

## Memo on Ratio Analysis for Strategy

### J.P. Eggers @ New York University

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The goals of financial statements analysis are different for different audiences, and these differences dictate which numbers are more or less important. For example:

- Creditors want to know if firm can repay loans
- Investors want to compare prospective returns from different options
- Employees want to check firm performance
- Regulators want to assess firm or industry health/performance
- Managers want to assess the strengths and weaknesses of their organization

Financial analysis also involves comparisons, though the relevant comparison depends on what you are trying to assess. Multiple comparisons could be relevant under different circumstances and for different purposes. This list would include performance versus prior period(s), versus industry norms, versus leading competitors, or versus predicted numbers.

### Ratios in Strategic Management

In strategic management analysis, we use ratios and analysis for specific purposes, including (but not limited to):

- To assess overall financial health of a company (i.e. leverage and liquidity ratios)
- To compare a firm's performance to its peers (i.e. ROE, ROA, cash flow from operations)
- To discern key differences in strategy between firms (i.e. inventory turnover, performance measures in context)

All ratios can be informative, but you have to use them *carefully* and interpret the meanings in context. In general, hard-and-fast "rules" relying on specific values can lead to missed opportunities. It is important to remember that ratios can be affected by differences in accounting practices or manipulation. More importantly, ratios can reflect differences in performance and/or differences in strategy, so comparing two firms with different strategies in terms of a given ratio may not tell you who is performing better on that ratio. This is especially true when comparing firms at dramatically different stages in the firm lifecycle, or across different industries.

### DuPont Analysis

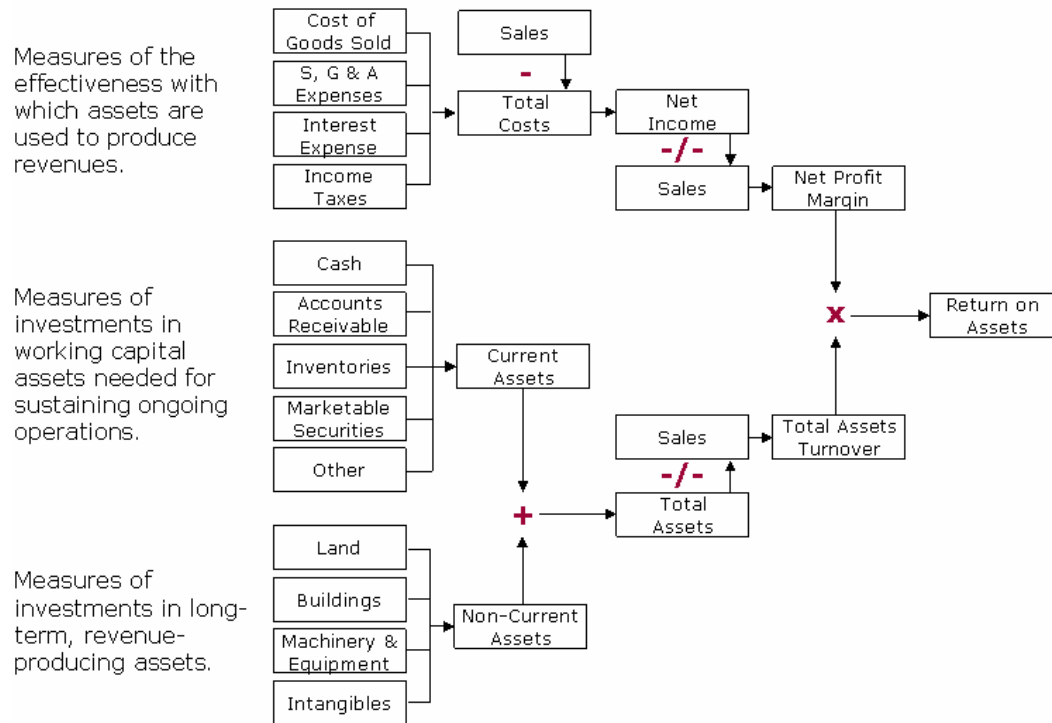
The DuPont Analysis or Ratio is a simple and helpful tool to assess performance and strategy. Obviously, the ratio was first used at DuPont, but has since become a basic standard of financial analysis. It often serves as an introductory analysis leading into more detail analysis. The DuPont Analysis is a simple accounting identity:

$$\begin{array}{ccccccc} \text{Return on Equity} & = & \frac{\text{Net Income}}{\text{Shareholders Equity}} & = & \frac{\text{Net Income}}{\text{Sales}} & \times & \frac{\text{Sales}}{\text{Total Assets}} & \times & \frac{\text{Total Assets}}{\text{Shareholders Equity}} \\ \text{(ROE)} & & & & \underbrace{\hspace{2cm}} & & \underbrace{\hspace{2cm}} & & \underbrace{\hspace{2cm}} \\ & & & & \text{Net} & & \text{Asset} & & \text{Leverage} \\ & & & & \text{Margin} & & \text{Turnover} & & \end{array}$$

The DuPont Ratio is often used to focus management attention on three key decisions. Net Margin focuses attention on price-cost relationship. Asset Turnover emphasizes efficient use of resources. Leverage focuses on proper balance between debt and equity. In strategy, we care more about the first two ratios than leverage. This detailed breakdown focuses on efficiency and effectiveness:

### The DuPont Model

$$\begin{aligned} \text{Return on Assets} &= \text{Net Profit Margin} \times \text{Total Assets Turnover} \\ &= \frac{\text{Net Operating Profit After Taxes}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average Net Assets}} \end{aligned}$$



The goal of the DuPont Ratio is to break down something important but abstract – ROE – into a series of component parts. If you are a manager, it is much easier to imagine coming up with strategies that affect Net Margin or Asset Turnover than ones that affect ROE directly. This reflects an important part of strategic analysis – decomposing a complex and challenging problem into a series of relatively modular questions that can be empirically answered.

**A note on timing in the calculation of ratios:** Balance Sheets are “snapshots” that capture a moment in time (the end of the fiscal year), while Income Statements are “flows” that capture the entire year. Ratios using only Income Statement or only Balance Sheet items are easy – just look at the appropriate year’s numbers. Ratios combining items from Income Statement and Balance Sheet (e.g., Return on Assets) are tricky, as the Balance Sheet number is only what the item was at the end of the year and the Income Statement measure happened during the course of the year. Thus, when calculating combined ratios, it is normal practice to calculate the average of the Balance Sheet item (e.g. Total Assets last year + Total Assets this year / 2). You may use average Balance Sheet numbers for ratios with two Balance Sheet items if you wish, but not doing so is less likely to produce real bias in your interpretation.

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#### The "Classic" Financial Analysis Ratios

##### **Profit Ratios:**

Measure the efficiency with which the company uses its resources. These are useful for comparing performance to competitors or benchmarking performance over time.

Gross Profit Margin =	$\frac{\text{Sales Rev.} - \text{COGS}}{\text{Sales Rev.}}$	This gives you a sense of the difference in what a firm pays for its inputs versus what it sells its final products for. It can increase with things like increasing the mark-up, having more value-added to inputs, or lowering the cost of inputs. Note that, in many cases, lower cost providers actually have a surprisingly low GP ratio – they price products lower, meaning that gap between COGS and price is actually small.
Net Profit Margin =	$\frac{\text{Net Income}}{\text{Sales Rev.}}$	This is the amount of profit the firm actually gets to keep per dollar of sales. Whereas gross margin looks at the spread only between input costs and selling price, this measure also takes into account all of the other costs borne by the firm such as labor, R&D, utilities, etc. While Net Income is often used for financial analysis, in many cases strategic analysis may use EBT (earnings before taxes), EBIT (earnings before interest and taxes) or EBITDA (also excluding depreciation and amortization) because factors such as taxes, interest, and depreciation are to some extent the result of financial decisions that have little to do with strategy directly. Thus EBITDA over sales may be a more accurate picture of the firm's strategic and operating performance.
Return on Total Assets =	$\frac{\text{Net Income}}{\text{Avg. Total Assets}}$	This is the rate of return the firm is earning on its assets. It is a very useful measure of profitability because it offers a simple measure of a firm's return on its overall investment.
Return on Stockholders' Equity =	$\frac{\text{Net Income}}{\text{Avg. S'Holder's Equity}}$	This is the amount of profit the firm earns as a percent of the portion of its assets paid with in equity. It is <i>not</i> the amount of profit stockholders have earned as a) market capitalization and stockholder's equity can be quite different, and b) net income need not be paid out to the stockholders. As noted above in discussing the DuPont ratio, this is (in the end) one of the key ratios that managers should be concerned with.

##### **Financing Ratios:**

Measure key issues involving the firm's capital structure decisions that are important for strategy.

Current Ratio =	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	This ratio assesses whether the assets a firm can turn into cash within the year will cover the obligations it must pay in cash within the year. Results <1 suggest solvency problems.
Quick Ratio (Acid Test) =	$\frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}$	This ratio is like the current ratio, but takes inventory out of current assets because it may not be realistic to assume that all of the inventory can be turned in to cash (for its book value) within the year. Results <1 suggest solvency problems.
Leverage Ratio	$\frac{\text{Total Assets}}{\text{Shareholders Equity}}$	As discussed above, this is a key ratio for understanding the source of the firm's external funding – how much is derived from debt holders (who have a stronger claim but who do not take residual upside) versus equity (secondary claim on assets, but share in upside). While this is primarily a financing decision, it has

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implications for growth potential as well. Note that there are other ways to get at a similar question – by considering debt over assets, or debt over equity, for example.

#### Activity Ratios:

Measure how effectively the company is managing its assets.

Asset Turnover 
$$\frac{\text{Sales Rev.}}{\text{Total Assets}}$$
 Discussed above around the DuPont Ratio. This is a key measure of how productive the firm is in converting the assets that it has purchased into annual sales. Basically it should capture the productivity of the asset base of the firm.

Inventory Turnover = 
$$\frac{\text{COGS}}{\text{Avg. Inventory}}$$
 This is how many times a firm turns over its inventory in a year. It should be very high for restaurants, grocery stores, etc. and quite low for automakers, appliance manufacturers, etc. It often has little relevance for service firms because they may carry little inventory. It can also be expressed as “days inventory” (e.g., inventory turnover of 10 = 36.5 days inventory)

#### Shareholder Return Ratios:

Measure return to shareholders from holding stock in the company.

Total Shareholder Returns = 
$$\frac{\text{Stock Price (t+1)} - \text{Stock Price (t)} + \text{Sum of Annual Dividends per Share}}{\text{Stock Price (t)}}$$

This measure gives you the total rate of return the stockholder has earned from their investment (it includes capital gains or losses, and dividends).

Price-Earnings Ratio = 
$$\frac{\text{Market Price per Share}}{\text{Earnings per Share}}$$
 This measure gives you a sense of how much the stock market thinks the company is worth compared to its actual earnings. Higher numbers suggest market optimism over the firm’s future prospects.

#### Cash Flow:

Measures cash available to the firm, available for investment.

Internally Generated Cash Flow = 
$$\text{Profits after Interest, Taxes and Dividend Payments} + \text{Depreciation}$$

If this figure is less than proposed expenditures, the firm will either require external financing or must curtail investments.

#### Other Ratios

In addition to the classic metrics such as the DuPont Ratio and the other ratios listed above, it is important to remember that every industry has its own metrics that may be more or less important than standard financial metrics. Some examples:

- *Retail*: sales / square foot, sales / employee, shrinkage, comp store sales
- *Manufacturing*: OEE (availability x performance x quality),
- *Marketing*: customer acquisition costs, customer turnover