

DUPONT ANALYSIS AND ITS INTERPRETATION

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The "bottom line" or dollar profit on sales tends to be the most important piece of financial data to which the amateur financial analyst is drawn. But, operating profit tells, at best, only one-third of the story about a firm's financial performance. To be successful, a business must not only produce day-to-day operating profits from sales, but it must also effectively manage its level of assets and its amount of debt.

A system of analysis has been developed which focuses management's attention on all three critical elements of good financial condition--operating management, asset management, and capital structure management. This analysis technique is called the **DuPont Formula**. The DuPont Formula shows the interrelationship between five key financial ratios. It can be presented in several ways. The first is with Return on Investment as an intermediate product (see the top part of the table below) while the second omits Return on Investment (see the bottom part below).

Profit Margin	×	Total Asset Turnover	=	Return on Investment				
				Return on Investment	×	Equity Multiplier	=	Return on Equity
Profit Margin	×	Total Asset Turnover			×	Equity Multiplier	=	Return on Equity

Each of the key ratios will now be defined in turn.

$$\text{Profit Margin (PM)} = \text{Net Income} \div \text{Sales (or Total Revenue)}$$

When this ratio is positive and rises across time, it is a good sign that operating management is going well. Management is producing sales and controlling costs such that the "bottom line" is growing.

$$\text{Total Asset Turnover (TAT)} = \text{Sales (or Total Revenue)} \div \text{Total Assets}$$

When this ratio rises across time, it is a good sign that asset management is going well. A rising ratio means that the firm is able to produce more and more sales from its assets. In other words, the firm is becoming more efficient in using its assets. Different industries have different levels of total asset turnover that indicate efficient asset management. Therefore, an industry average is often needed to interpret this ratio. Most manufacturing firms have TATs ranging from 1X to

2X. If the ratio is too high, it can mean that the firm is not adequately replacing its assets and this would be a sign of poor management.

$$\begin{aligned}\text{Return on Investment (ROI)} &= \text{PM} \times \text{TAT} \\ &= \text{Net Income} \div \text{Total Assets}\end{aligned}$$

Like most profit measures, ROI should be positive and growing over time. This ratio measures the profitability of assets in use by the firm. The same levels of ROI can be produced by either a high profit, low turnover strategy (for example, department stores) or by a low profit, high turnover strategy (for example, discount stores). Profit on sales and total asset turnover can thus be thought of as a potential strategic tradeoff.

$$\text{Equity Multiplier (EM)} = \text{Total Assets} \div \text{Total Equity}$$

This ratio should **not** be increasing across time because an increase means that more and more debt is being used to finance the firm. Debt requires fixed payments of principle and interest. If these payments are not made, the firm can be forced into bankruptcy. Therefore, high levels of debt (and a correspondingly high equity multiplier) represent poor capital structure management. Across a significant cross section of industrial firms, the equity multiplier tends to stay within the range of 2 to 3 times. An EM above 3 is thus likely to be a cause for concern.

$$\begin{aligned}\text{Return on Equity (ROE)} &= \text{PM} \times \text{TAT} \times \text{EM} \\ &= \text{ROI} \times \text{EM} \\ &= \text{Net Income} \div \text{Total Equity}\end{aligned}$$

Return on Equity represents the profitability of funds invested by the owners of the firm. All firms should attempt to make ROE as high as possible over the long-term. ROE can be high for the wrong reasons however. For example, when ROE is high because the equity multiplier is high, this means that high returns are really coming from overuse of debt which can spell trouble for the firm. Most of ROE should be produced by high ROI, PM, and TAT and not from high EM.

Because it links several critical ratios, the DuPont Formula allows you to examine how a firm generates its return on equity. If operating management is strong (high PM), and asset management is strong (high TAT), and capital structure management is strong (appropriately low EM), then ROE will be high for sound business reasons and the firm can be said to be in strong financial condition.