USDA

Grain Cooperative Mergers and Acquisitions, 1993-97

Abstract

RBS began keeping detailed statistics on mergers, acquisitions, consolidations, bank-ruptcies, and other "M/C" activities in 1993. Of the 367 events involving grain coopera-tives, most occurred in recent years (53 percent in 1996 and 1997), and among coop-eratives having less than $15 million in total sales (63 percent). These cooperatives were located principally in the heartland. Eighty-seven percent occurred in either the Corn Belt or the Southern Plains. Almost 70 percent (252 of 367) involved coopera-tives merging with another. A small number of cooperatives either merged with (9) or were acquired by (18) investor-owned-firms.

This report analyzes the operational and financial characteristics of the cooperatives that were merged or consolidated (M/C) during 1993-97. The report also frames M/C and surviving cooperatives in the context of agriculture's economic restructuring. Lessons learned provide insights to the challenges that lie ahead for grain coopera-tives hoping to thrive.

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Executive Summary

The goal of this study was to answer some questions about the financial health of grain cooperatives involved in mergers, acquisitions, and the other related activities. Compared were cooperatives involved with counterparts and those merged with or acquired by investor-owned firms (IOFs).

Grain cooperative balance sheets and operating statements were used to construct a set financial ratios. They were used to compare M/C cooperatives with national averages for grain cooperatives of their same relative size. Selected ratios represent four general aspects of a business: profitability, liquidity, efficiency, and solvency.

An economic model was also constructed to evaluate the likelihood of a grain cooperative going out of business in the near term given its financial performance record. A three-variable "best fit" was selected from among the 14 ratios using the score criterion for each of two size groups. Maximum likelihood estimates, related statistics, and an interpretation of the "best fit" model for each group are provided.

This report discusses M/C and surviving cooperatives in the context of agriculture's economic restructuring. Lessons learned provided insights to the challenges that lie ahead for grain cooperatives in an increasingly competitive environment.

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Grain Cooperative Mergers and Acquisitions, 1993-97

Anthony Crooks
Agricultural Economist
Rural Business-Cooperative Service

USDA's Rural Business-Cooperative Service has kept detailed statistics mergers,[1] acquisitions,[2] consolidations,[3] bankruptcies, and other related (M/C) activities since 1993 (table 1). For the 5-year period 1993-97, there were 367 M/C events out of an average of 997 grain cooperatives (or 7.3 percent/year). Most (198) occurred in 1996 and 1997 and among cooperatives having less than $15 million in total sales (64 percent).

Most activity was located principally in the grain producing heartland – 87 percent in the Corn Belt and Southern Plains regions (table 2). Of the 367 cooperatives that were merged and consolidated, 330 had total sales of at least $5 million and were located in the principle grain producing regions. This report focuses on the 330 cooperatives.

Figure 1 shows the number of cooperatives involved in each type of activity. Almost 74 percent (246 of 330) involved cooperatives that merged with one another. A limited number of cooperatives were either merged with (8 of 330) or acquired by (14) investor-owned firms (IOFs).

Grain Cooperative Characteristics

Storage Capacity — During 1993-97, grain cooperatives with total sales of at least $15 million had an average storage capacity of just over 4.6 million bushels (table 3). They conducted business from at least 4 elevator locations, employed an average 51 full- and part-time workers, and owned at least 1 unit-train loading facility. While M/C grain cooperatives of the

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[1] Control of different cooperatives (corporations) is vested into a single one by issuing of stock in the controlling organization in place of a majority of stock in the other(s) without dissolution of the consolidating companies.

[2] The assets of one cooperative (corporation) are purchased by another using either cash or other assets.

[3] Control of different cooperatives (corporations) is vested into a single one by issuing of stock in the controlling organization in place of a majority of stock in the other(s) and the dissolution of the consolidating companies.

Table 1—Number of Grain Cooperatives In and Out of Business, 1992-97, by Year and Size in Total Sales

	Grain cooperative size in Total Sales					Grain cooperative size in Total Sales			
Year	$15 million or more	Between $5 and $15	Less than $5 million	ALL	Year	$15 million or more	Between $5 and $15	Less tha $5 million	ALL
	Number of cooperatives "In Business"					Number of cooperatives "Out of Business"			
1992	419	570	204	1,193					
1993	405	537	203	1,145	1993	14	33	1	48
1994	384	495	191	1,070	1994	21	42	12	75
1995	370	463	191	1,024	1995	14	32	0	46
1996	326	408	186	920	1996	44	55	5	104
1997	286	357	183	826	1997	40	51	3	94
Average	354	452	191	997	Total	133	213	21	367

same size operated from the same number of elevator locations, they had 24 percent less capacity, employed 11 fewer workers, and had 2 load-out facilities. Grain cooperatives with total sales between $5 million and $15 million had just over 3.6 percent greater capacity than those which were merged or consolidated.

Balance Sheet — Grain inventory among all large cooperatives averaged slightly greater than $3.5 million during the 5 years (table 4) . Farm supply inventory averaged about $1.7 million. Total inventory averaged just under $5.2 million. While the large M/C cooperatives had 9.4 percent more grain inventory, they carried 40.4 percent less farm supply inventory. Total inventory averaged $4.8 million, or 6.6 percent less.

Medium-sized grain cooperatives carried an average grain inventory valued at $698,428 or 32.8 percent ($927,321) less than their M/C counterparts and

Table 2—Number of Grain Cooperatives Out of Business, 1993-97, by Region and Size

	Grain Cooperative Size by Total Sales			
Region	$15 million or more	Between $5 and $15 million	Less than $5 million	ALL
	Number of cooperatives "Out of Business"			
Corn Belt	102	156	12	270
Southern Plains	8	40		48
Norhtern Plains	15	4	7	26
Pacific Northwest	1	4		5
Other	7	9	2	18
Total	133	213	21	367

Figure 1—Grain Cooperatives "Out of Business," by Reason, 1993-97
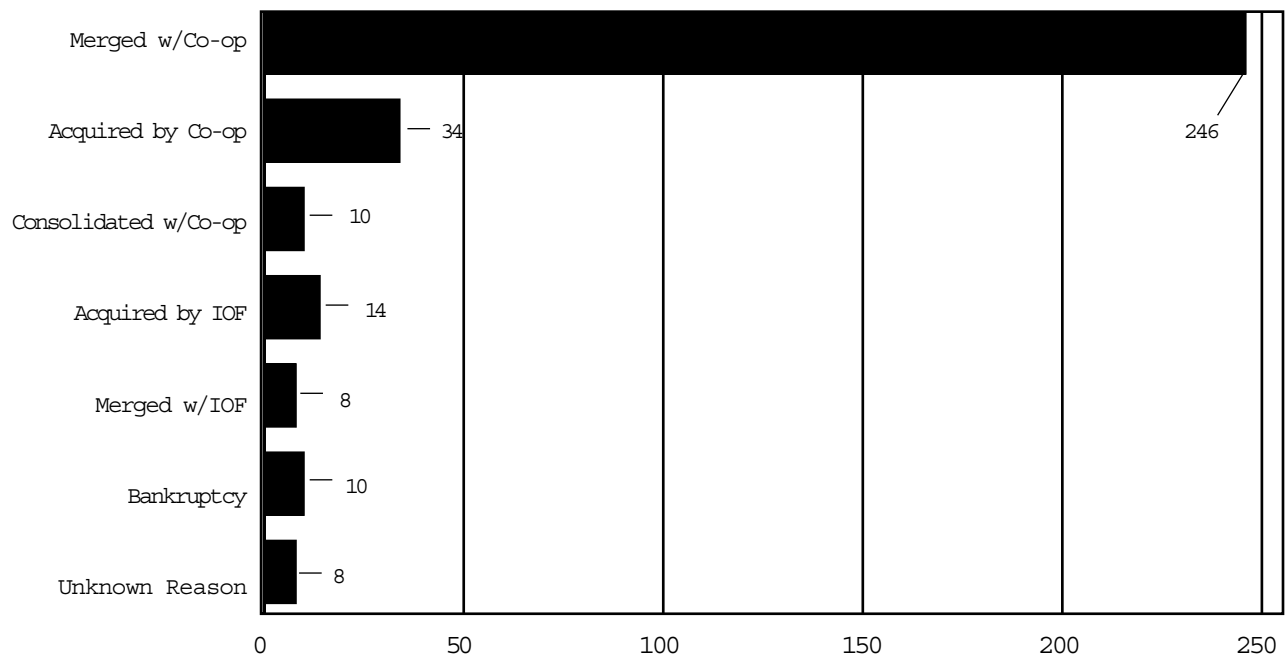
13.8 percent less farm supplies. The M/C cooperatives carried on average one-quarter (25.7 percent) more total inventory than the national ("in business") average.

Large M/C cooperatives held 7.2 percent fewer current assets, invested 3.1 percent less in other coop-eratives, and held 18 percent less fixed assets than the national average of large in-business cooperatives. In contrast, medium-sized M/C cooperatives had 10.4 percent more current assets, 59.6 percent more cooperative investments, and 12.4 percent more fixed assets than their operating counterparts.

Table 3—Grain Cooperative Capacity, Locations, Workforce, and Number of Unit Trains, 5-year Means, 1993-97

	Total ales of $15 million or more				Total Sales between $5 and $15 million			
	All Grain Cooperatives		Merged/Consolidated Cooperatives		All Grain Cooperatives		Merged/Consolidated Cooperatives	
	No. of Obs.	Mean	No. of Obs.	Mean	No. of Obs.	Mean	No. of Obs.	Mean
Elev. Cap	1,376	4,606,000	92	3,512,000	1,288	1,458,000	62	1,407,500
No. Locations	1,457	4	95	4	1,404	2	69	2
Full-time workers	1,454	40	93	32	1,364	11	65	11
Part-time workers	1,309	12	85	7	1,020	4	45	3
Total workforce	1,467	51	96	39	1,400	14	68	13
No. Unit trains	1,389	1	86	2	1,263	0	62	1

Table 4—Grain Cooperative Balance Sheet Statistics: "In Business" and "Merged/Consolidation," by Size, 5-year Means, 1993-97

	Total Sales of $15 million or more			Total Sales of between $5 to $15 million		
	In Business	Merged/ Consolidated	Percent Difference	In Business	Merged/ Consolidated	Percent Difference
	Dollars			Dollars		
Grain inventory	3,524,000	3,856,000	-9.4	698,428	927,321	-32.8
FS inventory	1,670,000	994,880	40.4	415,008	472,429	-13.8
Total inventory	5,194,000	4,850,880	6.6	1,113,436	1,399,750	-25.7
Current assets	7,860,000	7,292,000	7.2	1,944,000	2,146,000	-10.4
Cooperative invest.	1,920,000	1,860,000	3.1	578,346	923,025	-59.6
Fixed assets	3,464,000	2,842,000	18.0	914,538	1,028,285	-12.4
Other assets	193,508	139,273	28.0	44,882	69,245	-54.3
Total assets	13,437,508	12,133,273	9.7	3,481,766	4,166,554	-19.7
Short term debt	2,762,000	2,010,000	27.2	572,039	876,782	-53.3
Patronage refunds	176,614	99,787	43.5	57,259	46,528	18.7
Other current liab.	3,914,000	4,350,000	-11.1	879,664	774,714	11.9
Total current liab.	6,852,614	6,459,787	5.7	1,508,962	1,698,025	-12.5
Long term liab.	1,189,694	788,345	33.7	252,626	316,779	-25.4
Stock	1,366,000	1,708,000	-25.0	455,085	670,003	-47.2
Allocated equity	4,029,177	3,177,119	21.1	1,265,071	1,481,724	-17.1
Unallocated equity	1,938,000	1,496,000	22.8	688,434	635,399	7.7
Total equity	5,395,199	4,885,141	9.5	1,720,178	2,151,750	-25.1
Total L&OE	13,437,508	12,133,273	9.7	3,481,766	4,166,554	-19.7

Table 5—Grain Cooperative Operations Statistics: "In Business" and "Merger/Consolidated", by Size,
5-year Means, 1993-97

	Total Sales of $15 million or more			Total Sales of between $5 to $15 million		
	In Business	Merged/ Consolidated	Percent Difference	In Business	Merged/ Consolidated	Percent Difference
	Dollars			Dollars		
Grain sales	27,460,000	28,700,000	-4.5	7,132,000	6,520,000	8.6
Supply sales	9,434,000	8,650,000	8.3	2,468,000	2,532,000	-2.6
Total sales	36,560,000	37,340,000	-2.1	9,476,000	8,968,000	5.4
Grain margins	986,420	831,479	15.7	286,844	227,876	20.6
Gross margins	2,484,000	1,678,000	32.4	618,433	721,413	-16.7
Other co-ops. income	1,212,000	868,420	28.3	324,463	405,216	-24.9
Patronage received	314,080	314,931	-0.3	86,618	136,298	-57.4
Net interest	-269,200	-193,331	28.2	-45,907	-95,338	-107.7
Total non-co-ops.income	72,800	144,677	-98.7	46,208	54,170	-17.2
Total revenue	3,766,000	2,694,000	28.5	987,650	1,176,000	-19.1
Labor expenses	1,404,000	995,605	29.1	388,271	486,536	-25.3
Other expenses	1,700,000	1,374,000	19.2	463,969	596,847	-28.6
Total expenses	3,178,000	2,376,000	25.2	828,002	1,059,928	-28.0
Net income before taxes	588,000	318,000	45.9	159,648	116,072	27.3
Cash paid	178,705	100,877	43.6	59,401	49,554	16.6
Dividends	19,019	1,827	90.4	9,250	15,866	-71.5
Allocated equity	218,054	169,708	22.2	43,074	51,558	-11.9
Unallocated equity	111,652	14,181	87.3	35,320	-8,350	123.6
Income tax	60,570	31,407	48.1	12,603	7,445	40.9

Large M/C cooperatives also held current and long-term liabilities of 5.7 and 33.7 percent less, respectively, than the national average of large in-business cooperatives. On the other hand, medium-sized M/C cooperatives held 12.5 percent more current liabilities and 25.4 percent more long-term liabilities than with the national average of medium-sized in-business cooperatives.

The national average of in-business cooperatives for patronage refunds was greater in both size groups than in the M/C cooperatives. Large cooperatives paid 43.5 percent more and the medium cooperatives paid 18.7 percent more to their respective membership.

In general, members of medium-sized M/C cooperatives held 25.1 percent more equity than the national average of similar-sized cooperatives still in business but the large M/C cooperatives held less equity. Medium-sized M/C cooperatives issued almost half again as much stock (47.2 percent) and held 17.1 percent greater allocated equity than in their surviving cohorts. Their unallocated equity was 7.7 percent less than the national average.

In addition, while the large M/C cooperatives carried one-fourth more stock, they held 21.1 percent less allocated equity, 22.8 percent unallocated, and held 9.5 percent less total average equity compared with the national average.

Operating Statement — These statistics show the relative strength of the medium-sized M/C cooperatives compared with the medium-sized cooperatives staying in business, but in a less dramatic fashion (table 5). Average grain sales and total sales were 8.6 and 5.4 percent less, respectively, for the medium-sized M/C cooperatives. Moreover, while gross margins averaged 16.7 percent higher, grain margins were off the national average by more than a fifth (20.6 percent). In terms of non-operating income and total revenue, the M/C cooperatives were particularly strong, at 17.2 and 98.7 percent more, respectively, than the national average. However, their total expenses were also significantly higher (28 percent) than the national average. Consequently, average M/C cooperative net income was 27.3 percent lower than the national average for medium-sized grain cooperatives.

Table 6—Grain Cooperative Volume Statistics: "In Business" and "Merged/Consolidation," by Size, 5-year Means, 1993-97

	Total Sales of $15 million or more			Total Sales of between $5 to $15 million		
	In Business	Merged/ Consolidated	Percent Difference	In Business	Merged/ Consolidated	Percent Difference
	Dollars			Dollars		
Grain sales	27,460,000	28,700,000	-4.5	7,132,000	6,520,000	8.6
Wheat	1,944,000	3,116,239	-60.3	759,475	244,870	67.8
Corn	5,052,000	5,214,000	-3.2	969,355	1,305,638	-34.7
Soybeans	1,826,667	1,096,199	40.0	434,950	651,083	-49.7
Sorghum	1,316,000	1,205,335	8.4	447,049	331,336	25.9
Barley	746,489	1,678,084	-124.8	305,918	32,769	89.3
Other grain	176,114	525,503	-198.4	97,751	18,219	81.4

National averages for the large cooperatives also outperform those of the large M/C cooperatives. Except for grain sales, total sales and non-operating income, the national average was more than the M/C average in all categories. Consequently, the net income average was 45.9 percent higher than that of the M/C cooperatives.

Grain Volumes — Total grain volume marketed for large M/C cooperatives was 16 percent more than the 5-year national average of in-business cooperatives (table 6). This figure is consistent with the 4.5 percent greater average in large M/C cooperative grain sales reported in the operating statement. Much of the greater volume is concentrated in the small grains (wheat and barley) areas.

While the overall grain volume marketed by medium-sized M/C cooperatives was 5.3 percent less than the national average of in-business medium-sized cooperatives, the former traded significantly more corn and soybeans. M/C cooperative volumes for these crops were 34.7 and 49.7 more, respectively, than the national average of in-business medium-sized cooperatives.

Financial Characteristics

A summary look at balance sheets and operating statements led to some suggestions about the overall financial condition of grain cooperatives (M/C or otherwise) in the heartland. Data from individual grain cooperative balance sheets and operating statements[4] were also used to construct a set of financial ratios. They were used for direct comparisons of the M/C

groups of businesses with those remaining in business and with CoBank's benchmarks for good operating practices.

The financial ratios used are associated with four general aspects of a business: profitability, liquidity, efficiency, and solvency. Selected ratios in each of the four categories were used to compare the M/C cooperatives (by their M/C reason) with their national averages by size to draw inferences about the general nature and financial condition of these businesses.

Profitability — This describes the cooperative's ability to generate net savings. Profitability indicators generally compare the "returns" of the business (net income or net savings, from the operating statement) with another aspect of the cooperative's business. Three ratios -- returns to total assets, return to fixed assets, and return to equity -- compare the firm's present profit stream with previous years.

National and regional returns to total assets averaged on or slightly less than benchmark levels of 8 percent for large cooperatives, but were 2 to 3 percent off those levels for medium- sized cooperatives (table 7). Returns for M/C cooperatives, however, were substantially less. Large M/C cooperatives accrued zero returns to total assets on average while medium-sized M/C cooperatives incurred negative returns of -1 percent. Large M/C cooperatives that were involved with

[4] Financial ratios were constructed for each cooperative by using the five most recently received financial statements. To account for the impact of the absent M/C cooperatives on overall means, regional and national means were constructed in a two-step process. First a 5-year rolling average of surviving cooperatives was generated. The mean of the rolling average for each indicator was taken to generate the overall result.

Table 7—Profitability Indicators: National, Regional, and "M/C" Cooperatives By Reason, 5-year Means, by Size, 1993-97

	Total Sales of $15 million or more				Total Sales between $5 and $15 million			
	Return to Total Assets	Return to Fixed Assets	Return to Equity	Labor Return to Local Assets	Return to Total Assets	Return to Fixed Assets	Return to Equity	Local Return to Local Assets
In Business Cooperatives								
National	0.08	0.27	8	00.8	0.39		8	
Corn Belt	0.08	0.29	0.18	0.06	0.07	0.26	0.13	0.05
Southern Plains	0.08	0.30	0.15	0.07	0.06	0.22	0.09	0.05
Northern Plains	0.06	0.29	0.18	0.05	0.06	0.26	0.14	0.05
Pacific Northwest	0.09	0.22	0.14	0.08	0.06	0.12	0.08	0.05
M/C Cooperatives	0.00	0.03	0.00	(0.02)	(0.01)	(0.03)	(0.02)	(0.03)
By Reason:								
Merged w/ Co-op	0.01	0.03	0.02	(0.02)	0.02	0.05	0.03	(0.01)
Acquired by Co-op	0.00	0.00	0.00	(0.02)	(0.02)	(0.06)	(0.04)	(0.05
Consolidated w/ Co-op	0.01	0.02	0.01	(0.03)	0.00	0.00	0.00	(0.01)
Merged w/ IOF	0.04	0.11	0.06	0.02	(0.01)	(0.07)	(0.04)	(0.05)
Acquired by IOF	(0.09)	(0.13)	(0.18)	(0.09)	(0.02)	(0.06)	(0.06)	(0.04)
Bankruptcy	0.03	0.14	0.09	0.01				
Unknown Reason					(0.02)	(0.06)	(0.03)	(0.03)
Benchmark	0.08	0.30	0.10	0.03	0.08	0.30	0.10	0.03

Return to Total Assets -- Net income / Total assets
Return to Fixed Assets -- Net income / Fixed assets
Return to Equity -- Net income / Equity
Local return to local assets -- Net income (less patronage received) / Total assets (less cooperative investments)

another cooperative averaged 1 percent or less, regardless of whether they merged, were acquired, or consolidated. Medium-sized M/C cooperatives performed almost as poorly.

Return-to-fixed-assets indicates the firm's rate of return to property, plant, and equipment. Firms aspire to a 30-percent rate of return on fixed assets. Nationally, grain cooperatives remaining in business for the 5-year period achieved only 27 and 22 percent return, for large- and medium-sized cooperatives, respectively. M/C cooperative return-to-fixed-assets suggests these groups endured low income during the period or were heavily invested in plant and equipment. Only large cooperatives that merged with an IOF or went bankrupt approached double digit return-to-fixed-assets (11 and 14 percent, respectively). All other M/C cooperatives (large and medium-sized) experienced small or negative return on fixed assets.

Return-to-equity relates the cooperative's present profit to its accumulated wealth. Ideally, a firm will generate profits equivalent to about 10 percent of its equity a year. By this measure, grain cooperatives with national average return of 16 and 11percent, respectively, for large and mid-sized, must be pleased. However,return-to-equity among M/C cooperatives were disappointing, as with the other two indicators.

Patronage received from investments and business in other cooperatives is a vital portion of grain cooperative income. Unfortunately, apart from patronage received, many grain cooperatives would show negative income. Therefore, it's important to distin-

guish the return that is generated from the business' own activities vis-a-vis those received from investments in other cooperatives, i.e., the share in the profitability of other cooperative managers' abilities.

Local-return-to-local-assets reports only the returns that the cooperative generated from its own activities using its own assets. The importance of the overall contribution of cooperative patronage income to a grain cooperative's bottom line is reflected in the 1 or 2 percent difference between the return to total assets and the local return rate. The prosperity of the 1993-97 period is also reflected in these very robust rates of local return that are from 2 to 4 percentage points higher than the benchmark.

The importance of patronage received is also made clear particularly among the M/C cooperatives. The local-return-to-local-assets for the two groups of M/C cooperatives were generally negative and ranged from 1 to 3 percentage points less than their respective total return. Only large cooperatives that merged with an IOF (2 percent) or went bankrupt (1 percent) accrued a positive local return.

Liquidity — Firms, and their creditors, have a strong preference for a margin of safety against the uncertainties grain cooperatives face. Liquidity speaks to a cooperative's ability to generate cash in the short term in case of random shocks, extraordinary losses, or other such uncertainties. Liquidity indicators relate the current assets of the cooperative to its current liabilities. The more current assets relative to current liabilities, the greater the assurance that a firm's liabilities may be paid out of these assets.

The current ratio represents the excess of current resources over current obligations. The quick ratio also measures excess current resources over current obligations, after accounting for the firm's inventory.

In general, grain cooperatives were less diligent in keeping liquid accounts throughout the period as their creditors might have preferred (table 8). National current and quick ratio averages for the large-sized cooperatives were off the 1.5 current ratio benchmark at 1.32 and fell short of the 0.80 quick at 0.68. The national average for medium-sized cooperatives was slightly more liquid, at 1.56 and 0.85, respectively, for the two ratios.

Among cooperatives going out of business, only the medium-sized cooperatives that consolidated with another cooperative held liquid accounts with both measures exceeding the benchmark. Among the large M/C cooperatives, however, those that merged with an IOF held the most liquid accounts during the peri-

od and were not far off the desired levels of liquidity at 1.41 and 0.76 for current and quick ratios, respectively.

Working capital to sales is a measure of the ability of a firm to meet its short-term obligations in relation to its business volume. Generally, the large cooperatives did not come as close as the medium-sized ones to meeting the 7 percent ideal. National averages for the two sizes were 4 and 6 percent, respectively.

Among the cooperatives going out of business, large cooperatives that merged with an IOF had a robust working capital to sales rate of 8 percent. All other M/C groups reported noticeably lower rates than the benchmark, with medium-sized cooperatives 1 to 2 percentage points higher in all but the one previously mentioned group.

Efficiency — These indicators intend to provide some measure of how well the firm is managed. Because there is no direct measure for "management ability," these indicators serve as a proxy for two aspects of a manager's job: holding down costs and making the best use of the firm's resources (e.g., facilities and labor).

Ratios that compare expenses, either total or labor expenses (the largest share of total expenses), with levels of revenue and/or income provide a measure of the productivity of the workforce. The productivity ratio relates total expenses to total sales. At the national level, both large and medium-sized grain cooperative managers successfully held total expenses below 10 percent of total sales (table 9). On the other hand, labor expenses exceeded the desired rate of 35 percent of income for both groups. This twin result of controlled total expenses and slightly higher than desired labor expenses might reflect not only a rising wage rate, but also the growing demand among agricultural workers for health care and retirement benefits. It might also reflect the commensurate struggle among cooperative managers to attract and keep their best people while trying to limit total costs.

Managers of the M/C cooperatives were somewhat successful in keeping both labor and total expenses in check. The one exception was that large cooperatives that merged with an IOF had unusually large total expenses -- amounting to 15 percent of total sales.

Efficient use of a business' facilities involves limiting inventory storage time. Inventory turnover relates the number of dollars in sales generated per dollar of inventory and provides a gauge for the coop-

Table 8—Liquidity Indicators: National, Regional and "M/C" Cooperatives, by Reason, 5-Year Means, by Size, 1993-97

	Total Sales of $15 million or more				Total Sales between $5 and $15 million		
	Current ratio	Quick ratio	Working Capital to Sales		Current ratio	Quick ratio	Working Capital to Sales
In Business Cooperatives							
National	1.32	0.68	0.04		1.56	0.85	0.06
Corn Belt	1.18	0.48	0.03		1.45	0.56	0.06
Southern Plains	1.40	0.76	0.06		1.65	0.97	0.08
Northern Plains	1.12	0.53	0.03		1.25	0.63	0.05
Pacific Northwest	1.58	0.95	0.05		1.87	1.24	0.06
M/C Cooperatives	1.22	0.62	0.03		1.37	0.68	0.04
By Reason:							
Merged w/ Co-op	1.14	0.37	0.03		1.43	0.46	0.06
Acquired by Co-op	1.16	0.38	0.03		1.31	0.49	0.04
Consolidated w/ Co-op	1.19	0.66	0.02		1.76	1.18	0.04
Merged w/ IOF	1.41	0.76	0.08		1.20	0.55	0.03
Acquired by IOF	1.33	1.33	0.01				
Bankruptcy	1.11	0.23	0.01		1.24	0.63	0.04
Unknown Reason					1.29	0.78	0.04
Benchmark	1.50	0.80	0.07		1.50	0.80	0.07

Current ratio -- Current assets / Current liabilities
Quick ratio -- Current assets (less inventories) / Current liabilities
Working capital to sales -- Current assets (less current liabilities) / Total sales

erative's efficient use of storage facilities during the accounting period. For most grain cooperatives, this involves both grain inventory and farm supplies.[5]

Farm supply turnover rates among all grain cooperatives would suggest a less efficient use of inventory (bin, shelf, or tank, etc.) space than might be called for. The national inventory turnover rate was 8 times for both large and medium-sized cooperatives. Among the M/C cooperatives, those involved with

another cooperative in merger, acquisition, or consolidation seem to be the most efficient users of farm supply inventory space. Among large cooperatives, each of these groups averaged or exceeded the benchmark.

Solvency — This is an indication of the cooperative's long-term financial health. Solvency indicators include guidelines for a firm's interest expenses and liabilities compared with its income and equity.

Times interest earned (TIE) compares the cooperative's net income to its interest expense. Because greater interest expense implies a heavier debt load, interest expense should ideally be no greater than one-third a cooperative's net income (a TIE ratio of 3 or more). National averages for both large and medium-sized cooperatives were well over the benchmark for

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[5] Grain inventory turnover rates were computed, but because of wide variations were considered less than reliable and not reported. Reporting and regional differences in cooperative annual reports contribute largely to the variation. These differences generally involve each cooperative's choice of fiscal year and affects grain sales amounts and inventory values. Unfortunately, in most cases they are irreconcilable.

Table 9—Efficiency Indicators: National, Regional, and "M/C" Cooperatives By Reason,
5-Year Means, by Size, 1993-97

	Total Sales of $15 million or more			Total Sales between $5 and $15 million		
	Productivity Ratio	Labor Income Ratio	Farm Supply Inventory Turnover	Productivity Ratio	Labor Income Ratio	Farm Supply Inventory Turnover
In Business Cooperatives						
National	0.08	0.37	8	0.08	0.39	8
Corn Belt	0.08	0.38	10	0.09	0.40	8
Southern Plains	0.10	0.38	9	0.11	0.43	7
Northern Plains	0.06	0.37	7	0.06	0.37	8
Pacific Northwest	0.08	0.36	6	0.08	0.37	8
M/C Cooperatives	0.08	0.36	9	0.10	0.39	9
By Reason:						
Merged w/ Co-op	0.07	0.40	11	0.10	0.38	9
Acquired by Co-op	0.08	0.34	10	0.10	0.37	8
Consolidated w/ Co-op	0.10	0.39	14	0.08	0.37	10
Merged into IOF	0.15	0.38	3	0.10	0.39	4
Acquired by IOF	0.04	0.25		0.10	0.38	9
Bankruptcy	0.05	0.38	7			
Unknown Reason				0.11	0.44	13
Benchmark	0.10	0.35	10	0.10	0.35	10

Productivity ratio -- Total expenses / Total sales
Labor to income -- Labor expenses / Gross revenue
Farm supply inventory turnover -- Farm supply sales / Farm supply inventory

the period (table 10). This may reflect the relatively lower interest rates of the period as well as a managerial objective to control interest expenses.

Among the M/C cooperatives, however, uncontrolled interest expenses seemed to be a significant problem. No M/C cooperatives approached benchmark TIE levels. In fact, all but one group had interest expenses that exceeded their net income (or a TIE of less than 1). Interestingly, the group with the highest TIE (1.36) among the M/C cooperatives were the large cooperatives that went bankrupt. In some cases, cooperatives reported both negative net income and TIE.

The remaining two solvency indicators suggest that debt incurred both in and out of business was a less significant problem among large cooperatives. National averages approached the benchmark of 0.5 for liabilities to assets and liabilities to equity of 1.0. M/C cooperatives had similar long-term indebtedness performance.

Medium-sized cooperatives, on the other hand, appeared to have less difficulty managing their long-term debt structure. Except for medium-sized and

Northern Plains cooperatives that went bankrupt, both in- and out-of-business cooperatives held liabilities well below benchmark levels.

Best Co-ops 'Cherry-Picked?'

A legend expressed often in the cooperative community is that the most promising ones have or soon will be purchased by IOFs. This study generally refutes this belief and will be presented in two ways.

First, while both groups of cooperatives were in unfavorable financial circumstances, those that merged with other cooperatives outperformed those that merged with IOFs. Table 11 compares a simple average of all financial indicators previously mentioned for cooperatives that merged with other cooperatives versus those that merged with IOFs, along with national in- business averages. Large cooperatives that merged with other cooperatives outperformed those that merged with IOFs in 11 of 13 indicators. Similarly, medium-sized cooperatives outperformed their counterparts that merged with IOFs in 12 of the 13.

Table 10—Solvency Indicators: National, Regional, and "M/C" Cooperatives By Reason, 5-year Means, by Size, 1993-97

	Total Sales of $15 million or more			Total Sales between $5 and $15 million		
	Times Int. Earned	Liabilities to Assets	LT Liabilities to Equity	Times Int. Earned	Liabilities to Assets	LT Liabilities to Equity
In Business Cooperatives						
National	3.84	0.45	1.17	4.02	0.36	0.80
Corn Belt	2.77	0.50	1.41	3.83	0.40	0.83
Southern Plains	3.91	0.39	0.83	3.66	0.32	0.62
Northern Plains	4.16	0.59	1.84	5.53	0.54	1.44
Pacific Northwest	4.52	0.33	0.61	3.04	0.17	0.31
M/C Cooperatives	0.45	0.44	1.26	(0.30)	0.36	0.96
By Reason:						
Merged w/ Co-op	0.30	0.51	1.39	0.76	0.35	0.77
Acquired by Co-op	(0.03)	0.53	1.53	(0.56)	0.35	0.92
Consolidated w/ Co-op	0.18	0.37	1.04	(0.07)	0.23	0.56
Merged into IOF		0.42	0.85	(0.69)	0.41	0.97
Acquired by IOF		0.22	1.04	(0.61)	0.40	1.58
Bankruptcy	1.36	0.57	1.68			
Unknown Reason				(0.65)	0.43	0.98
Benchmark	3.00	0.50	1.00	3.00	0.50	1.00

Times interest earned -- Net income / Interest expense
Liabilities to assets -- Total liabilities / Total assets
Long-term liabilities to equity -- Long term liabilities / Equity

Second, a very broad measure of the relative financial health was given to the 330 cooperatives that went out of business and their merging partners. Firms that performed no worse than 90 percent of the benchmark level in at least 6 of the 13 indicators were considered healthy. Firms that failed to achieve the 90 percent performance level for seven or more indicators were considered in poor financial health.

Table 12 summarizes the financial health of the 330 M/C cooperatives and their partners. Sixty-five percent (82) of the 126 mergers that occurred among large cooperatives during the 1993-97 period involved 2 firms in poor financial health. Thirty-one percent (39) occurred among a healthy and a not-so-healthy firm. And only 4 percent (5) of all large cooperative mergers during that period involved two healthy firms.

And while a slightly larger percentage of medium-sized cooperative mergers (38 percent or 63 of 204) involved at least one healthy firm, the implication remains the same for both groups. Most cooperatives that went out of business during the period were performing poorly, or at least not as well as their surviving neighbors. In most categories, whether the average M/C cooperative was involved with a cooperative, or becoming part of an IOF, its financial indicators were "weaker" than national averages, and well short of benchmark values.

Like any other business, when a cooperative ceased to operate because of financial trouble and combined with another business, it tended to accept the terms offered by its benefactor, not dictate them. Few, if any, were able to negotiate from a position of strength.

Roughly two-fifths of the 291 cooperatives that stayed in the "cooperative family" were financially sound. However, among the 22 cooperatives that merged with, or were acquired by an IOF, there was only one solid performer. So, if we look at the best among a group of relatively weaker cooperatives, and ask whether they were "picked" or "stayed in the family," the answer is the latter. Of the 121 available "cherry" cooperatives that went out of business during 1993-97, only one was "picked" by an IOF.

Table 11—Financial Indicators: National Means and "M/C" Cooperatives, By Size and Type, 5-year Means with Benchmark

	Total Sales of $15 million or more				Total Sales between $5 and $15 million		
	National	M/C - to a Cooperative	M/C - to an IOF	Benchmark	National	M/C - to a Cooperative	M/C - to an IOF
Profitability							
Returns to Total							
Assets	0.08	0.01	(0.03)	0.08	0.06	0.00	(0.02)
Returns to Fixed							
Assets	0.27	0.02	(0.01)	0.30	0.22	(0.00)	(0.07)
Returns to Equity	0.16	0.01	(0.06)	0.10	0.11	(0.00)	(0.05)0
Local Returns to							
Local Assets	0.07	(0.02)	(0.04)	0.03	0.05	(0.02)	(0.05)
Liquidity							
Current Ratio	1.32	1.16	1.37	1.50	1.56	1.50	1.22
Quick Ratio	0.68	0.47	0.05	0.07	0.06	0.05	0.04
Working Capital to							
Sales	0.04	0.03	0.05	0.07	0.06	0.05	0.04
Efficiency							
Profitability	0.08	0.08	0.10	0.10	0.08	0.09	0.10
Labor to Income	0.37	0.38	0.32		0.32		
Farm Supply Sales							
to Inventory	8	12	3	10	8	9	6
Solvency							
Times Interest							
Earned	3.84	0.15	0.91	3.00	4.02	0.04	(0.65)
Total Liabilities to							
Total Assets	0.45	0.47	0.32	0.50	0.36	0.31	0.41
LT Liabilities to							
Equity	1.17	1.32	0.95	1.00	0.80	0.75	1.28

Predicting Mergers, Acquisitions

A substantial and growing body of literature exists in support of the economic forecasting of corporate mergers and acquisitions. Most recently, Adesoji et al., use two mathematical models to explain merger and acquisition (M&A) activities in the U.S. food manufacturing sector and, in particular, to predict the likelihood of a firm being targeted for M&A (a so-called target model) and a model to predict the likelihood of a targeted firm being taken over (a takeover model).

Among others, Adesoji et al., is rooted in the work of Dietrich and Sorensen, Harris et al., Langetieg, and Stevens (1973 and 1979). Dietrich and Sorensen applied logit estimation on financial performance indicators to predict the probability that a given firm will be a merger target. Harris et al., used probit analysis to study the financial and product market characteristics of acquired firms. Langetieg selected from among four alternative models to employ a three-factor performance index that measured stockholder gains from a merger. Stevens used multiple discriminate analysis on financial indicators to distinguish among acquired and non-acquired firms.

Following this line of inquiry, an economic model was used to evaluate the likelihood of a grain cooperative going out of business in the near term, given its financial performance record. A time-series of each of the 13 financial ratios (table 11) was constructed for each cooperative in the study.

Each series was regressed on the binary condition of the associated cooperative's survival (0) or M/C condition (1) during the study period. A three-variable "best fit" model was selected for each size group from

Table 12—Financial Health of M/C Cooperatives and Their Partners: National, Regional, and Reason, by Size and Relative Condition

M/C Cooperatives	Total Sales of $15 million or more				Total Sales between $5 and $15 million			
	None Healthy	One Healthy	Both Healthy	Total	None Healthy	One Healthy	Both Healthy	Total
	Number of cooperatives				Number of cooperatives			
National	82	39	5	126	123	63	18	204
Corn Belt	60	37	5	102	102	45	9	156
Southern Plains	6	2		8	13	18	9	40
Northern Plains	15			15	4			4
Pacific Northwest	1			1	4			4
By Reason:								
Merged w/ Co-op	46	29	5	80	89	59	18	166
Acquired by Co-op	19			19	15			15
Consolidated w/ Co-op		10		10				
Merged w/ IOF	4*			4		4		4
Acquired by IOF	5*			5	9*			9
Bankruptcy	4		4	4	6			6
Unknown Reason	4	4		4	4			4

* No IOF records were reviewed. This characterization reflects only the cooperatives that were involved.

among the 13 ratios using the Score Criterion[6] (Appendix 1). Maximum likelihood estimates and related statistics for each size are provided in table 13 (with complete results and diagnostics in Appendix 2). Each model has, in addition to the intercept, two variables that are significant at the 0.05 level and one that is not. In other words, the information contributed by the third variable is less significant than the first two toward successfully predicting whether a cooperative will go out of business.

Large grain cooperative M/Cs were most successfully predicted by the three ratios: return-to-total-assets, expenses-to-sales, and labor-to-income. The negative sign on the variable return-to-total-assets indicates that the likelihood of a cooperative becoming an M/C increases as return-to-total-assets decreases. The result makes sense. Also intuitive are the results that expenses-to-sales and labor-to-income are positive, that is, the likelihood of a cooperative going out of business increases with the value of these ratios.

However, the fact that out of all 13 variables, these three were selected as having the most power for predicting which large grain cooperatives go out of business, says a lot about the challenges that confront cooperatives that remain in the marketplace. That one variable indicates profitability and the other two, efficiency, speaks to the relentless pressure of a market of paper-thin margins. Managers are faced with seemingly impossible goals: make every asset a source of revenue while simultaneously reducing the cost of doing business. The bigger challenge still is to remain in the game while every player gets bigger and more competitive.

This analysis suggests that merger targets among large grain cooperatives are likely to have the following financial characteristics: a positive, but relatively low return-to-total-assets (3 - 4 percent range), expenses-to-sales approaching 10 percent, and labor-to-income significantly exceeding the 35 percent benchmark (40 percent and above). Given these conditions, another 32 large cooperatives were considered likely M/C candidates in 2000.

[6] The score criterion multiplies values from two data sets, one containing coefficients (factor scoring or regression coefficient) and the other containing raw data to be scored using coefficients from the first data set. This multiplication results in series of linear combinations of coefficients and raw data values. The Score Procedure then sorts over the results of each combination to select and rank them from greatest to least.

Table 13—Analysis of Maximum Likelihood Estimates

Variable	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square
Total Sales of $15 million or more				
Intercept	-3.088	0.813	14.435	0.000
Return to Total Assets -	8.686	2.802	9.613	0.002
Expenses to Sales	12.616	4.401	8.216	0.004
Labor to Income	-2.537	2.132	1.416	0.234
Total Sales of $5 to $14.9 million				
Intercept	-2.119	0.734	8.342	0.004
Local Return to Local Assets	-8.853	2.964	8.923	0.003
Expenses to Sales	-11.640	5.903	3.888	0.049
Return to Fixed Assets	-0.054	0.037	2.147	0.143

Medium-sized grain cooperative M/Cs were most successfully predicted by the three ratios: local-return-to-local-assets, expenses-to-sales, and return-to-fixed-assets. Again, the negative sign of two of the variables (local-return-to-local-assets and return-to-fixed-assets) indicates that, as these ratios increase, the likelihood of failure (M/C) diminishes.

Much like their large counterparts, medium-sized cooperatives must balance profitability and efficiency. However, while the large cooperatives concern themselves more with efficiency, medium-sized cooperatives must shift their emphasis toward profitability. It is significant that two of the three most important variables involve return. Particularly important is the contribution of local-return-to-local-assets.

It is well known that many otherwise struggling local grain cooperatives have managed to survive from one year to the next on patronage received from regional cooperatives. The results of the model suggest, however, that those days are surely ending. Simply put, local returns are primary to a grain cooperative's success.

Merger targets among medium-sized grain cooperatives are likely to have these financial characteristics: a local-return-to-total-assets of less than 2 percent, expenses-to-sales approaching 10 percent, and a return-to-fixed-assets significantly less than the 30 percent benchmark (18 percent or less). Under these circumstances, another 60 medium-sized cooperatives were likely targets for consolidation in 2000.

So then, to survive, both large and medium-sized cooperatives need to be profitable and efficient. But what does "survival" mean for grain cooperatives in the context of agriculture's widespread economic restructuring? Perhaps what has been learned about M/C cooperatives will provide some important keys to the challenges that lie ahead.

Horizontal, Vertical Integration

Even the most cursory look at the M/C cooperatives during the period suggests two predominant patterns: in an attempt to stave off bankruptcy, cooperatives in poor financial health in seeking out a partner may also discover their potential partner to be struggling financially, or, strong cooperatives seeking out a strong partner, and/or expanding internally to position themselves strategically for the future.

In regard to both patterns, historians looking back on the late 1990s may very easily conclude that the "farm" crisis of two decades earlier simply moved further up the food chain. The "family" farm was essentially shaken out of the industry in the generation past. Now, even among the largest players remaining in agriculture, "only the lowest-cost operations will remain." The buildup of surpluses and declining export demand have driven prices to their lowest levels in decades. Expectations for their recovery are equally as bleak. What was once a cost-price "squeeze" may now be likened to a hammer and anvil.

Paper-thin profit margins and low expectations are forcing grain cooperatives, along with the rest of agriculture, to lower operating costs. So a firm must get larger to spread operating costs over a larger business volume, or gain "scale economies." A merger with another cooperative is often perceived as a way of gaining a step on the economic treadmill. By cheaply

acquiring additional assets (e.g., storage facilities, unit-train load-out facilities, etc.), combining two sales forces or accounting departments and other consolidation measures, firms hope the benefits of size will help them to cut production costs.

Economists identify this cost-saving behavior among two or more firms at the same level or "link" along the supply chain as horizontal integration. Vertical integration, on the other hand, involves the forward or backward-linking of two or more firms at different levels of the supply chain.

While supply chain integration is not a new event in agriculture, its increasing pervasiveness in recent years is prominent. A supply chain is formed when one firm, usually a significantly dominant player or "integrator," works to control (contractually or through ownership) the activities of firms (groups of firms) at each level of the production process, up to and including, delivery to the consumer. The purpose of these chains is control. Integrators assume command of the production and delivery process to assure themselves: a) that product quality meets their customers' specific needs; b) that costs are driven to the absolute minimum, subject to meeting the quality specifications; and c) that the associated risks are managed to within acceptable levels.

Supply chain integration, long a fact of life in the broiler industry and near completion in the pork industry, is now underway in the grain industry (Drabenstott). The grain delivery system is not quite as complete as the broiler industry. A handful of firms have yet to completely dominate seed development, production, processing, and marketing with every coordinated step up and down the chain.

However, in recent years, we witnessed the harvest and marketing of herbicid-tolerant corn and soybeans. The so-called "Roundup®-ready" varieties are just the first of many crops derived from seed stock that was modified at the genetic level to garner specific properties. Moreover, we also watched as several alliances of seed corporations with pharmaceutical firms were formed with the specific interest of developing genetically modified seed stock. And, while international markets proved to be less than enthusiastic about genetically modified corn and soybeans, at least during the 1999-2000 marketing year, the die has been cast. In short, the best available genetics were combined with the best (i.e., most profitable) production processes to deliver products intended to meet the needs of an increasingly discriminating consumer.

Summary, Conclusions

This study attempted to frame grain cooperatives that survived during 1993-97 and those that went out of business in the context of the widespread economic restructuring that hit agriculture. Unfortunately, many more grain cooperatives may be casualties of the latest wave of economic consolidation. To retrain employees and producers who have been left behind remains one of the many formidable challenges ahead.

Those cooperatives hoping to survive and even thrive in the current wave of consolidation may face increasingly greater challenges. First is the unrelenting pressure of surviving in a market of ever-thinning margins. Perhaps even more difficult is the challenge of staying in the marketplace while competition grows in size and strength.

As the supply chain structure dominates the grain industry, both cooperatives and their producer members are faced with a straightforward choice: build new partnerships or be left behind. Survivors in the broiler and pork industries successfully adjusted to a shift in emphasis from "commodity marketing" to "product delivery." For producers and cooperatives in the grain industry, this will mean realignment to become an "integrator" themselves, such as Dakota Growers Pasta Cooperative of Carrington, ND, or, at the very least, a reliable supplier to an integrator, for example, the producers with membership and delivery rights of corn for Golden Oval Layers in Renville, MN.

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Appendix 1— Score Criterion Results to Select Three-Variable "Best Fit" Model

Score Results — Best Subset
Size 1 — $15 Mil. or More in Total Sales
Logistic Regression
Response Profile
Regression Models Selected by Score Criterion

```
        Score
   In   Value Variables Included in
Model

    1  20.355 RET_TA
    1  20.217 LR_LA
    1  19.211 RET_EQ
    1  12.836 RET_FA
    1   9.493 EXP_SLS
    1   4.507 LAB_INC
    1   2.174 SALES_FA
    1   1.109 WCAP_SLS
    1   0.923 GSLS_INV
    1   0.782 QUICK
    1   0.458 TIE
    1   0.259 FSLS_INV
    1   0.251 CURRENT
    1   0.050 TL_TEQ
    1   0.006 TL_TA


    2  25.544 RET_TA EXP_SLS
    2  24.177 EXP_SLS LR_LA
    2  22.976 RET_EQ EXP_SLS
    2  22.728 RET_TA TL_TEQ
    2  22.518 RET_TA SALES_FA
    2  22.125 SALES_FA LR_LA
    2  21.996 RET_EQ LR_LA
    2  21.673 RET_TA TL_TA
    2  21.087 TL_TEQ LR_LA
    2  21.065 RET_TA RET_EQ
    2  20.951 RET_TA GSLS_INV
    2  20.876 TL_TA LR_LA
    2  20.803 RET_FA LR_LA
    2  20.703 CURRENT LR_LA


    3  26.407 RET_TA EXP_SLS LAB_INC
    3  26.054 RET_TA EXP_SLS LR_LA
    3  26.028 RET_TA GSLS_INV EXP_SLS
    3  25.935 RET_TA TL_TEQ EXP_SLS
    3  25.743 RET_TA RET_FA EXP_SLS
    3  25.735 RET_TA SALES_FA EXP_SLS
    3  25.630 RET_TA RET_EQ EXP_SLS
    3  25.618 RET_TA FSLS_INV EXP_SLS
    3  25.588 RET_TA EXP_SLS WCAP_SLS
    3  25.582 RET_TA TIE EXP_SLS
    3  25.575 RET_TA CURRENT EXP_SLS
    3  25.567 RET_TA TL_TA EXP_SLS
    3  25.566 RET_TA QUICK EXP_SLS
    3  25.376 RET_EQ EXP_SLS LR_LA
    3  24.551 EXP_SLS LAB_INC LR_LA
```

Regression Models Selected by Score Criterion
(continued)

```
        Score
   In   Value Variables Included in
Model

    4  26.966 RET_TA TL_TEQ EXP_SLS
               LAB_INC
    4  26.932 RET_TA EXP_SLS LAB_INC
               LR_LA
    4  26.876 RET_TA CURRENT QUICK
               EXP_SLS
    4  26.844 RET_TA GSLS_INV EXP_SLS
               LAB_INC
    4  26.717 RET_TA RET_FA EXP_SLS
               LAB_INC
    4  26.659 RET_TA TL_TEQ GSLS_INV
               EXP_SLS
    4  26.495 RET_TA CURRENT EXP_SLS
               LAB_INC
    4  26.492 RET_TA TL_TA EXP_SLS
               LAB_INC
    4  26.471 RET_TA FSLS_INV EXP_SLS
               LAB_INC
    4  26.456 RET_TA SALES_FA EXP_SLS
               LAB_INC
    4  26.450 RET_TA RET_FA SALES_FA
               EXP_SLS
    4  26.440 RET_TA RET_EQ EXP_SLS
               LAB_INC
    4  26.421 RET_TA EXP_SLS LAB_INC
               WCAP_SLS
    4  26.418 RET_TA TIE EXP_SLS
LAB_INC
    4  26.409 RET_TA QUICK EXP_SLS
               LAB_INC


    5  27.800 RET_TA CURRENT QUICK
               EXP_SLS LAB_INC
    5  27.669 RET_TA TL_TEQ GSLS_INV
               EXP_SLS LAB_INC
```

```
    5   27.599 RET_TA RET_FA TL_TEQ        1 0.729 TL_TA
           EXP_SLS LAB_INC                 1 0.635 WCAP_SLS
    5 27.378 RET_TA TL_TEQ EXP_SLS         1 0.562 TIE
        LAB_INC LR_LA                      1 0.392 TL_TEQ
    5 27.345 RET_TA CURRENT QUICK          1 0.270 GSLS_INV
EXP_SLS                                    1 0.092 LAB_INC
        LR_LA                              1 0.010 FSLS_INV
    5 27.260 RET_TA CURRENT QUICK TL_TEQ
        EXP_SLS
    5 27.232 RET_TA GSLS_INV EXP_SLS       2 12.337 LR_LA EXP_SLS
LAB_INC                                    2 11.111 RET_TA EXP_SLS
        LR_LA                              2 11.046 RET_EQ EXP_SLS
    5 27.221 RET_TA CURRENT QUICK          2 10.461 LAB_INC LR_LA
EXP_SLS                                    2  9.320 SALES_FA LR_LA
        WCAP_SLS                           2 9.130 RET_TA LR_LA
    5 27.179 RET_TA RET_FA EXP_SLS         2 9.111 RET_TA LAB_INC
LAB_INC                                    2 9.103 RET_EQ LR_LA
        LR_LA                              2 9.089 TL_TA LR_LA
    5 27.168 RET_TA TL_TA GSLS_INV         2 9.064 GSLS_INV LR_LA
EXP_SLS                                    2 9.029 QUICK LR_LA
        LAB_INC                            2 8.934 FSLS_INV LR_LA
    5 27.134 RET_TA CURRENT EXP_SLS        2 8.851 LR_LA WCAP_SLS
        LAB_INC LR_LA                      2 8.825 TL_TEQ LR_LA
    5 27.132 RET_TA RET_FA SALES_FA        2 8.803 TIE LR_LA
EXP_SLS
LAB_INC
    5 27.130 RET_TA TL_TA TL_TEQ EXP_SLS   3 14.213 LR_LA EXP_SLS RET_FA
        LAB_INC                            3 13.426 RET_EQ SALES_FA EXP_SLS
    5 27.119 RET_TA CURRENT GSLS_INV       3 13.147 RET_TA SALES_FA EXP_SLS
        EXP_SLS LAB_INC                    3 13.005 RET_EQ EXP_SLS LR_LA
    5 27.083 RET_TA CURRENT QUICK          3 12.982 EXP_SLS LR_LA WCAP_SLS
GSLS_INV                                   3 12.812 EXP_SLS LAB_INC LR_LA
EXP_SLS                                    3 12.718 RET_TA EXP_SLS LR_LA
                                           3 12.487 QUICK EXP_SLS LR_LA
                                           3 12.478 GSLS_INV EXP_SLS LR_LA
                                           3 12.412 FSLS_INV EXP_SLS LR_LA
Score Results — Best Subset                3 12.412 TL_TA EXP_SLS LR_LA
Size 2 — $5 Mil. to $14.9 Mil. in Total    3 12.401 RET_FA EXP_SLS LR_LA
Sales                                      3 12.344 TIE EXP_SLS LR_LA
Logistic Regression                        3 12.337 TL_TEQ EXP_SLS LR_LA
Response Profile                           3 12.337 CURRENT EXP_SLS LR_LA
Regression Models Selected by Score
Criterion                                Regression Models Selected by Score
      Score                              Criterion (Continued)
   In Value Variables Included in Model        Score
                                            In   Value Variables Included in
                                         Model
   1  8.797 LR_LA
   1  7.929 RET_TA
   1  7.247 RET_EQ                          4 14.670 LR_LA RET_FA EXP_SLS
   1 5.155 RET_FA                        WCAP_SLS
   1 1.792 QUICK                            4 15.113 RET_EQ SALES_FA EXP_SLS
   1 1.525 EXP_SLS                       LR_LA
   1 0.912 CURRENT
```

```
     4 14.661 RET_TA SALES_FA EXP_SLS
LR_LA
     4 14.556 TL_TA SALES_FA EXP_SLS
LR_LA
     4 14.373 SALES_FA GSLS_INV EXP_SLS
LR_LA
     4 14.305 QUICK SALES_FA EXP_SLS
LR_LA
     4 14.291 TL_TEQ SALES_FA EXP_SLS
LR_LA
     4 14.268 SALES_FA EXP_SLS LAB_INC
LR_LA
     4 14.251 SALES_FA FSLS_INV EXP_SLS
LR_LA
     4 14.248 RET_FA SALES_FA EXP_SLS
LR_LA
     4 14.213 TIE SALES_FA EXP_SLS LR_LA
     4 14.213 CURRENT SALES_FA EXP_SLS
LR_LA
     4 13.889 QUICK RET_EQ SALES_FA
EXP_SLS
     4 13.736 RET_TA RET_EQ SALES_FA
EXP_SLS
     4 13.700 RET_EQ EXP_SLS LR_LA
WCAP_SLS


     5 15.657 RET_FA RET_EQ SALES_FA
EXP_SLS
        LR_LA
     5 15.608 RET_EQ SALES_FA EXP_SLS
LR_LA
        WCAP_SLS
     5 15.466 TL_TA SALES_FA EXP_SLS
LR_LA
        WCAP_SLS
     5 15.325 TL_TA RET_EQ SALES_FA
EXP_SLS
        LR_LA
     5 15.300 RET_EQ SALES_FA GSLS_INV
        EXP_SLS LR_LA
     5 15.253 QUICK RET_EQ SALES_FA
EXP_SLS
        LR_LA
     5 15.240 RET_TA SALES_FA EXP_SLS
LR_LA
        WCAP_SLS
     5 15.173 RET_EQ SALES_FA FSLS_INV
        EXP_SLS LR_LA
     5 15.158 RET_EQ SALES_FA EXP_SLS
LAB_INC
        LR_LA
```

```
     5 15.143 QUICK SALES_FA EXP_SLS
LR_LA
        WCAP_SLS
     5 15.121 CURRENT RET_EQ SALES_FA
        EXP_SLS LR_LA
     5 15.120 RET_TA RET_EQ SALES_FA
EXP_SLS
        LR_LA
     5 15.115 TL_TEQ RET_EQ SALES_FA
EXP_SLS
        LR_LA
     5 15.114 TIE RET_EQ SALES_FA EXP_SLS
        LR_LA
     5 14.968 TL_TEQ SALES_FA EXP_SLS
LR_LA
        WCAP_SLS
```

Size 1 — More than $15 Mil. in Total Sales

The LOGISTIC Procedure

Number of M/C observations: 1520
Link Function: Logit

Response Profile

Ordered Value	Binary Outcome	Count
1	EVENT	133
2	NO EVENT	1253

WARNING: 134 M/C observation(s) were deleted due to missing values for explanatory variables.

Deviance and Pearson Goodness-of-Fit Statistics

Criterion	DF	Value	Value/DF	Pr > Chi-Square
Deviance	447	217.6	0.4869	1.0000
Pearson	447	401.0	0.8970	0.9422

Number of unique profiles: 1520

Model Fitting Information and Testing GlM/Cal Null Hypothesis BETA=0

Criterion	Intercept Only	Intercept and Covariates	Chi-Square for Covariates
AIC	470.842	459.648	.
SC	476.020	480.359	.
-2 LOG L	468.842	451.648	17.195 with 3 DF (p=0.0006)
Score	.	.	18.456 with 3 DF (p=0.0004)

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-3.0878	0.8127	14.4347	0.0001	.	.
RET_TA	1	-8.6858	2.8015	9.6125	0.0019	-0.215383	0.000
EXP_SLS	1	12.6159	4.4013	8.2163	0.0042	0.225033	999.000
LAB_INC	1	2.5367	2.1316	1.4162	0.2340	0.104474	0.079

Association of Predicted PrM/Cabilities and M/C observed Responses

```
            Concordant = 64.5%      Somers' D = 0.319
            Discordant = 32.6%      Gamma     = 0.328
            Tied       =  2.9%      Tau-a     = 0.027
            (71421 pairs) c                   = 0.659
```

Parameter Estimates and 95% Confidence Intervals

		Profile Likelihood Confidence Limits	
Variable	Parameter Estimate	Lower	Upper
INTERCPT	-3.0878	-4.6966	-1.5101
RET_TA	-8.6858	-14.0327	-2.9536
EXP_SLS	12.6159	3.9075	21.2001
LAB_INC	2.5367	1.5595	6.7894

Parameter Estimates and 95% Confidence Intervals

		Wald Confidence Limits	
Variable	Parameter Estimate	Lower	Upper
INTERCPT	-3.0878	-4.6807	-1.4949
RET_TA	-8.6858	-14.1766	-3.1949
EXP_SLS	12.6159	3.9895	21.2423
LAB_INC	2.5367	1.6412	6.7146

Conditional Odds Ratios and 95% Confidence Intervals

			Profile Likelihood Confidence Limits	
Variable	Unit	Odds Ratio	Lower	Upper
RET_TA	1.0000	0.000	0.000	0.052
EXP_SLS	1.0000	999.000	49.774	999.000
LAB_INC	1.0000	0.079	0.001	4.756

```
           Conditional Odds Ratios and 95% Confidence Intervals

                                                Wald
                                           Confidence Limits
                                   Odds
               Variable    Unit    Ratio    Lower     Upper

               RET_TA    1.0000    0.000    0.000     0.041
               EXP_SLS   1.0000   99.000   54.029   999.000
               LAB_INC   1.0000    0.079    0.001     5.161

                      Estimated Correlation Matrix

          Variable    INTERCPT      RET_TA      EXP_SLS      LAB_INC

           INTERCPT    1.00000    -0.38455    -0.06474    -0.84786
           RET_TA     -0.38455     1.00000    -0.08578    -0.35677
           EXP_SLS    -0.06474    -0.08578     1.00000     0.45109
           LAB_INC    -0.84786    -0.35677     0.45109     1.00000
```

Size 2 — $5 Mil. to $14.9 Mil. in Total Sales

```
                     The LOGISTIC Procedure
```

Number of M/C observations: 2091
Link Function: Logit

```
                        Response Profile

               Ordered       Binary
                Value       Outcome      Count

                  1          EVENT        213
                  2        NO EVENT      1853
```

WARNING: 26 M/C observation(s) were deleted due to missing values for the explanatory variables.

```
           Deviance and Pearson Goodness-of-Fit Statistics

                                                      Pr >
               Criterion   DF     Value    Value/DF   Chi-Square

               Deviance    506    229.0     0.4525     1.0000
               Pearson     506    535.5     1.0584     0.1758
```

Number of unique profiles: 510

Model Fitting Information and Testing GlM/Cal Null Hypothesis BETA=0

		Intercept		
Criterion	Intercept Only	and Covariates	Chi-Square for Covariates	
AIC	449.955	444.441	.	
SC	455.506	466.642	.	
-2 LOG L	447.955	436.441	11.514 with 3 DF (p=0.0092)	
Score	.	.	9.987 with 3 DF (p=0.0187)	

Analysis of Maximum Likelihood Estimates

Variable	DF	Parameter Estimate	Standard Error	Wald Chi-Square	Pr > Chi-Square	Standardized Estimate	Odds Ratio
INTERCPT	1	-2.1188	0.7336	8.3416	0.0039	.	.
LR_LA	1	-8.8525	2.9636	8.9226	0.0028	-0.216537	0.000
EXP_SLS	1	11.6404	5.9031	3.8884	0.0486	0.188931	0.000
RET_FA	1	-0.0536	0.0366	2.1469	0.1429	-0.314920	0.948

Association of Predicted PrM/Cabilities and M/C observed Responses

Concordant	= 61.5%	Somers' D	= 0.280	
Discordant	= 33.5%	Gamma	= 0.295	
Tied	= 5.1%	Tau-a	= 0.014	
(88944 pairs)		c	= 0.640	

Parameter Estimates and 95% Confidence Intervals

		Profile Likelihood Confidence Limits	
Variable	Parameter Estimate	Lower	Upper
INTERCPT	-2.1188	-3.5345	-0.6604
LR_LA	-8.8525	14.4543	-2.8067
EXP_SLS	11.6404	0.4152	23.5797
RET_FA	-0.0536	-0.1316	0.0065

```
              Parameter Estimates and 95% Confidence Intervals


                                              Wald
                                        Confidence Limits
                            Parameter
              Variable      Estimate    Lower       Upper


              INTERCPT       -2.1188     3.5567     -0.6810
              LR_LA          -8.8525   -14.6611     -3.0439
              EXP_SLS        11.6404     0.0705     23.2103
              RET_FA         -0.0536    -0.1253      0.0181


        Conditional Odds Ratios and 95% Confidence Intervals


                                            Profile Likelihood
                                            Confidence Limits
                               Odds
              Variable   Unit   Ratio    Lower       Upper


              LR_LA     1.0000  0.000    0.000       0.060
              EXP_SLS   1.0000  0.000    0.000       0.660
              RET_FA    1.0000  0.948    0.877       1.007


        Conditional Odds Ratios and 95% Confidence Intervals


                                              Wald
                                        Confidence Limits
                               Odds
              Variable   Unit   Ratio    Lower       Upper


              LR_LA     1.0000  0.000    0.000       0.048
              EXP_SLS   1.0000  0.000    0.000       0.932
              RET_FA    1.0000  0.948    0.882       1.018


                    Estimated Correlation Matrix

Variable     INTERCPT       RET_FA        LR_LA        EXP_SLS


INTERCPT      1.00000     -0.74868     -0.12166       0.81442
LR_LA        -0.12166      0.00321      1.00000      -0.28354
EXP_SLS       0.81442     -0.28293     -0.28354       1.00000
RET_FA       -0.74868      1.00000      0.00321      -0.28293
```

U.S. Department of Agriculture

Rural Business–Cooperative Service

Stop 3250

Washington, D.C. 20250-3250

Rural Business–Cooperative Service (RBS) provides research, management, and educational assistance to cooperatives to strengthen the economic position of farmers and other rural residents. It works directly with cooperative leaders and Federal and State agencies to improve organization, leadership, and operation of cooperatives and to give guidance to further development.

The cooperative segment of RBS (1) helps farmers and other rural residents develop cooperatives to obtain supplies and services at lower cost and to get better prices for products they sell; (2) advises rural residents on developing existing resources through cooperative action to enhance rural living; (3) helps cooperatives improve services and operating efficiency; (4) informs members, directors, employees, and the public on how cooperatives work and benefit their members and their communities; and (5) encourages international cooperative programs. RBS also publishes research and educational materials and issues Rural Cooperatives magazine.