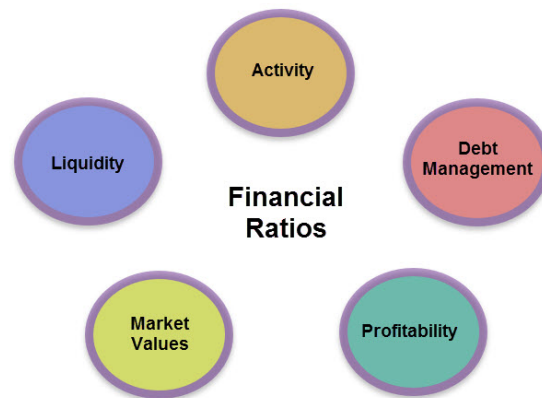


## 2.2: Financial Statements Analysis

Financial Statements provide a wealth of information to many different users. There are many ways to analyze financial statements. These include ratio analysis and common size statements both of which can be analyzed through trend analysis or comparative analysis (we will go into more detail on trend analysis and comparative analysis in a little bit). While ratio analysis and common size statements provide an excellent way to analyze the information in the income statement and balance sheet, the statement of cash flows is best analyzed by breaking it down into its three primary components as discussed earlier.

### Key Financial Ratios

There are a large variety of different financial ratios that attempt to evaluate different aspects of a company's health and performance. Some of these are specific to certain industries. For example, a popular ratio for brick-and-mortar retailers is sales-per-square-foot as it addresses how well the retailer is using its floor space to generate revenue. However, this same ratio would not make sense in evaluating the performance of a heavy equipment manufacturer like Caterpillar. Another challenge with ratios is that they can be calculated in different ways. For example, the Inventory Turnover ratio is sometimes calculated as Sales/Inventory and sometimes as Cost of Goods Sold/Inventory. To make things more complicated, sometimes the inventory level used as the denominator is defined as (beginning inventory + ending inventory)/2 and other times analysts will simply use ending inventory. Some ratios also go by different names. The Quick Ratio is sometimes referred to as the Acid Test Ratio or the Days Sales Outstanding Ratio is sometimes referred to as the Average Collection Ratio. This can make ratio analysis quite confusing for people who are just getting introduced to the topic. For the purposes of this class, we are going to focus on the following ratios which will be referred to and calculated as follows (using ending values for balance sheet items).



### Liquidity Ratios

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

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

### Activity Ratios

$$\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Inventory}}$$

$$\text{Days Sales Outstanding} = \frac{\text{Accounts Receivable}}{\text{Sales} / 365}$$

$$\text{Fixed Assets Turnover} = \frac{\text{Sales}}{\text{Net Property, Plant and Equipment}}$$

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

## Debt Management Ratios

$$\text{Total Debt to Total Assets} = \frac{\text{Liabilities}}{\text{Assets}}$$

$$\text{Total Debt to Equity} = \frac{\text{Liabilities}}{\text{Owners' Equity}}$$

$$\text{Times Interest Earned} = \frac{\text{EBIT}}{\text{Interest}}$$

## Profitability Ratios

$$\text{Gross Profit Margin} = \frac{(\text{Sales} - \text{Cost of Goods Sold})}{\text{Sales}}$$

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

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

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Owners' Equity}}$$

## Market Values

$$\text{Price/Earnings Ratio} = \frac{\text{Market Price per Share}}{\text{EPS}}$$

$$\text{Market/Book Ratio} = \frac{\text{Market Price per Share}}{\text{Book Value per Share}}$$

$$\text{Dividend Yield} = \frac{\text{Dividend per Share}}{\text{Market Price per Share}}$$

A couple of reminders. First, EPS refers to earnings per share and is simply (for the purposes of this class) net income divided by number of shares outstanding. Second, sales and revenues are used interchangeably in this class. Therefore, you can replace sales with revenues in any formula listed above. The goal of this class is not to make you an expert on ratio analysis, but to introduce it as a tool. This list of ratios will provide a strong foundation to build from if you delve further into ratio analysis.

One item that I want to stress is that interpreting ratios is as much of an art form as a science as there are always exceptions. Often, textbooks imply that once you calculate the ratios, you can easily identify a firm's strengths and/or weaknesses and take advantage of them and/or fix them. This is an illusion. Calculating the ratios is relatively simple. Interpreting the ratios requires context, understanding, and often experience. You need to understand where the numbers are coming from and why they are what they are (corporate strategy, company downturn, economic downturn, seasonality, etc.) in order to really make meaningful analysis. [Explanation of Ratios](#), in the Appendix B, focuses on explaining and interpreting each of these ratios. However, even if you can adequately interpret the ratios, they are diagnostic more than prescriptive. We will discuss some of the challenges in applying ratio (and other forms of financial statement) analysis in a little bit.

## Common Size Statements

In addition to ratios, we can also glean information from financial statements by comparing them from year to year or from firm to firm. However, we need to be careful. If our sales go up from year to year, most likely so will our costs. What becomes important then is not did costs go up, but how did they change relative to sales. Alternatively, our inventory may be down, but if all of our other assets are down as well, we may be starting to carry too much inventory. Our selling and administrative expenses (or accounts receivable) may appear relatively low to our competitors. However, if their firm is three times the size of ours, these expenses or receivables may still be too high. To fix these problems, we can develop common size income statements and common size balance sheets. A common size income statement takes each category in the income statement and divides by sales (expressing the item as a percentage of sales). A common size balance sheet divides each component of the balance sheet by total assets (expressing each item as a percentage of assets). This makes it easier to compare items from year to year (or across different size firms) and see how well the company is doing in each component.

## Trend Analysis

The ratios presented above are close to meaningless by themselves. Looking at a single ratio in isolation is about as useful as a physician trying to perform a diagnosis simply by looking at your temperature. It is a piece of the puzzle, but without context and additional information it is not very meaningful. Also, common size statements offer little value without context. In order for them to become valuable for analysis, we must have something to compare them to. One technique is to view how these ratios and common size statements change over time. For example, is our ROA rising or falling from year to year? If it is rising, that indicates we are doing a better job of generating profits from our assets. Alternatively, if our DSO ratio is rising, that indicates it is taking us longer to collect our credit sales. This may be a sign of a problem (note that I say “may” because it is also possible that we are intentionally offering more/better credit opportunities to customers in order to increase sales because our DSO was lower than optimal before). While we can do trend analysis with two years, it is better to have 3 to 5 years of ratios to analyze to truly spot trends. Too few years makes it hard to identify real trends as opposed to just normal year-to-year fluctuations. Alternatively, too many years may present a misleading picture as the company, industry, and economy has likely changed too much over the period to make comparisons meaningful. If you use quarterly data for trend analysis be careful of seasonality. It may not be appropriate to compare quarter two to quarter one, but instead only to quarter two of last year.

### Potential Problems with Trend Analysis

One challenge with financial statement analysis is that many of the techniques we use help provide context for analysis, but they typically also have some flaws. Trend analysis is no different.

### Seasonality

Due to seasonality in quarterly financial statements (and annual balance sheets), seasonality concerns may lead to distortions in trends. We must be aware of how seasonality can impact our ratios and common size statements before we can properly analyze trends.

### Trend Changes

Trend analysis is designed to help us identify weaknesses and forecast future performance. The problem is trends can change suddenly. Often we can not identify changes in trends until after they have happened which can hinder our ability to use trends for predictions.

### Fundamental Changes

Significant changes in firm strategy or industry dynamics may make comparisons to previous years less meaningful.

## Comparative Analysis

Another way to make the ratios and common size statements meaningful is to compare them to industry averages or key competitors. For example, labor intensive industries may have high return on assets numbers while companies in capital (asset) intensive industries may have relatively low return on assets. Also, grocery stores are likely to have higher cost of goods sold values as a percentage of sales than software developers. If you are analyzing a software developer, it is important to compare it to others in the industry to determine if the numbers are “good” or “bad”. If our numbers compare favorably to the industry average that is a good sign, and numbers that compare unfavorably to the industry average indicate potential weaknesses. However, we must be careful here. Our goal is not to be average. If we are better than the industry average in an area, that does not mean we have no room for improvement and management should ignore that area.

### Potential Problems with Comparative Analysis

Just like trend analysis, comparative analysis provides insights but also introduces some challenges. Some of these challenges are listed below.

### Conglomerates

Some companies (such as [Compass Minerals](#) or [Amazon.com](#)) defy industry classification. Compass Minerals is both active in salt mining and plant nutrition which are two very different business lines. Amazon.com is a major retailer. However, they also offer streaming services, cloud computing, and are active in voice-related artificial intelligence. When a firm is involved in many different industries, comparative analysis can be misleading or extremely difficult to implement.

### Concentrated Industry

Some companies (such as [Facebook](#)) dominate an industry to such a large extent that it can be misleading to compare them to the industry norm. It may also be hard to find a sample of direct, publicly-traded competitors to put together a good comparison.

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