DuPont Model

The DuPont Model is a methodology that computes Return on Equity by component parts. Business owners and shareholders are very interested in their level of return. A method of consulting with business owners and shareholders on ways to boost Return on Equity would be very valuable to the CPA.

The DuPont Model was first used by the DuPont Corporation in the 1920's. It breaks down the Return on Equity formula into three basic components; **Net Profit Margin, Asset Turnover** and **Equity Multiplier**. This can be used in conjunction with industry averages or competitor information to pinpoint opportunities to improve **Return on Equity (ROE)**.

ROE = Net Profit Margin x Asset Turnover x Equity Multiplier

or

ROE = (Net Income / Sales) x (Sales / Total Assets) x (Total Assets / Equity)

Use the following information:

	2010	2011
Cash	50,000	100,000
Accounts Receivable	3,286,595	4,351,411
Inventory	5,901,293	6,050,533
Other Assets	25,000	28,000
Property and Equipment	700,000	643,333
Total Assets	9,962,888	11,173,277
Accounts Payable	3,934,195	4,537,900
Accrued Expenses	1,330,254	1,293,007
Line of Credit	2,628,290	1,104,423
Total Liabilities	7,892,739	6,935,330
Retained Earnings	1,570,149	3,737,947
Shareholders Equity	500,000	500,000
Total Equity	2,070,149	4,237,947
Total Liabilities and Equity	9,962,888	11,173,277

	2010	2011
Sales Revenue	38,697,000	45,379,000
Cost of Sales	23,605,170	27,227,400
Gross Margin	15,091,830	18,151,600
Expenses:		
General & Admin	13,302,538	14,366,741
Interest	170,840	115,195
Depreciation	56,667	56,667
	13,530,045	14,538,603
Income Before Tax	1,561,785	3,612,997
Income Tax Expense	624,714	1,445,199
Net income	937,071	2,167,798

For 2011, the results of these ratios are shown below:

ROE = (2,167,798 / 45,379,000) x (45,379,000 / 11,173,277) x (11,173,277 / 4,237,947) = .51 or 51%

By looking at the three individual pieces, ROE = .048 x 4.06 x 2.63, you can compare to history and industry averages to see where your company can improve.

Starting with Net Profit Margin, if there is a shortfall in this statistic, look toward Gross Profit Margins or expenses. Gross profit margins may be impacted by raising prices, selling a different mix of higher margin product or by reducing product cost. A reduction in other expenses on the Income Statement should be a continual goal of management. Benchmarking these items against industry averages can help pinpoint the area(s) that require improvement.

Total Asset Turnover can be impacted by reducing assets relative to sales, if there is a shortfall in this measurement compared to industry averages. Look at Inventory Turnover, Accounts Receivable Turnover and Fixed Assets Turnover to identify the driver of any shortfall.

The Equity Multiplier will be impacted by how assets are financed. If more assets are required and financed by debt rather than through Shareholder's Equity, this will influence this measurement. Basically, leverage (more debt) has a positive impact on ROE. However, it's a dual edged sword as more debt also carries with it more risk.

Assume that you have used public companies in your industry as a benchmark. The following comparisons have been computed for 2011 using the industry benchmark companies:

Net Profit Margin – .045 industry benchmark vs. .048 for the 2011 company information provided

Total Asset Turnover – 5.0 industry benchmark vs. 4.06 for the 2011 company information provided

Equity Multiplier – 2.5 industry benchmark vs. 2.63 for the 2011 company information provided

So, the benchmark ROE is .045 x 5.0 x 2.5 = .563 or 56.3%

When we evaluate this against the previously computed numbers for the provided company information, the primary difference is in Total Asset Turnover. The example company has better profit margins and a slightly better Equity Multiplier.

Assume that the comparison to benchmark companies yield the following activity ratios:

Accounts Receivable Turnover – 11.75 industry benchmark vs. 11.88 for the 2011 company information provided

Inventory Turnover – 6.0 industry benchmark vs. 4.56 for the 2011 company information provided

Fixed Assets Turnover – 65.0 industry benchmark vs. 67.56 for the 2011 company information provided

The major discrepancy appears to be in the Inventory Turnover Ratio. The example company has approximately 80 days in Inventory (365/4.56 inventory turnover ratio) while the benchmark companies have approximately 61 days of inventory on hand (365 / 6.0).

You have now isolated an issue for the example company management to address. They may ask you to quantify the impact on ROE if Inventory Turnover is increased to 6.0. Using 2011 as a guide, we can re-compute inventory as if the Inventory Turnover Ratio was 6.0.

If the Inventory Turnover Ratio is Cost of Sales / Average Inventory and we want the answer to be 6.0, we need to solve algebraically for Average Inventory. We know the beginning inventory is 5,901,293 from the 2010 Balance Sheet and 2011 Cost of Sales is 27,227,400. Therefore, the formula looks like this:

Inventory Turnover Ratio = Cost of Sales / Average Inventory

Filling in the known numbers :

6.0 = 27,227,400 / ((5,901,293 + Ending Inventory) / 2)

Multiply both sides by Average Inventory.

((5,902,293 + Ending Inventory) / 2) x 6 = 27,227,400

Multiply both sides by 2.

(5,902,293 + Ending Inventory) x 6 = 54,454,800

Expand the left side by multiplying by 6.

35,413,758 + (6 x Ending Inventory) = 54,454,800

Subtract 35,413,758 from both sides.

6 x Ending Inventory = 19,041,042

Solve for ending Inventory by dividing by 6

Ending Inventory = 3,173,507

Just to be certain that we did the algebra correctly, plug the answer back into the Inventory Turnover formula.

27,227,400 / ((5,901,293 + 3,173,507) /2) = 6.0

Now that we know what the 2011 Inventory would be if the Inventory Turnover Ratio was 6.0, we know that Inventory would be lower by 6,050,533 (2011 reported) – 3,173,507 (2011 computed) = 2,877,026.

If Inventory is lower by the amount, then Total Assets must also be lower by 2,877,026. Therefore, Total Assets would be 11,173,277 (2011 reported) – 2,877,026 (computed inventory decrease) = 8,296,251.

Using computed Total Assets of 8,296,251 for the restated Total Asset Turnover Ratio = 45,379,000 / 8,296,251 = 5.47 Total Asset Turnover Ratio.

New computed Total Asset Turnover

So, the restated ROE for 2011 if the Inventory Turnover Ratio was 6.0 is:

ROE = Profit Margin x Total Asset Turnover x Equity Multiplier = .048 x 5.47 x 2.63 = .69 or 69%

If Inventory Turnover was to reach the industry benchmark of 6 times, this would boost ROE to 69%, well above the industry benchmark. This provides a discrete target for management focus so that ROE can be maximized.

Like most of ratio analysis, the DuPont model is a broad analytical tool. However, it does allow for the CPA analyst to pinpoint areas of strength and weakness for further examination and action in order to maximize Return on Equity.