COMMONLY USED RATIOS

I. LIQUIDITY

Liquidity is defined as having enough cash (or near-cash assets) to pay your bills when they come due. The liquidity ratios compare the assets that will be converted into cash soon (the numerator) to the bills that will be coming due soon (the denominator).

You always want to compare the liquidity ratios to the industry average, but two other factors should be considered as well:

- *The predictability (or stability) of the company's sales. If you know how much money will be received each month, you don't need to keep as much cash on hand as you would otherwise. Companies with highly unpredictable sales are always in danger of experiencing a sudden shortfall in sales, so they need to keep more cash and liquid assets on hand.*
- *The company's access to bank lines of credit or the credit markets. You don't need to keep as much money on hand if you can just pick up the phone, call the bank, and have money deposited into your account.*

1. ***Current Ratio*** -- The current ratio is the most commonly used measure of the liquidity of a company. It is simply a common sense measure. The numerator is the value of assets that should be converted into cash within the next year. The denominator is the amount of bills coming due within the next year.

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

2. ***Quick Ratio (or Acid Test Ratio)*** -- The quick ratio is a more restrictive measure than the current ratio. The numerator consists of the ***most liquid*** current assets. It assumes a worst-case scenario in which inventory cannot be sold.

   The average for all manufacturing companies is about one (1.0). This average also varies a great deal from one industry to another.

$$\text{Quick Ratio} = \frac{\text{Cash} + \text{Mkt. Securities} + \text{Acc. Receivable}}{\text{Current Liabilities}}$$

   A commonly used variation of the ratio is:

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

   This is the version that you usually see in a standard finance textbook. But notice that this variation may include some non-liquid assets in the numerator however, such as prepaid expenses (like insurance premiums). This is the measurement that is actually used in practice most frequently, although the first form is theoretically superior.

II. TURNOVER (or EFFICIENCY)

Turnover ratios measure the management's efficiency and effectiveness in managing the firm's assets. In general, sales (or a measure of sales, like cost of goods sold) will be in the numerator. You would like for the value of the turnover ratios to be quite high (with the exception of the average collection period).

3. ***Inventory Turnover*** -- Indicates the number of times a year that the firm's inventory has been replaced. A low ratio may indicate that the firm has some obsolete inventory, or that possibly, the firm is simply overstocked on inventory. If the inventory turnover is 4 times per year, the company is replacing its inventory approximately every 3 months; if its inventory turnover is 12 times per year, it is replacing its inventory approximately every 30 days (or 1 month).

   The most commonly used form of the ratio is:

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

   A theoretically-superior variation of the formula is:

$$\textit{Inventory Turnover} = \frac{\textit{Cost of Goods Sold}}{\textit{Average of last 4 quarters' Inventory}}$$

   This form of the ratio is better for two reasons:

   - *Why substitute "Cost of Goods Sold" for "Sales" in the numerator? Inventory (in the denominator) is shown on the company's books at cost; we would like to use a measure of cost in the numerator as well (i.e., cost of goods sold) in order to get a fairer comparison.*
   - *Why substitute "Average Inventory" for "Inventory" in the denominator? The numerator is measured over a period of time, like a year. The denominator should show the average amount of inventory that was available for sale during this period. For example, assume that sales increased rapidly during the year and that inventory increased dramatically as well. We would not want to use year-ending inventory in the denominator, as it does not accurately depict the amount of inventory that was available for sale.*

4. ***Accounts Receivable Turnover*** -- Indicates how quickly the company collects its accounts receivable: the higher the turnover, the more quickly it collects its receivables.

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

   Notice that the formula assumes that all sales are on credit (and therefore go through accounts receivable). It would be better to use credit sales in the numerator, if the value of credit sales is available. But, if you compare the ratio to an industry average, just make sure that you are using the same formula as your source for the industry average. You don't want to use credit sales in the numerator if the industry average is calculated with total sales in the numerator.

5. ***Average Collection Period*** – Technically, this is not a turnover ratio: it is the accounts receivable turnover divided into 365 days. It is an alternate measure of how quickly accounts receivable are being collected. The ratio calculates how long (in days) that it takes the firm to collect its receivables. (Use *credit sales* if available, since only credit sales go through the accounts receivable account.)

$$\text{Average Collection Period} = \frac{\text{Accounts Receivable}}{\text{Sales}/365}$$

If the *A/R turnover* is lower than the industry average (and the *average collection period* is higher than the industry average), this just means that the company is collecting its receivables slower than other firms in the industry. However, it is quite possible that the company's credit terms may give its customers longer to pay than its competitors. So, rather than the industry average, it is better to compare the company's average collection period to the terms that they sell on, if the credit terms are known.

6. ***Total Asset Turnover*** -- The purpose of investing in assets is to generate sales: the higher the sales per dollar invested in total assets, the better. This ratio measures how efficiently the management is achieving its goal.

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

Major fault of the ratio: Total assets are made up of current assets and fixed assets. If the company's fixed assets are old (and therefore almost fully depreciated), the value of net fixed assets on the balance sheet will be quite small. This, in turn, will make total assets appear to be small and the value of the ratio will be high. This implies that a company with old assets is managing its assets quite efficiently. In fact, the company may not be managing its assets well at all – they are simply old and very depreciated. A company that has recently upgraded its assets by investing in newer equipment may actually be better managed, but its total asset turnover ratio will look inferior to the company with older assets. In spite of this, the total asset turnover ratio is widely used; it's simply important to know of its major deficiency when using it.

III. DEBT (OR LEVERAGE)

The debt, or leverage, ratios measure the ability of the firm to meet the principal and interest payments on its debt. Keep in mind that debt is neither good nor bad; it is simply a tool. There are times that heavy use of it is appropriate (e.g., when sales are going up) and there are times that it is detrimental (when sales are going down). These ratios simply measure the extent to which the company is using debt in financing the company's assets and whether it has gone too far by using so much debt that it is having difficulty in paying the interest when it is due.

7. ***Debt Ratio*** -- Indicates the percentage of the total assets that have been financed by debt.

$$\text{Debt Ratio} = \frac{\text{Total Debt (or Liabilities)}}{\text{Total Assets}}$$

On the balance sheet, total assets must equal total liabilities and capital. In other words, total assets are equal to the amount of the company's debt plus the amount of equity. Looked at another way,

the company is financed with a combination of debt and equity. So this ratio simply measures the percentage of the total assets that are financed with debt. If the debt ratio is 40%, this means that the company has financed 40% of its assets with debt (borrowed money) and 60% with equity (investors' money). This ratio is one way of measuring the financial leverage of the company: the higher the debt ratio, the higher the degree of financial leverage that the company has.

8. ***Debt-to-Equity*** -- A variation of the debt ratio. Measures the money invested by creditors relative to the money invested by the owners.

$$\text{Debt - to - Equity Ratio} = \frac{\text{Total Debt (or Liabilities)}}{\text{Total Equity}}$$

This is just another way of measuring the degree of financial leverage. Notice that if the debt ratio is 40%, this means that every $1.00 of total assets is financed with $0.40 in debt and $0.60 in equity. If we knew that the debt ratio is 40%, could we figure out the value of the debt-to-equity ratio? Sure, because we know that if debt is 40% of the assets, then equity must be the other 60%. Therefore, the debt-to-equity ratio is a ratio of 40/60, or 66.67%. Some financial analysts prefer to use the debt ratio; others prefer to use the debt-to-equity ratio. It isn't necessary to use both of them because they tell you the same information - just in a different form.

9. ***Times Interest Earned (or Interest Coverage)*** - A key measure of the firm's ability to meet its interest payments on time.

$$\text{Times Interest Earned (or Interest Coverage)} = \frac{\text{Net Operating Income (or E.B.I.T.)}}{\text{Interest Expense}}$$

Notice that the numerator is the amount of earnings that is available to meet interest payments. The denominator shows the amount of those interest payments. In other words, it is a ratio of the amount of money that *we have* to the amount of money that *we need* (to pay the interest). So a high ratio would indicate an ability to pay its interest without difficulty.

IV. PROFITABILITY

Since a major goal of the company is to attain a high level of profitability, we would like to see a high value for these ratios. We can relate the company's profits to almost any item on the balance sheet or income statement (e.g., net income to total assets, net income to common equity, net income to sales, etc.)

10. ***Return on Assets*** – The primary purpose of investing in assets is to generate sales, which in turn lead to profits. The return on assets ratio measures the profitability per dollar of investment in the firm. Notice that the ratio doesn't say anything about how the assets are financed, i.e., where the money comes from (either debt or equity). It simply wants to know how profitable the company is per dollar invested in total assets (no matter where the money comes from to finance those assets).

$$\text{Return on Assets} = \frac{\text{Earnings After Taxes}}{\text{Total Assets}}$$

Note: You will see a lot of variations in the numerator for this ratio: some analysts use earnings before taxes (EBT), others will use earnings before interest and taxes (EBIT). The most common, however, is earnings after taxes (EAT). Just make sure that, if you are comparing a company's return on assets ratio to an industry average, you are calculating the ratio in the same manner as your source for the industry average.

11. ***Return on Equity*** – This ratio looks at the company's profits from the standpoint of the company's owners. It measures the profitability per dollar of investment in the firm by the owners.

$$\text{Return on Equity} = \frac{\text{Earnings After Taxes}}{\text{Total Equity}}$$

Note: As with the previous ratio, you will see a lot of variations in the numerator for this ratio. Again, just make sure that, if you are comparing a company's return on equity ratio to an industry average, you are calculating the ratio in the same manner as your source for the industry average.

12. ***Price-Earnings Ratio*** -- The price-earnings ratio is the most frequently used measure of a stock's relative value. The price-earnings ratio tells us two things about a company's stock:
    - It is a measure of how optimistic investors are about the company's future growth in earnings and dividends. The higher the P/E ratio, the more optimistic investors are about the company's future prospects.
    - It is a measure of the premium that you have to pay for the stock. For example, if a stock's P/E ratio is 35 and the average P/E for all stocks is 18, investors are having to pay a considerable premium to acquire the stock (but may be getting a higher quality company). On the other hand, if a stock's P/E ratio is 8, we are able to buy the stock at a discount relative to other stocks (but may be getting an inferior company).

$$\text{Price - Earnings Ratio} = \frac{\text{Current market price of the common stock}}{\text{Earnings per share (for the past 12 months)}}$$

The P/E ratio is often used to help estimate the future price of the stock using this equation:

$$Price_n = [P/E\ ratio]_n \text{ times } [Earnings\ per\ share]_n$$

where "n" refers to a specific year in the future.

For example, the price of a stock 3 years from now will be equal to the P/E ratio that the stock has 3 years from now times the earnings (per share) that the stock has 3 years from now. That is,

$$Price_3 = [P/E\ Ratio]_3 * [Earnings\ per\ share]_3$$

$$Price_3 = 12 * \$3.00 = \$36.00$$

If we can estimate the value of the P/E ratio 3 years from now and the earnings expected at that time, we can use the equation to estimate the market price of the stock at that time.

ADDITIONAL RATIOS THAT YOU MAY ENCOUNTER

V. VALUATION

Valuation ratios help determine whether a stock is over-priced or under-priced relative to other stocks (or relative to the basic earning power of the company). In general, we would like to purchase the items in the denominators (earnings, cash flow, sales, etc.) for a low price. Therefore, we prefer to invest in companies that have a low value for the following ratios.

13. ***Price-to-Cash Flow Ratio*** – The ultimate objective to investing is to earn a relatively high cash flow. If we can purchase this high cash flow at a cheap price, so much the better. Therefore, we would like to have invest in companies that have a low price-to-cash flow ratio.

$$\text{Price - to - Cash Flow Ratio} = \frac{\text{Current market price of the common stock}}{\text{Cash flow per share}}$$

14. ***Price-to-Sales Ratio*** – This ratio helps to value a company that has no earnings and no dividends. Also, the price-to-sales ratio may be more stable than the price/earnings ratio and, therefore, more useful. Research also supports the idea that a portfolio of stocks that have a low price-to-sales ratio may be an anomaly and outperform portfolios made up of high price-to-sales ratios.

$$\text{Price - to - Sales Ratio} = \frac{\text{Current market price of the common stock}}{\text{Sales per share (i.e., [Total Sales]/[shares outstanding]}}$$

15. ***Price-to-Book Value Ratio*** – This ratio relates the common stock's market value to its "accounting value" as shown on the company's books. One major respected research study maintains that stocks with a low price-to-book value ratio tend to outperform other portfolios.

$$\text{Price - to - Book Ratio} = \frac{\text{Current market price of the common stock}}{\text{Common equity as shown on the balance sheet}}$$

VI. MORE EFFICIENCY RATIOS

16. ***Capital Spending-to-Depreciation*** – This ratio assumes that the depreciation charges are an accurate reflection of the physical wear-and-tear on the fixed assets, i.e., the rate at which the fixed assets are being used up. Capital spending is the amount of money that is spent on the purchase of new fixed assets. So a ratio of capital spending-to-depreciation would show whether the fixed assets are being replaced at the same rate that they wear out. In other words, a ratio value greater than 1.0 would indicate that the assets are being adequately replaced; a value of less than 1.0 would indicate a shrinkage in the size of the fixed assets.

$$\text{Capital Spending - to - Depreciation} = \frac{\text{Capital Spending}}{\text{Depreciation}}$$

VII. MORE DEBT (OR LEVERAGE) RATIOS

17. ***EBITDA-to-Debt Service*** – EBITDA (pronounced ee-bit-DAH) can be determined by adding interest expense, taxes, and depreciation/amortization to earnings after taxes (i.e., EAT or net income). EBITDA is therefore the amount of money that is available to meet any payment obligations (i.e., interest and principal payments) on the company's debt. (Debt service refers to these interest and principal payments.)

    Therefore, the ratio relates the amount of money that we have from this year's cash flow that is available to pay down the debt (and related interest) to the amount of required payments. A ratio of 1.0 would be the bare minimum that would be required to meet these payments. However, you would want a much larger cushion than this to ensure that the cash flow will not drop to levels that are not sufficient to meet the debt payments.

$$\text{EBITDA - to - Debt Service} = \frac{\text{EAT} + \text{Interest expense} + \text{Taxes} + \text{Depreciation} + \text{Amortization}}{\text{Required interest payments} + \text{Required principal payments on the debt}}$$

VIII. MORE PROFITABILITY RATIOS

18. ***Gross Profit Margin (or Gross Margin)*** – By definition, gross profit is equal to total sales minus cost of goods sold. Therefore, if the gross profit margin declines, it is an indication that one of two things is likely happening:
    - The cost of goods sold are increasing, and the company is not able to pass along the higher costs in the form of price increases (possibly due to a highly competitive marketplace), or
    - The company has reduced its prices, perhaps in an attempt to attract new customers and to increase its market share.

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Total Sales}}$$

19. ***Net Profit Margin (or Net Margin)*** – Whereas the gross profit margin measures the performance of the company's operating managers, it doesn't say anything about the performance of the company's financial managers. (Gross margin is affected only by the decisions of operating managers with regard to pricing and cost control; it isn't affected by decisions on how to finance the company.) The net profit margin measures the combined performance of both the operating and financial managers.

$$\text{Net Profit Margin} = \frac{\text{Earnings AfterTaxes}}{\text{Total Sales}}$$

20. ***Return on Investment*** – *Return on investment* could be stated as the return on "long-term investment funds". Investment here refers to the total long-term sources of funds to a company, i.e., long-term liabilities, preferred stock, and common equity. The current liabilities are a temporary source of financing and may vary considerably over the course of a year; the providers of long-term funds have made a commitment to the company and provide the permanent financing for the firm.

$$\text{Return on Investment} = \frac{\text{Earnings After Taxes}}{\text{Long - term Liabilites} + \text{Preferred Stock} + \text{Common Equity}}$$