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Measuring Performance of Dairy Cooperatives

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Abstract

This report revises and simplifies the extra-value approach (developed previously in Research Report 166) for member-producers to evaluate their cooperative's performance. Extra value is defined as net savings after subtracting an interest charge on equity. For comparisons over time and among cooperatives, extra value is expressed as a percentage of operating capital to generate a scale-neutral and mode-neutral, extra-value index for each cooperative or group of cooperatives. The extra-value approach is also used to examine the performance of the surviving cooperatives following mergers and consolidations. The influence of cooperative size on performance is also examined.

Key words: Extra value, extra-value index, cooperative, dairy, performance, merger, size.

Measuring Performance of Dairy Cooperatives

K. Charles Ling
Agricultural Economist

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Preface

In response to inquiries concerning evaluation of the performance of cooperatives and cooperative management, a measurement method called the extra-value approach was proposed in Research Report 166 (published in 1998). This new evaluation method was developed because 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.--do not yield an unequivocal answer to the performance question. Furthermore, cooperatives do not have stock-exchange prices to gauge their performance and market value.

This report revises the approach developed in 1998 to make it clearer and simpler to understand and use extra value as an objective measure to evaluate cooperative performance. The extra-value index is an objective and definitive tool for comparing cooperatives' performance in creating value for member-producers.

For ease of presentation, cooperative codes (#1 through #21) are arbitrarily assigned according to the order a cooperative appears in table 5. Indexes and ratios about cooperative performance are presented after aggregation, and no single cooperative's proprietary data is shown in the report.

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Highlights

Without stock market valuation of a cooperative's performance, member-producers often are not sure how well their cooperative performs and whether the cooperative has created or destroyed the value of the cooperative in its operations. They are also perplexed at how the management should be objectively evaluated and rewarded. This is unlike a publicly traded corporation, where the stock price is a timely reflection of the performance and the value of the firm.

Conventional financial ratios--such as return on equity, return on assets, return on operating capital, net margins on sales, net margins per hundredweight of milk, etc.--do not account for the cost of using members' equity in financing a cooperative's operations. The performance of one cooperative may be rated better than that of a second cooperative by some of these measures but worse off by other measures, even if the two cooperatives are exactly the same in every aspect except the way the operations are financed: more by debt and less by equity capital, or vice versa. A definitive measure of cooperative performance called "extra value" was proposed in a previous research report and is further refined and simplified in this study and applied to a set of time-series data to show its usefulness.

The extra-value approach accounts for the total cost of operations, including the cost of using equity, and measures performance in terms of earnings generated above this total operating cost (thus extra value). The cost of using 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. A positive extra-value figure indicates a cooperative's management has created value for members in its operations; negative extra value means the value of members' investment in the cooperative is diminished.

For the extra-value approach to be an objective performance measure for comparing cooperative operations, extra value can be made neutral to scale and to mode of operations (relative mix of bargaining and/or processing operations) by an index that expresses extra value as a percentage of operating capital. The index shows the rate of creating extra value from using operating capital, which is the financial resource available to the management of a cooperative for operations.

Extra value is defined as net savings after subtracting interest on equity, and operating capital is the sum of fixed (non-current) assets and net working capital.

The analysis used data from dairy cooperatives in USDA's database. The time series were from 1992 through 1996 and from 2000 through 2004. Eleven of the original 28 cooperatives in the 1992-96 period merged or consolidated into four "surviving" cooperatives between 1997 and 1999. For the 1992-96 period, the data of the 11 "predecessor" cooperatives were summed together by assuming that they had already been consolidated into the surviving 4 cooperatives. Therefore, the total number of dairy cooperatives included in this study is 21.

The interest rate used to calculate the cost of using equity was based on the respective year's December average Libor for U.S. dollar loans with a 12-month maturity. 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 basis points above the Libor. So "Libor+2" was the basic rate used to calculate interest on equity.

Equity capital is considered by investors to be riskier than debt. To show the effects of such risk consideration, sensitivity analysis was made using 5 percentage points and 10 percentage points as the risk premium.

The performance of dairy cooperatives is portrayed in three ways to form a composite picture for evaluation: performance categories, changes in performance indexes, and performance rankings.

Cooperatives were placed into five categories according to their performance indexes:

- I. Cooperatives that had negative return on equity (one cooperative in the first period; one in the second).
- II. Cooperatives that had positive return on equity, but did not generate extra value beyond the cost of using equity capital at basic interest rate (six cooperatives in the first period; one in the second).
- III. Cooperatives that generated extra value beyond the cost of using equity capital at basic interest rate but short of reaching 5-percent risk premium (five cooperatives in the first period; 10 in the second).
- IV. Cooperatives that generated extra value beyond the cost of using equity capital at basic interest rate plus 5-percent risk premium but short of reaching 10-percent risk premium (three cooperatives in the first period; two in the second).
- V. Cooperatives that generated extra values beyond the cost of using equity capital at basic interest rate plus 10-percent risk premium (six cooperatives in the first period; seven in the second).

Most of the cooperatives, 14 (out of 21) in the first period and 19 in the second, generated extra values beyond the cost of using equity capital at basic interest rates (Category III and higher). And six cooperatives in the first period and seven in the second period attained the highest performance, Category V.

The performance indexes of 10 cooperatives showed improvement from the first period (1992-1996) to second period (2000-2004). All performance indexes for each of these cooperatives were more positive, changed from negative to positive, or became less negative in the second period as compared to the first period.

The performance indexes for another three cooperatives were positive in both time periods. However, their respective values declined from the first period to the second period. So they performed less well in the second period as compared to the first.

Likewise, the performance indexes of another six cooperatives all showed declines. Their performance indexes were less positive, changed from positive to negative, or became more negative in the second period. The performance indexes of the remaining two cooperatives showed mixed results.

Cooperatives may be ranked according to four criteria. For constructing the composite picture of cooperative performance, the performance ranking was based on the extra-value index that was calculated using the basic interest rate plus 10-percent risk premium-the most demanding criterion.

A cooperative may be evaluated relative to other cooperatives from the perspective of where it fits in the resulting composite picture.

The composite picture was used to evaluate the impacts on performance by the mergers and consolidations in the late 1990s. Three out of the four surviving cooperatives actually performed better than the sum of their respective predecessor counterparts. They either stayed in the same performance category or climbed to a higher performance category. Their performance indexes showed improvements between the two time periods. And their rankings were all better in the second period.

An interesting question is whether cooperative size affects performance. This may be answered by evaluating the cooperatives as a group--by comparing the weighted-average and simple-average performance indexes.

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, larger cooperatives (defined as cooperatives with larger amounts of operating capital, but not necessarily cooperatives with larger volumes of milk or larger numbers of producers) carry more weight and tend to dominate the results.

The simple-average performance indexes treat every cooperative equally, by calculating the performance indexes of each of the 21 cooperatives and then averaging the indexes. The simple averages give an equal weight to each cooperative regardless of size, and no one cooperative has more weight than another to influence the results. Furthermore, 21 is a large enough number of cooperatives, so one or a few cooperatives' performance can not overwhelm the rest.

Comparisons between weighted-average performance indexes and simple averages highlight the performance of larger cooperatives relative to the rest. All weighted-average performance indexes were lower than the corresponding simple averages, suggesting that some of the larger cooperatives did not perform as well as the rest of the cooperatives in either period.

Some of the larger cooperatives also relied less and less on equity and more and more on debt than smaller ones to finance their operations as shown by the differences between the weighted-average equity shares of operating capital and the simple averages. This distorted the comparison based on returns on equity.

In terms of operating efficiency, while the weighted-average extra-value indexes show that the cooperatives as a group did not perform as well in the second period as in the first period, the simple-average extra-value indexes indicate that the performance of the cooperatives on average barely changed between the two periods. This implies that some of the larger cooperatives did not perform as well in the second period when compared to the first period, but the rest of the cooperatives, on average, maintained their level of efficiency in using operating capital.

Member-producers may evaluate their cooperative based on how much extra value the cooperative has created. For comparison over time or with other cooperatives, the extra-value index is an objective and definitive tool and is scale-neutral and mode-neutral.

However, a cooperative is a membership organization as well as a business entity. It has to achieve its business goals, but also has to provide various services to members. The costs and returns of providing such services may not be fully measurable and thus may not be fully reflected in the financial statements and in the extra-value calculation. Furthermore, in a dairy cooperative, the distinction between milk pay prices and premiums on the one hand and profits on the other is not clear-cut. The board and members should consider all these factors when evaluating performance. They are also in the best position to judge the most representative opportunity cost of the cooperative's equity.

The extra -value approach is a worthwhile tool that furnishes some objectivity in evaluating cooperative performance. In the end, what really counts is how satisfied the member-producers are with the cooperative. There is no substitute for a well-informed membership and a vigilant board that understands the complexity of operating a cooperative, both as a business and as a membership organization, to adequately oversee and evaluate its operations.

Measuring Performance of Dairy Cooperatives

K. Charles Ling
Rural Development
Rural Business-Cooperative Service
STOP 3252, 1400 Independence Ave., S.W.
Washington, DC 20250-3252

Introduction

Without stock market valuation of a cooperative's performance, member-producers often wonder how well their cooperative performs and whether it performs at par with or better than other cooperatives. Conventional financial ratios are usually used to provide measures of performance. These include return on equity, return on assets, return on operating capital, net margins on sales, net margins per hundredweight of milk, etc. In the context of cooperatives, however, these performance measures do not account for the cost of using members' equity in financing a cooperative's operations. (This leads some people to characterize equity as free capital-but certainly it is not free, because it has an opportunity cost.) As a result, members cannot be sure whether the cooperative has created or destroyed the value of the cooperative in its operations, and are perplexed at how the management should be objectively evaluated and rewarded. This is unlike a publicly traded corporation, where the stock price can be a timely reflection of the value of the firm.

The ambiguity of measuring cooperative performance is illustrated 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 the operations are financed. Cooperative A's operating capital is financed by \$60,000 of debt and \$500,000 of member equity, while Cooperative B's operating capital is financed by \$310,000 of debt and \$250,000 of member equity.

The two cooperatives generate the same operating margin (\$60,000), from which interest on debt is subtracted to arrive at net savings. If the interest rate on debts is 5 percent, Cooperative A's net savings is \$57,000, or 23 cents per hundredweight of milk, compared to Cooperative B's net savings of \$44,500, or 18 cents per hundredweight. Cooperative A can claim to have outperformed Cooperative B by all conventional measures of performance (including return on assets, return on operating capital, and net margins on sales). The exception was return on equity—a widely used yardstick of a firm's profitability, which is 11.4 percent for Cooperative A vs. Cooperative B's 17.8 percent.

This example shows that by treating equity as free capital, the conventional performance measures subject the cooperatives' operating results to open interpretation. A definitive measure of cooperative performance—called “extra value,” which includes in its calculation the cost of using equity capital—was proposed in USDA RBS Research Report No. 166. It is further refined and simplified in this study to make it easy to understand and use. (See Box, page 4).

The Extra-Value Approach

The extra-value approach accounts for the total cost of operations, including the cost of using equity, and measures performance in terms of earnings generated above this total operating cost (thus, the extra value generated). The cost of using 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 else-

Table 1 — Comparison of two cooperatives using various 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
<i>-financed by Debt</i>	60,000	310,000
<i>-financed by Equity</i>	500,000	250,000
Sales	\$5,000,000	\$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
<i>Interest on debt @5 percent</i>	\$3,000	\$15,500
Net savings	57,000	44,500
Net savings per cwt	0.23	0.18
Return on equity	11.4%	17.8%
Return on assets	5.7%	4.5%
Return on operating capital	10.2%	7.9%
Net margins on sales	1.1%	0.9%
<i>Interest on debt @5 percent</i>	\$3,000	\$15,500
Net savings	57,000	44,500
Net savings per cwt	0.23	0.18
<i>Interest on equity @5 percent</i>	25,000	12,500
Extra value	32,000	32,000
Extra value index	5.7%	5.7%
<i>Interest on debt @11 percent</i>	\$6,600	\$34,100
Net savings	53,400	25,900
Net savings per cwt	0.21	0.10
<i>Interest on equity @11 percent</i>	55,000	27,500
Extra value	(1,600)	(1,600)
Extra value index	(0.3%)	(0.3%)

where. (Economists would call the extra value so created “economic rent,” “surplus,” or “economic value added.” The term “extra value” is more straightforward.)

A positive extra value indicates a cooperative's management has created value for members through the cooperative's operations. If a cooperative's operations cannot fully compensate the opportunity cost of using equity capital, thus generating a negative extra value, then the value of members' investment in the cooperative is diminished. Thus, the extra value could be a useful yardstick to measure the performance of the cooperative's management.

Continuing the example in table 1, we will assume the cost of using equity is the same as the 5-percent interest rate on debt. Cooperative A's extra value is calculated to be \$32,000, after subtracting a \$25,000 interest charge on equity from the \$57,000 net savings. Extra value for Cooperative B is also \$32,000 after the same calculation by subtracting a \$12,500 interest charge on equity from the \$44,500 net savings. Each cooperative increases members' value by \$32,000.

When the interest rate is 11 percent, neither cooperative can recover all its total cost (including the costs of using equity capital); each cooperative generates a

negative extra value of \$1,600. Nevertheless, the performance of the two cooperatives is equal—both diminish members' value by \$1,600.

This example shows how extra value is a definitive measure of performance. Both Cooperative A and Cooperative B have increased or decreased their members' values by the same amounts and therefore have performed equally well, or poorly, in their respective operations. This is as it should be, because of the assumption that, except for the differences in the proportion of debt and equity financing, every aspect of the cooperatives' operations is the same.

In real life, no two cooperatives are alike. Their sizes and operations may be vastly different. Some dairy cooperatives may have more bargaining operations than processing and marketing. Their margins on sales may be slim, but they do not employ much operating capital in the operation. Other cooperatives may engage more in further processing that uses more operating capital but probably returns higher margins on sales. Still others may have farm supplies and other businesses besides marketing milk (in which case, return per hundredweight of milk would paint a distorted picture of profitability).

For the extra-value approach to be an objective performance measure for comparing cooperative operations, extra value can be made neutral to scale and mode of operations by an index that expresses extra value as a percentage of operating capital. The index shows the rate of creating extra value from using operating capital, which is the financial resource available to the management of a cooperative for operations.

The extra-value index for the two cooperatives in the example is 5.7; that is, 5.7 cents of extra value is generated for every dollar of operating capital employed in the business when the interest rate on equity is 5 percent (table 1). When the interest rate is 11 percent, the extra-value index is minus 0.3; for every dollar of operating capital used in the operations, both cooperatives lost 3-tenths of a cent.

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 savings minus interest on equity, where interest on equity = members' (non-interest-bearing) equity \times interest rate.

The extra-value index is a percentage of operating capital:

Extra-value index = extra value / operating capital \times 100, where operating capital = fixed (non-current) assets + net working capital, while net working capital = current assets minus current liabilities.

In summary, the extra-value approach has the following characteristics:

- Extra value measures how well a co-op uses its operating capital in operations—whether it covers the opportunity cost of using the operating capital. A cooperative is creating value for its members if its extra value is positive. If its extra value is negative, the cooperative is not fully recovering its total input cost, including the opportunity cost of its members' equity capital, and is reducing the cooperative's value.
- An extra-value index can be created by dividing extra value by operating capital. The extra-value index is scale-neutral and can be used to compare performance of cooperatives of different sizes.
- Operating capital is the financial resource at the disposal of management for the cooperative's operations. Use of operating capital as the denominator in calculating the extra-value index puts various types of cooperatives on an equal footing regardless of their mode of operations, which range from bargaining cooperatives to the most sophisticated processing and marketing cooperatives.

Therefore, extra value and extra-value index measure the efficiency with which the management of a cooperative uses operating capital to create value for its member-producers. Operational performance of cooperatives can be compared by using extra-value indexes.

How this report varies from RR 166

For simplicity and clarity in presenting the extra-value approach to cooperative performance analysis, this report uses net savings as the basis (starting point) for calculating extra value. To member-producers, net savings is their cooperative's "bottom line," and is a number that is most easily understood by them and concerns them the most. The definition of operating capital is simply the same as total assets net of current liabilities.

The calculations are thus different from Research Report 166. Because extra value measures the efficiency of using operating capital in creating value for members, the previous report opted to use net operating margin (before taxes) as the basis for calculating extra value. (Net operating margin is operating margin plus interest and other income and minus interest and other expenses.)

Research Report 166 also excluded investment in other firms from operating capital, with the notion that extra value should capture the cooperative's operating performance but not the performance of other firms in which the cooperative invests. Therefore, investment in other firms was removed from the cooperative's assets and the corresponding amount was subtracted from members' equity. Patronage or investment income received was also excluded from the net operating margin because these are not the result of the cooperative's own operations and thus should not play a part in measuring operating performance.

The current report measures the performance of a cooperative's overall operations, while Research Report 166 focused on the performance of the business activities that are under a cooperative's direct operating control. The two measurements, however, are only marginally different.

The upshot is that the extra-value approach may have some variations depending on what emphasis is put on the variables for the calculation of the extra value and the extra-value index. The important thing is that the resulting extra value should be calculated after subtracting the opportunity cost of using equity capital.

Sources of Data

Financial data--Dairy cooperatives that have complete and continual financial information in the USDA database for its annual top-100 cooperative financial analysis are included in this study (table 2). The time series are from 1992 through 1996 and from 2000 through 2004. Using the data from the two 5-year periods makes it possible to show how the performances of the cooperatives progressed over time. (Please note that the database has 1 year of missing data for two cooperatives and 2 years of missing data for another two cooperatives. Considering the amount of information available, the missing data is a minor imperfection.)

Eleven of the original 28 cooperatives in the 1992-96 period merged or consolidated into four "surviving" cooperatives between 1997 and 1999. For the 1992-96 period, the data of the 11 "predecessor" cooperatives were added as if they had already been consolidated into the surviving four cooperatives. Therefore, the total number of dairy cooperatives included in this study is 21. This is necessary for comparing performances over time. The comparisons based on such grouping may not be perfect, but probably are reasonable. (From 1992 to 2004, 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.)

Interest rates--Ideally, the interest rate used to calculate the cost of using equity should have been the interest rate on a cooperative's debt (the opportunity-cost concept). However, it was difficult to derive a representative rate from a cooperative's various financing activities. An alternative was to use a rate that was based on the respective year's December average British Bankers' Association's London Inter-Bank Offered Rate (BBA Libor for U.S. dollar loans with a 12-month maturity (table 3). 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 basis points above the Libor. So 'Libor+2" was 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 they would argue that the imputed interest on equity should be higher than

Table 2—Dairy cooperatives included in the study

Names of cooperatives, 1992-96	Names of cooperatives, 2000-04
Agri-Mark, Inc. Alto Dairy Cooperative Bongards' Creameries Cass-Clay Creamery, Inc. Dairylea Cooperative, Inc. First District Association Foremost Farms USA Md. & Va. Milk Producers Cooperative Assn Michigan Milk Producers Association Northwest Dairy Assn. (Darigold Farms) O-AT-KA Milk Products Cooperative, Inc. Prairie Farms Dairy, Inc. St. Albans Cooperative Creamery, Inc. Swiss Valley Farms Company Tillamook County Creamery Association United Dairymen of Arizona Upstate Milk Cooperatives, Inc.	Agri-Mark, Inc. Alto Dairy Cooperative Bongards' Creameries Cass-Clay Creamery, Inc. Dairylea Cooperative, Inc. First District Association Foremost Farms USA Md. & Va. Milk Producers Cooperative Assn Michigan Milk Producers Association Northwest Dairy Assn. (WestFarm Foods) O-AT-KA Milk Products Cooperative, Inc. Prairie Farms Dairy, Inc. St. Albans Cooperative Creamery, Inc. Swiss Valley Farms Company Tillamook County Creamery Association United Dairymen of Arizona Upstate Farms Cooperatives, Inc.
<i>Predecessor cooperative(s)</i>	<i>Surviving cooperative</i>
Associated Milk Producers Inc. (All regions)	Associated Milk Producers Inc. (North Central) (1998) ¹
Land O'Lakes, Inc. Atlantic Dairy Cooperative Dairyman's Co-op Creamery Association	Land O'Lakes, Inc. (1997) (1998)
Mid-America Dairymen, Inc. Western Dairymen Cooperative, Inc. Milk Marketing, Inc. Associated Milk Producers Inc. (all regions) California Gold Dairy Products	Dairy Farmers of America (1998) (1998) (1998) (1998) (1999)
California Milk Producers Association Danish Creamery San Joaquin Valley Dairymen	California Dairies, Inc. (1999) (1999) (1999)

¹The number in parentheses indicates the year when a merger or consolidation took place.

interest on debt to compensate for the risk of investing in the business. Sensitivity analysis could show the effects of such risk consideration by using various rates for the risk premium. This report assumes such risk premiums were 5 and 10 percentage points for the analysis. (The 10 percentage-point premium was chosen because some researchers reported that the historical risk premium of equity was about 9 percent. See Davis et al., page 2.) So “basic interest rate+5” and “basic interest rate+10” were also used in the calculations of extra values and extra-value indexes.

In a nutshell: three interest rates were 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 3). In addition, the conventional returns on equity were calculated for reference purposes.

Performance of Dairy Cooperatives

USDA cannot present each cooperative's proprietary data, so the performance of dairy cooperatives is

Table 3—British Bankers' Association, London Inter-Bank Offered Rate (Libor), actual over 360-day basis, and the interest rates used in this study

Year	Libor, 12-month maturity, December average (%)	Basic rate (Libor+2)	Basic rate+5% risk premium	Basic rate+10% risk premium
1992	4.12984	6.13	11.13	16.13
1993	3.79874	5.80	10.80	15.80
1994	7.57188	9.57	14.57	19.57
1995	5.50452	7.50	12.50	17.50
1996	5.76289	7.76	12.76	17.76
2000	6.23740	8.24	13.24	18.24
2001	2.41674	4.42	9.42	14.42
2002	1.57735	3.58	8.58	13.58
2003	1.49595	3.50	8.50	13.50
2004	3.01515	5.02	10.02	15.02

portrayed in three ways to form a composite picture for evaluation: performance categories, changes in performance indexes, and performance rankings.

Performance categories--Cooperatives were placed into five categories according to their performance indexes (table 4):

- I. Cooperatives that had negative return on equity (one cooperative in the first period; one in the second).
- II. Cooperatives that had positive return on equity, but did not generate extra values beyond the cost of using equity capital at basic interest rate (six cooperatives in the first period; one in the second).

Table 4—Categories of dairy cooperative performance in the two 5-year periods

Performance category	First period average (1992-96)	Second period average (2000-04)
	<i>Co-op code</i>	
I. Cooperatives that had negative return on equity	7	21
II. Cooperatives that had positive return on equity, but did not generate extra values beyond the cost of using equity capital at basic interest rate	4, 8, 9, 10, 11, 12	11
III. Cooperatives that generated extra values beyond the cost of using equity capital at basic interest rate	5, 6, 19, 20, 21	6, 7, 8, 9, 10, 12, ,17, 18, 19, 20
IV. Cooperatives that generated extra values beyond the cost of using equity capital at basic interest rate plus 5-percent risk premium	2, 3, 18	5, 16
V. Cooperatives that generated extra values beyond the cost of using equity capital at basic interest rate plus 10-percent risk premium	1, 13, 14, 15, 16, 17	1, 2, 3, 4, 13, 14, 15

- III. Cooperatives that generated extra values beyond the cost of using equity capital at basic interest rate but short of reaching 5-percent risk premium (5 cooperatives in the first period; 10 in the second).
- IV. Cooperatives that generated extra values beyond the cost of using equity capital at basic interest rate plus 5-percent risk premium but short of reaching 10-percent risk premium (three cooperatives in the first period; two in the second).
- V. Cooperatives that generated extra values beyond the cost of using equity capital at basic interest rate plus 10-percent risk premium (six cooperatives in the first period; seven in the second).

Most of the cooperatives, 14 (out of 21) in the first period and 19 in the second, generated extra values beyond the cost of using equity capital at basic interest rates (Category III and higher). And six cooperatives in the first period and seven in the second period attained the highest performance Category V.

Nine cooperatives (Nos. 2, 3, 4, 5, 7, 8, 9, 10, and 12) moved to a category of better performance in the second period. Cooperative No. 4 improved the most, moving from Category II to Category V.

Meanwhile, four cooperatives (Nos. 16, 17, 18, and 21) moved to a lower performance category.

Four cooperatives (Nos. 1, 13, 14, and 15) maintained the top performing position (Category V) throughout the two 5-year periods. Three other cooperatives (Nos. 6, 19, and 20) remained in Category III and one cooperative (No. 11) in Category II in both periods.

Changes in performance indexes--Changes in the performance indexes of the 21 cooperatives are summarized in table 5. All performance indexes for Cooperative No. 1 were positive in the first period (1992-96) and improved ("+" in the change column) in the second period (2000-04). The cooperative was able to generate net savings that more than covered the opportunity cost of using equity capital that was calculated at the basic interest rate plus 10 percent risk premium. (The extra-value index, or EVI, calculated at basic interest rate +10 percent was positive.)

The net savings of Cooperative No. 2 in the first period was enough to cover the cost of using equity capital at the basic interest rate plus 5 percent risk premium. In the second period, it improved and was able to cover the cost at the basic interest rate plus 10 per-

cent risk premium. All performance indexes showed improvement in the second period for Cooperative No. 2.

In the similar manner, Cooperative No. 3 through Cooperative No. 10 improved their performance between the two time periods, as shown by all positive ("+") signs in the change column. All performance indexes for each of these cooperatives were more positive, changed from negative to positive, or became less negative in the second period as compared to the first period.

All three extra-value indexes for Cooperative No. 11 improved (became less negative) over time. However, the return on equity eroded. For Cooperative No. 12, the EVI using the basic interest rate became positive, the EVI using the basic interest rate plus 5-percent became less negative, while the EVI using the basic interest rate plus 10 percent and its return on equity became more negative.

All performance indexes for Cooperative No. 13 through Cooperative No. 15 were positive in both time periods. However, their respective values declined from the first period to the second period ("-" in the change column). So they performed less well in the second period as compared to the first period. Likewise, Cooperative No. 16 through Cooperative No. 21 all showed negative ("-") signs in the change column: Their performance indexes were less positive, changed from positive to negative, or became more negative in the second period. By all measures, Cooperative No. 21 was in the doldrums during the recent 5-year period.

Performance rankings--Cooperatives were ranked according to four criteria (return on equity and the three EVIs using respective interest rates) for both the 1992-96 and the 2000-04 periods (table 6). In the first period, rankings of 13 cooperatives varied somewhat depending on the criterion used. For example, Cooperative No. 2 was ranked 8th according to return on equity, while ranked 7th or 9th according to EVIs.

Similar ranking variations applied to 15 cooperatives in the second period.

Cooperative No. 13 was the top performer in both the first and second periods. Cooperative No. 16 was ranked second in the first period, but slipped to 9th place in the second period, while Cooperative No. 1 improved its standing from third to second place.

Some cooperatives, such as Cooperatives No. 4 and No. 7, showed the most improvement in their rankings, while others saw remarkable declines in their rankings.

Table 5—Comparisons of dairy cooperative performance between two 5-year periods

Co-op code	Performance index	1992-96 average	2000-04 average	Change
1	EVI, using basic interest rate	+	+	+
	EVI, using basic interest rate+5%	+	+	+
	EVI, using basic interest rate+10%	+	+	+
	Return on equity	+	+	+
2	EVI, using basic interest rate	+	+	+
	EVI, using basic interest rate+5%	+	+	+
	EVI, using basic interest rate+10%	-	+	+
	Return on equity	+	+	+
3	EVI, using basic interest rate	+	+	+
	EVI, using basic interest rate+5%	+	+	+
	EVI, using basic interest rate+10%	-	+	+
	Return on equity	+	+	+
4	EVI, using basic interest rate	-	+	+
	EVI, using basic interest rate+5%	-	+	+
	EVI, using basic interest rate+10%	-	+	+
	Return on equity	+	+	+
5	EVI, using basic interest rate	+	+	+
	EVI, using basic interest rate+5%	-	+	+
	EVI, using basic interest rate+10%	-	-	+
	Return on equity	+	+	+
6	EVI, using basic interest rate	+	+	+
	EVI, using basic interest rate+5%	-	-	+
	EVI, using basic interest rate+10%	-	-	+
	Return on equity	+	+	+
7	EVI, using basic interest rate	-	+	+
	EVI, using basic interest rate+5%	-	-	+
	EVI, using basic interest rate+10%	-	-	+
	Return on equity	-	+	+
8	EVI, using basic interest rate	-	+	+
	EVI, using basic interest rate+5%	-	-	+
	EVI, using basic interest rate+10%	-	-	+
	Return on equity	+	+	+
9	EVI, using basic interest rate	-	+	+
	EVI, using basic interest rate+5%	-	-	+
	EVI, using basic interest rate+10%	-	-	+
	Return on equity	+	+	+
10	EVI, using basic interest rate	-	+	+
	EVI, using basic interest rate+5%	-	-	+
	EVI, using basic interest rate+10%	-	-	+
	Return on equity	+	+	+
11	EVI, using basic interest rate	-	-	+
	EVI, using basic interest rate+5%	-	-	+
	EVI, using basic interest rate+10%	-	-	+
	Return on equity	+	+	-

Table 5—Comparisons of dairy cooperative performance between two 5-year periods (Continued)

Co-op code	Performance index	1992-96 average	2000-04 average	Change
12	EVI, using basic interest rate	-	+	+
	EVI, using basic interest rate+5%	-	-	+
	EVI, using basic interest rate+10%	-	-	-
	Return on equity	+	+	-
13	EVI, using basic interest rate	+	+	-
	EVI, using basic interest rate+5%	+	+	-
	EVI, using basic interest rate+10%	+	+	-
	Return on equity	+	+	-
14	EVI, using basic interest rate	+	+	-
	EVI, using basic interest rate+5%	+	+	-
	EVI, using basic interest rate+10%	+	+	-
	Return on equity	+	+	-
15	EVI, using basic interest rate	+	+	-
	EVI, using basic interest rate+5%	+	+	-
	EVI, using basic interest rate+10%	+	+	-
	Return on equity	+	+	-
16	EVI, using basic interest rate	+	+	-
	EVI, using basic interest rate+5%	+	+	-
	EVI, using basic interest rate+10%	+	-	-
	Return on equity	+	+	-
17	EVI, using basic interest rate	+	+	-
	EVI, using basic interest rate+5%	+	-	-
	EVI, using basic interest rate+10%	+	-	-
	Return on equity	+	+	-
18	EVI, using basic interest rate	+	+	-
	EVI, using basic interest rate+5%	+	-	-
	EVI, using basic interest rate+10%	-	-	-
	Return on equity	+	+	-
19	EVI, using basic interest rate	+	+	-
	EVI, using basic interest rate+5%	-	-	-
	EVI, using basic interest rate+10%	-	-	-
	Return on equity	+	+	-
20	EVI, using basic interest rate	+	+	-
	EVI, using basic interest rate+5%	-	-	-
	EVI, using basic interest rate+10%	-	-	-
	Return on equity	+	+	-
21	EVI, using basic interest rate	+	-	-
	EVI, using basic interest rate+5%	-	-	-
	EVI, using basic interest rate+10%	-	-	-
	Return on equity	+	-	-

Table 6—Comparisons of dairy cooperative rankings between two 5-year periods

Co-op code	1992-96 average				2000-04 average			
	Return on equity	EVI, using basic interest rate (Libor+2)	EVI, using basic interest rate+ 5%	EVI, using basic interest rate+ 10%	Return on equity	EVI, using basic interest rate (Libor+2)	EVI, using basic interest rate+ 5%	EVI, using basic interest rate+ 10%
1	3	3	3	3	2	2	2	2
2	8	7	7	(9)	4	3	3	4
3	9	8	8	(8)	3	5	4	3
4	20	(20)	(20)	(18)	7	8	8	7
5	10	10	(10)	(10)	8	7	7	(8)
6	15	14	(15)	(14)	15	13	(12)	(13)
7	(21)	(21)	(21)	(21)	10	10	(10)	(14)
8	18	(18)	(16)	(16)	14	15	(14)	(11)
9	16	(16)	(19)	(20)	11	11	(15)	(17)
10	19	(19)	(18)	(17)	13	12	(11)	(10)
11	17	(17)	(17)	(19)	20	(20)	(20)	(20)
12	13	(15)	(13)	(13)	19	19	(19)	(19)
13	1	1	1	1	1	1	1	1
14	6	5	5	6	6	4	5	5
15	4	4	4	4	5	6	6	6
16	2	2	2	2	9	9	9	(9)
17	5	6	6	5	12	14	(13)	(12)
18	7	9	9	(7)	17	18	(18)	(16)
19	12	12	(12)	(12)	16	16	(16)	(15)
20	11	11	(11)	(11)	18	17	(17)	(18)
21	14	13	(14)	(15)	(21)	(21)	(21)	(21)

*Parentheses indicate the cooperative had negative return (loss) for the particular entry.

Evaluating the performance of dairy cooperatives--The composite picture of cooperative performance emerging from examining cooperatives' performance categories, changes in performance indexes, and performance ranking are presented in table 7.

The 2000-04 period saw 7 cooperatives in performance Category V, 2 in Category IV, 10 in Category III, and 1 each in Categories II and I. This resulted from seven cooperatives moving up one level from the 1992-96 period, one moving up two levels, and another one moving up three levels. On the other hand, two cooperatives moved down one level and another two moved down two levels. Eight cooperatives stayed in their same respective categories throughout the two time periods.

Eleven cooperatives showed improvement in their extra-value indexes, nine showed deterioration, and one had mixed results. Eleven cooperatives also moved higher in the performance ranking, nine moved lower and the top-ranked cooperative stayed put. (In these two instances, the number of coopera-

tives appears to be the same, but they are not necessarily the same cooperatives.) The performance ranking was based on the EVI that was calculated using basic interest rate plus 10 percent risk premium—the most demanding criterion.

A cooperative may be evaluated relative to other cooperatives from the perspective of where it fits in the picture. For example, among the seven top performing cooperatives (performance Category V) in the 2000-04 period, members of Cooperative No. 13 probably would be satisfied that their cooperative retained the top rank. But they may also notice that ranking alone does not tell the whole story. They may wonder what had transpired during the past 5 years that their cooperative's performance indexes weakened, while Cooperatives Nos. 1, 3, and 2 were catching up.

Members of Cooperative No. 14 may also be left wondering, because the cooperative's performance indexes also declined, although its ranking moved up. Members of Cooperative No. 15 will certainly be puz-

Table 7—A composite portrait for evaluating performance of dairy cooperatives, the 2000-04 period compared with the 1992-96 period

Co-op code	Performance category 2000-04	Change in performance category	Changes in performance indices (EVIs) ¹	2000-24 ranking based on EVI using basic interest rate+10% ²
13	V	same	-	1st (+/-)
1	V	same	+	2nd (+)
3	V	up 1 level	+	3rd (+)
2	V	up 1 level	+	4th (+)
14	V	same	-	5th (+)
15	V	same	-	6th (-)
4	V	up 3 levels	+	7th (+)
5	IV	up 1 level	+	8th (+)
16	IV	down 1 level	-	9th (-)
10	III	up 1 level	+	10th (+)
8	III	up 1 level	+	11th (+)
17	III	down 2 levels	-	12th (-)
6	III	same	+	13th (+)
7	II	up 2 levels	+	14th (+)
19	III	same	-	15th (-)
18	III	down 1 level	-	16th (-)
9	III	up 1 level	+	17th (+)
20	III	same	-	18th (-)
12	III	up 1 level	mixed	19th (-)
11	II	same	+	20th (-)
21	I	down 2 levels	-	21st (-)

¹“+” means a cooperative's EVIs were more positive, changed from negative to positive, or became less negative in the 2000-04 period as compared to 1992-96 period. “-” means the opposite.

²Next to the rank, (+) means the cooperative's ranking improved from the 1992-96 period to the 2000-04 period, while (-) means the ranking dropped. (+/-) means no change.

zled, because their cooperative managed to remain in the top performing group, even though both performance indexes and ranking sagged.

On the other hand, members of Cooperative No. 4 probably would be elated that their cooperative's performance improved remarkably, climbing three levels from Category II to reach Category V, where it ranked 7th.

In conducting the performance evaluation, each cooperative will have to ask a host of questions: What happened? What worked? What did not? What improvements need to be made? How to achieve the goals? And so on.

The answers to these questions are certainly going to vary, depending on a cooperative's particular situation. If a cooperative did not turn in a stellar performance during the past 5 years, however, it proba-

bly should not be blamed on “market conditions,” which, after all, were faced by all dairy cooperatives. But not every cooperative experienced the same ill effects. There was an almost even split in the number of cooperatives that performed better or worse (11 to 9, judged either by performance indexes or by performance ranking) than in the 1992-96 period.

Merger and Consolidation

In the interim years between the first and second periods, 11 cooperatives merged or consolidated to form 4 surviving cooperatives (table 2). An interesting question: did the merger and consolidation improve the performance of the cooperatives?

The performance of the four surviving cooperatives was compared to that of the corresponding groupings of the predecessor cooperatives. Three out of the four surviving cooperatives actually did perform better than the sum of their respective predecessor counterparts. They either stayed in the same performance category or climbed to a higher performance category. Their performance indexes showed improvements between the two time periods. And their rankings were all better in the second period.

Did Size Matter?

One way to answer the question of whether cooperative size affected performance is by evaluating the cooperatives as a group--by comparing the weighted-average and simple-average performance indexes.

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, larger cooperatives (defined as cooperatives with larger amounts of operating capital, but not necessarily cooperatives with larger volumes of milk or larger numbers of producers) carry more weights and tend to dominate the results.

The simple-average performance indexes treat every cooperative equally, by calculating the performance indexes of each of the 21 cooperatives and then averaging the indexes. The simple averages give an equal weight to each cooperative regardless of size. No one cooperative has more weight than another to influence the results. Furthermore, 21 is a large enough pool of cooperatives that one, or even a few, cooperatives' performance cannot overwhelm the rest.

If the weighted-average performance indexes show that the cooperatives as a group performed better than indicated by the simple averages, it may be inferred that larger cooperatives used operating capital better than smaller ones, and vice-versa.

Weighted averages--Combining the 21 dairy cooperatives as if one single entity, the return on equity would be 10 percent in 1992 (annual weighted average,). The returns on equity for the other years were all in double digits, except in 2004, when the return was 9.6 percent.

The average return on equity during the first period (1992-96) was 13.1 percent, while it was 10.9 percent for the second period (2000-04).

The net savings of the group was able to pay for the opportunity cost of using equity capital at the basic interest rate. This savings generated an extra value that was 2.4 percent of the combined net operating capital in 1992 (EVI was 2.4 percent, table 8). All EVIs using the basic interest rates as the opportunity costs were positive during the 10 years of this study, with the first period having an average EVI of 4.9 percent and the second period, 2.7 percent.

If the opportunity cost of using equity capital had a risk premium of 5 percent above the basic rate, then the group was not able to cover the cost of using the equity capital in 1992 (when EVI was -0.7 percent) or in 2004 (when EVI was -0.5). EVI was positive for the other 8 years. The average EVI for the first period was 1.4 percent and 0 for the second period.

The combined net savings of the cooperatives was not able to cover the opportunity cost of using equity capital plus the 10 percent risk premium during any of the 10 years. EVIs were all negative. The 5-year average EVI for the first period was -2 percent, while the second period average was -2.7 percent.

Judged as if one single group, the 21 cooperatives did not perform as well in the second period as in the first period. The return on equity decreased 2.2 percentage points from 1992-96 to 2000-04, and the three EVIs also declined, respectively, by 2.1, 1.4 and 0.7 percentage points (table 8). This occurred as the equity share of operating capital was reduced by 14 percentage points and the cooperatives as a group relied proportionately more on debts to finance their operations.

Simple averages--By averaging the individual performance of the 21 dairy cooperatives, the 5-year average return on equity was 16.8 percent during the first period (1992-96) and decreased to 14.3 percent during the second period (2000-04).

The average EVI at the basic interest rate was 7.3 percent in 1992 (table 9). All average EVIs at the basic interest rates were positive during the 10 years, averaging 8.3 percent for the first period and 8.1 percent for the second.

If the opportunity cost of using equity capital had a risk premium of 5 percent above the basic rate, average EVIs were still positive for all 10 years. The average EVIs, respectively, for the two 5-year periods, were 4.5 percent and 4.4 percent.

However, if the risk premium was 10 percent above the basic interest rate, the results were mixed.

The EVIs were positive for some years, but negative for others. The 5-year average EVI was 0.8 percent for both periods.

The three average EVIs that were calculated at the respective interest rates changed very little from the first 5-year period to the most recent (table 9), suggesting that the performance of the cooperatives barely changed. So, while the average return on equity declined in recent years, the extra-value indexes show that the efficiency in using operating capital remained largely unchanged.

The average equity share of operating capital also changed little between the two periods, decreasing by only 3 percentage points (table 9). The dairy cooperatives on average seemed to maintain their equity close to a level that is proportional to the requirement of operating capital.

So, did size matter? Comparisons between weighted-average performance indexes and simple averages highlight the performance of larger cooperatives relative to the rest. All weighted-average performance indexes were lower than the corresponding simple averages, suggesting that some of the larger cooperatives did not perform as well as the rest of the cooperatives in either period (tables 8 and 9). Some of

the larger cooperatives also relied less on equity and more on debt than smaller ones to finance their operations--as shown by the differences between the weighted-average equity shares of operating capital and the simple averages.

The returns on equity, either weighted average or simple average, dipped by similar proportions from the first period to the second. This seems to indicate that the profitability of larger and smaller cooperatives declined by about the same proportion. But notice that the weighted-average equity share of operating capital declined 14 percentage points between the two periods, while the simple average decreased only 3 percentage points. Apparently, some of the larger cooperatives relied far more heavily on debt and less on equity to finance their operations in the second period and thus enhanced the return on equity. Otherwise, the weighted-average return on equity would have shown steeper decline than the simple average in the second period. (This is another example of why return on equity is not a reliable performance measure.)

In terms of operating efficiency, while the weighted-average EVIs show that the cooperatives as a group did not perform as well in the second period as in the first period, the simple-average EVIs indicate that the

Table 8—Performance of 21 dairy cooperatives as a group, annual weighted averages

Year	Return on equity	EVI (i=basic)	EVI (i=basic+5%)	EVI (i=basic+10%)	Equity share of operating capital
			<i>Percent</i>		
1992	10.0	2.4	(0.7)	(3.8)	62
1993	12.7	4.8	1.2	(2.3)	71
1994	15.1	4.8	1.2	(2.3)	71
1995	12.8	6.2	2.8	(0.6)	69
1996	14.8	6.1	2.6	(0.8)	69
Average ¹	13.1	4.9	1.4	(2.0)	68
2000	11.8	3.5	0.5	(2.5)	60
2001	11.2	2.7	0.1	(2.5)	52
2002	11.1	2.8	0.0	(2.7)	55
2003	10.8	2.6	0.0	(2.5)	51
2004	9.6	2.1	(0.5)	(3.1)	52
Average ¹	10.9	2.7	0.0	(2.7)	54
Change	(2.2)	(2.1)	(1.4)	(0.7)	(14)

¹Five-year simple average.

Table 9—Performance of 21 dairy cooperatives as a group, annual simple averages

Year	Return on equity	EVI (i=basic)	EVI (i=basic+5%)	EVI (i=basic+10%)	Equity share of operating capital
-----Percent-----					
1992	13.7	7.3	3.5	(0.3)	75
1993	17.4	10.4	6.6	2.7	77
1994	16.7	6.5	2.7	(1.2)	76
1995	16.9	8.2	4.5	0.8	76
1996	19.2	9.3	5.5	1.7	76
Average ¹	16.8	8.3	4.5	0.8	76
2000	15.5	6.8	3.0	(0.7)	75
2001	15.8	9.5	5.9	2.2	73
2002	14.2	9.4	5.8	2.2	72
2003	11.0	6.3	2.7	(0.9)	72
2004	14.8	8.4	4.8	1.2	72
Average ¹	14.3	8.1	4.4	0.8	73
Change	(2.5)	(0.3)	(0.1)	0.0	(3)

¹Five-year simple average.

average performance barely changed between the two periods. This implies that some of the larger cooperatives did not perform as well in the second period as in the first period. But the rest of the cooperatives, on average, maintained their level of efficiency in using operating capital.

The comparisons in this section offer some interesting general observations. But without presenting individual cooperatives' data, it is difficult to make a definitive conclusion about cooperative size and performance. Suffice it to say that some of the larger cooperatives did not perform as well as other cooperatives, that the performance of some of the larger cooperatives (not necessarily the same ones) slipped over time, and that some of the larger cooperatives relied proportionately less and less on member equity for financing operations.

Conclusion: No Substitute for Board and Member Vigilance

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 member equity.

- Extra-value index measures the rate at which the extra value is generated given the operating capital used in the cooperative's operations.
- Being scale-neutral and mode-neutral, the extra-value index is an objective and definitive tool for comparing performance over time and among cooperatives.

However, 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 field and other services (e.g., assist with production problems, assist with inspection problems, sell milking supplies and equipment, provide information on price and availability of hay and heifer replacements, provide marketing and outlook information, provide insurance programs (life, health, disaster), provide retirement programs, negotiate hauling rates, collect and ensure payment from buyers, check weights and tests, represent members' interests in government, regulatory and public affairs, and so on). 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

ratios, 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.

In a dairy cooperative, the distinction between milk pay prices and premiums on the one hand and profits on the other is not clear-cut. If a dairy cooperative pays members high prices and premiums for milk, it may report low margins, or even incur losses. On the other hand, a cooperative may pay lower milk prices and report hefty margins. The two cooperatives may perform equally well, although their financial results show otherwise. However, if milk procurement is competitive, this consideration may have only minimal, or no, effect. The board and members should take their cooperative's pricing policies into consideration in evaluating its performance.

The opportunity cost (including risk premium) of equity capital is specific to each individual cooperative, which most likely is different from the interest rates used in this report. Also, each member's financial situation may be different and their opportunity cost of capital may vary from one to another. 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 worthwhile tool that furnishes some objectivity in evaluating cooperative performance. In the end, what really counts is how satisfied the member-producers are with the cooperative. There is no substitute for a well-informed membership and a vigilant board that understands the complexity of operating a cooperative, both as a business and as a membership organization, to adequately oversee and evaluate its operations.

This report applies the extra-value approach to dairy cooperatives as an example. The approach should be equally applicable to cooperatives marketing other commodities. For comparing the performance of cooperatives across commodities, however, care should be taken to consider the characteristics of the various commodity sectors. (For example, the amount of operating capital required to market a unit of one commodity may be very different from that required for another commodity, and the margins on sales also may be different.) Although the extra-value index is scale-neutral and mode-neutral, it may, or may not, be commodity-neutral because of the characteristics of the respective sectors.

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Stop 3250

Washington, D.C. 20250-3250

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