

Estimating the Accounting Profitability of Pooling Cooperatives

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Cooperatives, as a user-owned form of business organization, coexist with the more familiar investor-owned or investor-oriented firms (IOFs). The difference in owner orientation results in different goals for these two forms of organization. We usually view IOFs as maximizing the return to owners' equity adjusted for risk. The ultimate objective of a cooperative is to maximize the benefits accruing to its user-owners from their cooperative-related activities. Profit maximization may not be an appropriate objective for a marketing cooperative if achieved by paying very low prices for the members' products.

We should evaluate the performance of a cooperative by measuring the benefits that the cooperative generates to its members. This is not practical, however, because member-level data are difficult to obtain. In addition, some cooperative-related benefits are of a public good or non-market nature, which makes evaluation more difficult (for a discussion of the non-market aspects of cooperatives and possible measures of performance, see Parliament, Lerman, and Fulton).

Due to these evaluation difficulties, researchers frequently measure the performance of cooperatives from cooperative-level accounting data. This approach restricts the evaluation of cooperatives to the IOF performance paradigm, and yet it relies on readily available standard data for which accepted interpretations are available. Recent examples of this approach include Schrader et al. and Lerman and Parliament (1990, 1991).

Performance evaluation from accounting data adopts a multidimensional approach, analyzing a set of financial ratios derived from annual reports. These financial ratios are related with various aspects of business strategy and their analysis produces a composite picture of the efficiency and risk of a firm (for a general discussion of financial ratios in performance analysis, see Brealey and Myers).

One of the standard performance measures for IOFs is profitability. It is defined as the rate of return to owners' equity and measured as the ratio of net profit to equity capital. The interpretation of this ratio for cooperatives is problematic. Helmberger and Hoos, for example, viewed cooperatives as zero-profit organizations, adjusting their payments or charges to members to achieve zero reported profit. Yet

recent results show that the rate of return to equity of cooperatives is not less than that of IOFs in comparable industries (Parliament, Lerman, and Fulton; Lerman and Parliament (1990)). These empirical findings raise a question about the role of profits in cooperatives. They suggest the inclusion of the profitability ratio in the set of standard financial ratios for performance evaluation of cooperatives.

There is, however, a large group of agricultural marketing cooperatives for which we cannot calculate the rate of return to equity directly from published accounting data. These cooperatives report "net proceeds" instead of a figure comparable to net profit or net margin. They operate as pooling cooperatives, commingling cost and sales figures across member producers and across products.

Marketing cooperatives that operate on a pooling basis fall into two groups based on the accounting treatment of cost of goods sold. Some pooling cooperatives follow the standard accounting convention of including the cost of members' raw products in their expenses and report the full cost of goods sold. The net profit or net margin in the income statement of these cooperatives is the residual return to members' equity. This is comparable to the net profit reported by IOFs and nonpooling cooperatives. Other pooling cooperatives exclude from their reported expenses the value of the raw products supplied by members to the cooperative. The excess of sales over expenses, reported as "net proceeds" by this second group of cooperatives, represents both the cost of members' raw products and the residual return to members' equity. The net proceeds are therefore not comparable to net profit or net margins.

Due to this incomparability in the income statements, only the profitability measures for pooling cooperatives that report the full cost of goods sold are calculated. For example, Touche Ross calculate profitability ratios only for the subgroup of marketing cooperatives that include members' raw products in the cost of goods sold. The Agricultural Cooperative Service (ACS), in its surveys of the top 100 cooperatives, specifically excludes from profitability calculations cooperatives that use "pooled accounting methods with no net margins reported" (Davidson and Kane). Finally, the National Cooperative Business Association does not publish earnings figures for "marketing cooperatives operating on a pool basis". The number of such cooperatives is not negligible. In the 1987-1988 Touche Ross survey, 10 out of 19 marketing cooperatives did not include raw products in their cost of goods sold. Of the largest 100 cooperatives in the US, 11 did not report net margins in the 1980 ACS survey (Davidson, Street, and Wissman), and seven in the 1986 survey (Davidson and Kane).

Yet the data necessary for estimating the cost of goods sold, and hence the net margin, are available in the financial statements of the pooling cooperatives. This paper will show how we can use the standard accounting information published in the audited statements to estimate the profitability of pooling cooperatives that do not include raw products in their reported costs.

Adjustment of Net Proceeds to Equivalent Net Profit

The two basic measures of profitability are the rate of return to assets and the rate of return to equity. In both cases, the return component used in profitability calculation includes the reported accounting profit (or net profit, net earnings, net income, or net margin). We can define net profit as the excess of revenues over related expenses during the accounting period. Revenues are the sales of products and services generated by the firm during the accounting period, and "expenses are outflows . . . of assets or incurrences of liabilities. . . from delivering or producing goods" (FASB, *italics added*). When a member delivers raw products to a marketing cooperative, the cooperative incurs a liability, which represents the cost of member's produce. When these products are sold (possibly after value-added processing) an expense is recorded equal to the amount of the liability previously created. This expense is conceptually part of cost of goods sold. However, how this product expense is valued and reported in the financial statement varies among pooling cooperatives.

Some cooperatives value the liability by estimating and paying their members the market value of the raw products. These cooperatives include raw products in their cost of goods sold and report net margins. The bottom line of their income statement is comparable to the standard net profit, which accrues to members in the form of allocated or unallocated retained earnings or extra payments in excess of the market value of their products.

Other cooperatives do not record their liability to members as a part of cost of goods sold, and instead report net proceeds, which is therefore not comparable to the standard net profit. This practice may have begun when some cooperatives dealt with members' products for which no alternative markets were available. Yet it persists today in cooperatives dealing with standard marketable products, which choose not to value the members' products at market on delivery date. These cooperatives append a separate section to the income statement, which details the distribution of the net proceeds to members. This distribution is in the form of cash, accounts payable to members, or retained earnings. The payments to members, whether in cash or as credits to members' accounts payable, discharge the cooperative's liability for the members' raw products. Accordingly, we can regard them as the raw product component of the cost of goods sold. It is reasonable to assume that payments to member producers roughly equal market prices for members' products over time. If producers did not receive payments equivalent to market prices, they would no longer use the cooperative. Alternatively, if the cooperative consistently paid more than the market value for the products, it would attract an increased business volume. Consequently, they would eventually be unable to pay more than the market prices to members.

Figure 1 illustrates typical income-statement formats of pooling cooperatives. The standard format represents cooperatives that include members' raw products in the cost of goods sold. This standard format is the same as conventional income

Figure 1:
Income Statement Formats of Pooling Cooperatives: Estimation of Cost of Goods Sold and Reconciliation to Standard Format

STANDARD FORMAT:		RECONCILIATION:	
Net Sales	1000	Net Sales	1000
Cost of Goods Sold	800	Cost of Goods Sold:	
Gross Profit	200 (1)	Production Costs	100 +
Operating Expenses	100	Payments to members	700 +
Operating Profit	100 (2)	Gross Profit	200 (1)
Interest Expense	50	Operating Expenses	100 (2)
Net Profit	50 (3)	Operating Profit	100 (2)
		Interest Expense	50 (3)
		Net Profit	50 (3)

STANDARD PROFITABILITY MEASURES:		Rate of Return on Assets (ROA) = (3)/Total Assets; Rate of Return to Equity (ROE) = (3)/Equity	
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COOPERATIVES NOT REPORTING COST OF GOODS SOLD:		VARIANT I:	
Net Sales	1000	Net Sales	1000
Production Costs	100 +	Production Costs	100 +
Operating Expenses	100	Operating Expenses	100
Interest Expense	50	Interest Expense	50
Net Proceeds	750	Net Proceeds	750
Payments to Members	700 +		
Retained Earnings	50		

VARIANT II:		VARIANT III:	
Net Sales	1000	Net Sales	1000
Production Costs	100 +	Production Costs	100 +
Operating Expenses	100	Operating Expenses	100
Interest Expense	50	Interest Expense	50
Net Proceeds	750	Net Proceeds	750

VARIANT IV:		Statement of Amounts Due to Members:	
Net Sales	1000	Balance, Beginning of the Year	378
Production Costs	100 +	ADD: Net Proceeds	750 +
Operating Expenses	100	Total available for distribution	1128
Interest Expense	50	LESS: Cash Payments	825
Net Proceeds	750	Allocated Retained Earnings	25
		Unallocated Retained Earnings	25
		Balance, End of the Year	25
			750

Distribution to Patrons:		Distribution to Patrons:	
Cash payments	500 +	Cash payments	500 +
Due to patrons	200 +	(Accounts Payable)	200 +
Allocated retained earnings	25	Allocated retained earnings	25
Unallocated retained earnings	25	Unallocated retained earnings	25
Total	750	Total	750

statements, and we can calculate profitability measures in the usual way, as shown in the figure. The other four formats represent variants of income statements found in pooling cooperatives that do not include raw products in the cost of goods sold. Items that we should include in cost of goods sold are identified by + (and -) sign in each variant.

In variant I, we add reported payments to members to production costs to get an estimate of the cost of goods sold. For this variant, retained earnings are equivalent to net profit. A separate note or statement in the financial reports usually details the distribution of the retained earnings.

In variants II and III, we show the payments to members and the allocated and unallocated retained earnings explicitly in a statement of distribution. The only difference between these variants is that all the payments in variant II are in cash, while the payments in variant III are part cash and part credit to members' accounts payable, to be paid in cash at a later.

While the first three variants present the distribution of net proceeds to members in the current year, variant IV presents a consolidated picture of the amounts due to members. The amounts include prior years and the balances carried forward to the next year. In this variant, part of cash payments represent discharge of liabilities incurred in previous years. We can credit part of the current year's liabilities to the balance of accounts payable and not distributed as cash. We can calculate members' product costs by subtracting the retained earnings (allocated and unallocated) from the net proceeds for the current year, as shown in Figure 1.

The reconciliation panel in Figure 1 summarizes the change of the four variants to the standard format. The cost of goods sold in the reconciled format includes the production costs, as originally reported, plus the adjustment items representing the cost of members' raw products, as identified in the four variants. In addition to the general formats of Figure 1, the adjustment should include such technical items as quality incentive payments or payments to members due to meeting their patronage quota, which relate directly to members' product cost. It should not include dividend payments and other amounts related to the equity account of the cooperative. The reconciled format in Figure 1 is the same as the standard format, so we can calculate profitability measures in a comparable way.

Application and Empirical Test of the Proposed Estimation Technique

We tested the proposed technique for estimating the profitability of pool cooperatives that do not include raw products in their cost of goods sold on a sample of 12 marketing cooperatives. The 12 were in the fruit and vegetable processing industry that operate on a pooling basis. The sample was made up of six cooperatives that included members' raw products in their cost of goods sold (group A), and six cooperatives that included only production and processing costs in their cost of sales (group B). These treated raw product costs as part of payments to members. The

sample data consisted of audited financial statements for the 17-year period 1971-1987. All sample cooperatives had a similar mix of operations, with the only obvious difference between them provided by the accounting treatment of costs of sales. We expect that the profitability measures of the cooperatives in the two groups would be statistically similar when estimated on a comparable basis.

We applied the technique described in Section 2 to convert the reported net proceeds to equivalent net margins for the six cooperatives in group B. We then calculated the rate of return to equity (ROE) for each of the 12 cooperatives for the years 1971-1987. We used the ratio of net profit before tax to total reported equity. We determined the median ROE and the interquartile range for each year for group A and group B cooperatives separately and list them in Table 1. Figure 2 shows the

Table 1.
Rate of Return to Equity for Group A and Group B Cooperatives: Medians and Interquartile Range, 1971-1987

Year	Lower Quartile Group A	Median Group A	Median Group B	Top Quartile Group A
1971	-26.20	-8.60	14.88	0.01
1972	12.97	23.30	27.96	26.08
1973	31.30	32.25	20.48	33.58
1974	33.63	35.68	24.44	52.00
1975	-17.30	11.22	20.27	37.04
1976	10.74	21.21	18.39	28.96
1977	9.28	29.86	23.62	35.67
1978	11.23	25.16	19.69	43.70
1979	18.91	26.67	24.91	83.20
1980	-25.80	8.47	23.80	55.36
1981	-23.21	33.70	16.17	47.36
1982	0.00	25.37	20.09	27.78
1983	-7.70	11.43	11.02	53.52
1984	6.57	14.60	21.55	29.32
1985	3.75	11.60	24.78	25.28
1986	2.09	4.47	23.13	18.72
1987	7.92	14.39	18.89	22.43

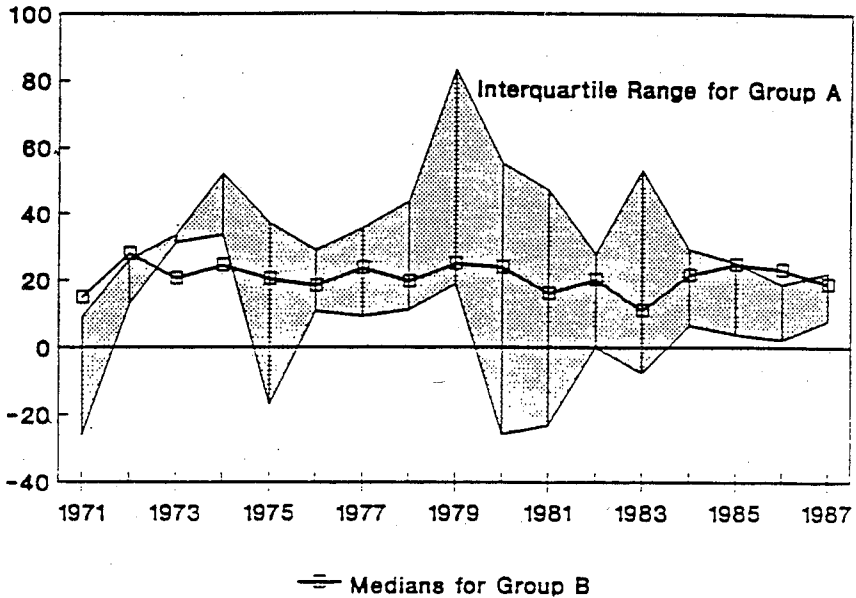
Note: Group A are cooperatives that include raw products in their cost of goods sold and report net margins.

Group B are cooperatives that do not include raw products in their costs and report net proceeds.

ROE time series. The shaded band is the interquartile range of the ROE of the group A cooperatives that follow standard accounting reporting. The solid line with square markers is the median rate of return for the group B cooperatives that do not include raw products in their cost of goods sold.

The median ROE of group B cooperatives in Figure 2 falls within the interquartile range of the group A cooperatives for most years. Thus, the adjustment procedure estimates rates of return to equity for cooperatives not reporting raw

Figure 2:
Median of Adjusted Rates of Return on Equity for Cooperatives Not Reporting Net Margins (Group B) Compared to Interquartile Range of Rates of Return on Equity for Cooperatives that Report Net Margins (Group A), 1971-1987



product costs that are comparable to rates of return to equity for “net-margin-reporting” cooperatives. The nonparametric Wilcoxon test (see for example, Daniel) of the time series of the median ROE for the two groups of pooling cooperatives did not reject the hypothesis of equal median rates of return. The probability of the test statistic exceeding the observed value under the null hypothesis of equal median rates of return for the two groups was 0.76.

Part of the payments to members incorporated into cost of goods sold by the proposed adjustment technique may represent product costs from prior years pools. The empirical results show, however that this departure from the matching principle of accounting does not have a significant effect on the profitability measure estimated for pool cooperatives that exclude raw products from their costs.

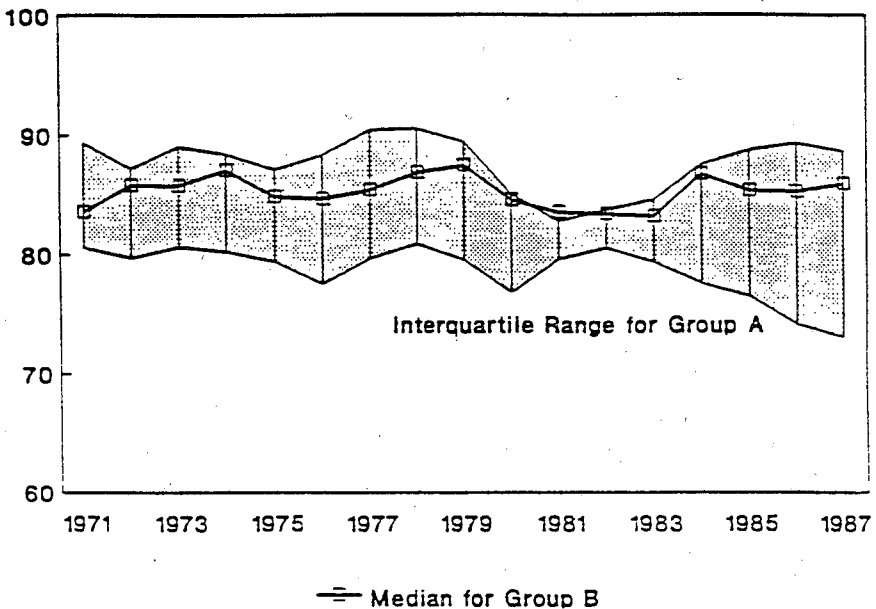
The empirical justification of the technique relies on the assumption that, because of similarity in operations, we expect group A and group B cooperatives to have basically similar profitability levels. Unfortunately, it was not possible to cross-check the results by running a similar analysis on the net proceeds of the cooperatives in groups A and B. The data for net-margin-reporting cooperatives in group A do not separate the cost of goods sold into processing and product costs. It is therefore not possible

to reconstruct net proceeds comparable to those reported by group B cooperatives. We therefore checked the similarity of the cooperatives in the two groups by analyzing a proxy profitability measure calculated as a margin on sales after operating, financing, and other expenses, excluding all components of cost of goods sold. We reported these cost components on a comparable basis by the cooperatives in both groups. We based the proxy measure on raw data that did not require any adjustment. Figure 3 shows the results of this analysis. Again, the median proxy measure for group B cooperatives falls within the interquartile range of this measure for group A cooperatives. The Wilcoxon test does not reject the hypothesis of equal medians for the two groups. This additional analysis supports our expectation that the cooperatives in both groups have equal profitability levels as measured by rate of return to equity and lends credence to the proposed adjustment technique.

Conclusion

Due to the similarity in their operations, we expect cooperatives in both groups—those reporting net proceeds and those reporting net margins—to post similar

Figure 3:
Median of Margin on Sales for Cooperatives Not Reporting Net Margins (Group B) Compared to Interquartile Range of Margin on Sales for Cooperatives that Report Net Margins (Group A), 1971-1987



measures of profitability in a competitive market. The results of this paper show that the profitability estimates obtained by the proposed adjustment procedure for cooperatives that do not report raw product costs are comparable to the profitability ratios of cooperatives that report conventional net margins. The empirical findings thus suggest that research can use this procedure to estimate the profitability of a category of pool cooperatives that we have previously ignored.

Application of the proposed profitability estimation technique will enrich the data base for future research on cooperative financial performance by including a substantial number of cooperatives for which no profitability measures were calculated in the past. It will also enable pooling cooperatives that do not report net margins to compare their profitability performance to other cooperatives and investor-owned firms.

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