Staff Papers Series

Staff Paper P90-7 January 1990

ESTIMATING THE PROFITABILITY OF POOL COOPERATIVES

Zvi Lerman

Claudia Parliament

Department of Agricultural and Applied Economics

University of Minnesota
Institute of Agriculture, Forestry and Home Economics
St. Paul, Minnesota 55108

Staff Paper P90-7 January 1990

ESTIMATING THE PROFITABILITY OF POOL COOPERATIVES

Zvi Lerman

Claudia Parliament

ESTIMATING THE PROFITABILITY OF POOL COOPERATIVES

Zvi Lerman and Claudia Parliament[1]

Abstract

Profitability measures are omitted from performance analyses of marketing pool cooperatives that do not include raw products in their reported costs. A procedure to estimate the profitability of these cooperatives is proposed, converting net proceeds to a figure comparable to standard net profit or net margin. The median ROE calculated using the proposed adjustment was not found to be significantly different from the median ROE of "net-margin-reporting" pools over the period 1971-1987. Application of this procedure will allow pool cooperatives to compare their profitability to other cooperatives and investor-owned firms.

Key words: profitability, ROE, pool cooperatives, marketing cooperatives, financial performance, net margins, net proceeds.

---

[1] Zvi Lerman is Lecturer in the Department of Agricultural Economics and Management, Hebrew University, Rehovot, Israel, and Claudia Parliament is Assistant Professor in the Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, MN. This paper was written when Zvi Lerman was on sabbatical leave at the University of Minnesota.

The research was supported by BARD – U.S.-Israel Bi-National Agricultural Research and Development Foundation.

1. Introduction

Agricultural marketing cooperatives that operate on a pooling basis fall into two categories 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. Other pooling cooperatives include production or processing costs in the expenses subtracted from sales, but exclude 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, thus represents both the cost of members' raw products and the residual return to members' equity. The net proceeds reported in this way are therefore not comparable to net profit or net income.

Because of this incomparability of the bottom line in the income statements, profitability measures have only been estimated for pooling cooperatives that report the full cost of goods sold. 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 (ASC), 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); the National Cooperative Business Association does not publish earnings figures for "marketing cooperatives operating on a pool basis;" and

Lerman and Parliament in their study of the performance of agricultural cooperatives in four industries excluded the entire food industry from the profitability analysis due to the substantial number of pool cooperatives not reporting members' product costs. 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. In the Lerman and Parliament study, 8 of the 14 cooperatives in the food industry did not report conventional cost of goods sold. Of the largest 100 cooperatives in the US, 11 did not report net margins in the 1980 ASC survey (Davidson, Street, and Wissman), and 7 in the 1986 survey (Davidson and Kane).

Yet the data necessary for estimating the cost of goods sold and hence the net profit (net margin) are available in the financial statements of the pooling cooperatives. The purpose of this paper is to show how the standard accounting information published in the audited statements can be used to estimate the profitability of pooling cooperatives that do not include raw products in their reported costs. The emphasis of this study is on measuring accounting profitability of a pool cooperative as a firm. For an evaluation of alternative pooling rules from the members' point of view, see Buccola and Subaei.

2. 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, variously referred to as net profit, net earnings, net income, or net margin. Net profit is defined 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* supplied). 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 are the cooperatives that 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 component of cost of goods sold, and instead report net proceeds, which is therefore not comparable to the standard net profit. 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 and accordingly can be regarded as the raw product component of the cost of goods sold.

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 identical to conventional income statements, and profitability measures can be calculated 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 should be included in cost of goods sold are identified by + (and -) signs in each variant.

In variant A, the reported payments to members should be added to production costs to obtain an estimate of the cost of goods sold. For this variant, retained earnings are equivalent to net profit, and a separate note or statement in the financial reports usually details the distribution of the retained earnings.

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

COOPERATIVES NOT REPORTING COST OF GOODS SOLD:

VARIANT A:

Net Sales	1000	
Production Costs	100	+
Operating Expenses	100	
Interest Expense	50	
Net Proceeds	750	
Payments to Members	700	+
Retained Earnings	50	

VARIANT B:

Net Sales	1000	
Production Costs	100	+
Operating Expenses	100	
Interest Expense	50	
Net Proceeds	750	

Distribution to Patrons:

Cash payments	700	+
Allocated retained earnings	25	
Unallocated retained earnings	25	
Total	750	

VARIANT C:

Net Sales	1000	
Production Costs	100	+
Operating Expenses	100	
Interest Expense	50	
Net Proceeds	750	

Distribution to Patrons:

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

VARIANT D:

Net Sales	1000	
Production Costs	100	+
Operating Expenses	100	
Interest Expense	50	
Net Proceeds	750	

Statement of Amounts Due to Members:

Balance, Beginning of the Year	378	
ADD: Net Proceeds	750	+
Total available for distribution	1128	
LESS: Cash Payments	825	
Allocated Retained Earnings	25	−
Unallocated Retained Earnings	25	−
Balance, End of the Year	253	

STANDARD FORMAT:

Net Sales	1000	
Cost of Goods Sold	800	
Gross Profit	200	(1)
Operating Expenses	100	
Operating Profit	100	(2)
Interest Expense	50	
Net Profit	50	(3)

RECONCILIATION:

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

STANDARD PROFITABILITY MEASURES: Rate of Return on Assets (ROA) = (3)/Total Assets; Rate of Return to Equity (ROE) = (3)/Equity

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

While the first three variants present the distribution of net proceeds to members in the current year, variant D presents a consolidated picture of the amounts due to members, including 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, while part of the current year's liabilities may be credited to the balance of accounts payable and not distributed as cash. Members' product costs may be calculated by subtracting the retained earnings (allocated and unallocated) from the net proceeds for the current year, as shown in Figure 1. Alternatively, a standard formula may be used for converting from changes of stocks to flows (the so-called "inventory adjustment formula"). In the present case, this formula takes the form

$$AP_0 + \text{Net Proceeds} = \text{Cost of Products} + AP_1$$

or

$$\text{Cost of Products} = \text{Net Proceeds} - (AP_1 - AP_0)$$

where AP_0 is the balance of members' accounts payable at the beginning of the year; AP_1 the balance at the end of the year. The beginning and ending balances of accounts payable are reported in the balance sheet, and the net proceeds are reported in the income statement. This formula can be used to estimate the cost of members' raw products if the information listed in variant D is not available.

The reconciliation panel in Figure 1 summarizes the transformation 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, cooperatives should include in the adjustments such items as quality incentive payments or payments to members due to meeting their patronage quota, which are directly related to members' product cost. The adjustments should not include dividend payments and other amounts that are related to the equity account of the cooperative. The reconciled format in Figure 1 is identical to the standard format, so that profitability measures can be calculated in a comparable way.

3. Application and Empirical Test of the Proposed Estimation Technique

The proposed technique for estimating the profitability of pool cooperatives that do not include raw products in their cost of goods sold was tested on a sample of 12 marketing cooperatives in the fruit and vegetable processing industry that operate on a pooling basis. The sample comprised 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, treating raw product costs as part of payments to members (group B). The sample data consisted of audited financial statements for the 17-year period 1971-1987.

The technique described in Sec. 2 was applied to convert the reported net proceeds to equivalent net margins for the six cooperatives in group B. The rate of return to equity (ROE) was then calculated for each of the 12 cooperatives for the years 1971-1987, using the ratio of net profit before tax to total reported equity.

The median ROE and the interquartile range were determined for each year for group A and group B cooperatives separately. The ROE time series are presented in Figure 2, where the shaded band is the interquartile range of the ROE of the group A cooperatives that follow standard accounting reporting, and 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 product costs that are comparable to rates of return to equity for "net-margin-reporting" cooperatives. The nonparametric Wilcoxon test (see, e.g., 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. The median ROE values and the interquartile ranges for the cooperatives of the two groups are reported in full in the Appendix.

It should be recognized that part of 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 indicate, however, that this violation of the matching principle of accounting does not appear to have a significant effect on the profitability measure estimated for pool cooperatives that exclude raw products from their costs.

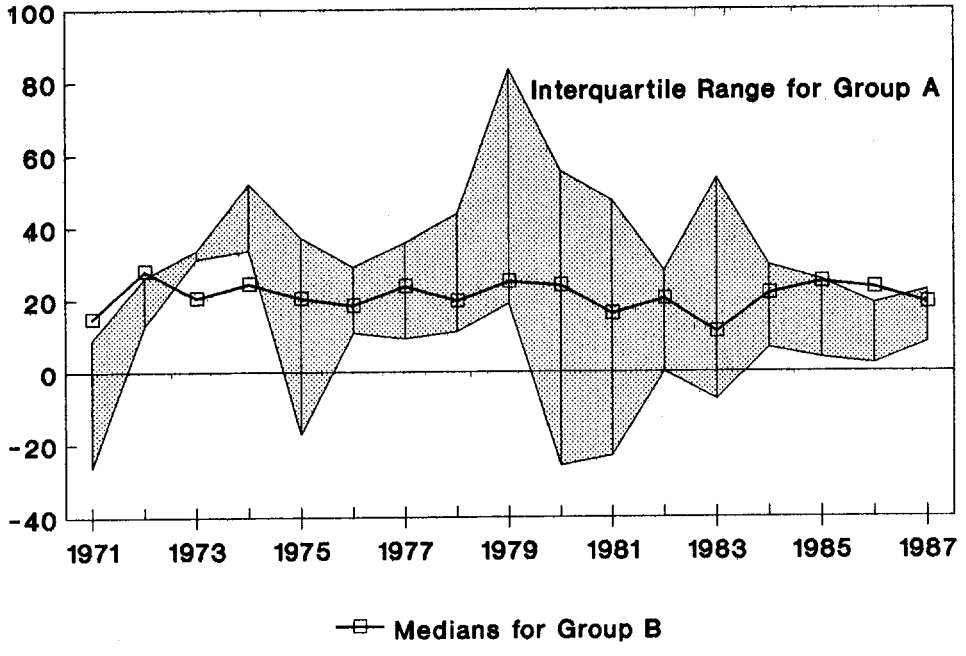

FIGURE 2. Median of Adjusted Rates of Return on Equity for Cooperatives Not Reporting Net Margins (Group B) Compared to Interquartile Range of Rates of Return on Equity for Cooperatives That Report Net Margins (Group A), 1971-1988.

4. Conclusion

The results of this paper indicate 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 do report raw product costs. This suggests that the procedure proposed in this paper may be used to estimate the profitability of a category of pool cooperatives that have previously been ignored. In addition to enriching the database for future research, application of this technique will enable pooling cooperatives that do not include members' products in cost of goods sold to compare their profitability performance to other cooperatives and investor-owned firms.

References

Buccola, S.T. and Subaei, A. "Optimal Market Pools for Agricultural Cooperatives." *American Journal of Agricultural Economics*, 67(1985):70-80.

Daniel, W.W. *Applied Nonparametric Statistics*. Boston: Houghton Mifflin, 1978.

Davidson, D.R. and Kane, M.D. *Top 100 Cooperatives, 1986 Financial Profile*. ACS Research Report No. 71, USDA Agricultural Cooperative Service, Washington, D.C., 1988.

Davidson, D.R., Street, D.W., and Wissman, R.A. *Top 100 Cooperatives, 1980 Financial Profile*. ACS Research Report No. 24, USDA Agricultural Cooperative Service, Washington, D.C., 1982.

FASB. *Elements of Financial Statements of Business Enterprises*. FASB Statement of Financial Accounting Concepts No. 3, Financial Accounting Standards Board, Stamford, Conn., 1980.

Lerman Z. and Parliament, C. "Industry and Size Effects in Agricultural Cooperatives." Staff Paper P89-40, University of Minnesota, Department of Agricultural and Applied Economics, St. Paul, Minn., 1989.

National Cooperative Business Association. *Special Report: 1986 Top 50 Agricultural Cooperatives*. Washington, D.C., 1987.

Touche Ross. *Financial Ratios for Food Processing Corporations and Agricultural Cooperatives, Fiscal Year 1987-1988*. San Francisco, 1989.

APPENDIX

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	9.01
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.