

Cooperative Earns, Turns, and Leverage: The DuPont Profitability Model

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For cooperative managers and directors, it is imperative to have a firm grasp on the financial position of their cooperative. Success often hinges on decisions that ensure and enhance the long term profitability of the cooperative. Making an informed decision typically requires a working knowledge of how to analyze financial statements, which can be cumbersome and at times confusing. Fortunately, this does not have to be the case! In this ACCC Fact Sheet, a straightforward profitability model is presented and applied to a set of data that will help cooperative managers and directors understand the financial position of their cooperative during periods of financial stress and prosperity.

The DuPont Profitability Model is a quick, efficient way to measure a firm's operating and financial performance. In the 1920s, the company DuPont, developed a model to better understand the financial condition of their business. While developed by DuPont, the model is flexible enough to be applied to any business because it uses standard numbers from the income statement and balance sheet. In fact, many Fortune 500 companies use this model in their company-wide analysis. In this fact sheet, the DuPont Model is applied to CoBank data for Kansas grain and farm supply cooperatives. The results clearly show how margins or "Earnings," efficient use of assets or "Turns," the "Spread" above cost of debt, and the debt capital structure or "Leverage" impacts the cooperative's return on equity.

The DuPont Profitability Model

The DuPont Model provides managers and boards of directors' insights into the financial condition of a cooperative. Using this model should assist every cooperative leaders' ability to make sound and informed financial decisions that enhance return on equity. Furthermore, the DuPont Model is straightforward because it puts the focus on evaluating (1) operating performance through profit margins and efficient use of assets; and (2) financial performance through the cost of debt and leverage. In this section, the DuPont Model is discussed.

The DuPont Model focuses on and decomposes return on equity (ROE). A cooperative's ROE is an important financial performance measure because it reflects how well the cooperative is using members' equity. Calculating ROE is done by simply dividing net income by total equity. However, by expanding on this ratio, the DuPont model breaks down ROE into four key

components of Earnings, Turns, Spread above Cost of Debt, and Leverage. These components can be shown as follows:

$$ROE = \text{Earnings} * \text{Turns} + [(\text{Spread Above Cost of Debt}) * \text{Leverage}]$$

The first two components of ROE, Earnings and Turns, reflect the cooperative's operating performance before interest expense. "Earnings" represents the margins earned on each dollar of revenue. "Turns" reflect how much revenue are generated by each asset. When Earnings is multiplied by Turns, the result is return on assets (ROA), the measure of operating performance in the DuPont Model. ROA can be calculated as follows:

$$\text{Return on Assets (ROA)} = \underbrace{\frac{(\text{Net Income} + \text{Interest Expense})}{\text{Total Revenue}}}_{\text{Earnings}} * \underbrace{\frac{\text{Total Revenue}}{\text{Total Assets}}}_{\text{Turns}}$$

The last two components, spread above cost of debt and leverage, account for interest expense and are the measures of the cooperative's financial performance. Spread above cost of debt shows if the cooperative is getting enough return on their assets to exceed the co-op's average cost of debt. As shown below, "Spread Above Cost of Debt" is calculated by subtracting ROA from the ratio of interest expense divided by total liabilities. Dividing interest expense by total liabilities effectively calculates the average cost of debt or COD for the co-op. A positive spread indicates debt is being used efficiently while a negative spread indicates debt costs are likely too high. Finally, leverage illustrates capital structure and is calculated by dividing total liabilities by total equity. Multiplying spread by leverage and adding ROA yields ROE as follows:

$$ROE = ROA + \left[\underbrace{\left(ROA - \frac{\text{Interest Expense}}{\text{Total Liabilities}} \right)}_{\text{Spread Above Cost of Debt}} * \underbrace{\frac{\text{Total Liabilities}}{\text{Total Equity}}}_{\text{Leverage}} \right]$$

Applying the DuPont Model to Kansas Grain and Farm Supply Cooperatives

To better understand the DuPont Model, the model is applied to and calculated for Kansas grain and farm supply cooperatives using the CoBank RiskAnalyst data. The data contains the necessary financial statement information to calculate the DuPont Model for fifty-five Kansas co-ops. To maintain confidentiality, all reported financial ratios below represent the average for all co-ops in the data set. Results are shown via graphs to better illustrate how the DuPont Model can be applied to your cooperative.

The results can also be used as financial benchmarks during times of stress and prosperity. Managers and directors can compare their own cooperative's operating and financial performance relative to the average Kansas grain and farm supply cooperative reported below. The data span from 1996 to 2014, which encompasses two distinct periods for co-ops that can serve as additional benchmarks during times of financial stress and of financial prosperity. From 1999 to 2003, co-ops experienced a great deal of financial stress due in part to the bankruptcy of Farmland Industries, Inc. From 2009 to 2013, co-ops experienced a financial boom along with the rest of the agricultural industry, which was led by rising ethanol demand and surging exports.

Operating performance is represented by return on assets or ROA, but its components, profit margins or "Earnings" and asset turnover or "Turns", really show what drives ROA. Figure 1 illustrates this relationship for Kansas grain and farm supply cooperatives. In general, ROA will rise and fall along with Earnings and Turns.

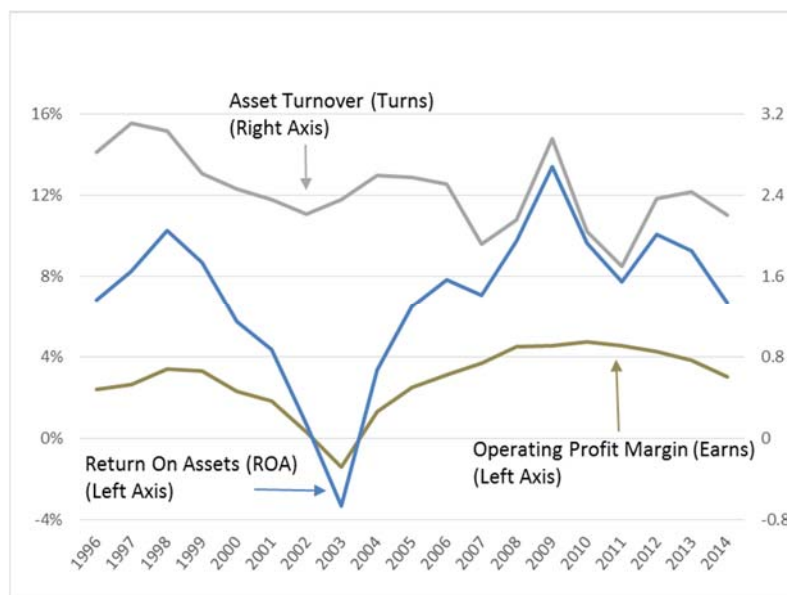


Figure 1. Operating Performance of Kansas Grain and Farm Supply Cooperatives from 1996 to 2014

During periods of financial stress, the operating performance of Kansas grain and farm supply cooperatives rapidly deteriorated. From 1999 to 2003, the average ROA plunged from 10 percent to -3 percent. Some reasons why Earns collapsed into negative territory are because operating costs surged, commodity prices dropped, and the Farmland Industries, Inc. bankruptcy added to the strain on many Kansas co-ops' operating performance. As a result, margins eroded and the average Kansas co-op's ROA collapsed.

Since 2003, ROA has sharply rebounded back into positive territory. In fact, this rebound is more dramatic than the fall because the rise from -3 percent in 2003 to 13 percent in 2009 eclipsed the previous high in 1998. ROA's significant improvement is because margins became positive and asset utilization or Turns greatly improved. In 2009, total sales for Kansas farmer cooperatives shot up as commodity, energy, and input prices spiked, which greatly improved Turns and ROA.

The key takeaways on managing and evaluating operating performance for directors and managers are to focus on maintaining adequate margins and the efficient use of assets. Positive and sustained margins are critical to a cooperative's financial success. Whether margins are

managed through finding new sources of revenue or controlling costs, maintaining adequate margins is vitally important for a co-op.

Secondly, efficient use of assets is critical for success. During periods of stress as well as prosperity, ensuring assets are being utilized in a manner that improves operating performance is key. Doing so will bolster a cooperative's ROA and provide benefits back to members through more efficient asset use that enhances speed, space, and service of the cooperative.

Financial performance is next in the DuPont Model analysis, which focuses on the co-op generating enough returns to cover interest costs and ROE. The first step is to calculate a co-op's spread above cost of debt or the difference between ROA and average cost of debt (COD). When the spread is positive, ROA is greater than COD so returns within the cooperative are more than enough to cover interest costs. But if spread is negative, interest costs are too high relative to ROA. Figure 2 below plots ROA, COD, and spread for Kansas grain and farm supply cooperatives.

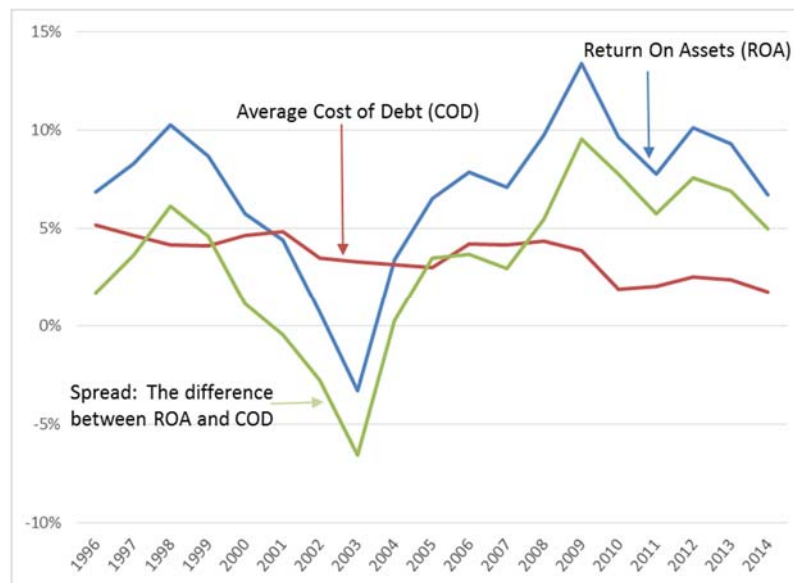


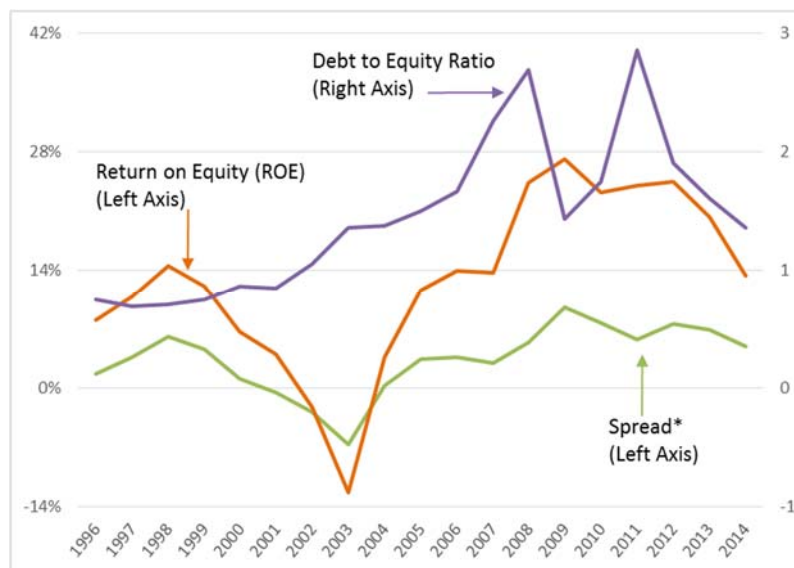
Figure 2. The Spread Between ROA and Average Cost of Debt for Kansas Grain and Farm Supply Cooperative from 1996 to 2014

While the average co-op's spread is typically positive, a negative spread is possible, especially during periods of stress. As shown in figure 2, the challenges of the early 2000s pushed the spread below zero. An interesting observation to point out is that the fall into negative territory was primarily driven by ROA collapsing, not a steep rise in the COD.

In fact, the average interest costs for Kansas co-ops does not fluctuate much over time. From 1996 to 2014, the COD held at a fairly constant 4.5 percent. Even when the Federal Reserve dropped interest rates to record lows in 2008, Kansas co-ops' COD decreased, but it did not drop drastically. As a result, the spread above cost of debt is not affected much by interest rate movements.

The key takeaway for directors and managers from figure 2 is the importance to first have discussions on improving operating performance (ROA) before addressing the need to reduce interest costs (COD). The reason for focusing on ROA or improving Earnings or Turns is because the COD does not fluctuate much within cooperatives. As a result, co-op leaders should identify ways to bolster ROA or operating performance before lowering interest costs.

The final piece of assessing the DuPont Model for Kansas grain and farm supply cooperatives is to consider leverage and the return on equity (ROE). Figure 3 shows how the efficient use of debt and leverage drive a cooperative's return on equity (ROE). Ultimately, ROE is the best measure of financial performance within the DuPont Model because it indicates how well the members' equity is being used to generate returns for the cooperative.



*Spread is equal to the difference between return on assets (ROA) and the average cost of debt (COD).

Figure 3. Financial Performance of Kansas Farmer Cooperative from 1996 to 2014

A key linkage between these components is that the sign of the spread variable determines whether or not ROE is negative or positive. When spread turned negative in the early 2000s, due in part to elevated costs and low commodity prices, the average ROE for a Kansas farmer cooperative fell below -10 percent. However, when debt is being used effectively and the spread is positive, the ROE will remain in positive territory.

Finally, the cooperative's leverage position amplifies how high ROE can climb or how low ROE can fall. Recall that financial performance is largely shaped by multiplying spread and the total liabilities-to-equity ratio or leverage ratio. So, when spread is positive, debt is being used efficiently, and a higher leverage ratio can push up the ROE well above ROA. For example, in the late 2000s, the average Kansas farmer cooperative had a positive spread and a sizable ROE. In 2009, the average Kansas farmer cooperative's ROE nearly reached 28 percent while the average ROA remained below 15 percent. Why is ROE nearly two times as high as the ROA? Debt is being used effectively by the cooperative.

However, if the spread is negative, adding more debt to boost ROE can be a very risky venture and even catastrophic for a grain and farm supply cooperative. For example, in 2003, the average Kansas co-op's ROE plummeted to -12 percent. The fall of ROE is especially eye

opening because the ROE is well below the average ROA of -3 percent. The reason this occurred is because the spread fell into negative territory. Taken together, financial performance of Kansas grain and farm supply cooperatives suffered significantly.

Conclusion

It is crucial for managers and directors to have a firm understanding of their cooperative's financial position when making decisions to maximize return on equity. In this ACCC Fact Sheet, the DuPont Profitability Model is presented as a straightforward method to assess a cooperative's operating and financial performance over time. In addition, the presented average financial ratios for Kansas grain and farm supply cooperatives can be used as two sets of benchmarks within your co-op for a period of financial stress and for a period prosperity.

While all aspects of the DuPont Model are important for co-ops, it appears that maintaining adequate margins is arguably the most important. During periods of financial stress, margins tend to fall considerably. When that happens, return on assets falls rapidly to a point when the average interest costs are too high. If this situation persists, debt is not being used efficiently and the return on equity within the cooperative suffers greatly. In this analysis, it appears that focusing on adequate margins is imperative for a cooperative's financial success.

If you are interested in applying the DuPont Profitability Model to your cooperative, please download the Excel spreadsheet at: https://accc.ksu.edu/research/fact_sheet_series.html. In addition, if you would like to discuss how to input your financial statement information into the spreadsheet, please contact Dr. Brian Briggeman at 785-532-2573 or at bbrigg@ksu.edu.