



For more information about Azar & Associates, go to [www.azarandassociates.com](http://www.azarandassociates.com)

## The Financial Ratio Analysis Encyclopedia

**Financial ratio analysis is the calculation and comparison of ratios which are derived from the information in a company's financial statements. The level and historical trends of these ratios can be used to make inferences about a company's financial condition, its operations and attractiveness as an investment.**

Financial ratios are calculated from one or more pieces of information from a company's financial statements. For example, the "gross margin" is the gross profit from operations divided by the total sales or revenues of a company, expressed in percentage terms. In isolation, a financial ratio is a useless piece of information. In context, however, a financial ratio can give a financial analyst an excellent picture of a company's situation and the trends that are developing.

A ratio gains utility by comparison to other data and standards. Taking our example, a gross profit margin for a company of 25% is meaningless by itself. If we know that this company's competitors have profit margins of 10%, we know that it is more profitable than its industry peers which is quite favorable. If we also know that the historical trend is upwards, for example has been increasing steadily for the last few years, this would also be a favorable sign that management is implementing effective business policies and strategies.

Financial ratio analysis groups the ratios into categories which tell us about different facets of a company's finances and operations. An overview of some of the categories of ratios is given below.



# Short-term Solvency or Liquidity Ratios

Short-term Solvency Ratios attempt to measure the ability of a firm to meet its short-term financial obligations. In other words, these ratios seek to determine the ability of a firm to avoid financial distress in the short-run. The two most important Short-term

Solvency Ratios are the Current Ratio and the Quick Ratio. (Note: the Quick Ratio is also known as the Acid-Test Ratio.)

## Current Ratio

The Current Ratio is calculated by dividing Current Assets by Current Liabilities. Current Assets are the assets that the firm expects to convert into cash in the coming year and Current Liabilities represent the liabilities, which have to be paid in cash in the coming year. The appropriate value for this ratio depends on the characteristics of the firm's industry and the composition of its Current Assets. However, at a minimum, the Current Ratio should be greater than one.

$$\text{Current Ratio} = \frac{\text{Total Current Assets}}{\text{Total Current Liabilities}}$$

## Quick Ratio

The Quick Ratio recognizes that, for many firms, Inventories can be rather illiquid. If these Inventories had to be sold off in a hurry to meet an obligation the firm might have difficulty in finding a buyer and the inventory items would likely have to be sold at a substantial discount from their fair market value.

This ratio attempts to measure the ability of the firm to meet its obligations relying solely on its more liquid Current Asset accounts such as Cash and Accounts Receivable. This ratio is calculated by dividing Current Assets less Inventories by Current Liabilities.

$$\text{Quick Ratio} = \frac{\text{Total Current Assets} - \text{Inventory}}{\text{Total Current Liabilities}}$$



## Asset Management Ratios

---

Asset Management Ratios attempt to measure the firm's success in managing its assets to generate sales. For example, these ratios can provide insight into the success of the firm's credit policy and inventory management. These ratios are also known as Activity or Turnover Ratios.

### Receivables Turnover and Days' Receivables

The Receivables Turnover and Days' Receivables Ratios assess the firm's management of its Accounts Receivables and, thus, its credit policy. In general, the higher the Receivables Turnover Ratio the better since this implies that the firm is

collecting on its accounts receivables sooner. However, if the ratio is too high then the firm may be offering too large of a discount for early payment or may have too restrictive credit terms. The Receivables Turnover Ratio is calculated by dividing Sales by Accounts Receivables. (Note: since Accounts Receivables arise from Credit Sales it is more meaningful to use Credit Sales in the numerator if the data is available.)

$$\text{Receivables Turnover} = \frac{\text{Sales}}{\text{Accounts Receivable}}$$

The Days' Receivables Ratio is calculated by dividing the number of days in a year, 365, by the Receivables Turnover Ratio. Therefore, the Days' Receivables indicates how long, on average, it takes for the firm to collect on its sales to customers on credit. This ratio is also known as the Days' Sales Outstanding (DSO) or Average Collection Period (ACP).

$$\text{Days' Receivables} = \frac{365}{\text{Receivables Turnover}}$$

### Inventory Turnover and Days' Inventory

The Inventory Turnover and Days' Inventory Ratios measure the firm's management of its Inventory. In general, a higher Inventory Turnover Ratio is indicative of better performance since this indicates that the firm's inventories are being sold more quickly. However, if the ratio is too high then the firm may be losing sales to competitors due to inventory shortages. The Inventory Turnover Ratio is calculated by dividing Cost of



Goods Sold by Inventory. When comparing one firm's Inventory Turnover ratio with that of another firm it is important to consider the inventory valuation method used by the firms. Some firms use a FIFO (first-in-first-out) method, others use a LIFO (last-in-first-out) method, while still others use a weighted average method.

$$\text{Inventory Turnover} = \frac{\text{COGS}}{\text{Inventory}}$$

The Days' Inventory Ratio is calculated by dividing the number of days in a year, 365, by the Inventory Turnover Ratio. Therefore, the Days' Inventory indicates how long, on average, an inventory item sits on the shelf until it is sold.

$$\text{Days' Inventory} = \frac{365}{\text{Inventory Turnover}}$$

## Fixed Assets Turnover

The Fixed Assets Turnover Ratio measures how productively the firm is managing its Fixed Assets to generate Sales. This ratio is calculated by dividing Sales by Net Fixed Assets. When comparing Fixed Assets Turnover Ratios of different firms it is important to keep in mind that the values for Net Fixed Assets reported on the firms' Balance Sheets are book values which can be very different from market values.

$$\text{Fixed Assets Turnover} = \frac{\text{Sales}}{\text{Net Fixed Assets}}$$

## Total Assets Turnover

The Total Assets Turnover Ratio measures how productively the firm is managing all of its assets to generate Sales. This ratio is calculated by dividing Sales by Total Assets.

$$\text{Total Assets Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$$

## Debt Management Ratios

Debt Management Ratios attempt to measure the firm's use of Financial Leverage and ability to avoid financial distress in the long run. These ratios are also known as Long-Term Solvency Ratios.



Debt is called Financial Leverage because the use of debt can improve returns to stockholders in good years and increase their losses in bad years. Debt generally represents a fixed cost of financing to a firm. Thus, if the firm can earn more on assets which are financed with debt than the cost of servicing the debt then these additional earnings will flow through to the stockholders. Moreover, our tax law favors debt as a source of financing since interest expense is tax deductible.

With the use of debt also comes the possibility of financial distress and bankruptcy. The amount of debt that a firm can utilize is dictated to a great extent by the characteristics

of the firm's industry. Firms which are in industries with volatile sales and cash flows cannot utilize debt to the same extent as firms in industries with stable sales and cash flows. Thus, the optimal mix of debt for a firm involves a tradeoff between the benefits of leverage and possibility of financial distress.

## Debt Ratio, Debt-Equity Ratio, and Equity Multiplier

The Debt Ratio, Debt-Equity Ratio, and Equity Multiplier are essentially three ways of looking at the same thing: the firm's use of debt to finance its assets. The Debt Ratio is calculated by dividing Total Debt by Total Assets. The Debt-Equity Ratio is calculated by dividing Total Debt by Total Owners' Equity. The Equity Multiplier is calculated by dividing Total Assets by Total Owners' Equity.

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}} = \frac{\text{Total Assets} - \text{Total Owners' Equity}}{\text{Total Assets}}$$

$$\text{Debt to Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Owners' Equity}} = \frac{\text{Total Assets} - \text{Total Owners' Equity}}{\text{Total Owners' Equity}}$$

$$\text{Equity Multiplier} = \frac{\text{Total Assets}}{\text{Total Owners' Equity}}$$

## Profitability Ratios

---



Profitability Ratios attempt to measure the firm's success in generating income. These ratios reflect the combined effects of the firm's asset and debt management.

## Profit Margin

The Profit Margin indicates the dollars in income that the firm earns on each dollar of sales. This ratio is calculated by dividing Net Income by Sales.

$$\text{Profit Margin} = \frac{\text{Net Income}}{\text{Sales}}$$

## Return on Assets (ROA) and Return on Equity (ROE)

The Return on Assets Ratio indicates the dollars in income earned by the firm on its assets and the Return on Equity Ratio indicates the dollars of income earned by the firm

on its shareholders' equity. It is important to remember that these ratios are based on Accounting book values and not on market values. Thus, it is not appropriate to compare these ratios with market rates of return such as the interest rate on Treasury bonds or the return earned on an investment in a stock.

$$\text{Return on Assets (ROA)} = \frac{\text{Net Income}}{\text{Total Assets}}$$

$$\text{Return on Equity (ROE)} = \frac{\text{Net Income}}{\text{Total Owners' Equity}}$$

## Market Value Ratios

---

Market Value Ratios relate an observable market value, the stock price, to book values obtained from the firm's financial statements.

### Price-Earnings Ratio (P/E Ratio)



The Price-Earnings Ratio is calculated by dividing the current market price per share of the stock by earnings per share (EPS). (Earnings per share are calculated by dividing net income by the number of shares outstanding.)

The P/E Ratio indicates how much investors are willing to pay per dollar of current earnings. As such, high P/E Ratios are associated with growth stocks. (Investors who are willing to pay a high price for a dollar of current earnings obviously expect high earnings in the future.) In this manner, the P/E Ratio also indicates how expensive a particular stock is. This ratio is not meaningful, however, if the firm has very little or negative earnings.

$$\text{P / E Ratio} = \frac{\text{Price Per Share}}{\text{Earnings Per Share}}$$

where

$$\text{Earnings Per Share} = \frac{\text{Net Income}}{\text{Number of Shares Outstanding}}$$

## Market-to-Book Ratio

The Market-to-Book Ratio relates the firm's market value per share to its book value per share. Since a firm's book value reflects historical cost accounting, this ratio indicates

management's success in creating value for its stockholders. This ratio is used by "value-based investors" to help to identify undervalued stocks.

$$\text{Market - To - Book Ratio} = \frac{\text{Price Per Share}}{\text{Book Value Per Share}}$$

where

$$\text{Book Value Per Share} = \frac{\text{Total Owners' Equity}}{\text{Number of Shares Outstanding}}$$

## Ratio Equations

---

### Short-term Solvency Ratios

**Current Ratio:**  $\text{Current Ratio} = \frac{\text{Total Current Assets}}{\text{Total Current Liabilities}}$

**Quick Ratio:**  $\text{Quick Ratio} = \frac{\text{Total Current Assets} - \text{Inventory}}{\text{Total Current Liabilities}}$

### Asset Management Ratios

**Receivables Turnover:** 
$$\text{Receivables Turnover} = \frac{\text{Sales}}{\text{Accounts Receivable}}$$

**Days' Receivables:** 
$$\text{Days' Receivables} = \frac{365}{\text{Receivables Turnover}}$$

**Inventory Turnover:** 
$$\text{Inventory Turnover} = \frac{\text{COGS}}{\text{Inventory}}$$

**Days' Inventory:** 
$$\text{Days' Inventory} = \frac{365}{\text{Inventory Turnover}}$$

**Fixed Assets Turnover:** 
$$\text{Fixed Assets Turnover} = \frac{\text{Sales}}{\text{Net Fixed Assets}}$$

**Total Assets Turnover:** 
$$\text{Total Assets Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$$

### Debt Management Ratios

**Times Interest Earned (TIE) Ratio:** 
$$\text{Times Interest Earned} = \frac{\text{EBIT}}{\text{Interest Expense}}$$

**Debt Ratio:** 
$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}} = \frac{\text{Total Assets} - \text{Total Owners' Equity}}{\text{Total Assets}}$$

**Debt-Equity Ratio:** 
$$\text{Debt to Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Owners' Equity}} = \frac{\text{Total Assets} - \text{Total Owners' Equity}}{\text{Total Owners' Equity}}$$

**Equity Multiplier:** 
$$\text{Equity Multiplier} = \frac{\text{Total Assets}}{\text{Total Owners' Equity}}$$

### Profitability Ratio

**Profit Margin:** 
$$\text{Profit Margin} = \frac{\text{Net Income}}{\text{Sales}}$$

**Return on Assets:** 
$$\text{Return on Assets (ROA)} = \frac{\text{Net Income}}{\text{Total Assets}}$$

**Return on Equity:** 
$$\text{Return on Equity (ROE)} = \frac{\text{Net Income}}{\text{Total Owners' Equity}}$$

### Market Value Ratios

**Price/Earnings Ratios:** 
$$\text{P/E Ratio} = \frac{\text{Price Per Share}}{\text{Earnings Per Share}}$$

**Market-to-Book Ratio:** 
$$\text{Market - To - Book Ratio} = \frac{\text{Price Per Share}}{\text{Book Value Per Share}}$$

### Dividend Ratios

**Payout Ratio:** 
$$\text{Payout Ratio} = \frac{\text{Dividends Paid}}{\text{Net Income}}$$

**Retention Ratio:** 
$$\text{Retention Ratio} = \frac{\text{Addition to Retained Earnings}}{\text{Net Income}}$$

### Other Equations



$$\begin{array}{l} \text{Earnings Per Share:} \\ \text{Book Value Per Share:} \end{array} \quad \begin{array}{l} \text{Earnings Per Share} = \frac{\text{Net Income}}{\text{Number of Shares Outstanding}} \\ \text{Book Value Per Share} = \frac{\text{Total Owners' Equity}}{\text{Number of Shares Outstanding}} \end{array}$$

It is imperative to note the importance of the proper context for ratio analysis. Like computer programming, financial ratio is governed by the GIGO law of "Garbage In...Garbage Out!" A cross industry comparison of the leverage of stable utility companies and cyclical mining companies would be worse than useless. Examining a cyclical company's profitability ratios over less than a full commodity or business cycle would fail to give an accurate long-term measure of profitability. Using historical data independent of fundamental changes in a company's situation or prospects would predict very little about future trends. For example, the historical ratios of a company that has undergone a merger or had a substantive change in its technology or market position would tell very little about the prospects for this company.

Credit analysts, those interpreting the financial ratios from the prospects of a lender, focus on the "downside" risk since they gain none of the upside from an improvement in operations. They pay great attention to liquidity and leverage ratios to ascertain a company's financial risk. Equity analysts look more to the operational and profitability ratios, to determine the future profits that will accrue to the shareholder.

Although financial ratio analysis is well-developed and the actual ratios are well-known, practicing financial analysts often develop their own measures for particular industries and even individual companies. Analysts will often differ drastically in their conclusions from the same ratio analysis.

To learn more about how you can establish your own ratio and measures for your individual business, call us today at (661) 810-2446 or visit us on-line at [www.azarandassociates.com](http://www.azarandassociates.com)