entirely by internal expansion averaged 6.7% annually (Table 18). If the internal growth factor is eliminated from total growth, the merging regional cooperatives grew at an average annual rate of 4.29%. Thus, regional cooperatives that grew internally grew at a faster rate, on the average, than cooperatives that grew with mergers. As with local merging cooperatives,

Table 17. Comparison of Average Growth Rate, Measured in Sales and Total Assets, of Merging and Nonmerging Local Cooperatives, United States, 1941-1964

| Year | Growth rate of merging cooperatives | | Growth rate of nonmerging local cooperatives | |
	Sales	Total assets	Sales	Total assets
	%	%	%	%
1941	3.325	28.756	2.748	–21.378
1942	9.751	5.446	7.995	1.512
1943	11.855	11.168	6.207	12.497
1944	20.484	40.866	5.910	6.279
1945	5.846	–10.234	1.609	33.189
1946	–.905	28.201	5.283	41.156
1947	3.104	18.735	1.237	13.799
1948	4.624	16.885	.639	9.293
1949	5.541	–4.602	6.197	.610
1950	–8.359	7.842	–6.887	3.011
1951	–1.637	5.958	3.113	12.810
1952	6.797	12.127	1.864	11.843
1953	3.828	1.779	4.624	5.198
1954	–.127	9.271	–.578	3.312
1955	9.858	11.349	4.572	2.298
1956	9.821	7.212	2.309	4.682
1957	4.742	6.863	5.005	8.322
1958	7.331	10.649	5.594	7.667
1959	8.766	15.785	6.334	14.511
1960	7.337	2.957	4.460	4.663
1961	3.545	7.038	5.132	6.283
1962	7.125	6.208	.022	8.089
1963	4.968	–4.109	7.837	5.712
1964	7.619	2.414	4.647	20.319
Average growth rate (1941-1964)	5.635	9.940	3.578	8.986
Standard deviation	5.44		3.24	

Table 18. Comparison of Average Growth Rate Measured in Sales of Merging and Nonmerging Regional Cooperatives, United States, 1941-1964

Year	Growth rate of merging cooperatives (sales)	Growth rate of nonmerging cooperatives (sales)
	%	%
1941	12.480	–33.652
1942	–3.780	84.923
1943	19.947	19.965
1944	20.074	35.945
1945	3.601	–7.521
1946	–7.202	–1.007
1947	–3.353	–44.336
1948	–1.239	54.369
1949	7.227	17.507
1950	–3.304	–19.886
1951	–5.538	14.339
1952	9.633	–6.679
1953	9.991	–10.306
1954	2.803	4.089
1955	1.870	1.816
1956	1.972	–7.680
1957	3.985	7.892
1958	3.157	14.440
1959	9.091	6.444
1960	2.827	4.121
1961	7.385	1.083
1962	2.346	7.951
1963	8.313	–2.215
1964	9.287	16.059
Average growth rate (1941-1964)	4.649	6.572
Standard deviation	7.11	26.18

regional merging cooperatives had a faster rate of growth before merger than after merger.[27]

A comparison of the average annual growth rates of regionals between 1940 and 1964, by type of organization, shows that federated cooperatives grew more rapidly than centralized cooperatives. Also, centralized cooperatives grew faster than mixed cooperatives (Table 19).[28] Nonmerging regional cooperatives, regardless of type of organization, grew more rapidly than merging cooperatives.

Even though the rate of growth of internal growth regionals has been larger than their merging counter-

Table 19. Comparison of Average Growth Rate Measured in Sales of Merging and Nonmerging Regional Cooperatives, by Type of Organization, United States, 1941-1964

| Type of organization | Merging cooperatives | | Nonmerging cooperatives | |
	Number of cooperatives	Average rate of growth	Number of cooperatives	Average rate of growth
		%		%
Centralized	65	4.89	44	5.90
Federated	39	6.49	9	8.41
Mixed	35	4.51	6	6.63[1]

[1] Mixed cooperative growth from 1951 to 1964.

[27] This comparison may be misleading for regionals, because they can grow externally through centralization or federation with other cooperatives through contractual arrangements. This growth, technically external growth, is not taken into account. Thus, it is possible for so-called internal growth cooperatives to have grown more externally via contracts than the merging cooperatives did by merger.

[28] The same limitation expressed in the preceding footnote applies to this comparison.

parts, the variability of the internal growth cooperatives was more than three times the variation in the rate of growth of merging regional cooperatives (Table 18). The variation in the growth rates among local cooperatives was the opposite of regional cooperatives. The standard deviation in the external growth rate of locals between 1941 and 1964 was 5.44%, compared to 3.24% among internal growth cooperatives.

Future Size Distribution of Local and Regional Cooperatives

The statistical procedure of Markov chains[29] was used to project the future growth of cooperatives, based on the number and size distribution of cooperatives existing in 1956. The Markov process allows for entry into and departure from the industry, and this modification was incorporated into the model.

The Markov process was used to observe the future growth pattern of local marketing and supply cooperatives that grew by external means as contrasted to cooperatives that grew entirely by internal means.[30] Assuming a continuation of factors influencing cooperative operations since 1956, results show that cooperatives using merger as a means of growth and which have annual sales greater than four million dollars have a remote chance of disappearing. The same conclusion held for internal growth cooperatives with annual sales greater than 1.2 million dollars. The analysis also shows that the larger the size of the cooperative, the higher is the probability of increasing in size. The most likely cooperatives to exit and enter are ones with small volumes.

The Markov process indicates only a gradual trend for fewer local cooperatives (Table 20). It is estimated that the number of local cooperatives will decrease from 7,418 in 1964 to 7,238 in 1980, or only 2.4%. In the size class of less than .8 million dollars of annual sales, the number of local cooperatives are projected to decrease by almost 31% between 1964 and 1980. In contrast to this, local cooperatives with annual sales greater than 6.4 million dollars are estimated to increase by 350% over the same period. This does not imply the start of substantial numbers of large cooperatives, but emphasizes the growth potential for large local cooperatives.

The analysis shows that the total number of local cooperatives will decrease in number, with merger accounting for about 50% of the cooperatives disappearing in the size category of less than .8 million dollars of sales. Both internal and external growth cooperatives have inherent growth tendencies that will increase the number of cooperatives in all of the size classes above 1.59 million dollars for cooperatives using external growth and above .79 million dollars for other local cooperatives.

Regional cooperatives also show good growth potential, with larger regionals possessing relatively greater potential than smaller regionals. The likelihood of entry of new regionals is small, but the probability of a regional cooperative with annual sales of less than 10 million dollars merging or leaving business is only 35%.

The predicted number of regional cooperatives in 1972 and 1980 is given in Table 21. The projected total number of regional cooperatives shows a decrease of 280 cooperatives, or 42%, between 1964 and 1980. Disappearance will be primarily from among the smaller volume regionals. The number of regionals with sales greater than 80 million dollars annually are projected to increase by 252%.

The analysis by Markov chains shows that under existing conditions the vitality of farmer cooperatives in the United States is great. Projections are based on some reasonable relationship of the factors that have existed since 1965 continuing through the 1970's. From this assumption, the analysis indicates there will be fewer but larger cooperatives, with smaller cooperatives being forced to merge or liquidate their operations. The evidence suggests regional cooperatives can grow as effectively and rapidly through internal expansion as by merger, assuming no major changes in competitive factors. This may be a heroic assumption, because of the recent entry of new firms and conglomerates in some distribution fields, and a shortening of distribution lines between manufacturers and users. Local cooperatives that have used external growth are expected to grow only slightly more rapidly than those using only internal growth.

Policy Implications

Two policy implications result from this research. The first involves merger planning, and the second involves national policy.

Benefits are not generated automatically from the combination of two firms. Planning and evaluation are necessary to achieve merger objectives. Wallace states that merger principles differ little from good management principles. His three basic principles are: (a) development of specific, realizable operating objectives before the merger is consummated; (b) development of a positive program for achieving operating benefits through controls, and integrating common functions; and (c) provision of necessary leadership, creation of an atmosphere for change, and the readiness to give an acquisition (or merger) the time it needs.[31]

Generally, many cooperatives have not planned their mergers. Only the largest cooperative in the sample of 10 cooperatives made an economic study of the benefits and costs of acquisition. An improvement in the evaluation of specific mergers could possibly either increase

[29] For an explanation of Markov chains, see G. G. Judge and E. R. Swanson, Markov Chains: Basic Concepts and Suggested Uses in Agricultural Economics, Research Report AERR 49, Illinois Agric. Expt. Sta., 1961.

[30] For a complete treatment of this subject, including transition probability matrices, see Gail Latimer Cramer, An Economic Analysis of the Merger Component in the Growth of Agricultural Cooperatives, unpublished doctoral dissertation, Oregon State University, 1968.

[31] Forest D. Wallace, Some principles of acquisition. In: *The Corporate Merger,* ed. by William W. Alberts and Joel E. Segall. (Chicago: University of Chicago, 1966), pp. 166-178.

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Table 20. ESTIMATED NUMBER OF LOCAL COOPERATIVES PER SIZE CLASS, UNITED STATES, 1972 AND 1980

Year	Size category[1]									
	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	Total
1956[2]	5,921	1,136	371	143	46	69	16	5	43	7,750
1964[2]	4,596	1,589	597	244	169	80	46	5	92	7,418
1972	3,752	1,626	821	343	267	127	98	39	220	7,290
1980	3,178	1,548	922	422	355	205	147	47	414	7,238

[1] Size categories based on annual sales in millions of dollars for merging and nonmerging cooperatives, respectively, are: S_1 0-.79, 0-39; S_2, .8-1.59, .4-.79; S_3, 1.6-2.39, .8-1.19; S_4, 2.4-3.19, 1.2-1.59; S_5, 3.2-3.99, 1.6-1.99; S_6, 4.0-4.79, 2.0-2.39; S_7, 4.8-5.59, 2.4-2.79; S_8, 5.6-6.39, 2.8-3.19; S_9, 6.4 and greater, 3.2 and greater.
[2] Actual number of cooperatives calculated from a 10% sample of merging and nonmerging local cooperatives.

Table 21. ESTIMATED NUMBER OF REGIONAL COOPERATIVES PER SIZE CLASS, UNITED STATES, 1972 AND 1980

Year	Size category[1]									
	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	Total
1956[2]	691	102	35	19	5	3	2	4	13	874
1964[2]	441	67	45	39	13	25	3	2	25	660
1972	237	42	42	44	10	34	7	2	53	417
1980	143	25	34	41	7	33	7	2	88	380

[1] Size categories in millions of dollars are: S_1, 0.-9.99; S_2, 10-19.99; S_3, 20-29.99; S_4, 30-39.99; S_5, 40-40.99; S_6, 50-59.99; S_7, 60-69.99; S_8, 70-79.99; S_9, 80 or more.
[2] Actual number of cooperatives calculated from a 10% sample of merging and nonmerging regional cooperatives.

the benefit from mergers, or increase the liquidation rate of smaller cooperatives having financial difficulties. In either case, agricultural producers should benefit substantially. Also, it is apparent that few merging cooperatives have a plan for growth. Such planning should be helpful in recognizing growth opportunities for cooperatives.

A primary objective of this research was to determine how successful cooperative mergers have been in achieving their pre-merger objectives. The specific question of how closely the objectives of merging cooperatives coincide with those of society in general was beyond the scope of the study. However, the findings do enable us to draw inferences which should be useful for policy decisions.

Mergers comprised in the case studies were largely initiated by the acquired cooperatives, which were mostly small, undercapitalized, and in operational difficulty. Because of their small size and general ineffectiveness, it is questionable whether their continued existence would ensure maintaining effective competition at local levels. The increased market concentration which resulted from their merger with stronger cooperatives was not deemed significant, with but one exception. Failure of the sample cooperatives to achieve economies of size following merger was due mainly to their failure to dispose of excess facilities acquired. Cooperatives which disposed of acquired facilities achieved economies of size. Thus, the potential of economies of size was

present, even though management of a majority of the cooperatives in the sample did not appear to have planned adequately to achieve such economies.

". . . antitrust laws seldom block small and medium size concerns from going out of business via the merger route, although they may rule out certain prospective buyers."[32] According to Mueller, "less than 2% of the over 9,000 mergers reported during the past six years have been the subject of antitrust cases,"[33] indicating a high degree of selectivity in challenging mergers by antitrust agencies.

Because the main objective of cooperative mergers was to achieve economies of size, thereby improving performance at local levels of aggregation, it is likely that the vast majority of cooperative mergers of the types studied have encouraged the survival and growth of small and medium size businesses. Many otherwise would not have been able to compete effectively with the large, integrated firms in most industries represented in this study. Public policy should be continued to permit such mergers among cooperatives. This would ensure effective competition in local markets and prevent excessive concentration of market power among surviving firms.

[32] Statement of W. F. Mueller before the Select Committee on Small Business, U. S. Senate, March 15, 1967, p. 4.
[33] *Ibid.*

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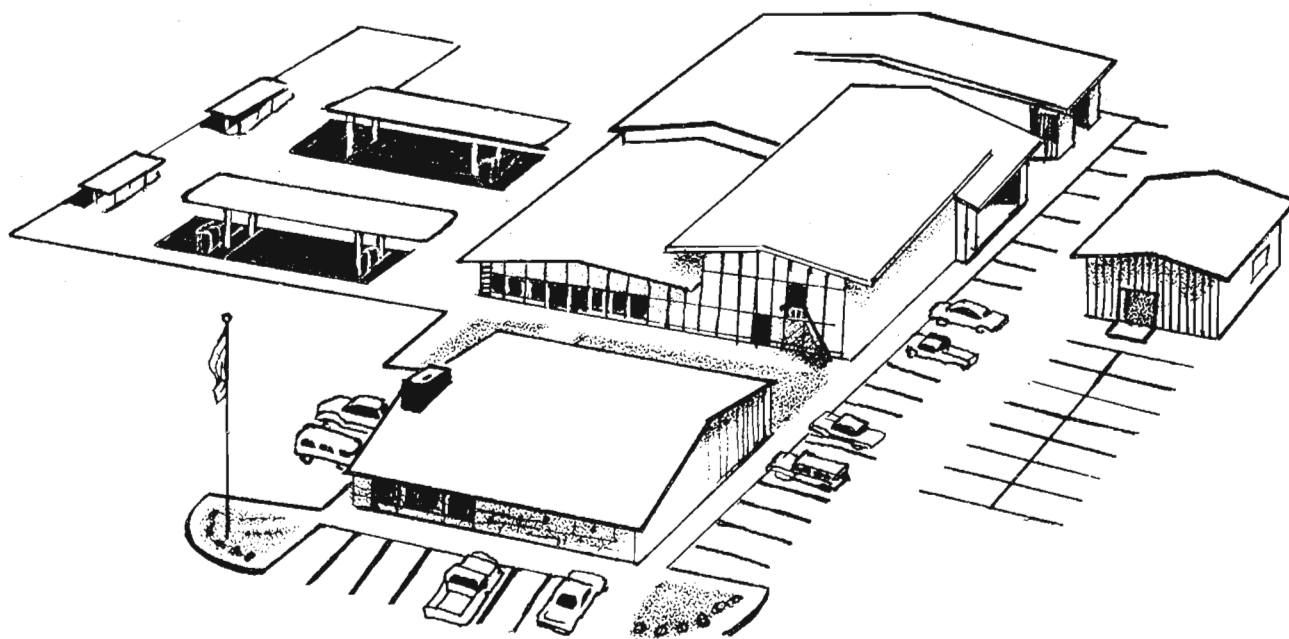
Summary and Conclusions

The purpose of this study was to determine the *ex ante* objectives of mergers among agricultural cooperatives, to determine the extent to which these objectives were achieved via merger, and to identify factors that were instrumental in the success or lack of success in equating *ex ante* objectives and *ex post* merger results. Also, the impact of mergers on past and future growth of agricultural cooperatives was examined.

To analyze the objectives and operating results of specific cooperative mergers, a 10% sample was taken of all cooperatives in the United States that acquired another cooperative between 1956 and 1960. Cost studies from internal records of the firms provided the necessary data to analyze actual merger accomplishments. Deviations between pre-merger objectives and post-merger operating results were studied from intensive case interviews and multiple regression analyses.

Empirical results indicated that all acquiring cooperatives were motivated to grow by merger to attain economies of size; however, only 50% of these cooperatives achieved this objective two years subsequent to merger and only 40% of the sampled cooperatives achieved this objective by their latest fiscal year (5 to 12 years after merger). In addition, most acquiring cooperatives did not increase their rate of return on investment after merger. However, almost all of the smaller acquired cooperatives achieved substantial economies of size and increased their rate of return to their members considerably after merger.

Acquiring cooperatives that merged to improve member patron services, to increase barriers to entry, to obtain additional facilities, or to diversify their operations, generally achieved their objectives. Acquiring cooperatives that attempted to gain market or bargaining power failed to attain their objective because of changes in technology, supply response of producers, and the structure of the market.

The Farmer Cooperative Service, USDA, provided growth data on 434 local and regional cooperatives that used external growth and on 791 local and regional associations that used strictly internal growth. A comparison of the average growth rates of external growth and internal growth locals showed no statistically significant difference. Conversely, regionals growing only by internal expansion grew at a faster average rate than regional cooperatives that grew in part by merger. This was true regardless of whether the comparison was made between federated, centralized, or mixed types of regional organization.

External growth accounted for an average of approximately one-third of the growth of local cooperatives using merger between 1940 and 1960. However, external growth accounted for only one-eighth of the growth of regional associations using merger over the same time period.

Multiple regression analysis suggests that cooperative mergers occur during periods when stock prices (expectations) are high and during periods when farm

income is favorable rather than during depressed periods of economic activity in agriculture. Cooperative merger activity is not closely associated with the business cycle, nor do cooperative mergers occur when other business firms are failing.

Two policy implications are derived from the study. The first relates to the need for improved merger planning. Cooperatives need to determine the economic feasibility of mergers before concluding negotiations, including pro forma cost and benefit projections. The second relates to antitrust policy. Since most acquired and acquiring cooperatives are small by any measure of firm size, and most cooperative mergers are occurring on "competitive fringes" of oligopolistic markets, there appears to be little need for applying antimerger legislation to maintain "competitive" markets.