



United States
Department of
Agriculture

Rural Development

Performance of the Top 18 Dairy Co-ops, 1992-2012

Rural Business-Cooperative Programs
Research Report 232

ABSTRACT

Cooperatives' performance changed substantially over time as well as relative to one another, reflecting the challenges of operating in the dynamic dairy industry over the past two decades. Performance did improve for the majority of the surviving cooperatives of mergers and consolidations, at least initially. In the time periods under consideration, some of the larger scale cooperatives did not perform as well as the rest of the cooperatives. And some of the larger scale cooperatives also relied more on debt and less on equity than the rest of the cooperatives to finance their operations.

Performance is measured by the amount a cooperative's net savings exceeds the opportunity cost of members' equity—the “extra value.” Extra value is made scale-neutral and mode-neutral by expressing it as a percentage of operating capital to arrive at an extra-value index for comparing performance among cooperatives and over time.

Keywords: Cooperative, dairy, extra-value index, operating capital, opportunity cost, scale.

Performance of the Top 18 Dairy Co-ops, 1992-2012

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Research Report 232
December 2014

On the cover: In an effort to help balance the growing regional milk supply, the Michigan Milk Producers Association (MMPA) Ovid Plant installed a new tower dryer in 2010, doubling the facility's drying capacity and increasing daily processing capacity to 5 million pounds of milk. Photo courtesy MMPA

PREFACE

For evaluating the performance of cooperatives, this study adopts the extra-value approach that has been developed and used in USDA Cooperative Programs studies. The approach yields extra-value indexes that are scale-neutral and operating mode-neutral and, therefore, are useful in definitively comparing performance among cooperatives.

The extra-value approach is judged to be preferable to the conventional measures of performance (return on equity, return on assets, return on operating capital, net margins on sales, net margins per hundredweight of milk, etc.), which do not yield an

unequivocal answer to the performance question. Furthermore, cooperatives do not have equity market prices to gauge their performance and market value.

For ease of presentation, cooperatives are assigned number codes (Nos.1 through 18) according to their performance rankings at the very beginning (column 2 of table 5). Measures of cooperative performance are presented after aggregation. Every effort has been made to avoid revealing cooperatives' identifiable proprietary data.

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HIGHLIGHTS

The equity retained by dairy cooperatives represents a substantial sum of the members' money and competes with the capital needed for financing their farm operations. Therefore, the retained equity should not be regarded as free capital for the cooperative, but should carry an opportunity cost that reflects the value of the capital in alternative uses: the opportunity cost is an interest charge on the equity at a rate equivalent to the amount the money could earn elsewhere. This consideration is the focal point of this study on evaluating cooperative performance.

If the cooperative's net savings exceed the opportunity cost of members' equity, it has enhanced the value of the equity and generated "extra value" for members. Conversely, a cooperative has diminished the value of the equity if it generates a negative extra value—members bear the opportunity cost of equity capital that is not fully recovered.

For comparing cooperative performance, extra value is made neutral to scale and mode of operation by expressing it as a percentage of operating capital. The index shows the rate of creating extra value from using operating capital that is the financial resources available to the management of a cooperative. Operating capital is the sum of non-current assets and net working capital and is a more accurate measure of a dairy cooperative's scale of operation than is total assets.

The time series of data covers three periods: 1992-1996, 2000-2004 and 2008-2012. In the 2008-2012 period, there were 18 dairy cooperatives (or their predecessor cooperatives) that had been continuously on the USDA Cooperative Programs' top 100 cooperatives list since 1992. For comparing performance over time, the data of all the predecessor cooperatives were combined as if they had already been consolidated into their respective successor cooperatives.

The interest rate for calculating the opportunity cost of equity is based on the respective year's December average London Inter-Bank Offered Rate (LIBOR) for U.S. dollar loans with a 12-month maturity. The basic interest rate used to calculate interest on equity is "LIBOR+2%". In addition, "basic interest rate+5%" and "basic interest rate+10%" are

also used in the analysis to account for risk premium of equity investment at 5-percent and 10-percent levels.

To avoid revealing each cooperative's identifiable proprietary data, the performance of the cooperatives is portrayed in three ways to form a composite picture for evaluation: performance categories, changes in performance indexes, and performance rankings. To further maintain proprietary data confidentiality, the performance indexes for each cooperative are 5-year averages for each of the three study periods.

Cooperatives are placed into four performance categories according to average extra values generated in the three 5-year periods:

- I. Cooperatives that did not fully recover the opportunity cost of equity capital and did not generate extra value at basic interest rate: 7 cooperatives in the first period; 1 each in the second and third.
- II. Cooperatives that generated extra values beyond the opportunity cost of equity capital at basic interest rate but short of reaching 5 percent risk premium: 3 cooperatives in the first period; 8 in the second; and 3 in the third.
- III. Cooperatives that generated extra values beyond the opportunity cost of equity capital at basic interest rate plus 5 percent risk premium but short of reaching 10 percent risk premium: 2 cooperatives in each of the three periods.
- IV. Cooperatives that generated extra values beyond the opportunity cost of equity capital at basic interest rate plus 10 percent risk premium: 6 cooperatives in the first period; 7 in the second; and 12 in the third.

Eleven cooperatives in the first period and 17 in each of the second and third periods generated extra values beyond the opportunity cost of equity capital at basic interest rates (Category II and higher). Most cooperatives shifted around different performance categories over the three periods, except there were 3 cooperatives that remained in the top performance category (Category IV) throughout.

In the first period, Category I had the most coop-

eratives, 7 in total. In the second period, Category II had the most, 8. And in the third period, two-thirds (12) of all 18 cooperatives were in the top performance Category IV.

Extra-value indexes (EVIs) for 6 cooperatives improved successively from the first to the second period and then to the third period. Five cooperatives improved their performance indexes from the first period to the second, but the performance indexes turned lower from the second period to the third. Conversely, the performance indexes of another 6 cooperatives declined from the first period to the second, but improved from the second period to the third. One single cooperative had the distinction of showing that its performance indexes declined continuously through time.

Cooperatives are ranked according to their performance measures (EVIs) for the three study periods. For convenience of presentation, the 18 performance rankings are divided into 3 groups of equal number, 6 each: ranks 1 to 6 are the first ranking group, ranks 7 to 12 are the second ranking group, and ranks 13 to 18 are the third ranking group. Cooperative codes are assigned according to a cooperative's ranking by EVI using the basic interest rate for the 1992-96 period. Therefore, initially, cooperatives are also grouped following the performance ranking grouping.

The rankings are particularly useful for comparing cooperatives that are in the same performance category, such as for the third period where performance Category IV has 12 cooperatives. The rankings of these 12 cooperatives are very different from their initial performance ranking sequence, indicating that the dairy industry is very dynamic.

By the end of the third study period, performance rankings of the cooperatives had spread out from their original standings:

- The 6 initially top-ranked cooperatives saw 3 of their peers remain in the first ranking

group, while 2 dropped to the second ranking group and 1 was further down in the third ranking group.

- The cooperatives in the initial second ranking group had 1 cooperative elevated to the first ranking group, 3 stayed in the second ranking group, and 2 fell to the third ranking group.
- Two of the 6 cooperatives that were initially in the lowest ranking group rose to the first ranking group, and 1 moved to the second ranking group, although 3 still remained in the third ranking group.

In the interim years between the first and the second periods, 12 cooperatives underwent structural changes to form 4 surviving cooperatives, and between the second and the third periods, 4 cooperatives underwent structural changes to form 2 surviving cooperatives. In the period immediately following the structural changes, 4 out of the 6 successor cooperatives actually did perform better than the sum of their respective predecessor counterparts.

For comparing the performance of cooperatives of different scales, the weighted averages and the simple averages of performance indexes of the 18 cooperatives were calculated. The weighted averages are heavily influenced by the performance of larger scale cooperatives, while the simple averages give an equal weight to each cooperative regardless of scale.

Comparisons between weighted-average performance indexes and simple averages suggest that some of the larger scale cooperatives did not perform as well as the rest of the cooperatives in all three periods. Also, some of the larger scale cooperatives relied more on debt and less on equity to finance their operations than the rest of the cooperatives. But these cannot be generalized to conclude that larger scale dairy cooperatives always perform better or worse than smaller scale ones.

Performance of the Top 18 Dairy Co-ops, 1992-2012

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Introduction

Dairy cooperatives require an adequate level of capital to market members' milk. The complete financial data of 89 dairy cooperatives for the fiscal year ending in 2012 reported their total equity was \$3.6 billion, or \$2.78 per hundredweight of member milk. Almost all of the equity was supplied and owned by members: allocated equity accounted for 83.8 percent; retained earnings and unallocated equity (a large part of which was patronage earnings yet to be allocated), 7.6 percent; and preferred stock (mostly issued to members), 7 percent (USDA/RBS Research Report No. 230).

This shows that the equity retained by the cooperative represents a substantial sum of the members' money and competes with the capital needed for financing their farm operations. Therefore, the retained equity should not be regarded as free capital for the cooperative, but should carry an opportunity cost that reflects the value of the capital in alternative uses: the opportunity cost is an interest charge on the equity at a rate equivalent to the amount the money could earn elsewhere. This consideration is the focal point of this study on evaluating cooperative performance.

If the cooperative's net savings exceed the opportunity cost of members' equity, it has enhanced the value of the equity and generated "extra value" for members. Conversely, a cooperative has diminished the value of the equity if it generates a negative extra value—members bear the opportunity cost of equity capital that is not fully recovered.

Calculating and analyzing extra values generated by dairy cooperatives in using members' equity is the approach of this report to measuring cooperative performance.

The Extra-Value Approach

The extra-value approach was proposed and used in previous USDA Cooperative Programs studies (Research Reports No. 166, No. 212, and No. 213). This simple formula shows how extra value is calculated:

Extra value = Net savings - Opportunity cost of equity, where

Opportunity cost of equity (or interest on equity) = Member equity x Interest rate.

Extra value can be made neutral to scale and mode of operation by expressing it as a percentage of operating capital:

Extra-value index = (Extra value / Operating capital) x 100, where

Operating capital = Assets other than current assets + Net working capital, and

Net working capital = Current assets - Current liabilities.

The index shows the rate of creating extra value from using operating capital that is the financial resource available to the management of a cooperative. Dairy cooperatives typically pay members for their milk twice a month. A large proportion of the current assets and the current liabilities are for passing through such pending periodic cash payments to members. This is a unique characteristic of the balance sheets of dairy cooperatives. Therefore, operating capital is a more accurate measure of a cooperative's scale of operation than total assets.

The extra-value approach has the following characteristics:

Table 1 Major dairy cooperatives in the study: 1992-1996 (27 co-ops), 2000-2004 (20 co-ops), and 2008-2012 (18 co-ops denoted by ●)

<i>1992-1996 data</i>	<i>2008-2012 data</i>
Agri-Mark, Inc.	● Agri-Mark, Inc.
Bongards Creameries	● Bongards Creameries
Dairylea Cooperative Inc.	● Dairylea Cooperative Inc.
First District Association	● First District Association
Foremost Farms USA	● Foremost Farms USA
Maryland & Virginia Milk Producers Assn.	● Maryland & Virginia Milk Producers Assn.
Michigan Milk Producers Association	● Michigan Milk Producers Association
Northwest Dairy Association (Darigold)	● Northwest Dairy Association (Darigold)
Prairie Farms Dairy, Inc.	● Prairie Farms Dairy, Inc.
St. Albans Cooperative Creamery, Inc.	● St. Albans Cooperative Creamery, Inc.
Swiss Valley Farms Company	● Swiss Valley Farms Company
Tillamook County Creamery Association	● Tillamook County Creamery Association
United Dairymen of Arizona	● United Dairymen of Arizona

11 co-ops for the 1992-1996 period that merged or consolidated during 1997-2000

<i>Predecessor cooperative(s)</i>	<i>Surviving cooperative</i>
Associated Milk Producers Inc.* (NC Region)	<input type="checkbox"/> Associated Milk Producers Inc.*
Land O'Lakes, Inc.	● Land O'Lakes, Inc.
Atlantic Dairy Cooperative Dairyman's Co-op Creamery Association	
Mid-America Dairymen Western Dairymen Cooperative, Inc. Milk Marketing, Inc. Associated Milk Producers Inc.* (S Region)	● Dairy Farmers of America, Inc.
California Gold Dairy Products California Milk Producers San Joaquin Valley Dairymen Danish Creamery	● California Dairies, Inc.

4 co-ops for the 1992-96 and 2000-04 periods that merged or consolidated during 2005-2008

<i>Predecessor cooperative(s)</i>	<i>Surviving cooperative</i>
<input type="checkbox"/> Associated Milk Producers Inc.* <input type="checkbox"/> Cass-Clay Creamery, Inc.	● Associated Milk Producers Inc.*
<input type="checkbox"/> Upstate Farms Cooperatives, Inc. <input type="checkbox"/> O-AT-KA Milk Products Cooperative	● Upstate Niagara Cooperatives, Inc.

Notes:

● denotes the 18 dairy cooperatives included in the 2008-2012 study dataset.

* denotes Associated Milk Producers Inc. in its various incarnations.

denotes the 4 dairy cooperatives included in both the 1992-1996 and 2000-2004 periods but had undergone further merger and consolidation in 2005 through 2008.

Table 2 London Inter-Bank Offered Rate (LIBOR) and the interest rates used

Year	LIBOR (%)	Basic rate (LIBOR+2%)	Basic rate + 5% risk premium	Basic rate +10% risk premium
1992	4.08	6.08	11.08	16.08
1993	3.81	5.81	10.81	15.81
1994	7.75	9.75	14.75	19.75
1995	5.45	7.45	12.45	17.45
1996	5.79	7.79	12.79	17.79
2000	6.00	8.00	13.00	18.00
2001	2.45	4.45	9.45	14.45
2002	1.45	3.45	8.45	13.45
2003	1.46	3.46	8.46	13.46
2004	3.10	5.10	10.10	15.10
2008	2.38	4.38	9.38	14.38
2009	1.00	3.00	8.00	13.00
2010	0.78	2.78	7.78	12.78
2011	1.10	3.10	8.10	13.10
2012	0.85	2.85	7.85	12.85

Source: Adopted for this study exercise only, December rates as reported in LIBOR Rates History (Historical), http://www.fedprimerate.com/libor/libor_rates_history.htm.

- Extra value measures whether a cooperative's earnings fully recover the opportunity cost of equity capital and by how much.
- Extra-value index is scale-neutral and is useful for comparing performance of cooperatives of different scales.
- Extra-value index puts various types of cooperatives on an equal footing regardless of the mode of their operations, ranging from bargaining to the most sophisticated processing and marketing.

Source of Data

Cooperative financial data. USDA Cooperative Programs maintains a set of data for its annual financial analysis of top 100 cooperatives. In the 2008-2012 period, there were 18 dairy cooperatives (or their predecessor cooperatives) that had been continuously on the top 100 list since 1992 (the cooperatives denoted by “•” in table 1). These 18 were

the successors of the 20 cooperatives for the 2000-2004 period in the previous study (Research Report No. 212), after the merger and consolidation of 4 of them into 2. In turn, these 20 cooperatives were the successors of the 27 for the 1992-1996 period (Research Report No. 166), after the merger and consolidation of 11 of them into 4.

For comparing performance over time, the data of all the predecessor cooperatives were added as if they had already been consolidated into the 18 successor cooperatives. The comparisons based on such grouping may not be perfect, but probably are reasonable. (In the two decades from 1992 to 2012, many smaller cooperatives also merged into the cooperatives included in this study. However, no complete historical financial data for them are available. In any case, their inclusion in this study probably would not have material impacts on the results.)

So, the time series of data is: 1992-1996, 2000-2004 and 2008-2012 for 18 dairy cooperatives. Using the data from the three 5-year periods, it is possible to show how the performance of the cooperatives progressed over time and whether structural changes (mergers and consolidations) improved the performance of the cooperatives involved.

Interest rates. The interest rate for calculating the opportunity cost of equity ideally should be the interest rate on a cooperative's debts. However, it is difficult to derive a representative rate from a cooperative's various financing activities. An alternative is to use a rate that is based on the respective year's December average LIBOR (BBA LIBOR—British Bankers' Association London Inter-Bank Offered Rate) for U.S. dollar loans with a 12-month maturity (table 2). Banks in the United States generally will extend loans to a firm with a better-than-average credit rating, at an interest rate of about 200

Table 3 Categories of dairy cooperative performance based on average extra values generated in the three 5-year periods

<i>Performance category</i>	<i>First period (1992-96)</i>	<i>Second period (2000-04)</i>	<i>Third period (2008-12)</i>
I. Cooperatives that did not fully recover the opportunity cost of equity capital and did not generate extra values at basic interest rate	12, 13, 14, 15, 16, 17, 18	11	15
II. Cooperatives that generated extra values beyond the opportunity cost of equity capitals at basic interest rate	9, 10, 11	6, 10, 12, 13, 14, 15, 16, 17	12, 13, 16
III. Cooperatives that generated extra values beyond the opportunity cost of equity capitals at basic interest rate plus 5% risk premiums	7, 8	3, 9	5, 10
IV. Cooperatives that generated extra values beyond the opportunity cost of equity capitals at basic interest rate plus 10% risk premiums	1, 2, 3, 4, 5, 6	1, 2, 4, 5, 7, 8, 18	1, 2, 3, 4, 6, 7, 8, 9, 11, 14, 17, 18

basis points above the LIBOR. So “LIBOR+2%” is the basic rate used to calculate interest on equity, with the implicit assumption that all included cooperatives had better-than-average credit ratings.

Equity capital is considered by investors to be riskier than debt, and the imputed interest on equity is reckoned to be higher than interest on debt to compensate for the risk of investing in the business (*Davis, et al*). This report assumes such risk premiums were 5 and 10 percentage points for the analysis.

Thus, three interest rates are used in the calculation of extra value and extra-value indexes: basic interest rate, which is LIBOR plus 2 percent; basic interest rate plus 5 percent; and basic interest rate plus 10 percent (table 2).

Performance of Dairy Cooperatives

To avoid revealing each cooperative’s identifiable proprietary data, the performance of the cooperatives is portrayed in three ways to form a composite picture for evaluation: performance categories, changes in performance indexes, and performance rankings. To further maintain proprietary data confidentiality, the extra-value indexes used in the evaluation for each cooperative are 5-year averages for each of the three study periods and represent the cooperative’s average level of performance in the

respective periods. Some information is lost because the averages gloss over intra-period performance variations.

Performance categories. Cooperatives are placed into four performance categories according to average extra values generated in the three 5-year periods (table 3):

- I. Cooperatives that did not fully recover the opportunity cost of equity capital and did not generate extra value at basic interest rate: 7 cooperatives in the first period; 1 each in the second and third.
- II. Cooperatives that generated extra values beyond the opportunity cost of equity capital at basic interest rate but short of reaching 5 percent risk premium: 3 cooperatives in the first period; 8 in the second; and 3 in the third.
- III. Cooperatives that generated extra values beyond the opportunity cost of equity capital at basic interest rate plus 5 percent risk premium but short of reaching 10 percent risk premium: 2 cooperatives in each of the three periods.
- IV. Cooperatives that generated extra values beyond the opportunity cost of equity capital at basic interest rate plus 10 percent risk premium: 6 cooperatives in the first period; 7 in the second; and 12 in the third.

Table 4 Changes in average extra-value indexes (EVIs) between each 5-year period and in the performance category

Co-op Code	1992-96	2000-04				2008-12			
	Performance Category	EVI (Basic)	EVI (Basic+5%)	EVI (Basic+10%)	Performance Category	EVI (Basic)	EVI (Basic+5%)	EVI (Basic+10%)	Performance Category
		Index Increase (+) or decrease (-)				Index Increase (+) or decrease (-)			
7	III	+	+	+	IV	+	+	+	IV
12	I	+	+	+	II	+	+	+	II
14	I	+	+	+	II	+	+	+	IV
17	I	+	+	+	II	+	+	+	IV
18	I	+	+	+	IV	+	+	+	IV
9	II	+	+	+	III	-	-	+	IV
2	IV	+	+	+	IV	-	-	-	IV
8	III	+	+	+	IV	-	-	-	IV
13	I	+	+	+	II	-	-	-	II
15	I	+	+	+	II	-	-	-	I
16	I	+	+	+	II	-	-	-	II
1	IV	-	-	-	IV	+	+	+	IV
3	IV	-	-	-	III	+	+	+	IV
6	IV	-	-	-	II	+	+	+	IV
10	II	-	-	-	II	+	+	+	III
11	II	-	-	-	I	+	+	+	IV
4	IV	-	-	-	IV	-	+	+	IV
5	IV	+	-	-	IV	-	-	-	III

Eleven cooperatives in the first period and 17 in each of the second and third periods generated extra values beyond the opportunity cost of equity capital at basic interest rates (Category II and higher). Most cooperatives shifted around different performance categories over the three periods, except for the 3 cooperatives (Nos. 1, 2, and 4) that remained in the top performance category (Category IV) throughout.

In the first period, Category I had the most cooperatives, 7 in total, and they did not generate extra value. These 7 all achieved a higher level of performance in the second period, 6 in Category II, and 1 (No. 18) in Category IV; further, 3 of the 7 (Nos. 14, 17, as well as 18) were in the top performance level Category IV in the third period.

The second period saw Category II had the most cooperatives (8). In the third period, two-thirds (12) of all 18 cooperatives were in the top performance Category IV.

Changes in performance indexes. Changes in the performance indexes of the 18 cooperatives between the time periods are summarized in table 4.

Performance indexes as measured by EVIs for 5 cooperatives, Nos. 7, 12, 14, 17, and 18, improved (as indicated by “+” in the table) from the first period to the second period, and then to the third period. In other words, these cooperatives’ performance indexes improved throughout the three study periods. Cooperative No. 9 is not a perfect fit but may be included in this group for a total of 6 cooperatives because its EVI at basic interest rate plus 10 percent risk premium successively improved over the study period.

Cooperatives Nos. 2, 8, 13, 15, and 16 saw their performance indexes improved from the first period to the second period but turned lower (as indicated by “-”) from the second period to the third period.

Conversely, performance indexes of Cooperative

Table 5 Rankings by extra-value indexes (EVIs) based on the respective averages for the three periods generated in the three 5-year periods

Rank #	1992-1996			2000-2004			2008-2012			
	EVI (Basic)	EVI (Basic+5%)	EVI (Basic+10%)	EVI (Basic)	EVI (Basic+5%)	EVI (Basic+10%)	EVI (Basic)	EVI (Basic+5%)	EVI (Basic+10%)	
Cooperative standing in the ranking shown by cooperative code ¹										
1	1	1	1	1	1	1	1	1	1	
2	2	2	2	2	2	2	7	17	17	
3	3	3	3	7	7	8	17	7	7	
4	4	4	4	5	8	7	3	3	3	
5	5	6	6	8	5	4	14	14	2	
6	6	5	5	4	4	5	2	2	14	
7	7	7	8	9	9	18	11	11	11	
8	8	8	7	18	18	9	8	8	8	
9	9	9	9	3	3	3	4	4	6	
10	10	10	10	14	13	6	6	6	4	
11	11	12	12	17	6	13	18	18	18	
12	12	11	13	13	15	15	9	9	9	
13	13	13	11	16	16	16	5	5	10	
14	14	15	15	6	14	17	10	10	5	
15	15	16	16	10	17	10	12	12	13	
16	16	14	18	15	10	14	13	16	16	
17	17	18	17	12	12	12	16	13	12	
18	18	17	14	11	11	11	15	15	15	
Column	1	2	3	4	5	6	7	8	9	10

¹Co-op codes are assigned according to a co-op's ranking by EVI using the basic interest rate for the 1992-96 period (column 2). For easier visual identification, co-ops Nos. 1-6 are blocked in white, Nos. 7-12 are in gray, and Nos. 13-18 are in black. Boxes (dashed) enclose the co-ops in the same performance categories that fully recovered the opportunity cost as indicated by the particular interest rate used in calculating the co-ops' EVIs (corresponding to categories in table 3). Co-ops that are not enclosed in any of the boxes did not generate extra value at the respective basic interest rate (performance Category I, table 3).

Nos. 1, 3, 6, 10, and 11 turned lower from the first period to the second period, but improved from the second period to the third period. This group may count 6 cooperatives if cooperative No. 4 is also included. The performance indexes of the remaining cooperative declined continuously through time.

Performance rankings. Cooperatives are ranked according to the three EVIs using respective interest rates for the three study periods. For convenience of presentation, the 18 performance rankings are divided into 3 groups of equal number, 6 each: ranks 1 to 6 are the first ranking group, ranks 7 to 12 are the second ranking group, and ranks 13 to 18 are the third ranking group (table 5, column 1)

In this study, cooperative codes are assigned according to a cooperative's ranking by EVI using the basic interest rate for the 1992-96 period (table

5, column 2). Therefore, initially, cooperatives are grouped following the performance ranking grouping: cooperative Nos. 1-6 are in the first ranking group (in white blocks for easier visual identification), cooperative Nos. 7-12 are in the second ranking group (in gray), and cooperative Nos. 13-18 are in the third ranking group (in black).

The performance rankings by EVIs of the 18 dairy cooperatives over the 3 study periods as displayed in table 5 are summarily described below:

- ◆ Cooperatives initially in the first ranking group (cooperative Nos. 1-6):
 1. Consistently maintained the top performance rank throughout the three periods.
 2. Maintained the second top performance rank in the first two periods. In the third period, rankings dropped to be near the

bottom of the first ranking group.

3. Dipped to the second ranking group in the second period and recovered to be in the first ranking group again in the third period.
 4. Declined gradually, dropping to the second ranking group in the third period.
 5. Remained in the first ranking group in the first and the second periods, but fell to the third ranking group in the third period.
 6. Dropped to straddle the second and third ranking groups in the second period; improved somewhat but still stayed in the second ranking group in the third period.
- ◆ Cooperatives initially in the second ranking group (cooperative Nos. 7-12):
7. Improved to land in the first ranking group, and ranked nearly at the top of all cooperatives throughout the second and the third periods.
 8. Improved to be in the first ranking group in the second period; dropped back to the second ranking group in the third period to be at par with the first period.
 9. Remained in the second ranking group throughout the three periods; its ranking in the third period was relatively lower.
 10. Dropped to the third ranking group throughout the second and the third periods.
 11. Dipped to the third ranking group and actually ranked last (rank 18) in the second period; remarkably recovered in the third period to be at the top of second ranking groups (rank 7).
 12. Dropped to the third ranking group and ranked near the bottom throughout the second and the third periods.
- ◆ Cooperatives initially in the third ranking group (cooperative Nos. 13-18):
13. Improved to be in the second ranking group in the second period but dropped back to the third ranking group to be near the bottom in the third period.
 14. Improved somewhat in the second period; further remarkably improved in the third period to the first ranking group.
 15. Improved somewhat to straddle the first and the second ranking groups in the second period but fell back to the last ranking group to be at the bottom in the third periods.
 16. Remained in the last ranking group throughout the three periods.
 17. Improved through time and moved from the last ranking group to be nearly the top-ranked among all cooperatives in the third period.
 18. Improved to, and stayed in, the second ranking group in the second and the third periods.

Evaluating the performance of dairy cooperatives.

In addition to showing performance rankings, table 5 also brings together all three facets of dairy cooperatives' performance—performance categories, changes in performance indexes, and performance rankings—for a comprehensive evaluation.

The dashed boxes in table 5 that enclose the cooperatives that fully recovered the opportunity cost at basic interest rate plus 10 percent risk premium (columns 4, 7 and 10) correspond to performance Category IV in table 3. The dashed boxes that enclose the cooperatives that fully recovered the opportunity cost at basic interest rate plus 5 percent risk premium (columns 3, 6 and 9) correspond to performance Category III. The dashed boxes that enclose the cooperatives that fully recovered the opportunity cost at basic interest rate (columns 2, 5 and 8) correspond to performance Category II.

Seven cooperatives in the first period, cooperatives 12-18 (below the dashed box in column 2), could not recover the opportunity cost of equity capital at basic interest rate. They are listed in performance Category I in table 3. So are cooperative No. 11 (column 5) in the second period and cooperative No. 15 (column 8) in the third period. Only 1 cooperative out of the 18 in this study was unable to generate extra value beyond the opportunity cost of equity capital at basic interest rate in the second and the third periods. This was an improvement over the first period, when a total of 7 could not recover such cost.

Furthermore, in the first period, there were 6 cooperatives that generated extra values beyond the

opportunity cost of equity capital at basic interest rate plus 10 percent risk premiums (column 4), while there were 7 cooperatives able to do so in the second period (column 7) and 12 cooperatives in the third period (column 10; see also Category IV in table 3).

Performance category indicates that a cooperative's EVI has surpassed a certain category threshold level. To tell how the cooperative performs over time, the changes of the cooperative's performance indexes (EVIs) from one period to the next should be examined. However, the examination is complicated by the downward trend of interest-rate level over the study periods (table 2) that successively lowered the opportunity cost of equity capital and allowed the cooperative to have higher extra values and move into higher performance categories.

Even so, there were only 6 cooperatives that had successively higher EVI performance indexes over the three periods—cooperatives Nos. 7, 12, 14, 17, and 18, and arguably cooperative No. 9 (as earlier shown in table 4). Cooperative No. 7 moved from performance Category III in the first period (table 5, column 3), and cooperative No. 18 moved from Category I (column 2) to be in Category IV (column 7) in the second period, and both then remained in that category in the third period (column 10). Cooperatives No. 14 and 17 improved from Category I (column 2) to Category II (column 5) and then to Category IV (column 10). And cooperative No. 12 rose from Category I (column 2) to stay in Category II through the second and the third periods (columns 5 and 8, respectively). Cooperative No. 9 made the cut because its EVI at basic interest rate plus 10 percent risk premium allowed it to move from performance Category II to Category III and then to Category IV.

The EVIs of the other 12 cooperatives showed checkered variations. Most notable are cooperatives Nos. 1, 2, and 4. Although the 3 cooperatives remained in the highest performance level over time, their EVIs actually experienced up and down (or down and up; see table 4). Apparently, the extra values they generated were high enough that they could cushion their operation variations for their EVIs to stay above the threshold level for Category IV through all three periods.

The performance variations of the remaining 9

cooperatives should also be examined in the same light: how did their EVIs change over time, along with their performance categories?

Performance ranking shows a cooperative's efficiency in using operating capital to generate extra value relative to one another, given that all cooperatives operate in the same economic environment and market conditions. The rankings are particularly useful for comparing cooperatives that are in the same performance category, such as for the third period where performance Category IV has 12 cooperatives. The dashed block in column 10 of table 5 that encloses these 12 cooperatives shows that their rankings are very different from their initial performance ranking sequence (column 2).

The dairy industry is very dynamic. By the end of the third study period, performance rankings of the cooperatives had spread out from their original standings:

- The 6 initially top ranked cooperatives saw 3 of their peers remain in the first ranking group, while 2 dropped to the second ranking group and 1 was further down in the third ranking group.
- The cooperatives in the initial second ranking group had 1 cooperative elevated to the first ranking group, 3 stayed in the second ranking group, and 2 fell to the third ranking group.
- Two of the 6 cooperatives that were initially in the lowest ranking group rose to the first ranking group, and 1 moved to the second ranking group, although 3 still remained in the third ranking group.

In summary, the composite picture painted by dairy cooperatives' standings in the performance categories, changes in performance indexes and performance rankings help evaluate operating performance by asking these three questions:

- How much extra value does a cooperative generate relative to its operating capital?
- How does the cooperative's extra-value index change from one time period to another?
- How does the cooperative's extra-value index compare with other cooperatives in their relative performance rankings?

Structural Changes (Mergers and Consolidations)

In the interim years between the first and the second periods, 12 cooperatives underwent structural changes (mergers and consolidations) to form 4 surviving cooperatives, and between the second and the third periods, 4 cooperatives underwent structural changes to form 2 surviving cooperatives (table 1). An interesting question: did the structural changes improve the performance of the cooperatives?

The performance of the 6 surviving cooperatives was compared to that of the corresponding groupings of the predecessor cooperatives. Four out of the 6 surviving cooperatives actually did perform better than the sum of their respective predecessor counterparts in the period immediately following the structural changes: their performance indexes showed improvements, and their rankings and performance categories either advanced or remained in the same level.

Further detailed analysis is necessary to determine what factors, or what post-merger/consolidation measures the surviving cooperatives undertook, made the improvements possible.

Scale of Cooperatives and Performance

Another interesting question is: did larger scale cooperatives perform better than smaller scale ones?

Being scale-neutral and mode-neutral, extra-value index can be used to objectively compare the performance of cooperatives of different scales. This can be done by comparing the weighted averages and the simple averages of performance indexes of the 18 cooperatives.

The weighted-average performance indexes of cooperatives are calculated by adding the financial data across all cooperatives and calculating the performance indexes as if they had been one single organization. Because of the weighting process, the resulting indexes would be heavily influenced by the performance of larger scale cooperatives.

The simple-average performance indexes treat every cooperative equally by calculating the performance indexes of each of the 18 cooperatives and then averaging the indexes. The simple averages

give an equal weight to each cooperative regardless of scale. No one cooperative has more weight than another to influence the results.

If the weighted-average performance indexes show that the 18 cooperatives as a group performed better than indicated by the simple averages, it may be inferred that larger scale cooperatives used operating capital more efficiently to generate extra value than smaller ones. Conversely, smaller scale cooperatives used operating capital more efficiently to generate extra value than larger ones, if the simple-average performance indexes show that the 18 cooperatives as a group performed better than indicated by the weighted averages.

Weighted averages. Combining the 18 dairy cooperatives as if they had been 1 single entity, the net savings of the group was able to pay for the opportunity cost of equity capital at the basic interest rate: for example, the group generated an extra value that was 2.4 percent of the combined net operating capital in 1992 (EVI was 2.4 percent, table 6). All EVIs using the basic interest rates as the opportunity costs were positive in the 15 years of this study, with the first 5-year period having an average EVI of 3.9 percent; the second period, 3.2 percent; and the third period, 5.6 percent.

If the opportunity cost of equity capital included a risk premium of 5 percent above the basic interest rate, then the group was not able to cover the opportunity cost of using the equity capital in 2 years in both the first and the second periods. The average EVI was 0.4 percent for the first period, 0.5 percent for the second period, and 2.9 percent for the third period.

The combined net savings of the cooperatives was not able to cover the opportunity cost of equity capital at the basic interest rate plus 10 percent risk premium in 13 out of the 15 years (the exceptions being 2009 and 2010). The 5-year average EVI was -2.9 percent for the first period, -2.2 percent for the second period, and 0.2 percent for the third period.

The weighted-average EVIs that were calculated with the basic interest rates show that the efficiency in using operating capital to generate extra value was the highest in the third period, followed by the first period, and then the second period. However, the other two series of average EVIs suggest that

Table 6 Performance of 18 dairy cooperatives as a group, annual weighted average extra-value indexes (EVIs) and equity share of operating capital

Year	EVI (i=basic)	EVI (i=basic+5%)	EVI (i=basic+10%)	Equity share of operating capital
-----Percent-----				
1992	2.4	(0.7)	(3.9)	63
1993	4.9	1.3	(2.2)	71
1994	1.9	(1.4)	(4.7)	66
1995	5.3	1.8	(1.6)	69
1996	4.8	1.2	(2.1)	69
Average	3.9	0.4	(2.9)	68
2000	2.3	(0.7)	(3.7)	60
2001	3.5	0.9	(1.8)	53
2002	4.3	1.6	(1.2)	55
2003	3.5	1.1	(1.3)	48
2004	2.5	(0.3)	(3.0)	55
Average	3.2	0.5	(2.2)	54
2008	5.3	2.6	(0.1)	53
2009	9.3	6.3	3.4	59
2010	6.7	3.8	0.8	59
2011	4.3	1.6	(1.0)	53
2012	2.4	0.1	(2.3)	48
Average	5.6	2.9	0.2	54

the efficiency in using operating capital to generate extra value was the highest in the third period, followed by the second period and then the first period.

The weighted-average equity share of the operating capital in both the second period and the third periods averaged 14 points lower than the first period. In those two later periods, the cooperatives as a group relied on debts to finance almost half (46 percent) of their operating capital.

Simple averages. By averaging the individual performance of the 18 dairy cooperatives, all average EVIs at the basic interest rates were positive in the 15 years, averaging 9 percent for the first 5-year period, 9.2 percent for the second period, and 10.4 percent for the third period (table 7).

If the opportunity cost of equity capital included a risk premium of 5 percent above the basic rate, average EVIs were still positive for all 15 years. The average EVIs, respectively, for the three periods, were 5.2 percent, 5.6 percent, and 7.1 percent.

If the risk premium was 10 percent above the basic interest rate, the resulting EVIs were also all

positive except for 2 years, 2000 and 2008. The 5-year average EVI was 1.6 percent for the first period, 1.9 percent for the second, and 3.8 percent for the third.

The three simple-average EVIs that were calculated at the respective interest rates show that the efficiency in using operating capital to generate extra value was the highest in the third period, followed by the second period and then the first period.

The simple-average equity share of the operating capital changed little from the first period to the second, but dropped 7 points (to 66 percent) between the second and the third periods. The 18 cooperatives, on average, relied on debts to finance about a quarter of their operating capital in the first 2 periods, and about a third in the third period.

Scale and performance. Comparisons between weighted-average performance indexes and simple averages highlight the performance of larger scale cooperatives relative to the rest. Except for one (very marginal) case in 2008, all weighted-average performance indexes were lower than the corresponding simple averages, suggesting that some of the larger scale cooperatives did not perform as well as the rest of the cooperatives in all three periods (tables 6 and 7). Some of the larger scale cooperatives also relied more on debt and less on equity than the rest of the cooperatives to finance their operations, as shown by the differences between the weighted-average equity shares of the operating capital and the simple averages.

The comparisons in this section offer some interesting general observations. But without presenting individual cooperative's data, it is not prudent to make a definitive conclusion about cooperative scale and performance. Suffice it to say that some of the larger scale cooperatives did not perform as well as other cooperatives and that some of the larger scale cooperatives relied more on debts and

Table 7 Performance of 18 dairy cooperatives as a group, annual simple average extra-value indexes (EVIs) and equity share of operating capital

Year	EVI (i=basic)	EVI (i=basic+5%)	EVI (i=basic+10%)	Equity share of operating capital
-----Percent-----				
1992	7.3	3.6	0.0	73
1993	10.9	7.1	3.4	75
1994	7.4	3.7	0.0	74
1995	9.4	5.7	2.0	76
1996	9.8	6.1	2.4	74
Average	9.0	5.2	1.6	74
2000	7.5	3.7	(0.1)	76
2001	10.6	6.9	3.2	74
2002	11.0	7.4	3.7	73
2003	7.5	3.9	0.4	71
2004	9.5	5.9	2.2	73
Average	9.2	5.6	1.9	73
2008	6.0	2.9	(0.2)	62
2009	15.9	12.3	8.8	71
2010	13.3	9.9	6.4	69
2011	7.8	4.6	1.5	63
2012	9.1	5.8	2.4	66
Average	10.4	7.1	3.8	66

less on member equity than other cooperatives to finance their operations.

Attributes of the Extra-Value Approach and Some Caveats

The extra-value approach is a useful tool for member-producers to evaluate the performance of their cooperative:

- Extra value measures whether and by how much the cooperative's net savings exceeds the opportunity cost of using members' equity capital.
- Extra-value index measures the rate at which the extra value is generated given the operating capital used in the cooperative's operation.
- Being scale-neutral and mode-neutral, the extra-value index is an objective tool for comparing performance among cooperatives and over time.

- Extra-value index hinges on the interplays of these four key factors: net savings, equity, the opportunity cost of equity, and the amount of operating capital, and is a broader measure than conventional financial ratios of cooperative performance.
- Extra-value index can be reformulated as:

$$\text{EVI} = [(\text{Return on Equity} - \text{Interest rate}) / (\text{Operating capital} / \text{Equity})] \times 100.$$

In essence, EVI measures the rate by which return on equity exceeds the opportunity cost (interest rate) of equity, the rate being standardized by the ratio of operating capital to equity. A cooperative that uses more operating capital relative to equity (or having lower equity share of operating capital)

should achieve a higher return on equity for its EVI to be at par with or better than the EVI of a cooperative that has a higher equity share of operating capital (assuming the two cooperatives have the same opportunity cost of equity as in this study).

Using the extra-value index for measuring and comparing performance of cooperatives should be qualified by two considerations:

- In a dairy cooperative, the distinction between milk pay prices, premiums, and member subsidies on the one hand and earnings (net savings) on the other is not clear-cut. If a dairy cooperative's policy is to pay members high milk prices and premiums and various member subsidies, it may report low earnings or even incur losses. On the other hand, a cooperative's upfront payments to members may be lower and then it can report hefty yearend earnings. The two cooperatives may perform

equally well, but their earnings may appear to show otherwise.

- The interest on equity (the opportunity cost of equity) is imputed, and the “right” rate to use is specific to each individual cooperative, depending on its creditworthiness. For practicality, this study applies a uniform interest rate across all cooperatives (mindful of the fact that this rate uniformity rarely exists in real life).

It also should be noted that the dataset used in this study has some missing values in the second and the third periods (table 8). These missing values may or may not have some impacts on the results of the analysis.

Conclusion: Board and Member Vigilance Is Essential

A cooperative is a membership organization as well as a business entity. It has to achieve its business goals but also has to satisfy its members’ objectives. Besides expecting good returns by marketing milk through the cooperative as an assured market, dairy farmers also look to the cooperative to provide some or all of these services to help sustain their farming operations (Cooperative Information Report No. 65):

- Field services to assist with on-farm production problems and regulatory and inspection issues.
- Disseminating market information about the situation and outlook of the milk market.
- Other marketing-related services that help members deal with all the minutiae related to

Table 8 Cooperatives with missing data

Co-op	2000	2001	2002	2003	2004	2008	2009	2010	2011	2012
1						x				
2										x
3	x					x				
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14				x	x	x	x			
15										
16										
17						x				x
18					x					

producing and marketing quality milk.

- Milking supplies and equipment or farm supplies, etc.
- Insurance products, such as disaster insurance for the farm, health and/or life insurance, and farm workers’ compensation.
- Retirement programs.
- Risk management services to deal with market uncertainties.
- Farm business consulting services.
- Livestock marketing services (for culled cows and calves).
- Representing members’ interests in government, regulatory, and public affairs.
- Other services that may help members’ farming operations.

The returns of providing such member services may not be fully measurable and thus may not be fully reflected in the financial statements. The extra-value index, like any other financial ratio, does not capture the value of member benefits that are not quantified. The board and members should be cognizant of the value of such benefits in addition to financial returns when evaluating their cooperative’s performance.

They should also take their cooperative’s pricing policies into consideration, as the distinction between a cooperative’s milk pay prices and earnings

(net savings) is not clear-cut.

Each cooperative has its own opportunity cost of equity capital, and each cooperative member's opportunity cost of capital may be different. The board and the members are in the best position to judge the most representative interest rates to use in the extra-value calculation.

The extra-value approach is a useful tool for evaluating cooperative performance. In the end, however, there is no substitute for a well-informed membership and a vigilant board that understands the complexity of operating a cooperative to adequately oversee its operations and satisfy members' expectations (Research Report No. 229).

References

- Davis, Evan, C. Gouzouli, M. Spence, and J. Star. "Measuring the Performance of Banks," *Business Strategy Review*, Autumn 1993, Vol. 4, No. 3.
- Ling, K. Charles. "Dairy Cooperatives: What They Are and What They Do," in *The Nature of the Cooperative*, Cooperative Information Report No. 65, Rural Business-Cooperative Service, U.S. Department of Agriculture, November 2014, pp. 16-21.
- Ling, K. Charles and Carolyn Liebrand. *A New Approach to Measuring Dairy Cooperative Performance*, RBS Research Report No. 166, Rural Business-Cooperative Service, U.S. Department of Agriculture, September 1998.
- Ling, K. Charles. *Measuring Performance of Dairy Cooperatives*, RBS Research Report No. 212, Rural Business-Cooperative Service, U.S. Department of Agriculture, June 2006.
- Liebrand, Carolyn B. *Measuring the Performance of Agricultural Cooperatives*, RBS Research Report No. 213, Rural Business-Cooperative Service, U.S. Department of Agriculture, December 2007.
- Liebrand, Carolyn B. and K. Charles Ling. *Member Satisfaction With Their Cooperatives: Insights From Dairy Farmers*, RBS Research Report No. 229, Rural Business-Cooperative Service, U.S. Department of Agriculture, June 2014.
- Ling, K. Charles. *Marketing Operations of Dairy Cooperatives, 2012*, Rural Development Research Report No. 230, Rural Business-Cooperative Service, U.S. Department of Agriculture, May 2014.

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