

USING THE DU PONT MODEL TO ANALYZE YOUR OPERATION

by Todd A. Doehring, tdoehring@centrec.com

Abstract

Understanding the profitability of any business is vital for management decision-making and monitoring. This article explores the interaction of two financial ratios and their impact on understanding profitability for a farm or ranch. The key financial ratios are operating profit margin and asset turnover, which are two of the ratios recommended by the Farm Financial Standards Council (FFSC).

Introduction

The Du Pont model was developed as a tool for analyzing methods of increasing return on assets (ROA). At the heart of the analysis are two financial measures: operating profit margin (OPM) and asset turnover ratio (ATR). The OPM measures a business' pre-tax returns relative to its level of sales, while the ATR measures the efficiency of the business' asset base. Multiplying OPM times ATR equals the business' ROA. Over time the Du Pont model has been expanded to include the leverage of an operation and thereby allowing for computation and analysis of return on equity (ROE).

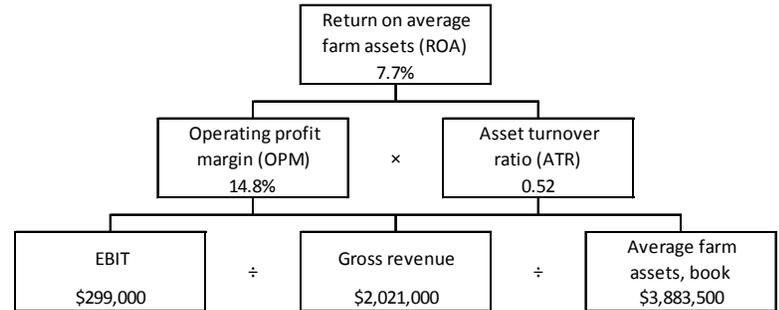
Original Du Pont Model

The original Du Pont model focused on ROA and is depicted at right. EBIT stands for earnings before interest and taxes, is computed as net farm income from operations (NIFO), plus interest expense less withdrawals for labor and management, and is a measure of the earnings from recurring operating activities. It is the margin on each dollar of sales.

Some basic financial information is presented for the sample operation. This information is used in the calculations that follow.

Balance Sheet (Book Value) Data		
	Beginning	Ending
Total Farm Assets	3,770,000	3,997,000
Total Farm Liabilities	2,887,000	3,002,000
Total Farm Equity	883,000	995,000
Income Statement Data (Accrual Adjusted)		
Gross Revenues		2,021,000
-Operating Expenses		1,493,000
-Depreciation Expense		123,000
-Interest Expense		<u>142,000</u>
=Net Farm Income from Operations		263,000
Other Information		
Withdrawals for Labor and Management		106,000
EBIT		
Earnings before Interest and Taxes		299,000

The Du Pont model is such a powerful analysis tool because it breaks down ROA into two basic components: 1) margin on each unit of sales and 2) volume of sales. Thus, as long as OPM is positive, ROA can be increased by 1) increasing the per unit profit margin, or 2) selling more volume given the current business' asset base.



Operating Profit Margin

OPM measures a business' pre-tax returns relative to its level of sales, and is calculated as:

$$\frac{\text{NIFO} + \text{Interest} - \text{Withdrawals}}{\text{Gross Revenues}} = \frac{263,000 + 142,000 - 106,000}{2,021,000} = \frac{299,000}{2,021,000} = 14.8\%$$

The higher this ratio, the more profit the farm is generating for each dollar of sales.

Asset Turnover Ratio

ATR is a measure of how efficiently the assets of a business are being used to generate revenue, and is calculated as:

$$\frac{\text{Gross revenues}}{\text{Average farm assets}} = \frac{2,021,000}{(3,770,000 + 3,997,000) \div 2} = \frac{2,021,000}{3,883,500} = 0.52$$

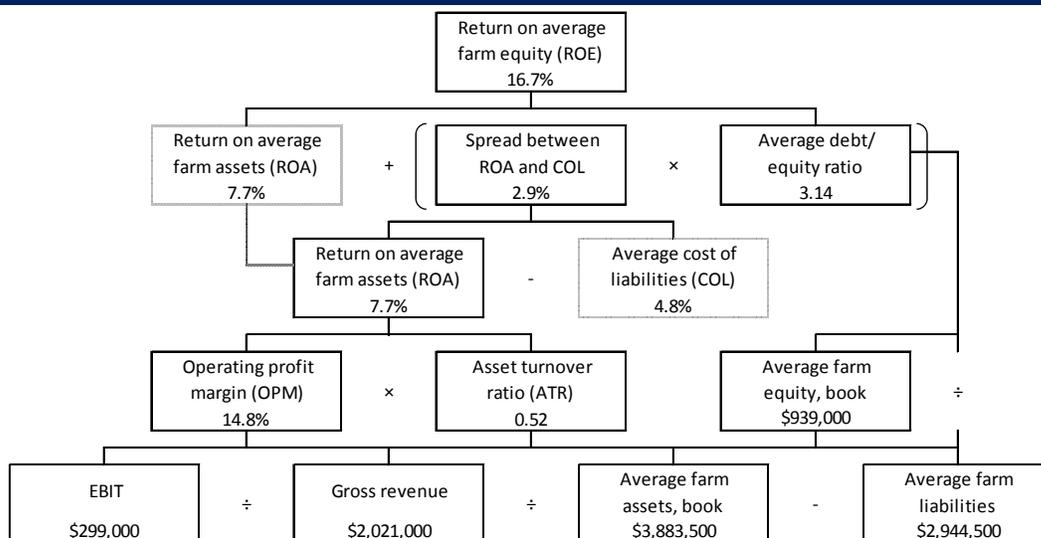
The higher the asset turnover ratio the more rapidly the business is converting assets into revenue.

Return on Farm Assets

ROA measures a business' pre-tax returns to the entire business and is calculated as:

$$\frac{\text{NIFO} + \text{Interest} - \text{Withdrawals}}{\text{Average Farm Assets}} = \frac{263,000 + 142,000 - 106,000}{(3,770,000 + 3,997,000) \div 2} = \frac{299,000}{3,883,500} = 7.7\%$$

Notice the numerator is the same as the OPM and the denominator is the same as ATR. When multiplying OPM times ATR, the Gross revenues cancel and you are left with the above computation.



To increase operating profit margin a commercial business might increase its prices. However, for a farm business it generally means cutting operating costs or lowering family living withdrawals. But where do we begin to cut costs? Operational ratios can help point to potential problem areas. As the operating expense ratio, depreciation expense ratio, or interest expense ratio begin to exceed “normal” values, you can identify potential problem sources.

To increase asset turnover for a commercial business might mean beginning an extra shift in the manufacturing plant. However, for a farm business it generally means using some risk management techniques to increase the price received for products sold or selling some unproductive assets. Another way to increase asset turnover would be to rent land instead of purchasing it (in other words, control of assets versus ownership of assets).

Modified Du Pont Model

More recently, the Du Pont model has been expanded to include the leverage of an operation thereby allowing for the computation of return on equity (ROE) and comparison to ROA, as depicted above.

By measuring the total cost of liabilities and comparing to ROA, you can tell if the operation is earning more on its asset base than it’s paying in interest on its liabilities or vice versa.

$$\frac{\text{Interest expense}}{\text{Average farm liabilities}} = \frac{142,000}{(2,887,000 + 3,002,000) \div 2} = \frac{299,000}{2,944,500} = 4.8\%$$

Ideally, an operation would borrow money at a cost that is less than the return on assets. When this situation occurs, the operation is earning more on its assets than its paying on its liabilities and ROE will exceed ROA. When this situation is reversed and ROA exceeds ROE, then the cost of liabilities is greater than the return on assets and borrowed money is generating a negative margin that must be subsidized by the equity of the operation.

In the above model, the spread on ROA and COL reveals whether leverage is helping or hurting. When ROA exceeds COL, the spread is positive and leverage allows for ROE to exceed ROA. When the spread is negative, leverage amplifies this difference and pulls ROE below ROA.

Caveats

There are a few caveats related to this type of analysis. First, while the above computations can be done with market values of assets and equity, it is best if this analysis is done with book values as it provides a more accurate comparison of the return on the original investment and provides a return that can be compared to other investment alternatives. Second, all of the numbers are pre-tax. In corporate finance, after-tax numbers are used, however, given the significant differences in the structure of farm/ranch entities and corresponding tax rates, using a before-tax number allows for more comparable numbers. Third, the portion of withdrawals related to labor and management are subtracted from earnings to arrive at EBIT. Because withdrawals are not an income statement item, it is often overlooked. Finally, this article has merely touched the surface of this topic. Feel free to contact us for more information on using the Du Pont Financial Analysis to analyze your operation.

In conclusion, while this is only a brief overview of the Du Pont Model, it should allow you to “work backwards” to identify areas in your farm business that may need some management attention. Please note that our web site contains an interactive version of the Du Pont model that you can use to enter and analyze your operation’s profitability.

This article was developed by Centrec Consulting Group as a way to share our thoughts and interpretations of financial analysis in the agricultural sector. For reprints of this or other series of articles, please visit our website at www.centrec.com for contact information.

