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# A New Approach To Measuring Dairy Cooperative Performance



## Abstract

This report prescribes a new method to evaluate and compare operational performance of dairy cooperatives. A cooperative is creating extra value if its net operating margin can more than cover its operating cost, including the opportunity cost of operating capital (the sum of fixed assets and working capital). The extra-value measure can be common-sized by operating capital to create an extra-value index (EVI). The scale-neutral index is an objective measure for comparing operating efficiency between dairy cooperatives and dairy investor-owned firms (IOFs). Using actual data, performance rankings of firms by EVI and by return on equity (ROE) differed somewhat. Dairy cooperatives performed as well as IOFs, based on both EVI and ROE.

Key words: Economic rent, extra value index, cooperatives, dairy, performance ranking.

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## **Preface**

A question frequently asked by people is, "Which cooperative performs better for the members?" The obvious response is, "The cooperative with the most satisfied members." The answer, however, is very subjective and is not easy to determine. Financial ratios are usually used to provide objective and readily available measures of performance—return on equity, return on assets, return on operating capital (the sum of fixed assets and working capital), net margins on sales, and net margins per hundredweight of milk, etc. While worthwhile benchmarks, none would yield an unequivocal answer to the performance question.

In searching for a better measurement, we came across a new way of comparing firm performance by Davis and Kay in the *Business Strategy Review* (Summer 1990, Vol. 1, No. 2). Their approach measures performance in terms of earnings generated net of total costs, including a cost for equity employed. The approach was modified to fit the cooperative context. Our purpose was to provide dairy farmers an objective tool to measure the performance of their cooperatives and compare that performance with certainty.

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## Highlights

Common measures of a cooperative's operating performance—return on equity, return on assets, return on operating capital, net margins on sales, net margins per hundred-weight of milk, etc.—are useful for evaluating an individual cooperative's operating results. However, they may not be objective measures for comparing performance between cooperatives. They do not unequivocally tell which cooperative actually performs better.

To illustrate the point, this report examines two cooperatives that market exactly the same volume of milk and have the same amount of assets, operating capital, sales, cost of goods sold, operating cost and net operating margin, but have different ways of financing the operation.

This report describes a relatively new approach called “extra value” for measuring business performance. The approach accounts for the total cost of operations, including cost on equity, and measures performance in terms of earnings generated, net of this total operating cost. The cost on equity is the opportunity cost of equity capital. It is an interest charge on the equity used in the operation at a rate equivalent to the amount the money could earn elsewhere.

Extra value can be calculated using the information commonly found on any firm's financial statements (except for interest rate on equity which has to be imputed):

Extra value = Net operating margin (before tax) - Interest on equity, where

Net operating margin (before tax) = Operating margin + Interest income - Interest expenses + Other income - Other expenses, and

Interest on equity = (Member or stockholder equity - Investment in other firms) X Interest rate.

Any patronage or investment income is excluded from the net operating margin because it does not result from the cooperative's own operations and should not be used to measure the cooperative's operating performance. Likewise, investment in other firms is removed from the cooperative's assets and the corresponding amount is subtracted from members' or stockholders' equity. This way, extra value captures the cooperative's operating performance and not the performance of other firms in which the cooperative invests. Earnings are before income tax. They do not measure a business' performance based on tax accounting maneuvers.

A positive extra value, indicating a cooperative generated value for its members, attests to the cooperative's comparative advantage in the marketplace. The cooperative may have a comparative advantage in one or several ways. Its operations may be more efficient than the competition, it may be technologically more advanced or it may have developed brand names or niche markets that allow it to extract premiums from the marketplace.

A negative extra value indicates that a cooperative is not fully recovering its total costs and is losing value as a business. The erosion of a cooperative's value may be caused by its comparative disadvantage in the marketplace, due to inefficient operations, technological deficiency or overpaying for the cost of goods sold.

This extra-value measure may be of special interest to members because cooperatives

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do not have valuation through stock markets. Knowing whether a cooperative is creating value should be of particular interest to members.

To make the extra value scale-neutral, an “extra-value index” (EVI) is developed by expressing extra value as a percentage of operating capital. Because EVI is common-sized by operating capital and is thus scale-neutral, it allows cooperatives and firms of different sizes and/or types of operations to be compared fairly.

Dairy cooperatives that have more bargaining than processing and marketing operations may have lower margins on sales but also use less operating capital. Other cooperatives that engage in further processing may add more value to milk and milk products, but require more operating capital to generate the higher margins on sales. The extra-value index, being common-sized, puts all cooperatives on an equal footing for comparing their operating performance.

Data for 25 dairy cooperatives that were consistently on USDA’s Cooperative Services’ list of the nation’s 100 largest agricultural cooperatives every year for 11 years between 1986 and 1996 were used to illustrate the extra-value approach, as compared with the most commonly used performance measure, the return on equity (ROE).

While ROE highlights the relationship of a firm’s net earnings to the equity it employs, EVI measures the efficiency of a firm’s operation in adding value to the firm for the stakeholders (cooperative member-producers). The two measures have different emphasis. Depending on a cooperative’s particular situation, in some cases they would result in yielding different performance ranking of a cooperative as compared with other cooperatives. In other cases, the ranking may converge. The relative performance of the cooperatives also depends upon what cost is assigned to equity capital for the EVI measure.

The rankings of cooperatives appeared more similar between ROE and EVI when equity capital was not charged a cost in the extra-value calculation than when equity capital was assumed to cost 10 or 25 percent. Very few (no more than three) cooperatives ended up with the same rank under each measure. Because the differing degrees to which an individual cooperative relied on equity capital, versus debt capital, in financing its operations, the relative ranking by EVI changed when the opportunity cost of member equity changed. It appears that the EVI rankings at selected rates for equity capital cost were more similar in the earlier years of the time period. Perhaps this reflected cooperatives adjusting their mix of equity versus debt capital in different ways due to the more market-oriented operations of recent years.

A more telling observation than the differences in ranking was that the number of cooperatives showing negative extra value was typically larger than the number of cooperatives that had negative returns to equity. Because ROE measures the return members’ equity earns by being employed by cooperatives and EVI measures the earning ability after covering the cost of equity, a cooperative could show positive returns to equity but actually be losing value as a going concern. Not unexpectedly, the number of cooperatives with a negative extra-value index increased as the imputed cost of equity increased. Very significantly, however, over the 11 -year period of 1986-1996, 5 to 10 cooperatives each year generated value while “paying” a charge of 25 percent on the equity capital employed.

Investor-owned firms (IOFs) from the Dairy Field magazine’s annual list of the top 100

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dairy processing firms that filed financial data with the U.S. Securities and Exchange Commission (SEC) for 1994 through 1996 were also analyzed. The rankings using ROE and EVI appeared to be quite different in 1996, but almost the same in 1994 especially when stockholder equity was valued at a cost of 25 percent.

The performance of dairy cooperatives and dairy investor-owned firms (IOFs) were compared for 3 years, 1994-1996. In ROE terms, most firms had positive earnings and few lost money in 1994-1996. However, many firms could not cover their imputed cost of equity capital in their operations-they lost value as a business concern.

While an IOF ranked first by all measures for the 3-year period, the top rankings were held by both cooperatives and dairy IOFs. In terms of profitability (ROE) or extra value created (EVI), dairy cooperatives performed as well as IOFs. Three out of seven losing firms that had negative ROEs were IOFs in 1994, and three out of four losing firms were IOFs in 1995. And the only firm that lost money in 1996 was an IOF.

Neither IOFs nor cooperatives were much out of proportion in the groups of firms that had negative EVIs. It was not obvious which group was more prone to losing value in their business operations.

In summary, EVI may give a better indication of a company's operating efficiency in generating value for its shareholders than conventional measures of profitability. By showing the rate of value creation in the operation, EVI may be a better measure than other traditional means for evaluating a manager's performance. EVI is an indicator calculated on operating capital that does not include funds for investment activities. It measures operational efficiency, not the profitability of financial transactions derived from investment activities. EVI is also based on earnings before income tax, and neither rewards nor punishes a manager based on tax accounting maneuvers.

This report illustrates the use of extra-value index in comparing operational performance among dairy cooperative and dairy companies. The concept and the method are equally applicable to other commodities and businesses.

# A New Approach To Measuring Dairy Cooperative Performance

## Introduction

There are many ways to measure a cooperative's operating performance—return on equity, return on assets, return on operating capital, net margins on sales, and net margins per hundredweight (cwt) of milk, among others. While useful tools, they fall short of providing a clearcut comparison between firms as shown in table 1 using two hypothetical dairy cooperatives.

Cooperative A and Cooperative B market exactly the same volume of milk and have the same amount of assets, operating capital, sales, cost of goods sold, operating cost and operating margin. The only difference is the way they finance their operations. Cooperative A's operating capital is financed by \$80,000 debt and \$480,000 member equity, while Cooperative B's operating capital is financed by \$310,000 debt and \$250,000 member equity. The table shows how the cooperatives perform at various interest rates on debt.

The operating results allow both cooperatives to claim successful performance. When the interest rate on debt is 10 percent, Cooperative B can claim that it has achieved better return on member equity, while having acceptable net savings and other measures of performance, and not requiring members to contribute much capital. On the other hand, Cooperative A can tell its members that it has generated higher net savings per cwt of milk, has performed better by almost every measure and achieved a reasonable return on equity. The two cooperatives can make the same claims when the interest rate on debt is lower, such as 9 percent. When the interest rate on debt is higher, 11 percent for instance, Cooperative A can claim that it has outperformed Cooperative B in every aspect, even in terms of return on equity.

This example shows that conventional measures of performance do not unequivocally tell which coop-

Table 1— Comparison of two cooperatives using conventional measures of performance

	Cooperative A	Cooperative B
Milk volume handled (cwt)	250,000	250,000
Total assets	\$1,000,000	\$1,000,000
Operating capital	560,000	560,000
Debt	80,000	310,000
Equity	480,000	250,000
Sales	\$5000,000	\$5,000,000
Cost of goods sold	4,500,000	4,500,000
Gross margin	500,000	500,000
Operating cost	440,000	440,000
Operating margin	60,000	60,000
<b>Interest on debt @ 10 percent</b>	8,000	31,000
Net savings	52,000	29,000
Return on equity	10.8%	11.6%
Return on assets	5.2%	2.9%
Return on operating capital	9.3%	5.2%
Net margins on sales	1.0%	0.6%
Net margins per cwt	\$0.21	\$0.12
<b>Interest on debt @ 9 percent</b>	7,200	27,900
Net savings	52,800	32,100
Return on equity	11.0%	12.8%
Return on assets	5.3%	3.2%
Return on operating capital	9.4%	5.7%
Net margins on sales	1.1%	0.6%
Net margins per cwt	\$0.21	\$0.13
<b>Interest on debt @ 11 percent</b>	8,800	34,100
Net savings	51,200	25,900
Return on equity	10.7%	10.4%
Return on assets	5.1%	2.6%
Return on operating capital	9.1%	4.6%
Net margins on sales	1.0%	0.5%
Net margins per cwt	\$0.20	\$0.10



erative actually performs better. A new tool may be useful to clarify cooperative performance. This report uses a new method for evaluating business performance to measure and compare U.S. dairy cooperatives. This method was proposed by Davis and Kay in 1990 and modified to suit cooperatives.

### Extra Value Defined

The new tool uses an “extra value” approach. It accounts for the total cost of operations — including cost on equity — and measures performance in terms of earnings generated, net of this total cost. Extra value can be calculated using the information commonly found on any firm’s financial statements (except for the interest rate on equity which has to be imputed).

$$\text{Extra value} = \text{Net operating margin (before tax)} - \text{Interest on equity}$$

where:

*Net operating margin*

$$\begin{aligned} \text{(before tax)} &= \text{Operating margin} + \text{Interest income} \\ &\quad - \text{Interest expenses} + \text{Other income} \\ &\quad - \text{Other expenses, and} \end{aligned}$$

$$\begin{aligned} \text{Interest on equity} &= (\text{Member or stockholder equity} \\ &\quad - \text{Investment in other firms}) \\ &\quad \times \text{Interest rate.} \end{aligned}$$

Any patronage or investment income is excluded from the net operating margin as these are not the results of the cooperative’s own operations and should not play a part in measuring operating performance. Likewise, investment in other firms is removed from the cooperative’s assets and the corresponding amount is subtracted from members’ or stockholders’ equity. This way, extra value captures the cooperative’s operating performance and not the performance of other firms in which the cooperative invests.

Ideally, the interest on equity is a value imputed from the cooperative’s own opportunity cost of capital. The appropriate rate is cooperative-specific. However, it is difficult, if not impossible, to figure out a cooperative’s opportunity cost of equity capital from its financial statement. Using various assumed rates across all cooperatives in the extra-value calculation, sensitivity analysis can be made to examine results.

In table 2, interest on equity is calculated at the same rate as on debt. When the interest rate is 10 percent, total input cost of Cooperative A is \$496,000 (\$440,000 operating cost, \$8,000 interest on debt and \$48,000 interest on equity). Subtracting this total input cost from gross margin (\$500,000) would produce a net amount of \$4,000. This is the net amount generated by the cooperative’s operations after all cost is paid, including a cost for

using member equity. Economists call it “economic rent,” “surplus” or “economic value added.” The term “extra value” is more straight-forward. It is earned by Cooperative A for its members after paying for everything used in the operation, including the opportunity cost of using retained member equity.

To make the extra value scale-neutral, an “extra-value index” is developed by expressing extra value as a percentage of operating capital. The extra value can then be expressed as a ratio to the cooperative’s or firm’s operating capital. This way, the effects of scale are removed. This is useful for comparison purposes.

$$\text{Extra-value index} = \text{Extra value} / \text{Operating capital} \times 100$$

where:

$$\text{Operating capital} = \text{Fixed assets} + \text{Net working capital}$$

and

$$\text{Net working capital} = \text{Current assets} - \text{Current liabilities.}$$

Again, any investment in other firms is excluded from fixed assets because these investments are not used in the cooperative’s own operations.

As an example, if the extra-value index is 10 percent, it means 10 cents of extra value is generated for every dollar of operating capital used by a business.

Table 2— Comparison of two cooperatives using extra value to measure performance

	Cooperative A	Cooperative B
Operating capital	560,000	560,000
Debt	80,000	310,000
Equity	480,000	250,000
Gross margin	500,000	500,000
Operating cost	440,000	440,000
<b>Interest on debt @10 percent</b>	8,000	31,000
<b>Interest on equity @10 percent</b>	\$48,000	\$25,000
Total input cost	496,000	496,000
Extra value	4,000	4,000
Extra-value index	0.7%	0.7%
<b>Interest on debt @9 percent</b>	7,200	27,900
<b>Interest on equity @9 percent</b>	\$43,200	\$22,500
Total input cost	490,400	490,400
Extra value	9,600	9,600
Extra-value index	1.7%	1.7%
<b>Interest on debt @11 percent</b>	8,800	34,100
<b>Interest on equity @11 percent</b>	\$52,800	\$27,500
Total input cost	501,600	501,600
Extra value	(1,600)	(1,600)
Extra-value index	-0.3%	-0.3%

Table 2 shows that Cooperative A generates an extra value of \$4,000, the same as Cooperative B. The extra-value index is 0.7 percent for both cooperatives. These numbers indicate that the performance of Cooperatives A and B are the same. It may be concluded that the two cooperatives perform equally well, despite apparent differences exhibited by the conventional performance measures in table 1.

When the interest rate is 9 percent, each cooperative generates an extra value of \$9,600 (extra-value index 1.7 percent). Again, both perform equally well. When the interest rate is 11 percent, neither cooperative can recover its total input cost. Each cooperative generates a negative extra value of \$1,600 (extra-value index -0.3 percent). Nevertheless, the performance of the two cooperatives is equal, although the value of each cooperative declines by \$1,600.

The erosion of a cooperative's value may be caused by its comparative disadvantage in the marketplace, possibly caused by inefficient operations, technological deficiency or overpaying for the cost of goods sold. Many dairy cooperatives are under pressure from members or competitors to pay various kinds of premiums and subsidies that may hurt the financial integrity of the cooperative.

However, positive extra value by a cooperative attests to its comparative advantage in the marketplace in one or several ways. Its operations may be more efficient than the competition, it may be technologically more advanced, or it may have developed brand names or niche markets that allow it to extract premiums from the marketplace.

The extra-value concept appears to provide a sound measure for comparing cooperative performances. Given that Cooperatives A and B are assumed to be identical except for the different levels of debt and equity, one would expect an objective performance measure to indicate that they perform equally well (table 2).

Because the two cooperatives have different debt-to-equity levels, this conclusion is valid only when the interest on debt and the imputed interest on equity are the same. When interest rates differ, using extra value to compare performance becomes more complicated. This is shown in table 3 where interest on debt is held at 10 percent, while the imputed interest rate on equity varies.

Some would argue that because a cooperative is owned by members, member equity used in its operation should be cost-free. Following this argument, the imputed interest on member equity is zero (table 3). Extra value calculated for Cooperative A is \$52,000 (an index of 9.3 percent). Cooperative B generates \$29,000

extra value (an index of 5.2 percent). By comparing the extra values and the indices generated, Cooperative A therefore outperforms Cooperative B.

Others could argue that using member equity might be cheaper than debt, but it is certainly not cost-free. If the imputed interest on equity is lower than the interest on debt, 9 percent for instance, the extra values calculated again indicate that Cooperative A has outperformed Cooperative B, although by a slimmer margin.

Still others might argue that equity is riskier than debt, so the imputed interest on equity should be higher than interest on debt to compensate for the risk of investing in the business. (Equity in an investor-owned firm is usually treated this way.) In some dairy cooperatives, members exert high pressure to pay out as much as possible and retain little as equity. The imputed interest on equity for these cooperatives is very high.

Take, for example, a situation where the imputed interest on equity is 11 percent. Table 3 shows that Cooperative A, which is financed mostly with member equity, does not fully recover its total input cost and has a negative extra value of \$800 (an index of -0.1 percent). On the other hand, a highly leveraged cooperative (B) has an extra value of \$1,500, (an index of 0.3 percent). In

Table 3 — Extra values at various interest rates on equity (interest on debt 10 percent)

	Cooperative A	Cooperative B
<b>Interest on equity @ 0 percent</b>		
Total input cost	\$448,000	\$471,000
Extra value	52,000	29,000
Extra-value index	9.3%	5.2%
<b>Interest on equity @ 9 percent</b>		
Total input cost	\$43,200	\$22,500
Total input cost	491,200	493,500
Extra value	8,800	6,500
Extra-value index	1.6%	1.2%
<b>Interest on equity @ 11 percent</b>		
Total input cost	\$52,800	\$27,500
Total input cost	500,800	498,500
Extra value	(800)	1,500
Extra-value index	-0.1%	0.3%
<b>Interest on equity @ 15 percent</b>		
Total input cost	\$72,000	\$37,500
Total input cost	520,000	508,500
Extra value	(20,000)	(8,500)
Extra-value index	-3.6%	-1.5%
<b>Interest on equity @ 20 percent</b>		
Total input cost	<b>\$96,000</b>	\$50,000
Total input cost	544,000	521,000
Extra value	(44,000)	(21,000)
Extra-value index	-7.9%	-3.8%

this case, Cooperative B's performance is better than Cooperative A's, although Cooperative B's highly leveraged position may leave it financially vulnerable.

When the imputed interest on equity is zero, or lower than interest on debt, firms tend to use more equity than debt in financing its operation. Conversely, when the interest on debt is lower than the imputed interest on equity, it is more profitable to finance operations with more debt than equity to a prudent extent. To adequately finance a cooperative's operations, members should carefully evaluate the opportunity cost of their equity capital.

### **Extra-Value Measure Characteristics**

In summary, extra value measures the performance of a cooperative's operation. A cooperative is creating value for its members if its extra value is positive. If it is negative, the cooperative is not fully recovering its total input cost and is reducing its value as a going concern. A cooperative's stock is not exchanged on the stock market and therefore its value is not known. Therefore, knowing to what extent a cooperative is creating value is useful and should be of particular interest to members.

The extra-value index is scale neutral. Using this index, cooperatives of different sizes and with different types of operations can be compared fairly. For example, some dairy cooperatives may have more bargaining operations than processing and marketing. Their margins on sales may be slim, but they do not use much operating capital in the operation. Other cooperatives engaged in further processing use more operating capital but probably return higher margins on sales. Use of operating capital as the denominator in calculating the extra-value index puts various types of cooperatives on an equal footing. This is useful for comparing the performance of dairy cooperatives that are engaged in various mixes of operations, ranging from bargaining to the most sophisticated processing and marketing. So, extra value may be more revealing than traditional performance measures when comparing the performance of diverse dairy cooperatives and their managers' performance.

To show the real-life application of the approach, actual data from major dairy cooperatives were used to calculate extra values and extra-value indices. The results were compared with those using return on equity, the most commonly used conventional measure. In addition, dairy cooperative performance was compared with the performance of investor-owned dairy firms.

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## **Data**

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There were 25 dairy cooperatives that were consistently on USDA's Cooperative Services' list of the nation's 100 largest agricultural cooperatives every year between 1986 and 1996. Their financial data for those 11 years were analyzed (cooperatives listed in Appendix A).

Dairy Field magazine annually lists the top 100 dairy processing firms. IOFs from this list that filed financial data with the U.S. Securities and Exchange Commission (SEC) for 1994 through 1996 were analyzed in this report (Appendix B). The companies' annual reports (as filed with the SEC via Form 10K) and "current reports" (filed with the SEC via Form 8K) were used. Complete data for 12 IOFs were available from this source for 1994 and 15 were available for 1995 and 1996. Only 3 years of data were used. Because of fast-paced industry restructuring, it was not feasible to maintain a consistent time series of data for IOFs.

The 15 IOFs were primarily in the dairy business, although many were also involved in other enterprises. A few were grocery chains that had their own milk processing facilities. Seven of the companies processed and marketed fresh milk products and/or ice cream, three processed fresh milk products and nondairy products, two manufactured cheese and three were supermarket chains that manufactured and processed milk products. The publicly available data did not segment dairy from nondairy operations.

Two of the IOFs had minor investments in other businesses. Their investment earnings were not separately identifiable and thus could not be purged from net margins from operations in the extra-value calculation. However, the impact of this on the comparison should be minimal.

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## **Return on Equity vs. Extra-Value Index**

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While return on equity highlights a firm's financial performance, extra-value index measures a firm's efficiency in adding value for the stakeholders (member-producers in a cooperative). The two measures have different emphasis. Depending on a cooperative's particular situation, the measures may result in a different performance ranking when comparing one cooperative with another. In other cases, the ranking may converge. The relative performance of the cooperatives also depends upon what cost is assigned to equity capital for the extra-value calculation.

Table 4— Comparison of dairy cooperatives' ROE and EVI, 1993-I 996

Dairy Co-op Code	ROE	EVI-0%	EVI-10%	EVI-25%	Dairy Co-op Code	ROE	EVI-0%	EVI-10%	EVI-25%
----- 1996 Rank -----					----- 1995 Rank -----				
16	1	1	1	1	16	1	5	3	1
6	2	6	4	2	6	2	7	6	4
19	3	3	3	3	3	3	1	2	3
8	4	5	6	5	19	4	3	4	5
1	5	11	8	7	1	5	12	10	(9)
17	6	9	9	(9)	12	6	2	1	2
22	7	2	2	4	17	7	10	9	(10)
12	8	4	5	6	22	8	4	5	7
24	9	14	11	(8)	7	9	8	7	(8)
7	10	7	7	(10)	14	10	6	8	(13)
11	11	13	13	(11)	11	11	13	12	(12)
14	12	8	10	(16)	24	12	15	15	(11)
3	13	10	12	(15)	8	13	11	13	(15)
9	14	12	14	(17)	9	14	9	14	(18)
13	15	15	15	(13)	13	15	17	(17)	(16)
18	16	17	17	(21)	23	16	14	16	(14)
25	17	19	18	(18)	5	17	20	(19)	(21)
5	18	18	(19)	(19)	21	18	18	(20)	(22)
10	19	(25)	(22)	(12)	10	19	16	11	6
21	20	20	(24)	(24)	15	20	19	(18)	(19)
2	21	16	16	(14)	18	21	23	(23)	(23)
20	22	22	(20)	(20)	4	22	21	(24)	(25)
15	23	21	(21)	(23)	2	23	22	(21)	(17)
23	24	23	(23)	(22)	25	24	(24)	(22)	(20)
4	25	24	(25)	(25)	20	(25)	(25)	(25)	(24)
----- 1994 Rank -----					----- 1993 Rank -----				
6	1	2	2	2	19	1	2	2	2
16	2	5	4	4	6	2	4	3	3
12	3	3	3	3	16	3	7	6	4
22	4	1	1	1	22	4	1	1	1
3	5	4	5	5	12	5	5	5	5
19	6	6	6	7	3	6	6	7	7
17	7	7	7	6	17	7	8	8	(8)
1	8	10	9	(9)	7	8	3	4	6
7	9	9	8	(8)	5	9	10	9	(9)
24	10	16	11	(10)	24	10	15	13	(11)
14	11	8	10	(13)	20	11	11	12	(15)
11	12	14	12	(12)	14	12	9	11	(14)
9	13	11	13	(17)	1	13	12	10	(10)
15	14	12	14	(16)	11	14	13	14	(13)
8	15	13	15	(14)	13	15	17	16	(16)
13	16	15	17	(15)	9	16	14	18	(20)
21	17	18	(19)	(23)	18	17	18	(19)	(19)
10	18	17	16	(11)	15	18	16	17	(17)
18	19	19	(21)	(20)	23	19	20	15	(12)
25	20	20	(18)	(18)	21	20	19	(21)	(24)
20	21	21	(22)	(21)	2	21	21	(20)	(18)
23	22	22	(20)	(19)	4	22	22	(25)	(25)
5	(23)	(23)	(24)	(24)	10	23	24	(22)	(21)
2	(24)	(24)	(23)	(22)	8	24	23	(24)	(23)
4	(25)	(25)	(25)	(25)	25	(25)	(25)	(23)	(22)

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry.

For illustration, table 4 compares how the cooperatives rank using return on equity after taxes (ROE) and the extra-value index (EVI) for 1993-1996. The 1986 through 1992 comparison is found in Appendix C. Table 5 summarizes all 11 years.

For instance, cooperative No.16 was ranked first under all measures in 1996, while cooperative No.6 was ranked second based on ROE and sixth, fourth and second if the imputed capital cost used in computing EVI was 0, 10, and 25 percent, respectively (table 4). In 1995, cooperative No.16 again was ranked first based on ROE, but fifth, third and first based on EVI using different capital cost. Cooperative No.6 was again ranked second based on ROE, but seventh, sixth and fourth based on three EVIs. The two cooperatives

had the highest ROEs in 1996 and 1995, but were not necessarily the most efficient users of operating capital as reflected by their EVIs. Other cooperatives and for other years can be examined in the same manner in table 4 and Appendix C.

In general, the rankings by ROE and by EVI appeared more similar when equity capital was not charged a cost in the extra-value calculation than when equity capital was assumed to cost 10 or 25 percent (table 5, upper left panel). Very few (no more than three) cooperatives ended up with the same rank under each measure (table 5, lower left panel).

Because of the differing degrees to which a cooperative relied on equity capital versus debt capital in financing its operations, the relative ranking by EVI

Table 5— Summary of selected difference between ROE and EVI measures of performance, 1986-I 996

Year	EVI-0% Number of cooperatives with same rank as ROE			ROE	EVI-10% Number of cooperatives with negative returns			EVI-25%
	EVI-0%	EVI-10%	EVI-25%		EVI-0%	EVI-10%	EVI-25%	
1996	6	5	7	0	1	7	18	
1995	3	5	2	1	2	9	18	
1994	11	9	6	3	3	8	18	
1993	6	4	2	1	1	7	18	
1992	3	4	5	3	3	11	20	
1991	8	3	5	3	4	14	20	
1990	10	5	2	3	4	12	20	
1989	6	5	3	1	3	6	15	
1988	7	5	3	2	2	5	15	
1987	8	4	2	2	2	6	16	
1986	3	8	4	1	1	10	16	
Average	6	5	4	2	2	9	18	
Mode	6	5	2	1	1	7	18	
Max.	11	9	7	3	4	14	20	
Min.	3	3	2	0	1	5	15	

Number of cooperatives with same rank by all measures (ROE and EVI @ 0%, 10% and 25%)

<i>Year</i>	<i>Number</i>
1996	2
1995	0
1994	2
1993	1
1992	0
1991	2
1990	0
1989	3
1988	1
1987	2
1986	1

Number of cooperatives with same rank by EVI at each selected level of equity cost

<i>Year</i>	<i>Number</i>
1996	3
1995	1
1994	4
1993	4
1992	4
1991	5
1990	6
1989	7
1988	8
1987	7
1986	6

changed when the opportunity cost of member equity changed. For instance, from 1992 to 1996, just one to four cooperatives held the same rank across the three different levels of cost for equity capital (table 5, lower right panel). It appeared that the EVI rankings at selected rates for equity capital cost were more similar in the earlier years of the time period (five to eight cooperatives held the same rank under the three different charges for equity capital from 1986 through 1991). Perhaps this reflected cooperatives adjusting their mix of equity versus debt capital in different ways due to the more market-oriented operations of recent years.

A more telling observation than the differences in ranking was that the number of cooperatives showing negative extra value (the cooperative actually lost value in operations) was typically larger than the number of cooperatives that had negative returns to equity (table 5, upper right panel). This was particularly pronounced when opportunity cost for equity capital was 10 and 25 percent.

Because ROE measured the return members' equity earns by being employed by cooperatives, and EVI measured the earning ability beyond covering all operating cost-including the cost of equity, a cooperative could show positive returns to equity but actually be losing value as a going concern. Not unexpectedly, the number of cooperatives with a negative extra-value index increased as the imputed cost of equity increased. Very significantly however, over the 11-year period 1986-1996, five to 10 cooperatives each year were able to generate value while "paying" a charge of 25 percent on the equity capital employed.

## Comparing Cooperative Performance

### Ranking Based on ROE

The relative ranking of the 25 dairy cooperatives for 1986-1996 using this traditional measure is shown in table 6. Twelve cooperatives ranked in the top five

Table 6— Relative ranking of dairy cooperatives based on return on equity after tax, by rank, 1986-96

Rank	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
	<i>Dairy Cooperative Code</i>										
1	6	6	6	12	19	19	19	19	6	16	16
2	3	3	16	6	16	16	22	6	16	6	6
3	15	16	19	16	22	7	16	16	12	3	19
4	19	15	12	19	6	6	6	22	22	19	8
5	4	12	3	22	7	12	20	12	3	1	1
6	17	7	7	14	12	3	7	3	19	12	17
7	12	17	15	20	3	1	3	17	17	17	22
8	7	22	13	15	14	22	17	7	1	22	12
9	8	19	17	13	20	17	1	5	7	7	24
10	22	4	20	3	15	10	14	24	24	14	7
11	24	20	18	7	1	4	24	20	14	11	11
12	21	21	5	17	13	20	13	14	11	24	14
13	16	24	22	21	4	15	12	1	9	8	3
14	18	13	14	5	17	11	15	11	15	9	9
15	25	8	21	18	21	18	9	13	8	13	13
16	11	5	1	24	2	14	21	9	13	23	18
17	20	10	24	11	24	13	18	18	21	5	25
18	10	14	4	1	11	8	5	15	10	21	5
19	1	18	8	23	9	5	4	23	18	10	10
20	14	11	10	8	8	2	8	21	25	15	21
21	13	25	11	4	18	23	10	2	20	18	2
22	9	1	25	10	5	21	11	4	23	4	20
23	23	23	23	9	(25)	(24)	(25)	10	(5)	2	15
24	5	(9)	(9)	25	(10)	(25)	(2)	8	(2)	25	23
25	2	(2)	(2)	(2)	(23)	(9)	(23)	(25)	(4)	(20)	4

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry.

for at least 1 of the 11 years. Cooperative No.6 was the only cooperative ranking in the top five every year while cooperatives No.16, No.19 and No.12 were in the top five for most years.

At the other end, almost two-thirds of the 25 cooperatives (16) found themselves in the bottom five at sometime during 1986-1996. Cooperatives Nos. 2, 23 and 25 were at the bottom a majority of the time. Cooperative No.2 had losses for 5 out of the 11 years, as evidenced by a negative return on equity. In 1990, 1991, 1992 and 1994, three cooperatives had losses.

Interestingly, four cooperatives ranked both in the top five and the bottom five at some point between 1986 and 1996. Cooperative No.4, which ranked fifth in 1986, but ended up among the bottom five for 5 of the 11 years and was last in 1994 and 1996. Cooperative No.20 ranked fifth in 1992, but had the lowest return on equity just 3 years later in 1995. Cooperative No.15

ranked in the top five the first 2 years of the period, but ended up 23rd in 1996. Conversely, cooperative No.1 ranked 22nd in 1987, but was fifth in both 1995 and 1996. In 1986 and 1996, all of the 25 cooperatives showed profits.

### Ranking Based on EVI

Cooperative rankings using the EVI under different assumptions on the value or cost of equity capital are shown in tables 7 through 9. Five different charges for equity capital—0, 5, 10, 15 and 25 percent were used. Results using 0, 10 and 25 percent are presented here. Results using the other two rates are in Appendices D and E.

Case One: Assuming member equity to be free capital. The cost of equity capital was valued at 0 percent (table 7) and 12 different cooperatives ranked

Table 7— Relative ranking of dairy cooperatives based on extra-value index if equity capital equals zero percent per year, by rank, 1986-1996

Rank	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<i>Dairy Cooperative Code</i>											
1	3	22	22	12	22	19	22	22	22	3	16
2	7	3	16	14	19	12	19	19	6	12	22
3	6	6	6	16	16	7	7	7	12	19	19
4	4	7	7	6	7	22	20	6	3	22	12
5	15	15	19	19	14	6	6	12	16	16	8
6	19	16	12	13	12	1	14	3	19	14	6
7	12	12	15	7	6	3	3	16	17	6	7
8	17	19	13	15	15	4	1	17	14	7	14
9	22	4	3	20	20	16	17	14	7	9	17
10	8	21	14	17	3	17	13	5	1	17	3
11	21	17	21	3	1	15	21	20	9	8	1
12	1	13	18	21	21	20	16	1	15	1	9
13	24	24	17	22	4	14	15	11	8	11	11
14	11	20	5	5	17	11	9	9	11	23	24
15	18	a	4	1	9	10	24	24	13	24	13
16	10	1	20	11	2	18	12	15	24	10	2
17	14	5	24	18	11	8	4	13	10	13	18
18	9	14	11	8	13	2	8	18	21	21	5
19	20	10	8	24	24	21	18	21	18	15	25
20	25	11	1	23	8	13	10	23	25	5	21
21	13	18	10	9	18	23	5	2	20	4	15
22	16	25	25	10	(25)	(5)	11	4	23	2	20
23	5	23	23	(25)	(5)	(24)	(25)	8	(5)	18	23
24	23	(9)	(2)	(4)	(10)	(25)	(23)	10	(2)	(25)	4
25	(2)	(2)	(9)	(2)	(23)	(9)	(2)	(25)	(4)	(20)	(10)

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry.

in the top five at some point between 1986 and 1996. While none ranked in the top five every year using the EVI, cooperative No.22 was in the top five for 9 of the years and ranked first for 6 years. Five other cooperatives ranked in the top five a majority of the time—Nos. 6, 7, 12, 16 and 19.

Sixty percent of the cooperatives (15) ranked in the bottom five at some time between 1986 and 1996, if equity capital was assumed to have zero cost. Three cooperatives (Nos. 2, 23 and 25) were in the bottom five for a majority (8) of the years. Six cooperatives appeared in the bottom five for just 1 of the 11 years (Nos. 8, 11, 13, 15, 16 and 24). Each year, at least one of the 25 cooperatives showed negative extra value, indicating that the operations reduced the overall worth of the cooperative, even without charging a cost for the use of members' capital. In 1990 and 1991, four cooperatives lost value.

Five cooperatives ranked both in the top five and in the bottom five at some time between 1986 and 1996 when using the EVI with equity capital assumed to have zero cost. Cooperative No.16 started out in the bottom five in 1986, but ranked in the top five a majority of the years and first in 1996. Cooperative No.4 showed the opposite pattern, ranking fourth in 1986 and in the bottom five for half of the remaining years, and in 1996 was 24th.

**Case Two:** Assuming member equity cost 10 percent per year. Eleven cooperatives ranked in the top five sometime between 1986 and 1996 when using the EVI (table 8). These same cooperatives ranked in the top five when equity was assumed to be cost-free. In 1996, cooperative No.8 ranked fifth when the annual cost of equity was assumed to be cost-free and dropped to sixth when equity was assumed to cost 10 percent.

**Table 8— Relative ranking of dairy cooperatives based on extra-value index if equity capital cost equals 10 percent per year, by rank, 1988-1 998**

Rank	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<i>Dairy Cooperative Code</i>											
1	3	22	22	12	22	19	22	22	22	12	16
2	7	3	16	14	19	7	19	19	6	3	22
3	6	6	6	16	16	12	7	6	12	16	19
4	15	7	7	6	7	22	20	7	16	19	6
5	4	15	19	19	14	6	6	12	3	22	12
6	19	16	12	7	12	1	14	16	19	6	8
7	12	12	15	13	6	3	3	3	17	7	7
8	17	19	3	15	20	16	1	17	7	14	1
9	8	4	13	20	15	4	16	5	1	17	17
10	22	17	14	22	3	17	17	1	14	1	14
11	1	21	17	17	1	20	13	14	24	10	24
12	21	1	18	3	21	(15)	24	20	11	11	3
13	24	13	5	1	4	(11)	21	24	9	8	11
14	18	20	20	21	(24)	(10)	15	11	15	9	9
15	25	24	1	5	(17)	(14)	(12)	23	8	24	13
16	(10)	5	21	11	(25)	(23)	(9)	13	10	23	2
17	(11)	8	4	18	(2)	(2)	(4)	15	13	(13)	18
18	(14)	10	24	24	(11)	(18)	(10)	9	(25)	(15)	25
19	(20)	14	10	23	(9)	(8)	(8)	(18)	(21)	(5)	(5)
20	(13)	(25)	8	(25)	(13)	(24)	(18)	(2)	(23)	(21)	(20)
21	(23)	(18)	(11)	(8)	(8)	(13)	(5)	(21)	(18)	(2)	(15)
22	(5)	(23)	(25)	(10)	(18)	(5)	(11)	(10)	(20)	(25)	(10)
23	(16)	(11)	(23)	(2)	(5)	(21)	(25)	(25)	(2)	(18)	(23)
24	(9)	(9)	(2)	(9)	(23)	(25)	(23)	(8)	(5)	(4)	(21)
25	(2)	(2)	(9)	(4)	(10)	(9)	(2)	(4)	(4)	(20)	(4)

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry.



There were minor changes in the order of the top five ranking, and in 5 of the years, the order was exactly the same when equity cost was either 10 percent or cost-free.

Similarly, 15 cooperatives ranked in the bottom five at least once during the 11 years when equity capital was assumed to cost 10 percent per year. Fourteen of the 15 cooperatives were the same that held the bottom five position when equity was assumed to be cost-free. However, the relative ranking among the bottom five cooperatives was more varied when equity cost 10 percent versus no cost. Only in 1992 was the rank order the same for the two different costs of equity capital.

Notable was the increase in the number in any given year that showed a diminishing of the cooperative's value (i.e., negative EVI) when equity capital was assigned a cost. At a cost of 10 percent for equity

capital, at least 5 of the 25 cooperatives lost value as a business entity in any given year between 1986 and 1996. In 1991, more than one-half of the 25 cooperatives (14) lost value. In 1996, 7 lost value.

**Case Three:** Assuming member equity cost 25 percent per year. The same 12 cooperatives that ranked in the top five between 1986 and 1996 when equity capital was assumed to have no cost, ranked in the top five when equity capital cost 25 percent per year (table 9). Cooperative No.6 ranked in the top five every year except 1990. However, when equity capital was assumed to be cost-free, cooperative No.6 also fell out of the top five in 1995 and 1996 (table 7).

Sixteen cooperatives ranked in the bottom five sometime during the 11-year period when equity capital was assumed to cost 25 percent per year. The same 14 ranked in the bottom five when equity capital was

**Table 9— Relative ranking of dairy cooperatives based upon extra-value index if the cost of equity capital is 25 percent per year, by rank, 1988-1998**

Rank	1988	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<i>Dairy Cooperative Code</i>											
1	3	22	22	12	22	19	22	22	22	16	16
2	7	7	16	14	19	7	19	19	6	12	6
3	6	6	6	16	16	22	6	6	12	3	19
4	15	3	7	6	7	12	20	16	16	6	22
5	4	15	19	19	14	6	7	<b>12</b>	3	19	8
6	19	16	12	22	(6)	<b>(1)</b>	<b>(16)</b>	<b>7</b>	17	<b>10</b>	12
7	17	12	3	7	(25)	<b>(16)</b>	<b>(1)</b>	<b>3</b>	19	22	<b>1</b>
8	12	1	13	13	<b>(12)</b>	(3)	(3)	<b>(17)</b>	(7)	(7)	<b>(24)</b>
9	<b>1</b>	<b>17</b>	15	20	(20)	(23)	<b>(17)</b>	<b>(5)</b>	<b>(1)</b>	<b>(1)</b>	<b>(17)</b>
10	<b>(24)</b>	<b>(19)</b>	1	15	<b>(1)</b>	<b>(17)</b>	<b>(14)</b>	<b>(1)</b>	(24)	<b>(17)</b>	(7)
11	(25)	(4)	<b>(17)</b>	(25)	(3)	(4)	(24)	(24)	<b>(10)</b>	(24)	<b>(11)</b>
12	(8)	(20)	<b>(18)</b>	<b>(1)</b>	<b>(15)</b>	<b>(10)</b>	<b>(13)</b>	(23)	<b>(11)</b>	<b>(11)</b>	<b>(10)</b>
13	(22)	<b>(13)</b>	(5)	(3)	(24)	(20)	<b>(15)</b>	<b>(11)</b>	<b>(14)</b>	<b>(14)</b>	<b>(13)</b>
14	<b>(18)</b>	(24)	<b>(20)</b>	<b>(17)</b>	(2)	<b>(11)</b>	<b>(10)</b>	<b>(14)</b>	(8)	(23)	(2)
15	<b>(21)</b>	(5)	<b>(14)</b>	(23)	<b>(21)</b>	(2)	(23)	(20)	<b>(13)</b>	(8)	(3)
16	<b>(10)</b>	(25)	<b>(10)</b>	(5)	<b>(11)</b>	(24)	<b>(21)</b>	<b>(13)</b>	<b>(15)</b>	<b>(13)</b>	<b>(14)</b>
17	<b>(13)</b>	<b>(21)</b>	(24)	(24)	(4)	<b>(15)</b>	<b>(12)</b>	<b>(15)</b>	(9)	(2)	(9)
18	(20)	<b>(10)</b>	(25)	<b>(21)</b>	<b>(17)</b>	<b>(18)</b>	(25)	(2)	(25)	(9)	(25)
19	(23)	(23)	<b>(21)</b>	<b>(18)</b>	<b>(13)</b>	(5)	(5)	<b>(18)</b>	(23)	<b>(15)</b>	(5)
20	<b>(14)</b>	<b>(18)</b>	(23)	<b>(11)</b>	(9)	<b>(14)</b>	(8)	(9)	<b>(18)</b>	(25)	(20)
21	(5)	(8)	(4)	(8)	(8)	<b>(13)</b>	(9)	<b>(10)</b>	(20)	(5)	<b>(18)</b>
22	<b>(11)</b>	<b>(14)</b>	(8)	<b>(10)</b>	<b>(18)</b>	(8)	<b>(18)</b>	(25)	(2)	<b>(21)</b>	(23)
23	<b>(16)</b>	<b>(11)</b>	(2)	(2)	(5)	(25)	<b>(11)</b>	(8)	<b>(21)</b>	<b>(18)</b>	<b>(15)</b>
24	(9)	(9)	<b>(11)</b>	(9)	(23)	<b>(21)</b>	(4)	<b>(21)</b>	<b>(5)</b>	<b>(20)</b>	<b>(21)</b>
25	(2)	(2)	(9)	(4)	<b>(10)</b>	(9)	(2)	(4)	(4)	(4)	(4)

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry.

considered free to the cooperative. Cooperative No.21 was in the bottom five in 1991 and from 1993 through 1996 when equity cost 25 percent, but when equity was cost-free it ranked 19th or higher in each of the years.

As expected, the number of cooperatives with negative EVI was high when equity capital was charged a cost of 25 percent per year. Noteworthy was that the top five cooperatives managed to increase their value every year from 1986 to 1996, while valuing the use of their member's capital at 25 percent. In fact, in 1988 and 1989, 10 cooperatives created value from operations while "paying" 25 percent for member capital.

### Implications of Rankings

Some points of interest are discernable from the analysis. Table 10 uses four of the 25 co-ops to illustrate.

Altering the assumed cost of equity capital had different effects on a cooperative's relative ranking. For example, performance of No.9 tended to decline (relative to the other cooperatives) as the imputed cost for equity capital increased. For instance, in 1995, cooperative No.9 ranked ninth when equity was not charged a cost, but 18th when equity was assumed to cost 25 percent. Conversely, the relative ranking of No.10 improved as the equity charge rose, as was the

case in 1995 when equity capital was assumed to be no cost, it ranked 16th. But if the charge for equity was 25 percent, No.10's rank rose to sixth. The differing results in response to increased cost of equity capital might have been due to cooperative No.9 using more equity capital while cooperative No.10 relied more heavily on debt, or because the interest costs of their debt capital were different, or both.

Because the EVI and ROE had different emphasis, there were some marked differences in cooperative performance ranking. Take cooperative No.16's relative performance. By the ROE measure, it ranked 13th in 1986 and 1st, 2nd or 3rd for 1987 through 1996. However, by EVI (assuming no charge for equity capital), cooperative No.16 ranked 22nd in 1986 and fluctuated between 12th and first for the remaining 10 years. On the other hand, cooperative No.22 showed a different pattern. It ranked first by EVI (at all three levels of assumed equity cost) for 6 of the years from 1986 to 1996, but by the ROE measure, it ranked 13th to 2nd in those same years. Furthermore, while cooperative No.16 held the same rank as measured by ROE and EVI in 3 of the 11 years, cooperative No.22 never held the same rank between the EVI and ROE measures, except for 1986 when it ranked 10th by ROE and by EVI at 10 percent equity cost.

Table 10- Selected dairy cooperatives' ranking, by various measures, 1986-1996

Measure	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<i>Cooperative No.9</i>											
Rank by ROE	22	(24)	(24)	23	19	(25)	15	16	13	14	14
Rank by EVI @ 0%	18	(24)	(25)	21	15	(25)	14	14	11	9	12
Rank by EVI @ 10%	(24)	(24)	(25)	(24)	(19)	(25)	(16)	18	13	14	14
Rank by EVI @ 25%	(24)	(24)	(25)	(24)	(20)	(25)	(21)	(20)	(17)	(18)	(17)
<i>Cooperative No.10</i>											
Rank by ROE @ 0%	16	17	20	22	(24)	15	20	24	18	10	19
Rank by EVI @ 10%	(16)	18	19	(22)	(25)	(14)	(18)	(22)	16	11	(22)
Rank by EVI @ 25%	(16)	(18)	(16)	(22)	(25)	(12)	(14)	(21)	(11)	6	(12)
<i>Cooperative No.16</i>											
Rank by ROE	22	3	2	3	2	2	3	3	2	1	1
Rank by EVI @ 0%	(23)	6	2	3	3	8	9	7	5	5	1
Rank by EVI @ 10%		6	2	3	3	(7)	(6)	6	4	3	1
Rank by EVI @ 25%	(23)	6	2	3	3			4	4	1	1
<i>Cooperative No.22</i>											
Rank by ROE	10	8	13	5	3	8	2	4	4	8	7
Rank by EVI @ 0%	9	1	1	13	1	4	1	1	1	4	2
Rank by EVI @ 10%	10	1	1	10	1	4	1	1	1	5	2
Rank by EVI @ 25%	(13)	1	1	6	1	3	1	1	1	7	4

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry.

## Comparing IOF Performance

The relative ranking of dairy IOFs for 1994 through 1996 using return on equity after taxes (ROE) and the extra-value index (EVI) is shown in table 11. The rankings using ROE and EVI appeared to be quite different in 1996, but almost the same in 1994, especially when stockholder equity was valued at a cost of 25 percent.

Table 12 summarizes the differences in ranking between the ROE and EVI at various charges for equity capital. The effect on the ranking by EVI, when the opportunity cost of stockholder equity was varied, was not consistent between the 3 years for which data was readily available. In 1996, just four of the 15 firms held the same rank whether the cost for equity was 0, 10 or 25 percent. However in 1994, seven of 12 firms held the same rank. In addition, just one firm held the

Table 11- Comparison of dairy IOF's ranking by ROE and EVI, 1994-1996

IOF Code	ROE	EVI-0%	EVI-10%	EVI-25%	IOF Code	ROE	EVI-0%	EVI-10%	EVI-25%	IOF Code	ROE	EVI-0%	EVI-10%	EVI-25%
----- 1996 Rank -----					----- 1995 Rank -----					----- 1994 Rank* -----				
F10	1	2	2	2	F9	1	1	1	1	F8	1	1	1	1
F9	2	1	1	1	F1	2	2	2	2	F7	2	2	2	2
F6	3	11	11	(7)	F10	3	4	4	3	F4	3	7	7	3
F1	4	3	3	3	F8	4	3	3	4	F5	4	3	3	4
F8	5	4	6	(10)	F7	5	5	5	5	F11	5	6	6	(5)
F7	6	8	8	(11)	F4	6	12	10	6	F15	6	4	4	(6)
F3	7	6	5	4	F5	7	6	6	(9)	F14	7	5	5	(7)
F11	8	10	10	5	F11	8	9	8	(10)	F12	8	8	8	(8)
F5	9	5	4	(8)	F15	9	8	7	(8)	F2	9	9	(9)	(9)
F12	10	9	7	6	F14	10	7	9	(12)	F13	(10)	(10)	(10)	(10)
F14	11	7	9	(12)	F12	11	11	11	(11)	F1**	(11)	(12)	(12)	(12)
F4	12	13	12	(9)	F13	12	10	12	(14)	F3**	(12)	(11)	(11)	(11)
F2	13	14	13	(13)	F2	(13)	(14)	(14)	(13)					
F13	14	12	(14)	(14)	F6	(14)	13	(13)	(7)					
F15	(15)	(15)	(15)	(15)	F3	(15)	(15)	(15)	(15)					

Paranthesis indicates the firm had negative returns (losses) for the particular entry.

. Data was unavailable for firms Nos. F6, F9 and F10 in 1994.

\*\* Firms Nos. F1 and F3 had both negative margins and negative equity in 1994. Therefore these cooperatives were "forced" to have a negative ROE.

Table 12-Summary of selected differences between rankings by ROE and EVI, dairy IOFs, 1994-1996

Year	EVI-0%	EVI-10%	EVI-25%	ROE	EVI-0%	EVI-10%	EVI-25%
	<i>Number of firms with same rank as ROE</i>				<i>Number of firms with neaative returns</i>		
<b>1996</b>	1	4	3	1	1	2	9
<b>1995</b>	5	7	9	3	2	3	9
<b>1994</b>	5	5	10	3	3	4	8
<b>Average</b>	4	5	7	2	2	3	9
<b>Max.</b>	5	7	10	3	3	4	9
<b>Mn.</b>	1	4	3	1	1	2	8
	<i>Number of firms with same rank by all measures (ROE and EVI @ 0%, 70% and 25%)</i>				<i>Number of firms with same rank by EVI at each selected level of equity cost</i>		
<b>1996</b>	1			4			
<b>1995</b>	5			5			
<b>1994</b>	5			7			

same rank in 1996 between ROE and EVI at the three rates, while in 1994 and 1995, five firms ranked the same by all measures.

### Investor-Owned Firms' Rankings

The rankings of dairy IOFs as measured by ROE and by EVI at five different charges for equity capital are reported in table 13. Firm F9 ranked first by all measures in 1995, first by EVI at all five levels of

equity capital charge in 1996, and second by ROE in 1996 (1994 data for F9 was not available). Firm F3 ranked last or second-to-last in 1994 and 1995 by all measures. In 1996, F3's relative performance improved markedly to achieve seventh in ranking by ROE and higher rankings when measured by EVI.

In 1994, F8 ranked first by ROE and by EVI—even as the opportunity cost of equity ranged from 0 to 25 percent (table 13). However, in 1996, as F8's perfor-

Table 13— Relative ranking of dairy IOFs based on ROE and EVI at equity costs of 0, 5, 10, 15 and 25 percent, by rank, 1994-96

Rank	1994	1995	1996	1994	1995	1996	1994	1995	1996
	-----ROE-----			-----EVI— 0%-----			-----EVI— 5%-----		
1	F8	F9	F10	F8	F9	F9	F8	F9	F9
2	F7	F1	F9	F7	F1	F10	F7	F1	F10
3	F4	F10	F6	F5	F8	F1	F5	F8	F1
4	F5	F8	F1	F15	F10	F8	F15	F10	F8
5	F11	F7	F8	F14	F7	F5	F14	F7	F5
6	F15	F4	F7	F11	F5	F3	F11	F5	F3
7	F14	F5	F3	F4	F14	F14	F4	F15	F14
8	F12	F11	F11	F12	F15	F7	F12	F11	F7
9	F2	F15	F5	F2	F11	F12	(F2)	F14	F12
10	(F13)	F14	F12	(F13)	F13	F11	(F13)	F4	F11
11	(F1*)	F12	F14	(F3)	F12	F6	(F3)	F12	F6
12	(F3*)	F13	F4	(F1)	F4	F13	(F1)	F13	F4
13	**	(F2)	F2	**	F6	F4	**	F6	F13
14	**	(F6)	F13	**	(F2)	F2	**	(F2)	F2
15	**	(F3)	(F15)	**	(F3)	(F15)	**	(F3)	(F15)
	-----EVI—10%-----			-----EVI— 15%-----			-----EVI— 25%-----		
1	F8	F9	F9	F8	F9	F9	F8	F9	F9
2	F7	F1	F10	F7	F1	F10	F7	F1	F10
3	F5	F8	F1	F5	F8	F1	F4	F10	F1
4	F15	F10	F5	F15	F10	F3	F5	F8	F3
5	F14	F7	F3	F14	F7	F5	(F11)	F7	F11
6	F11	F5	F8	F11	F5	F8	(F15)	F4	F12
7	F4	F15	F12	F4	F15	F12	(F14)	(F6)	(F6)
8	F12	F11	F7	(F12)	F11	F7	(F12)	(F15)	(F5)
9	(F2)	F14	F14	(F2)	F14	F14	(F2)	(F5)	(F4)
10	(F13)	F4	F11	(F13)	F4	F11	(F13)	(F11)	(F8)
11	(F3)	F12	F6	(F3)	F12	F6	(F3)	(F12)	(F7)
12	(F1)	F13	F4	(F1)	(F6)	F4	(F1)	(F14)	(F14)
13	**	F6	F2	**	(F13)	(F2)	**	(F2)	(F2)
14	**	(F2)	(F13)	**	(F2)	(F13)	**	(F13)	(F13)
15	**	(F3)	(F15)	**	(F3)	(F15)	**	(F3)	F15

Parenthesis indicates the firm had negative returns (losses) for the particular entry.

\* Firms Nos. F1 and F3 had both negative margins and negative equity in 1994. Therefore these firms were "forced" to have a negative ROE.

\*\* Data was unavailable for firms Nos. F6, F9 and F10 in 1994.

mance in terms of ROE declined to 5th, its rank in terms of EVI was 10th when the opportunity cost for equity capital was assumed to be 25 percent.

The pattern in F6's ranking was interesting. By ROE, it ranked 14th in 1995, rising to 3rd in 1996. However, when ranked by EVI, it was more consistent between the 2 years, ranking the same or differing by just one to two places.

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## Dairy Co-ops vs. Investor-Owned Firms

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The performances of dairy cooperatives and dairy IOFs are compared in table 14, by ranking them together according to ROE and EVI for 1994-1996. In terms of ROEs, most cooperatives and IOFs had positive earnings and few lost money. However, many could not cover their imputed cost of equity capital in their operations and lost value as a business concern.

While an IOF (F8 in 1994, F9 in 1995, and F10 and F9 in 1996) ranked first by all measures for the 3-year period, the top rankings were not dominated by dairy IOFs—although in 1995, IOFs occupied the top four rankings by all measures. The number of IOFs in the top 10 rankings by all measures in 1995 and 1996 was 4 (2 to 3 in 1994), occupying 40 percent (20 to 30 percent in 1994) of the top 10. Of the 40 firms (37 in 1994) in the comparison, 15 were IOFs (12 in 1994), or a proportion of 37.5 percent (32.4 percent in 1994). In terms of profitability (ROE) or extra value created (EVI), IOFs did not outperform dairy cooperatives. Three of six losing firms (50 percent) that had negative ROE's were IOFs in 1994, and three out of four losing firms (75 percent) were IOFs in 1995. The only firm that lost money according to ROE in 1996 was an IOF.

In summary, comparing the performance of firms examined in this study, it may be concluded that during 1994-1996, dairy cooperatives did about as well as IOFs.

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## Conclusions

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This report indicates that there is more to the conventional measures of profitability than meets the eye and shows how EVI may better indicate a company's operating efficiency in generating value for its shareholders. A firm may earn a positive ROE, the most commonly used profitability measure, but may have a negative EVI when the cost of equity capital is considered.

In other words, the firm may show that it is making money for the shareholders, but in reality its operations cannot cover the cost of operating capital

and therefore its alternative cost of equity capital. The firm actually loses value by operating. Rewarding the management of such a firm based on ROE is ironic, because it amounts to a reward for reducing the firm's value through its operations.

ROE assumes equity capital is free. It is also common-sized by equity (using equity capital as the denominator) and is biased in favor of firms that use more debt capital and less equity capital in operations (other things being equal). On the other hand, EVI assumes there is an imputed cost of equity capital. It is common-sized by operating capital which is the sum of debt capital and equity capital, and therefore is unbiased. It does not favor using debt capital over equity capital, or vice versa, unless there is a difference between the cost of debt financing and equity financing.

The EVI is a particularly meaningful tool for measuring the operating efficiency of a cooperative, where members typically supply equity capital through retained patronage earnings or capital retains and where stock-market valuation of its business worth is usually nonexistent. A cooperative's operating efficiency can be properly evaluated by charging a cost for using members' equity capital. By including the cost of equity capital in evaluating a cooperative's performance, the EVI approach uses a total cost concept.

By showing the rate of value creation in the operation, EVI may be a better measure than other traditional means for evaluating a manager's performance. EVI is an indicator calculated on operating capital that does not include funds for investment activities. It measures operational efficiency, not the profitability of financial transactions derived from investment activities. EVI is also based on earnings before income tax, and thus does not reward or punish a manager based on tax accounting maneuvers. EVI is common-sized by operating capital and is thus scale neutral. It allows firms of different sizes and with different types of operations to be compared fairly.

The EVI performance measure also indicated that dairy cooperatives did just as well in creating value for their members as did dairy IOFs for their shareholders. This is significant because detractors perceive cooperatives as being unable to generate earnings for member-producers.

While the extra-value index is an objective measure for comparing performance of cooperatives, two considerations should be borne in mind when using it:

Consideration one-The interest on equity is imputed and the "right" rate to use is cooperative-

Table 14— Relative ranking of dairy cooperatives and IOFs based on ROE and EVI at equity costs of 0.5, 10, 15 and 25 percent, 1994-96 (IOFs are identified with ““F”” preceding firm codes.)

Rank	1994						1995						1996						
	ROE	EVI at various interest rates					ROE	EVI at various interest rates					ROE	EVI at various interest rates					
		0%	5%	7.0%	7.5%	2.5%	0%	5%	7.0%	7.5%	2.5%		0%	5%	7.0%	7.5%	2.5%		
1	F8	F8	F8	F8	F8	F8	<b>F9</b>	<b>F9</b>	<b>F9</b>	<b>F9</b>	<b>F9</b>	<b>F9</b>	<b>F10</b>	<b>F9</b>	<b>F9</b>	<b>F9</b>	<b>F9</b>	<b>F9</b>	
2	6	22	22	22	22	22	<b>F1</b>	<b>F1</b>	<b>F1</b>	<b>F1</b>	<b>F1</b>	<b>F1</b>	<b>F9</b>	16	16	<b>F10</b>	<b>F10</b>	<b>F10</b>	
3	16	6	6	6	6	6	<b>F10</b>	F8	F8	F8	F8	<b>F10</b>	16	22	<b>F10</b>	16	16	16	
4	12	12	12	12	12	12	F8	<b>F10</b>	<b>F10</b>	<b>F10</b>	<b>F10</b>	F8	6	19	22	22	19	<b>F1</b>	
5	22	3	16	16	16	16	16	3	3	12	12	16	19	<b>F10</b>	19	19	22	6	
6	3	16	3	3	3	3	6	12	12	3	3	12	F6	12	12	<b>F1</b>	<b>F1</b>	19	
7	19	19	19	19	19	17	3	19	19	16	16	3	<b>F1</b>	8	<b>F1</b>	6	6	22	
8	17	F7	F7	F7	F7	19	19	22	16	19	19	6	8	<b>F1</b>	6	12	12	F3	
9	F7	F5	F5	17	17	F7	1	16	22	22	6	19	1	6	8	8	8	8	
10	1	17	17	F5	F5	F4	12	14	6	6	22	10	17	F8	F8	F5	F3	12	
11	7	14	7	7	7	F5	F7	6	F7	F7	F7	F7	22	F5	F5	F3	F5	1	
12	F4	7	<b>1</b>	1	<b>1</b>	(F11)	17	F7	14	7	7	22	12	7	7	F8	F8	<b>F11</b>	
13	F5	1	14	14	F15	(F15)	22	7	7	F5	F5	<b>F4</b>	<b>F8</b>	14	F3	7	1	<b>F12</b>	
14	24	<b>F15</b>	F15	<b>F15</b>	F14	(7)	7	F5	F5	14	14	(F6)	24	F3	14	1	7	(F6)	
15	14	<b>F14</b>	<b>F14</b>	F14	<b>F11</b>	(1)	F4	F14	<b>F15</b>	<b>F15</b>	F15	(F15)	F7	17	17	17	<b>F12</b>	(F5)	
16	<b>F11</b>	9	9	<b>F11</b>	F4	(F14)	14	F15	<b>F11</b>	<b>F11</b>	<b>F11</b>	(F5)	7	3	1	14	17	(24)	
17	<b>F15</b>	<b>F11</b>	<b>F11</b>	F4	14	(F12)	11	<b>F11</b>	<b>F14</b>	F14	10	(7)	F3	F14	F14	F12	F7	(F4)	
18	<b>F14</b>	15	15	24	24	(24)	F5	9	17	17	F14	(F11)	<b>F11</b>	F7	F7	F7	F14	(17)	
19	11	8	8	11	(11)	(10)	<b>F11</b>	17	1	1	17	(F12)	11	1	3	F14	24	(F8)	
20	9	11	11	9	(8)	(11)	24	8	9	1	0	1	(1)	14	9	F12	24	<b>F11</b>	(F7)
21	15	13	24	15	(10)	(14)	<b>F15</b>	1	8	F4	F4	(17)	F5	<b>F12</b>	9	3	14	(7)	
22	8	24	13	8	(15)	(8)	8	11	11	11	<b>F12</b>	(F14)	3	11	24	11	F6	(F14)	
23	13	F4	F4	<b>10</b>	(F12)	(13)	9	23	F4	8	11	(24)	F12	24	11	9	11	(F2)	
24	21	<b>10</b>	<b>10</b>	13	(9)	(15)	F14	24	<b>10</b>	<b>F12</b>	24	(11)	9	13	<b>F11</b>	<b>F11</b>	3	(11)	
25	10	21	21	<b>F12</b>	(13)	(F2)	F12	<b>F13</b>	F12	9	8	(14)	<b>F14</b>	2	13	F6	F4	(10)	
26	<b>F12</b>	<b>F12</b>	<b>F12</b>	(25)	(F2)	(9)	<b>13</b>	<b>F12</b>	23	24	(F6)	(23)	13	18	2	13	9	(13)	
27	18	18	(25)	(F2)	(25)	(25)	<b>23</b>	<b>F4</b>	24	23	(23)	(F2)	18	<b>F11</b>	F6	2	(13)	(2)	
28	25	25	(18)	(21)	(23)	(23)	<b>F13</b>	<b>10</b>	F13	<b>F13</b>	(9)	(8)	25	5	18	F4	(2)	(3)	
29	20	20	(20)	(23)	(18)	(18)	<b>5</b>	<b>13</b>	13	F6	(F13)	(F13)	F4	F6	5	F2	(F2)	(14)	
30	23	23	(23)	(18)	(21)	(20)	<b>21</b>	<b>21</b>	21	13	(13)	(13)	5	25	25	18	(25)	(9)	
31	F2	F2	(F2)	(20)	(20)	(2)	<b>10</b>	15	<b>15</b>	(15)	(F2)	(2)	<b>10</b>	21	F4	25	(5)	(25)	
32	(5)	(F13)	(F13)	(F13)	(F13)	(21)	15	5	5	(F2)	(15)	(9)	F2	F13	F13	(5)	(18)	(5)	
33	(F13)	(5)	(2)	(2)	(2)	(F13)	18	4	F6	(5)	(2)	(15)	21	15	F2	(F13)	(10)	(F13)	
34	(2)	(2)	(5)	(5)	(5)	(5)	4	2	(2)	(21)	(5)	(25)	2	F4	15	(20)	(F13)	(20)	
35	(4)	(4)	(4)	(4)	(F3)	(F3)	2	18	(F2)	(2)	(21)	(5)	20	20	21	(15)	(20)	(18)	
36	(F1*)	(F3)	(F3)	(F3)	(4)	(F1)	25	F6	(25)	(25)	(25)	(21)	F13	F2	20	(10)	(23)	(23)	
37	(F3*)	(F1)	(F1)	(F1)	(F1)	(4)	(F2)	(25)	(4)	(18)	(18)	(18)	15	23	(23)	(23)	(15)	(15)	
38	**	**	**	**	*	**	(20)	(F2)	(18)	(4)	(4)	(20)	23	4	(10)	(21)	(21)	(21)	
39	**	**	**	**	*	**	(F6)	(20)	(20)	(20)	(20)	(4)	4	(10)	(4)	(4)	(4)	(F15)	
40	**	**	**	**	**	**	(F3)	(F3)	(F3)	(F3)	(F3)	(F3)	(F15)	(F15)	(F15)	(F15)	(F15)	(4)	

Parenthesis indicates the firm or cooperative had negative returns (losses) for the particular entry.

\* Firms Nos. F1 and F3 had both negative margins and negative equity in 1994. Therefore these firms were ““forced”” to have a negative ROE.

\*\* Data was unavailable for firms Nos. F6, F9 and F10 in 1994.

specific and depends on its credit worthiness and its cost of equity capital. Sensitivity analyses showed the impact various interest rates, from 0 to 25 percent, had on the extra value and the extra-value index. It remains for the members to decide the appropriate rate to use for the cooperative's opportunity cost of equity capital.

Consideration two-If a dairy cooperative has to pay the prevailing market price for milk to stay competitive in recruiting members, then this second consideration is moot. Nevertheless, when a dairy cooperative pays members high prices for milk, the cooperative may generate low net savings or even incur losses. On the other hand, a cooperative may pay lower milk prices and report hefty net earnings. The two cooperatives may perform equally well, although their earnings show otherwise. This is the well-known shortcoming of using the conventional measures, such as return on equity or return on investment for comparing performance. Because extra value also uses earnings as a part of the calculation, a similar shortcoming may exist.

But extra value has the advantage of putting the cooperative pay-price issue in proper perspective. If its extra value is negative, the cooperative cannot fully recover the cost of using capital in the operation. Then, over time, the purchasing power of member equity will erode. This can happen even if the cooperative has positive earnings (but negative extra value). Members will have to ask whether the negative extra value is caused by inefficient operations or by unsustainable milk prices they have demanded.

Thus, members need to consider these two factors to accurately evaluate their cooperative's performance using EVI: the pay price (relative to the market), and the opportunity cost of the equity they have invested in their cooperative.

This report uses dairy cooperatives and dairy IOFs as examples to illustrate the use of extra-value index in comparing operational performance among firms. The concept and the method should be applicable to other commodities and businesses as well.

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## Appendices Appendix A- The Cooperatives\*

Agri-Mark, Inc.  
Alto Dairy Cooperative  
Associated Milk Productions, Inc.  
Atlantic Dairy Cooperative  
Bongards' Creamery  
California Gold Dairy Products  
California Milk Producers Association  
Cass-Clay Creamery  
Dairyman's Cooperative Creamery Association  
Danish Creamery  
Darigold Farms, Inc.  
First District Association  
Foremost Farms  
Land **O'Lakes**  
Michigan Milk Producers Association  
Mid-America Dairymen, Inc.  
Milk Marketing, Inc.  
O-AT-KA Milk Producers  
Prairie Farms Dairy Cooperative  
San Joaquin Valley Dairymen  
Swiss Valley Farms, Inc.  
Upstate Milk Cooperative  
Valley of Virginia  
Western Dairymen Cooperative, Inc.

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\*Alphabetical order does not correspond to the cooperative code in the study, which was randomly assigned.

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## Appendix B- The Dairy IOFs\*

Alpine Lace Brands, Inc.  
Ben & Jerry's Homemade, Inc.  
Borden, Inc.  
**ConAgra**, Inc.  
Dairy Fresh L.P.  
Dean Foods Company  
Dreyer's Grand Ice Cream, Inc.  
Giant Food, Inc.  
Model Dairy  
Morningstar Group, Inc.  
Publix Super Markets, Inc.  
Suiza Foods Corporation  
Swiss Dairy  
The Vons Companies, Inc.

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\*Alphabetical order does not correspond to the firm code in the study, which was randomly assigned.



**Appendix C- Comparison of dairy cooperatives' ROE and EVI, 1986-1992**

Code	ROE	EVI-0%	EVI-10%	EVI-25%	Code	ROE	EVI-0%	EVI-10%	EVI-25%
----- 1992 Rank -----					----- 1991 Rank -----				
19	1	2	2	2	19			1	1
22	2	1	1		16	2	9	8	(7)
16	3	12	9	(6)	7	3	3	2	2
6	4	5	5	3	6	4	5	5	5
20	5	4	4	4	12	5	2	3	4
7	6	3	3	5	3	6	7	7	(8)
3	7	7	7	(8)	1	7	6	6	(6)
17	8	9	10	(9)	22	8	4	4	3
1	9	8	8	(7)	17	9	10	10	(10)
14	10	6	6	(10)	10	10	15	(14)	(12)
24	11	15	12	(11)	4	11	8	9	(11)
13	12	10	11	(12)	20	12	12	11	(13)
12	13	16	(15)	(17)	15	13	11	(12)	(17)
15	14	13	14	(13)	11	14	14	(13)	(14)
9	15	14	(16)	(21)	18	15	16	(18)	(18)
21	16	11	13	(16)	14	16	13	(15)	(20)
18	17	19	(20)	(22)	13	17	20	(21)	(21)
5	18	21	(21)	(19)	8	18	17	(19)	(22)
4	19	17	(17)	(24)	5	19	(22)	(22)	(19)
8	20	18	(19)	(20)	2	20	18	(17)	(15)
10	21	20	(18)	(14)	23	21	21	(16)	(9)
11	22	22	(22)	(23)	21	22	19	(23)	(24)
25	(23)	(23)	(23)	(18)	24	(23)	(23)	(20)	(16)
2	(24)	(25)	(25)	(25)	25	(24)	(24)	(24)	(23)
23	(25)	(24)	(24)	(15)	9	(25)	(25)	(25)	(25)
----- 1990 Rank -----					----- 1989 Rank -----				
19	1	2	2	2	12	1		1	1
16	2	3	3	3	6	2	4	4	4
22	3	1	1		16	3	3	3	3
6	4	7	7	(6)	19	4	5	5	5
7	5	4	4	4	22	5	13	10	6
12	6	6	6	(8)	14	6	2	2	2
3	7	10	10	(11)	20	7	9	9	9
14	8	5	5	5	15	8	8	8	10
20	9	9	8	(9)	13	9	6	7	8
15	10	8	9	(12)	3	10	11	12	(13)
1	11	11	11	(10)	7	11	7	6	7
13	12	18	(20)	(19)	17	12	10	11	(14)
4	13	13	13	(17)	21	13	12	14	(18)
17	14	14	(15)	(18)	5	14	14	15	(16)
21	15	12	12	(15)	18	15	17	17	(19)
2	16	16	(17)	(14)	24	16	19	18	(17)
24	17	19	(14)	(13)	11	17	16	16	(20)
11	18	17	(18)	(16)	1	18	15	13	(12)
9	19	15	(19)	(20)	23	19	20	19	(15)
8	20	20	(21)	(21)	8	20	18	(21)	(21)
18	21	21	(22)	(22)	4	21	(24)	(25)	(25)
5	22	(23)	(23)	(23)	10	22	22	(22)	(22)
25	(23)	(22)	(16)	(7)	9	23	21	(24)	(24)
10	(24)	(24)	(25)	(25)	25	24	(23)	(20)	(11)
23	(25)	(25)	(24)	(24)	2	(25)	(25)	(23)	(23)

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry. — Continued

**Appendix C (Continued)- Comparison of dairy cooperatives' ROE and EVI, 1988-I 992**

Code	ROE	EVI-0%	EVI-10%	EVI-25%	Code	ROE	EVI-0%	EVI-10%	EVI-25%
----- 1988 Rank -----					----- 1987 Rank -----				
6	1	3	3	3	6	1	3	3	3
16	2	2	2	2	3	2	2	2	4
19	3	5	5	5	16	3	6	6	6
12	4	6	6	6	15	4	5	5	5
3	5	9	8	7	12	5	7	7	7
7	6	4	4	4	7	6	4	4	2
15	7	7	7	9	17	7	11	10	9
13				8	22	8	1	1	1
17	8	18	19	(11)	19	9	8	8	(10)
20	10	16	14	(14)	4	10	9	9	(11)
18	11	12	12	(12)	20	11	14	14	(12)
5	12	14	13	(13)	21	12	10	11	(17)
22				1	24	13	13	15	(14)
14	13	10	10	(15)	13	14	12	13	(13)
21	15	11	16	(19)	8	15	15	17	(21)
1	16	20	15	10	5	16	17	16	(15)
24	17	17	18	(17)	10	17	19	18	(18)
4	18	15	17	(21)	14	18	18	19	(22)
8	19	19	20	(22)	18	19	21	(21)	(20)
10	20	21	19	(16)	11	20	20	(23)	(23)
11	21	18	(21)	(24)	25	21	22	(20)	(16)
25	22	22	(22)	(18)	1	22	16	12	8
23	23	23	(23)	(20)	23	23	23	(22)	(19)
9	(24)	(25)	(25)	(25)	9	(24)	(24)	(24)	(24)
2	(25)	(24)	(24)	(23)	2	(25)	(25)	(25)	(25)
----- 1986 Rank -----									
6	1	3	3	3					
3	2	1	1	1					
15	3	5	4	4					
19	4	6	6	6					
4	5	4	5	5					
17	6	8	8	7					
12	7	7	7	8					
7				2					
8	8	10	9	(12)					
22	10	9	10	(13)					
24	11	13	13	(10)					
21	12	11	12	(15)					
16	13	22	(23)	(23)					
18	14	15	14	(14)					
25	15	20	15	(11)					
11	16	14	(17)	(22)					
20	17	19	(19)	(18)					
10	18	16	(16)	(16)					
1	19	12	11	9					
14	20	17	(18)	(20)					
13	21	21	(20)	(17)					
9	22	18	(24)	(24)					
23	23	24	(21)	(19)					
5	24	23	(22)	(21)					
2	(25)	(25)	(25)	(25)					

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry.

**Appendix D- Relative ranking of dairy cooperatives based on extra-value index if cost of equity capital is 5 percent per year, by rank, 1986- 96**

Rank	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
<i>Dairy Cooperative Code</i>											
1	3	22	22	12	22	19	22	22	22	3	16
2	7	3	16	14	19	12	19	19	6	12	22
3	6	6	6	16	16	7	7	6	12	19	19
4	4	7	7	6	7	22	20	7	16	16	12
5	15	15	19	19	14	6	6	12	3	22	6
6	19	16	12	13	12	1	14	3	19	6	8
7	12	12	15	7	6	3	3	16	17	14	7
8	17	19	13	15	20	16	1	17	7	7	14
9	22	4	3	20	15	4	17	5	1	17	17
10	8	17	14	17	3	17	16	14	14	1	1
11	21	21	18	22	1	20	13	1	9	9	3
12	1	13	17	3	21	15	21	20	15	8	9
13	24	24	5	21	4	14	24	24	8	11	24
14	18	1	21	1	17	11	15	11	11	10	11
15	10	20	20	5	2	(10)	9	9	24	23	13
16	11	8	4	11	9	(18)	12	15	13	24	2
17	25	5	1	18	24	(23)	4	13	10	13	18
18	14	14	24	8	11	(2)	8	18	21	21	5
19	20	10	8	24	13	(8)	(10)	23	(25)	15	25
20	13	18	10	23	(8)	(13)	(18)	21	(18)	5	15
21	9	25	11	(25)	(25)	(5)	(5)	(2)	(20)	(2)	21
22	(16)	23	25	(10)	(18)	(21)	(11)	(10)	(23)	(25)	20
23	(5)	11	(23)	(9)	(5)	(24)	(25)	(8)	(2)	(4)	(23)
24	(23)	(9)	(2)	(2)	(10)	(25)	(23)	(25)	(5)	(18)	(10)
25	(2)	(2)	(9)	(4)	(23)	(9)	(2)	(4)	(4)	(20)	(4)

Parenthesis indicates the cooperative had negative returns (losses) for the particular entry.

**Appendix E- Relative ranking of dairy cooperatives based on extra-value index if the cost of equity capital is 15 percent per year, by rank, 1986-96**

<b>Rank</b>	<b>1966</b>	<b>1987</b>	<b>1988</b>	<b>1989</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>
<i>Dairy Cooperative Code</i>											
1	3	22	22	12	22	19	22	22	22	12	16
	2	7	7	16	14	19	7	19	19	6	319
3	6	6	6	16	16	12	6	6	12	16	22
4	15	3	7	6	7	22	20	7	16	19	6
5	4	15	19	19	14	6	7	12	3	6	12
6	19	16	12	7	12	1	3	16	19	22	8
7	17	12	3	13	6	16	14	3	17	7	1
8	12	19	15	22	20	3	1	17	7	14	7
9	1	17	13	15	1	(4)	16	5	1	10	17
10	8	4	17	20	3	(17)	17	1	14	17	24
11	22	1	1	3	15	(20)	(13)	14	24	1	14
12	21	21	14	17	(25)	(23)	(24)	24	(11)	11	11
13	24	20	18	1	(21)	(10)	(15)	20	(8)	24	3
14	(25)	13	5	5	(24)	(11)	(21)	(11)	(10)	8	9
15	(18)	24	20	21	(2)	(15)	(12)	(23)	(15)	(23)	(13)
16	(10)	5	21	(25)	(4)	(14)	(9)	(13)	(9)	(9)	(2)
17	(14)	(10)	(24)	(24)	(11)	(2)	(10)	(15)	(13)	(13)	(25)
18	(13)	(8)	(10)	(23)	(17)	(18)	(4)	(9)	(25)	(15)	(5)
19	(20)	(25)	(4)	(11)	(9)	(24)	(6)	(18)	(23)	(2)	(18)
20	(11)	(14)	(8)	(18)	(13)	(5)	(5)	(2)	(18)	(5)	(10)
21	(23)	(23)	(25)	(8)	(8)	(8)	(18)	(10)	(21)	(21)	(20)
22	(5)	(18)	(23)	(10)	(18)	(13)	(11)	(21)	(20)	(25)	(23)
23	(16)	(11)	(11)	(2)	(5)	(21)	(25)	(25)	(2)	(18)	(15)
24	(9)	(9)	(2)	(9)	(23)	(25)	(23)	(6)	(5)	(4)	(21)
25	(2)	(2)	(9)	(4)	(10)	(9)	(2)	(4)	(4)	(20)	(4)

**Parenthesis** indicates the cooperative had negative returns (losses) for the particular entry.

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## 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.

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