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Cooperative
Service

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Report 175

Financial Management and Ratio Analysis for Cooperative Enterprises

Abstract

This study discusses differences in financial management and goals between the investor-oriented firms and cooperatives. It briefly reviews what bankers look for when appraising potential borrowers. A summary of standard financial ratios used to analyze a variety of business structures is included, along with other modified ratios to address deficiencies evident in standard ratios.

Key words: Cooperatives, financial ratio, liquidity, leverage, activity, profitability.

Financial Management and Ratio Analysis For Cooperative Enterprises

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Preface

Several unique financial characteristics differentiate a cooperative from an investor-oriented firm (IOF). When evaluating the cooperative's performance, comparing a cooperative's financial position with an IOF can be misleading for those unfamiliar with these characteristics. This report was written to help boards and managers assess the financial performance of their cooperatives and to familiarize potential creditors with the unique financial characteristics and performance of cooperatives.

This study discusses the differences in financial management and goals of cooperatives versus IOFs. It starts by discussing the contents of the various cooperative financial statements and follows with a view of common sizing statements for analysis. Next, it reviews the usefulness of standard financial ratios applied to the cooperative framework. A brief review shows what lenders look for when analyzing potential borrowers. Finally, financial ratios are developed to build on these standards with an eye toward a comprehensive understanding of a cooperative's performance. Ratios will be related to data during the last 18 years from the largest agricultural cooperatives.

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Financial Management and Ratio Analysis for Cooperative Enterprises

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Introduction

An analyst must have a clear understanding of the firm's objectives to effectively measure its business performance and management. In most financial textbooks, the objective of a company is maximizing the value of the owner's interest in the firm. For the investor-oriented firm (IOF), the firm's value depends on earnings used to reward investors and to reinvest in productive assets that will generate future earnings.

The interdependence of a firm's value and its earnings has led to the theory of profit maximization. The firm seeks optimum current and future earnings. This ensures that the long-run return for investors is maximized through increased returns and the firm's appreciating stock value.

On the other hand, cooperatives have goals other than generating direct profits for their members. Thus, in the cooperative environment, the interdependence giving rise to the theory of profit maximization generally will not hold true. In a cooperative, owners are the primary users. Cooperatives have objectives other than generating direct profits for its owners. These unique objectives may cause operational decisions made by cooperative managers and directors to sometimes differ from those made by management of IOFs.

Investment in a cooperative is primarily based on investors use of it. Appreciation in the value of members equity is not common. Additionally, legal requirements often limit dividends paid on cooperative stock. As a result, the traditional theory of the firm does not fully hold in the cooperative environment. Profit maximization translates into neither greater dividend streams nor appreciated value of the member's cooperative investment.

Why then would a producer invest in a cooperative? Why would someone be willing to give up access to these funds without the traditional investment incentives? The unique nature of the cooperative owner/user relationship weakens this theory of profit maximization. Benefits of ownership are not gained from the appreciation of the cooperative stock value, but from assured access to competitively priced supplies, assured product market through the cooperative, or simply access to goods and services not available elsewhere

To further illustrate the different functions between the cooperative and IOF, consider this example of a simplified income statement:

	Sales
Less	Cost of goods sold

Equals	Gross Margin
Less	Operating expenses

Equals	Profits

Assuming a cooperative and an IOF have identical operating expenses, profit for each is achieved by maximizing the gross margin. If one assumes a competitive external market, then the cooperative and the IOF must take the price each receives as given, and, therefore, can increase gross margins only by reducing cost of goods sold (COGS). The IOF's function is to return more to the investors, thereby trying to lower the COGS and increase the profits.

In a marketing cooperative, the COGS largely represents payments to the member/owners for products marketed through the cooperative. Therefore, the cooperative seeks to return the highest amount to the member, through higher COGS and lower "profits."

In a farm supply cooperative, sales largely represent purchases by the member/owner for product received from the cooperative. Again, assuming competitive external markets, both the cooperative and the IOF must take the price at which it purchases the product for resale as given (i.e., COGS is given). Therefore gross margins can be increased only by raising the sales price placed on farm supply products. While this is sound business for an IOF, the cooperative seeks to limit these prices for its members, thereby reducing profits.

Another concern facing cooperatives is the treatment of equity. Under most circumstances, equity is risk capital and usually considered permanent in IOFs. On the other hand, Cobia and Brewer claim that much of cooperative equity is temporary because cooperatives have an implied obligation to redeem it. However, the equity is not temporary. Rather, it is dynamic. Boards generally try to maintain an equity base, but those who use the cooperative and own that equity may change from year to year depending on the use of it.

From an analytical point of view, the most significant information in the equity section of the balance sheet relates to the composition of the capital accounts and to restrictions. The analyst must know how to reconstruct and to explain changes in the capital accounts, especially with cooperatives.

An analysis of restrictions imposed on the distribution of equity usually sheds light on the cooperative's freedom of action in such areas as patronage distributions and levels of working capital. Such restrictions also note the cooperative's bargaining strength and standing in the credit markets. Moreover, a careful reading of the covenants will enable the analyst to assess the potential for default.

Financial Statements

A brief review of cooperative financial statements is warranted before starting a discussion of financial analysis. Financial statements provide certain basic information that focuses on the entity as a whole and meets the common needs of external users. Three main financial statements are required from businesses—a statement of financial position (balance sheet), a statement of activities (operating statement), and a statement of cash flows.

The balance sheet states the cooperative's assets, liabilities, and members equity as of a particular date, for example, as of Dec. 31, 2001. Asset values are usu-

ally stated at historical cost (what the cooperative paid for it). However, some accounting standards prescribe using current market values for specific assets.

The stated liabilities indicate the amount owed and are stated at cost. Members' equity is the difference between assets and liabilities. The balance sheet of Farmer Cooperative is shown in table 1. Notice that cooperative equity is divided into allocated and unallocated portions. Allocated equity is owned by specific members. Unallocated equity is not earmarked for specific members and is used as a general reserve.

The operating statement (table 2) reveals a cooperative's performance during a particular period of time, such as the fiscal year ending Dec. 31, 2001. It reports revenues from sales, services, and patronage refunds received from other cooperatives. It also includes various costs, including the cost of goods sold, general and administrative expenses, interest expenses, and taxes. Some marketing cooperatives report the results of their commodity pools in the operating statement.

The Statement of Cash Flows (SCF) indicates cash receipts and cash disbursements during the accounting year. The SCF summarizes the operating, investing, and financing activities of a business enterprise during an accounting period and completes the disclosure of changes in financial position that aren't readily apparent in comparative balance sheets and income statements (table 3).

The SCF complements the financial description of a business when used in conjunction with the operating statement and balance sheet. Looking at annual "trends" of cash flows over several years enhances the analysis. The SCF presents "pure cash flow" information that sometimes is difficult to glean from the other statements.

Decisions that might not affect the long-run ability of the firm to generate a positive net income may affect the cash flow information disclosed for a particular period. The net cash flow from operations, however, shouldn't be viewed as a substitute for net income. Both the cash and accrual descriptions of events are important, and the inclusion of an SCF ensures that both will be available for the assessment of the future cash flow and income potential of the cooperative.

One additional financial statement is frequently available in the annual reports issued by cooperatives. The Statement of Changes in Members Equity (table 4) describes how various equity accounts are affected

Table 1—Farmer Cooperative's balance sheet for years ended Dec. 31, 2000 and 2001

Assets	2001	2000
	Dollars	
Current assets		
Cash and equivalents	113	7
Accounts receivable	12,092	13,511
Inventories	21,825	20,805
Other current assets	333	274
Total Current Assets	<u>34,364</u>	<u>34,596</u>
Investments		
Bank for Cooperatives	3,679	3,225
Other cooperatives	505	443
Other businesses	0	0
Other investments	0	0
Total Investments	<u>4,184</u>	<u>3,668</u>
Net plant, property and equipment	22,424	19,086
Other assets	312	301
Total Assets	<u>61,283</u>	<u>57,652</u>
Liabilities and Members Equity		
Current liabilities		
Current portion long-term debt	1,246	1,783
Seasonal notes and loans	8	9,188
Total Short-term Liabilities	<u>1,254</u>	<u>10,971</u>
Trade accounts payable	20,359	13,234
Cash payments to members	2,477	738
Patron and pool liabilities	0	0
Other current liabilities	2,001	1,054
Total Current Liabilities	<u>26,091</u>	<u>25,998</u>
Long-term Debt	10,677	9,927
Other Non-current Liabilities	0	0
Minority Interests	0	0
Members' Equity		
Allocated		
Preferred stock	288	320
Common stock	89	90
Equity certificates	22,387	19,589
Unallocated capital	1,751	1,728
Total Member Equity	<u>24,515</u>	<u>21,727</u>
Total Liabilities and Equity	<u>61,283</u>	<u>57,652</u>

Table 2—Farmer Cooperative's operating statement for years ended Dec. 31, 2001 and 2000

	2001	2000
	Dollars	
Revenues		
Marketing sales	73,513	76,700
Farm supply sales	46,710	46,053
Total Sales	120,223	122,753
Cost of sales	98,474	106,057
Gross Margin	21,749	16,695
Other operating revenues	0	0
Total Operating Revenue	21,749	16,695
Expenses:		
General and administrative	11,850	10,263
Operating	2,759	2,836
Net Operating Income	7,139	3,596
Other Revenues (expenses):		
Patronage refunds received	483	348
Interest income	162	120
Other income	31	107
Interest expense	(1,493)	(2,095)
Other expenses	0	0
Net Income, Continuing Operations	6,322	2,076
Other margin interests	0	0
Discontinued operations	0	0
Extraordinary items	0	0
Net Income Before Taxes	6,322	2,076
Taxes	8	35
Net Income to be Distributed	6,314	2,041

during the business cycle. Cooperatives generate equity from several sources, including net income, issuance of stock, and per-unit capital retains.

Financial Statement Analysis

The amount of information contained in a cooperative's financial statements is voluminous, spanning the cooperative's internal operations, its relationship with the outside world, and its relationship with its member/patrons. To be useful, this information must be organized into an understandable, coherent, and sufficiently limited set of data. Financial statement analysis can be beneficial in this respect because it highlights a firm's strengths and weaknesses.

Data from a cooperative's financial statements reveal the company's financial condition. Examining common-size statements, cash flows, and financial ratios provides management, members, and creditors a glimpse of the cooperative's strengths and weaknesses. The value of a particular ratio compared with a target range of values indicates the firm's financial health, and also identifies potential problem areas. Analysis can also indicate areas of mismanagement and potential danger.

As with all analytical methods, common-size statements, cash flow data, and financial ratios must be used in the light of other relevant facts. Also, the analyst must remember that financial statements are a "snapshot" of a firm at a particular point in the past. In a highly seasonal industry, conclusions drawn through

Table 3—Farmer Cooperative’s statement of cash flows for years ended Dec. 31, 2001, and 2000

	Adjustments to reconcile net margins to net cash flows from operating activities	
	2001	2000
Dollars		
Net Margins From Operations	6,314	2,041
Depreciation and amortization	2,759	2,836
Deferred taxes	0	0
Loss (Gain) from asset disposal	7	(74)
Loss (Gain) from investment disposal	0	0
Patronage refunds received, (non-cash)	(232)	(221)
Other cash adjustments	0	0
Other non-cash operating adjustments	0	0
Cash From Operating Activities	<u>8,848</u>	<u>4,582</u>
Cash Provided (Used) by Changes in Assets and Liabilities		
Receivables	1,419	89
Inventories	(1,022)	7,345
Other current assets	(59)	88
Accounts pay	7,124	(4,188)
Due patrons	0	0
Other current liabilities	946	81
Other assets and liabilities	0	0
Net Cash Flow Operations	<u>17,256</u>	<u>7,997</u>
Net Cash Flow Discontinued Operations	0	0
Net Cash Flow Operating Activities	<u>17,256</u>	<u>7,997</u>
Cash Flows From Investing Activities:		
Purchases property, plant, and equipment	(6,113)	(4,162)
Proceeds sale or disposal PP&E	9	76
Purchases, equity in cooperatives	(284)	(1)
Redemptions equity in cooperatives	0	11
Change in other investing activities	(9)	131
Net Cash Flow Investing Activities	<u>(6,396)</u>	<u>(3,946)</u>
Cash Flow From Financing Activities:		
Net change in short-term liabilities	0	0
Long-term bank debt		
Proceeds	40,964	47,848
(Payments)	(49,930)	(49,858)
Capital lease payments	0	0
Stock transactions		
Proceeds	3	1
(Redemptions)	(36)	(7)
Per-unit capital retains	0	0
Equity certificates issued	0	0
Equity certificates redeemed	0	0
Cash patronage refunds	(1,732)	(2,007)
Stock dividends	(22)	(28)
Other financing adjustments	0	0
Net Cash Flow From Financing Activities	<u>(10,753)</u>	<u>(4,051)</u>
Net Change Cash and Equivalents	106	0
Cash at Beginning of Year	7	7
Cash at End of Year	<u>113</u>	<u>7</u>
Supplemental Information		
Interest paid	1,697	2,056
Income taxes paid	26	(5)

Table 4—Farmer Cooperative’s statement of changes in allocated patronage refunds and capital reserve for years ended Dec. 31, 2001 and 2000

	Unallocated Equity	Allocated Equity
Dollars		
Balance - Dec. 31, 1999	1,567	19,701
Net Margins	2,041	
Net Margins Allocated to Patrons	(1,922)	1,922
Transfer	71	(71)
7% Dividend on Stock	(29)	
Patronage Distributions paid in cash		
40 percent 2000 Patronage Refund		(738)
Allocated Patronage Revolvement		(1,225)
	-----	-----
Balance - Dec. 31, 2000	1,728	19,589
Net Margins	6,314	
Net Margins Allocated to Patrons	(6,253)	6,253
Transfer	(16)	16
7% Dividend on Stock	(22)	
Patronage Distributions paid in cash		
40 percent 2000 Patronage Refund		(2,477)
Allocated Patronage Revolvement		(993)
	-----	-----
Balance - Dec. 31, 2001	1,752	22,387

ratio analysis might depend greatly on the period being analyzed. Historical comparison adds to any analysis.

Common-size Statements

When analyzing financial statements, it is helpful to determine the proportion that a single account item represents of a group or subgroup total. This works especially well for comparing various sizes of cooperatives. In a balance sheet, total assets is expressed as 100 percent. Each item in a common-size balance sheet is expressed as a percentage of the total assets. Similarly, in the income statement, total net sales is set at 100 percent and all other items are expressed as a percent - age of net sales. Tables 5 and 6 illustrate the common-size balance sheet and income statement for Farmer Cooperative.

The analysis of common-size financial statements may best be described as structural. In the analysis of the balance sheet, the structural analysis focuses on several important aspects. What is the capital structure of the cooperative? (E.g., how much of the cooperative’s assets is financed by current liabilities, long-term liabilities, and member equity?) And what is the distribution of the cooperative’s assets (current, fixed, and other)? Put another way, what is the mix of assets the cooperative uses to conduct operations?

Common-sizing can also be used within sub-groups on the financial statements. For example, it may be of interest to know both the percentage of cash to current assets as well as the percentage of cash to total assets. Knowing both provides a better understanding of the cooperative’s liquidity.

In the case of the income statement, common-size analysis is a very useful tool, perhaps more important than the analysis of the common-size balance sheet. The income statement lends itself to this form of analysis. Each item in it is related to a central quantity, that is, sales. With some exceptions, such as some administration and overhead, the level of each revenue and expense is directly related to the level of sales. Thus, it is instructive to know what proportion of the sales dollar is absorbed by the various costs and expenses incurred by the cooperative.

The use of common-size financial statements for comparing cooperative financial performance over time is valuable in focusing on changing proportions of components within a group of assets, liabilities, revenues, expenses, and other financial categories.

However, one must be careful in interpreting changes. For example, the percentage of accounts receivable to total assets could show an increasing trend. Yet, the actual dollar value of accounts receivable might be the same and the increase in the percentage is caused by a decline in total assets, e.g., because

Table 5—Farmer Cooperative's common size balance sheet for year ended Dec. 31, 2000 and 2001

Assets	2001	2000
	Percent	
Current assets		
Cash and equivalents	0.2	0.0
Accounts receivable	19.7	23.4
Inventories	35.6	36.1
Other current assets	0.5	0.5
Total Current Assets	<u>56.1</u>	<u>60.0</u>
Investments		
Bank for Cooperatives	6.0	5.6
Other cooperatives	0.8	0.8
Other businesses	0.0	0.0
Other investments	0.0	0.0
Total Investments	<u>6.8</u>	<u>6.4</u>
Net plant, property and equipment	36.6	33.1
Other assets	0.5	0.5
Total Assets	<u>100.0</u>	<u>100.0</u>
Liabilities and Members Equity		
Current liabilities		
Current portion long-term debt	2.0	3.1
Seasonal notes and loans	0.0	15.9
Total Short-term Liabilities	<u>2.0</u>	<u>19.0</u>
Trade accounts payable	33.2	23.0
Cash payments to members	4.0	1.3
Patron and pool liabilities	0.0	0.0
Other current liabilities	3.3	1.8
Total Current Liabilities	<u>42.6</u>	<u>45.1</u>
Long-term Debt	17.4	17.2
Other Non-current Liabilities	0.0	0.0
Minority Interests	0.0	0.0
Members' Equity		
Allocated		
Preferred stock	0.5	0.6
Common stock	0.1	0.2
Equity certificates	36.5	34.0
Unallocated capital	2.9	3.0
Total Member Equity	<u>40.0</u>	<u>37.7</u>
Total Liabilities and Equity	<u>100.0</u>	<u>100.0</u>

Table 6—Farmer Cooperative's common size operating statement for year's ended Dec. 31, 2001 and 2000

Assets	2001	2000
		Percent
Revenues		
Marketing sales	61.1	62.5
Farm supply sales	38.9	37.5
Total Sales	<u>100.0</u>	<u>100.0</u>
Cost of sales	81.9	86.4
Gross Margin	18.1	13.6
Other operating revenues	0.0	0.0
Total Operating Revenue	<u>18.1</u>	<u>13.6</u>
Expenses:		
General and administrative	9.9	8.4
Operating	<u>2.3</u>	<u>2.3</u>
Net Operating Income	5.9	2.9
Other Revenues (expenses):		
Patronage refunds received	0.4	0.3
Interest income	0.1	0.1
Other income	0.0	0.1
Interest expense	(1.2)	(1.7)
Other expenses	0.0	0.0
Net Income, Continuing Operations	<u>5.3</u>	<u>1.7</u>
Other margin interests	0.0	0.0
Discontinued operations	0.0	0.0
Extraordinary items	0.0	0.0
Net Income Before Taxes	<u>5.3</u>	<u>1.7</u>
Taxes	0.0	0.0
Net Income to be Distributed	<u>5.3</u>	<u>1.7</u>

of lower fixed assets or a write-off of investments. Because a proportion can change either in the absolute amount of the item or in the total of the group of which it is a part, the interpretation of a common-size statement comparison requires an examination of the actual figures and the basis on which they are computed.

Analysis of Cash Flow

While managers and financial officers know the cash flow and earnings potential for their cooperative, many potential creditors might not. Most look at the financial statements of the cooperative and pick out specific information to determine if the cooperative can repay a loan.

For example, if inventory levels uncharacteristically increase without a corresponding rise in sales, the

creditor may perceive the cooperative is in a less liquid position—unaware the cooperative is preparing for additional seasonal demand by purchasing early to gain preseason discounts in the current year. The lender perceives that the uncharacteristic increase is a sign of old inventory left over from the prior season, leading to obsolete goods and future sales losses.

In other situations, the loan officer may not have a clear understand of the concept of pooling. The creditor may see low profitability ratios and deny the loan because they do not believe the cooperative can generate enough revenue. But a cooperative operating on a pooling basis may show higher cost of goods sold because of the way margins are distributed at the end of the year.

It is imperative that the cooperative inform lenders about the nature of its business and the back-

ground behind sudden changes in financial position. If left to an inexperienced or uninformed lender, the cooperative may not receive its anticipated loan.

There are several key cash-related early warning signs of financial difficulties. In addition to looking at ratios, lenders often look at changes in various accounts over time. They want to see if there are any major changes or slow erosions taking place. In other words, is the liquidity of the cooperative going to be a problem before the loan is repaid? Bankers look for early warning signs, including: continued reliance on a line of credit, overdrafts, increases in inventory and/or receivables, patronage refunds and other payments to members greater than earnings, and a history of poor cash flow from operations. Most of these changes are evident or can be determined from the SCF.

The SCF sheds light on the effects earning activities have on cash resources and financing of the cooperative. It helps clarify the distinction between "reported net income" and "cash provided by operations"—two different concepts. Net income can be misleading because it is influenced by several estimated values (i.e., depreciation schedules, bad debt expense, and inventory valuation). Cash flow is "real cash" flowing in and out due to operations, investing, and financing activities. Consequently, cash flow should never be confused with net income.

The ability of an enterprise to consistently generate cash from operations is an important indicator of financial health. No cooperative can survive the long term without generating cash from operations. While a cooperative can inflate cash flows through both financing and investment, operations must keep the cooperative financially viable in the long run. The interpretation of cash flow from operations and related trends must be made with care and a full understanding of all circumstances.

Prosperous as well as failing entities may find themselves unable to generate cash from operations at any given time, but for different reasons. The entity caught in the prosperity squeeze of having to invest its cash in receivables and inventories to meet ever-increasing customer demand will often find that its profitability will facilitate financing by equity and debt. That same profitability should, ultimately, turn cash flow from operations into a positive figure.

The unsuccessful entity might find its cash drained by slowdowns in receivables and inventory turnovers, by operating losses, or by a combination of these factors. These conditions usually contain the seeds of further losses and cash drains that may even-

tually lead to the drying up of trade credit. In such cases, a lack of cash flow from operations has a different implication.

The next SCF category is cash flows from investing activities. Most businesses must reinvest cash in order to remain viable. The largest cash flows from investments, by far, are those in property, plant, and equipment (PP&E). For the past 5 years, PP&E purchases represented 92 percent of total cash outlays for investments of the largest 100 agricultural cooperatives. Cash flow from investing activities generally is negative, but not always. If a cooperative sells capital assets or receives significant patronage refunds, the value could be positive. However, a cooperative that resorts to selling capital assets or productive capacity to generate a positive cash flow cannot do so indefinitely.

Cash flow from financing activities varies tremendously from year to year. Most inflows and outflows are either from proceeds or from repayment of long-term debt. Between 60 and 70 percent of both cash inflows and outflows from the 100 largest agricultural cooperatives since 1987 were from these two categories. However, if the trend for the cooperative is a continuous inflow of cash from financing and the cooperative is not expanding, then a closer look is warranted. For example, if the cooperative is using external funds to purchase capital assets, it is investing in the future. On the other hand, if it is using external funds to finance operations, the cooperative could be heading toward a liquidity crisis.

After looking at all those sources of cash—operations, investment, and financing—a creditor can get an idea of where the cooperative is heading financially. Table 7 illustrates some general guidelines on where to focus the analysis. An analyst should look at the trends and the magnitude of change over the years and not just a single year of information.

Above all, the SCF must be approached with care. The analyst must understand the concept of cash flow and other non-cash expenses in relation to net income. If not, the analyst may be trapped by the numerous clichés and useless generalizations, which are all too often employed even by those who should know better.

Ratio Analysis

Ratios are the most widely used tools for financial analysis. Yet, their function is often misunderstood, and, consequently, their significance may easily be overrated.

A ratio expresses the mathematical relationship between two quantities. The ratio of 200 to 100 is

Table 7—Cash flow analysis

	Scenario							
	1	2	3	4	5	6	7	8
Cash From Operation	+	-	+	+	-	-	+	-
Cash From Investment	+	+	-	+	-	+	-	-
Cash From Financing	+	+	+	-	+	-	-	-

(+) increase in cash flow
 (-) decrease in cash flow

Scenario

1. The cooperative is using cash flow from all three areas (operations, investments, and financing) to build up cash reserves. The cooperative may be looking for acquisition. This position is not stable in the long run.
2. The cooperative is subsidizing its operations through debt/equity and selling off parts of its investments. This situation is not stable in the long run.
3. The cooperative is expanding its operation, using the positive cash flows from operations and financing to expand its capital base. This scenario is stable.
4. The cooperative is selling off its assets and using the cash from operations to pay off member equity/debt. However, the cooperative can not keep selling off its investments and survive in the long run. This is a stable scenario in the short run.
5. The cooperative could be expanding operations because of increased business or business could be in a downturn. Either way, it is not a stable long-term position. This scenario is indeterminate.
6. The business is contracting and the cooperative is selling off its investments to fund operations and retire its equity/debt. This situation is not stable.
7. The cash flows from operations are funding capital expansion and debt/equity retirement. This scenario shows very strong operations and is stable.
8. The cooperative is drawing down its cash reserves and may face liquidity problems in the near future. This situation is not stable.

expressed as 2:1 or 2. While the computation of a ratio involves a simple arithmetical operation, its interpretation is far more complex.

The ratio must express a relevant relationship. For example, there is a clear, direct, and understandable relationship between the sales price of an item and its cost. On the other hand, there is no real relationship between salaries and investments in other cooperatives.

Ratios are analysis tools that provide clues to help identify symptoms of underlying conditions. Analysts, depending on their needs, may differ in the ratios they find useful when examining a cooperative's financial position. Short-term creditors are primarily interested in the cooperative's current performance and its holdings of liquid assets that can provide a ready source of cash to meet current cash requirements. These assets include cash, marketable securities, accounts receivable, inventory, and other assets which can be sold for cash or can become cash through

the normal course of a business cycle. Long-term creditors and member/owners, on the other hand, are concerned with both the long-term and short-term outlook. Management will also find ratios useful in measuring its own performance.

As a final note of caution, the analysis of ratios is useful only when all influencing factors are interpreted skillfully and intelligently. This is, by far, the most difficult aspect of ratio analysis. Look at a simple example relating to a non-financial problem. In comparing the ratio of gas consumption to mileage driven, driver A claims to be more efficient than driver B (i.e., A gets 30 mpg and B only gets 20 mpg). Assuming that both drive the same car, it would appear that driver A is more efficient. However, other facts should be considered:

- weight of the load carried,
- type of terrain (flat versus hilly),
- city or highway driving, and
- speed at which the car was driven.

All of these driving factors influence gasoline efficiency. In financial analysis, the same premise holds. The ratios should be used as a tool to help find strengths and weaknesses but, other factors should also be considered.

Standard Financial Ratios—Four categories of ratios are typically used in analyzing financial position:

- Liquidity
- Leverage
- Activity
- Profitability

Liquidity ratios measure the ability to fulfill short-term commitments with liquid assets. Such ratios are of particular interest to the cooperative's short-term creditors. These ratios compare assets that can be converted to cash quickly to fund maturing short-term obligations. The current ratio and the quick ratio are the two most commonly used measures of liquidity. For most cooperatives, these two ratios provide a good indication of liquidity. However, these ratios do not address the quality of liquid assets.

Leverage ratios measure the extent of the firm's "total debt" burden. They reflect the cooperative's ability to meet both short- and long-term debt obligations. The ratios are computed either by comparing earnings from the income statement to interest payments or by relating the debt and equity items from the balance sheet. Creditors value these ratios because they measure the capacity of the cooperative's revenues to support interest and other fixed charges, and indicate if the capital base is sufficient to pay off the debt in the event of liquidation.

In terms of debt load, the more predictable the returns of the firm, the more debt will be acceptable, because the firm will be less likely to be surprised by circumstances that prevent fulfilling debt obligations. For example, utilities (i.e., rural electric cooperatives) have historically had relatively stable incomes, but are also among the industries with the heaviest debt structure. By contrast, fruit and vegetable cooperatives are in a cyclical business, where income is greatly influenced by weather conditions, and they normally carry a far lower proportion of debt in their capital structure.

Activity ratios show the intensity with which the firm uses assets in generating sales. These ratios indicate whether the firm's investment in current and long-term assets is too large, too small, or just right. If too large, funds may be tied up in assets that could be

used more productively. If too small, the firm may be providing poor service to customers or inefficiently producing products.

There are two basic approaches to the computation of activity ratios. The first looks at the average performance of the firm over the year. The second uses year-end balances in the calculations.

The first method is preferred if asset balances fluctuate significantly during the year. For example, inventory levels for most fruit and vegetable cooperatives vary significantly, depending on the time of the season. If the fiscal year ends before the harvest, when inventories are low, calculations using year-end balances will be biased and the resulting ratios will be of little value for comparing between different cooperatives. The second method is the most commonly used approach because in practice, data limitations often force outside analysts to use year-end data.

Profitability ratios measure the success of the firm in earning a net return on its operations. Profit is an important objective of a cooperative, so poor performance indicates a basic failure that, if not corrected, would probably result in the firm going out of business. Cooperatives must operate profitably, although their definition of profitable might differ from an IOF's. Hence, appropriate profitability ratios pose the biggest challenge for analyzing cooperatives.

Patronage refund policies have a dramatic effect on cooperative profitability ratio analysis. Some cooperatives return patronage at the end of the operating year and show significant profits on the closing statements. Other cooperatives have different operational policies and may show little end-of-the-year profits. Lending institutions not familiar with these businesses may shy away from cooperatives with low reported net income. This will be especially true for pooling cooperatives that generally report a minimum amount of income at year-end.

Common ratios used to analyze the four areas of financial performance can be found in most basic financial textbooks and were developed to analyze a wide variety of businesses. Most of these ratios are applicable to the cooperative form of business, while others should be viewed with some reservation.

Interdependence of Ratios—Ratios must be evaluated together, not independently. A firm may have low liquidity ratios, but more than adequate leverage, interest coverage, and profitability ratios. This firm would be in a good position to obtain additional long-term funds, and in the process, pay down short-term debt or purchase liquid assets. This

firm would improve its liquidity ratios while maintaining adequate levels of the remaining performance measures.

The net operating margin (net margin/sales) will be used to further illustrate the interdependence between ratios. Knowing the value of the net operating margin without knowing the level of sales is not too helpful. The net operating ratio may be lower than the industry average, but this might be because the firm has cut margins to increase total sales. The result may be that the firm's return on assets is extremely high for the industry, if the firm's increased sales are sufficient to compensate for the lower return per dollar of sales. Consider this example:

$$\frac{\text{Net margins}}{\text{Total assets}} = \frac{\text{Net margins}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total assets}}$$

In this example, if the net operating margin is low and the assets turnover ratio (sales/assets) is high, return on total assets may be high. Consequently, a low operating margin due to a price cut policy that increases sales may prove to be a very profitable situation.

Similarly, the net operating margin may be high but the return on total assets may be poor. This occurs when the firm has excess operating capacity and consequently a high level of non-performing fixed assets. However, more information is needed to understand whether or not this is a good situation for the cooperative. For example, this may be the case where the firm's business is contracting and could benefit by selling off unused facilities or by using the remaining fixed assets more efficiently. On the other hand, the firm may experience a tremendous increase in sales and is expanding its production facilities beyond their current needs, expecting to grow into the facilities in the future.

Trends over time—Historical information can be very beneficial when analyzing financial performance. When analysis reveals certain weaknesses in a cooperative's financial health, the initial management reaction may be to take immediate action to correct the situation. However, if historical trend analysis indicates the situation is improving, the best remedy may be to monitor performance for continued improvement—in other words, don't overreact.

Historical trends are important for other reasons as well. During the life of the firm, pricing, credit policy, production methodology, and other areas under

managerial control can change. Each change has an effect on the firm's performance. Ratios analyzing these changes provide feedback to management. A thorough analysis of the performance ratios regarding managerial policies in effect at each period of time may guide future policy decisions.

Another reason to look at historical performance of a cooperative is to avoid the difficulties encountered when comparing two similar cooperatives. Although comparisons should be between like firms, generally, no two firms are exactly the same.

While two farm supply cooperatives may be of similar size, one may sell mostly bulk feed with lower margins, while the other sells more agronomy products, which typically carry higher margins. Also, boards may vary on their philosophy on the ideal capital structure. One cooperative may be debt-free but the another cooperative board might feel that returns from leveraging the cooperative outweigh the risk of acquiring the debt.

Ratios for Cooperatives

There are some inherent problems associated with some common ratios used in cooperative financial analysis. Some problems are intrinsic with the ratios themselves and some are with the cooperative structure. For instance, the current ratio is used to analyze liquidity. It provides a good benchmark for determining whether a cooperative has liquid assets to cover current payments. However, interpreting these ratios beyond the conclusion that it represents current resources over current obligations at a given point in time requires a more in-depth look at the trends of the individual parts that make up the ratio. A current ratio doesn't show the quality of the liquid assets which can greatly affect the "true" liquidity.

Profitability ratios can also be deceiving. As mentioned earlier, cooperatives are generally not profit motivated. They are more concerned toward serving member-owners. Therefore, low profit ratios can be misleading to the analyst, especially with some pooling cooperatives.

This next section looks at limitations and tries to remedy the shortcomings of common ratios. Along with each ratio, a table illustrates the values from the database of the largest agricultural cooperatives. These values are presented to show an order of magnitude. The average values and the high and low corresponding to the 95 percentile are included in the table. These

ratio values might not relate to the optimal value for efficient operations, but have value for comparison purposes.

Data

The ratios were developed from financial data taken from 113 cooperatives across an 18-year period—1980-97. When two or more cooperatives merged, no attempt was made to estimate the financial statements as if they had merged prior to the point of merger. Once a cooperative ceased to exist, either through merger or through cessation of operations, it was no longer included in the database. A ratio for each cooperative was computed from 18 years of data. If the cooperative was less than 18 years old, the total number of years the cooperative was in service was used. These values were then averaged.

Conversion Period of Inventories

Creditors must be concerned not only with the current liquidity position of the firm, but also with its overall financial position. The current or quick ratios alone do not tell the whole story. A firm with adequate liquidity ratios might be a greater threat to short-term creditors if its liquidity is tied up in uncollectible accounts receivable or outdated inventory. However, this does not imply that liquidity ratios are irrelevant. On the contrary, a higher liquidity ratio is generally preferred.

A look at the quality of the current assets indicates how well the cooperative can meet current obligations. The average cooperative has more than 75 percent of current assets tied up in inventories and accounts receivable, so the asset quality warrants closer examination. One way to examine the liquidity of accounts receivables and inventories is to calculate the conversion period of inventories.

Although not a cooperative-specific ratio, the conversion period of inventories is used to analyze the quality of the least liquid current assets—inventory and accounts receivable. The value represents the average number of days it takes to convert inventories into cash. The ratio is calculated in three steps. Each step is important on its own.

The first step is to determine the number of days it takes to sell inventory. This is calculated by dividing the average inventory by the cost of goods sold multiplied by 360 days or 360 days divided by the inventory

$$\text{Days to sell inventory} = \frac{\text{Average Inventory}}{\text{Cost of goods sold}} * 360 \text{ days}$$

Table 8—Days to sell inventory

	95 Percent Confidence Interval		
	Average	High	Low
All	49	57	40
Cotton	63	98	27
Dairy	19	26	11
Diversified	44	49	39
Farm Supply	41	52	30
Fruit/Vegetable	105	136	74
Grain	46	55	37
Poultry/Livestock	4	8	0
Rice	90	134	45
Sugar	58	78	38

turnover ratio. This ratio provides insight into how many days the average inventory sits on the shelf or in storage. Usually a lower value is better (Table 8).

The use of average monthly inventory is preferable to taking the beginning and ending inventory divided by two. Many cooperatives end their fiscal year when inventory levels are at their seasonal low. This will suppress the value. Due to limited information, these values are calculated by taking the beginning and ending inventory levels divided by two.

However, 360 days is an arbitrary number. Most businesses have fewer than 360 working days. But, using a standardized number allows comparisons between different time periods and cooperatives.

If all sales are cash, this procedure gives the number of days to convert inventory to cash. However, two more steps are needed if there are credit sales—calculate the days in accounts receivable and add that value to days in inventory. To calculate this ratio, use the average accounts receivable divided by the total credit sales for the year multiplied by 360 days. As with the days to sell inventory, the days in accounts receivable is 360 days divided by accounts receivable turnover (Table 9).

In the third step, the conversion period is calculated by adding the days to sell inventory and days in accounts receivable. Although using credit sales to determine days in accounts receivable is more accurate, total sales works without more detailed informa-

$$\text{Days in accounts receivable} = \left(\frac{\text{Average accounts receivable}}{\text{Credit sales}} \right) * 360 \text{ days}$$

Table 9-Days in accounts receivable

	95 Percent Confidence Interval		
	Average	High	Low
All	27	30	24
Cotton	17	20	14
Dairy	26	28	23
Diversified	42	66	17
Farm Supply	30	36	23
Fruit/Vegetable	36	48	24
Grain	20	24	17
Poultry/Livestock	22	40	4
Rice	32	39	24
Sugar	25	31	19

tion. If a distinction between credit and cash sales can be made, the following weighted average formula should be used:

This value should help management and creditors gauge liquidity of the cooperative's inventory and accounts receivable. If the cooperative has a substantial percentage of current assets tied up in these two accounts, then a high ratio number implies the cooperative's current position might not be very liquid (Table 10).

Percent Cash Sales * Days to Sell Inventory

+Percent Credit Sales * (Days to Sell Inventory +Days in Accounts Receivable)

Conversion Period of Inventories

Table 10-Conversion period of inventories

	95 Percent Confidence Interval		
	Average	High	Low
All	75	84	67
Cotton	80	116	44
Dairy	44	52	37
Diversified	86	114	57
Farm Supply	71	84	58
Fruit/Vegetable	141	169	113
Grain	66	75	58
Poultry/Livestock	26	45	7
Rice	121	165	78
Sugar	83	99	68

Payout Ratio

This ratio measures the proportion of current and past earnings returned to members during the year, looking only at total cash disbursements. The numerator consists of all cash payments to members. This is important because the equity portion of cooperatives is not static. This ratio examines the equity revolvment and dividend policy.

A value of less than 1 indicates the cooperative is growing its equity position or not revolving member equity, while a value of greater than 1 implies a shrinking of its equity base. While this ratio is important to all creditors, those with a long-term stake should look at the trend during the past few years to see if the cooperative's at-risk capital is being maintained (Table 11).

$$\text{Payout Ratio} = \frac{\text{Cash patronage dividends + other dividends + revolving equity redeemed}}{\text{Net margins}}$$

Table 11-Payout ratio

	95 Percent Confidence Interval		
	Average	High	Low
All	0.59	0.66	0.51
Cotton	0.85	0.99	0.71
Dairy	0.72	0.84	0.60
Diversified	0.23	0.44	0.01
Farm Supply	0.46	0.61	0.32
Fruit/Vegetable	0.66	0.88	0.44
Grain	0.42	0.52	0.31
Poultry/Livestock	0.47	0.62	0.31
Rice	0.61	0.90	0.33
Sugar	0.63	1.00	0.25

Capitalization Growth Rate

The payout ratio can further determine the capitalization growth rate of the cooperative. In other words, creditors and members may want to forecast the growth of the cooperative's at-risk capital base. This will show whether the cooperative can continue revolving member equity and still maintain the equity base to ensure enough capital to satisfy creditors.

However, care must be used when interpreting the growth rate. The analyst must look at the rate over time to smooth out the boom/bust years (Table 12).

$$\text{Capitalization growth rate} = (1 - \text{Payout Ratio}) * \text{Return on Equity}$$

Table 12—Capitalization growth rate

	95 Percent Confidence Interval		
	Average	High	Low
All	.06	.07	.05
Cotton	.05	.08	.03
Dairy	.04	.08	.01
Diversified	.07	.13	.00
Farm Supply	.08	.11	.05
Fruit/Vegetable	.05	.08	.01
Grain	.08	.10	.06
Poultry/Livestock	.07	.11	.03
Rice	.02	.04	.00
Sugar	.02	.04	.01

Profit Index

The profit index looks at pricing policy and inventory control. Although generally associated with retail sales, it can be used for marketing cooperatives. However, some marketing cooperatives show higher values due to value-added activities and timing of inventory recording. A few of the largest cooperatives have been using this ratio for some time in analyzing their inventory control and pricing policy.

The ratio is calculated by taking the gross margin percent times inventory turnover. If a cooperative maintains its inventory and margins so that the profit index is close to 1, the cooperative will likely be profitable. If the cooperative has certain inventory items that have a high turnover (e.g., feed), the profit margin will not need to be high. High volume and low margins should generate enough revenues to cover overhead expenses. However, if the cooperative has items that don't have a high sales volume (e.g., tractors), a higher margin will be needed to compensate for the low turnover (Table 13).

$$\text{Profit index} = \frac{(\text{Sales} - \text{cost of goods sold})}{\text{Sales}} * \frac{\text{Sales}}{\text{Average inventory}}$$

Table 13—Profit index

	95 Percent Confidence Interval		
	Average	High	Low
All	2.83	4.10	1.57
Cotton	2.31	4.72	(0.09)
Dairy	4.59	7.00	2.18
Diversified	0.96	1.24	0.69
Farm Supply	1.17	1.46	0.88
Fruit/Vegetable	4.54	10.41	(1.32)
Grain	0.93	1.21	0.65
Poultry/Livestock	3.52	5.26	1.79
Rice	1.77	1.96	1.57
Sugar	2.14	2.92	1.37

Local Return on Local Assets

One area in which cooperatives can get themselves into trouble is relying on patronage refunds from other cooperatives to balance revenue against expenses. For perspective, nine of the largest cooperatives in this database would have reported a net loss without patronage refunds from other cooperatives in 1997. Because this income source relies on the operations from an outside business, it does not reflect the operations of the cooperative being analyzed. Therefore, excluding this source of income will provide a more accurate analysis of the cooperative's operation.

Similarly, investment in other cooperatives should not be included in the asset base when looking at return on assets. The equity investment in other cooperatives represents business conducted with them. The investment is made at face value and later redeemed at face value. There is no secondary market for cooperative stock, and most cooperative stock is non-transferable. Therefore, as an asset, it is considered a non-performing asset and should not be included within the calculation of the return on assets.

Local return on local assets is calculated by taking net income before income taxes and interest less patronage refunds received divided by total assets less investments in other cooperatives. This ratio provides a better indication of the cooperative's operation and its ability to generate revenues (Table 14).

$$\text{Local return on local assets} = \frac{\text{Net income before interest and income taxes} - \text{patronage refunds}}{\text{Total assets} - \text{investments in other cooperatives}}$$

Table 14—Local return on local assets

	95 Percent Confidence Interval		
	Average	High	Low
All	.05	.06	.04
Cotton	.11	.15	.06
Dairy	.07	.09	.05
Diversified	.03	.05	.02
Farm Supply	.06	.09	.03
Fruit/Vegetable	.03	.04	.02
Grain	.03	.05	.02
Poultry/Livestock	.06	.13	(.02)
Rice	.04	.05	.03
Sugar	.03	.05	.01

Table 15—Earnings variability

	95 Percent Confidence Interval		
	Average	High	Low
All	1.41	1.79	1.03
Cotton	0.81	1.27	0.34
Dairy	0.93	1.31	0.55
Diversified	1.49	2.33	0.65
Farm Supply	2.50	3.93	1.07
Fruit/Vegetable	2.54	3.76	1.32
Grain	0.59	1.37	(0.19)
Poultry/Livestock	1.08	2.06	0.10
Rice	1.00	1.01	0.99
Sugar	1.47	2.24	0.70

Earnings Variability

Lenders are concerned with large debt burdens only if the future earnings of the cooperative are uncertain. While future earnings are unpredictable, a look at the past can give a clue to the risk associated with the cooperative's business. A statistician defines "risk" as the variation about the mean, or expected return. A creditor defines "risk" as the probability of having to take an unacceptable loss. However, these two definitions are closely related. Both try to define how much the actual return differs from the expected.

A creditor might want to look at the variability over time of the cooperative's earnings to see if it is credit worthy. The income variability ratio examines how much income varies from year to year compared to the period-average income. It is calculated by taking the standard deviation of the year-to-year change in local earnings before interest and income taxes from several years divided by the average level of local earnings over the entire period analyzed. This provides a good proxy for earning variability (Table 15).

$$\text{Earnings Variability} = \frac{\text{Standard deviation (local earnings}_t - \text{local earnings}_{t-1})}{\text{Average local earnings}}$$

Local earnings are more appropriate and focus on the operations of the cooperative and don't rely on patronage received from other cooperatives.

While there is no set rule of thumb for an income variability value, a value between 0 and 1 indicates fairly stable income. A negative number will indicate that the cooperative, on average, has a negative income. A number greater than 2 usually means that

the cooperative will have a large variance in its net margins. This ratio works well for pooling cooperatives that report minimal net income because it doesn't rely on the magnitude of the earnings. While this ratio gives the variability of a cooperative's income, it doesn't illustrate the quality of that income.

Income Quality Ratio

Both the variability and quality of a cooperative's earnings are important. The ratio of cash flow from operations to net income provides some insight into the quality of earnings. The cash flow from operations has a financing rather than a profit-measurement focus and is well suited in evaluating short-term liquidity and long-term solvency. Cash flow from operations represents cash in the bank that can be used to pay off the loan. Reported net income often has estimated values placed on various revenues and expenses that can distort the amount of funds available. A cooperative can report a positive net income and yet not have funds to pay off its creditors.

The higher this ratio, the higher the quality of the reported net income. For example, if the cooperative is selling more products because of a relaxed credit policy, accounts receivable might be higher and less collectible. Therefore, the increase in accounts receivable will cause the cash flow from operations to fall relative to net income, thereby lowering the income quality ratio (Table 16).

$$\text{Income quality ratio} = \frac{\text{Cash flow from operation}}{\text{Net income}}$$

Table 16—Income quality

	95 Percent Confidence Interval		
	Average	High	Low
All	0.77	1.00	0.53
Cotton	0.33	1.14	(0.48)
Dairy	0.82	1.01	0.64
Diversified	0.81	1.08	0.54
Farm Supply	0.58	0.80	0.36
Fruit/Vegetable	1.58	2.73	0.43
Grain	0.35	0.58	0.13
Poultry/Livestock	(0.00)	0.89	(0.90)
Rice	0.75	0.90	0.60
Sugar	0.88	0.92	0.84

Table 17—Cash interest coverage

	95 Percent Confidence Interval		
	Average	High	Low
All	3.02	3.93	2.12
Cotton	4.18	10.05	(1.70)
Dairy	6.80	9.28	4.32
Diversified	1.97	3.34	0.59
Farm supply	1.98	3.42	0.55
Fruit/Vegetable	1.69	3.02	0.36
Grain	1.42	2.72	0.11
Poultry/livestock	0.30	2.70	(2.09)
Rice	1.69	2.43	0.96
Sugar	1.83	2.10	1.56

Cash Interest Coverage Ratio

“Cold hard cash” is critical to the successful operation of any business. Fixed charges are paid with cash. Net margins taken from the statement of operations might not provide a reliable measure of cash available to meet these fixed-debt charges. Net margins contains many items that do not generate cash as well as expense items that do not require the current use of cash.

Therefore, an alternative measure is to use the pretax cash flow from operations. The cash interest coverage ratio is similar to the interest coverage ratio. However, non-cash expenses are added back and non-cash revenues are deducted from net margins. When these net margins are adjusted for non-cash items, the result is cash generated from operations. This value is included in the cash flow statement as cash flow from operations (Table 17).

$$\text{Cash interest coverage ratio} = \frac{\text{Cash flow operations} + \text{Income tax} + \text{Interest expense}}{\text{Interest expense}}$$

Conclusion

Financial reports contain a lot of information. The main objective of financial analysis is to sort through that information to find useful and relevant data in analyzing a business. Literature is rich with financial analysis tools that examine the performance and strength of businesses. However, not all businesses are alike. Differences between IOFs and cooperatives mean that some standard financial analyses do not relate well with cooperatives. This is especially relevant for profit-oriented ratios. This report provides a supplement to standard analysis with an eye toward cooperatives. Some ratios help analyze the cooperative’s financial performance and cash flow analysis. Managers and creditors should find these findings helpful in appraising the financial strength of the cooperative. While there is no set standard at this time, using these analysis tools should help the cooperative develop its own performance measurements.

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