

## RATIO ANALYSIS DESCRIPTIONS

### ACTIVITY RATIOS

<b>Inventory Turnover - model for measuring inventory usage</b> Measures the number of times that average inventory of finished goods was turned over or sold during a period of time, usually one year.	<b>Inventory Turnover Formula:</b> $\text{Total Income} / \text{Inventory}$ Decimal
<b>Days of Inventory - model for measuring inventory on hand</b> Measures the number of times that average inventory of finished goods was turned over or sold during a period of time, usually one year.	<b>Days of Inventory Formula:</b> $\text{Inventory} / (\text{COGS} / 360)$ Days
<b>Net Working Capital Turnover</b> Measures how effectively the net working capital is used to generate sales.	<b>Net Working Capital Turnover Formula:</b> $\text{Total Income} / \text{NWC}$ Decimal
<b>Asset Turnover</b> Measures the utilization of all the company's assets; measures how many sales are generated by each dollar of assets.	<b>Asset Turnover Formula:</b> $\text{Total Income} / \text{Total Assets}$ Decimal
<b>Fixed Asset Turnover</b> Measures the utilization of all the company's fixed assets i.e. plant and equipment): measures how many sales are generated by each dollar of fixed of fixed assets.	<b>Fixed Asset Turnover Formula:</b> $\text{Total Income} / \text{Fixed Assets}$ Decimal
<b>Average Collection Period</b> Indicates the average length of time in days that a company must wait to collect a sale after making it; may be compared to the credit terms offered by the company to its customers.	<b>Average Collection Period Formula:</b> $\text{AR} / (\text{Total Income} / 360)$ Days
<b>Accounts Receivable Turnover</b> Indicates the number of times that AR is cycled during the period (usually one year).	<b>Accounts Receivable Turnover Formula</b> $\text{Credit Sales} / \text{AR}$ Decimal
<b>Days of Cash Ratio model - method for measuring liquidity in days.</b> Indicates the number of days of cash on hand, at present sales levels	<b>Days of Cash Ratio Formula</b> $(\text{Cash Equivalents} + \text{Cash}) / (\text{Total Income} / 360)$ Days
<b>Debt to Asset Ratio.</b> Measures the extent to which borrowed funds have been used to finance the company's assets.	<b>Debt to Asset Ratio Formula</b> $\text{Total Liabilities} / \text{Total Assets}$ Percentage

### LEVERAGE RATIOS

<b>Equity to Asset Ratio.</b> Measures the extent to which equity funds have been used to finance the company's assets.	<b>Equity to Asset Ratio Formula</b> $\text{Total Equity} / \text{Total Assets}$ Percentage
<b>Debt to Equity Ratio -Measuring Solvency and Capital</b> Measures the funds provided by creditors versus the funds provided by equity.	<b>Debt to Equity Ratio Formula</b> $\text{Total Liabilities} / \text{Total Equity}$

## RATIO ANALYSIS DESCRIPTIONS

<p><b>LEVERAGE RATIOS (CONTINUED)</b></p> <p>The <b>Debt to Equity Ratio</b> is used for <b>Measuring Solvency</b> and researching the <b>Capital Structure</b> of a company. It indicates how much the company is leveraged (in debt) by comparing what is owed to what is owned. In other words it measures a company's ability to borrow and repay money. The Debt to Equity Ratio is closely watched by <b>creditors and investors</b>, because it reveals the extent to which company management is willing to fund its operations with debt, rather than equity. <b>Lenders such as banks</b> are particularly sensitive about this ratio, since an excessively high ratio of debt to equity will put their loans at risk of not being repaid. Possible actions by banks to counteract this problem are the use of restrictive contracts that force excess cash flow into debt repayment, restrictions on alternative use of cash, and a requirement for investors to put more equity into the company themselves.</p> <p>Sometimes only long-term debt is taken into account in the numerator to look at the long term debt to equity <i>capital</i> structure. Comparing the result with industry peers may prove useful. It is recommended to use this ratio over a period of several years and additionally take into account WHEN certain repayments are due as this can make a major difference for the solvency of the company. Compare with Debt to Equity Ratio: Cash Flow from Operations   Dividend Payout Ratio</p>	<p>Percentage</p>
<p><b>Current Liabilities to Equity Ratio.</b>  Measures the short-term financing portion versus that provided by equity.</p>	<p><b>Current Liabilities to Equity Ratio Formula</b>  Current Liabilities / Total Equity  Percentage</p>
<p><b>Current Ratio method - model for measuring liquidity</b>  A short-term indicator of the company's ability to pay its short-term liabilities from short-term assets: how much of a current assets are available to cover each dollar of current liabilities</p> <p>The <b>Current Ratio (CR) method</b> is a model for <b>measuring the liquidity</b> of a company by calculating the ratio between all current assets and all current liabilities. It is an indicator of a company's ability to pay short-term obligations.</p> <p>This ratio is also known as the <b>working capital ratio</b> and <b>real ratio</b> and is the standard measure of a business' financial health. It will tell us whether a business is able to meet its current obligations by measuring if it has enough assets to cover its liabilities. For <b>example</b>, if a corporation has \$50M in current assets to cover \$50M in current liabilities, this means it has a 1:1 current ratio.</p> <p><b>What is an acceptable current ratio?</b>  This varies by industry. Generally speaking, the more liquid the current assets, the smaller the CR can be without cause for concern. For most industrial companies, 1.5 is an acceptable CR. A standard CR for a healthy business is close to two, meaning it has twice as many assets as liabilities. A thing to remember when using the CR is that it <i>ignores timing of both cash received and cash paid out</i>. Take the example of a company with no bills due today, but lots of bills that are due tomorrow. The company also owns a lot of inventory (as part of its current assets). However the inventory will only be sold in the longer term. This company may show a good current ratio, but can not be considered as having a good liquidity.</p>	<p><b>Current Ratio Formula:</b>  Current Assets / Current Liabilities  Decimal</p>

## RATIO ANALYSIS DESCRIPTIONS

<b>LEVERAGE RATIOS (CONTINUED)</b>	
<p><b>Quick Ratio (Acid-test Ratio) - A method for measuring liquidity</b> Measures the company's ability to payoff its short-term obligations from current assets, excluding inventories.</p> <p>The <b>Quick Ratio (QR) method</b> is a model for <b>measuring the liquidity</b> of a company by calculating the ratio between all assets quickly convertible into cash and all current liabilities. It specifically excludes inventory. It is an indicator of the extent to which a company can pay current liabilities without relying on the sale of inventory. Typically, a QR of 1:1 or higher is good and indicates a company does not have to rely on the sale of inventory to pay the bills.</p> <p>A thing to remember when using the QR model is that it <i>ignores timing of both cash received and cash paid out</i>. Take the example of a company with no bills due today, but lots of bills that are due tomorrow. This company may show a good quick ratio, but can not be considered as having a good liquidity.</p>	<p><b>Quick Ratio Formula:</b> <math display="block">\frac{\text{Current Assets} - \text{Inventory}}{\text{Current Liabilities}}</math> Decimal</p>
<p><b>Inventory to Net Working Capital (NWC)</b> A measure of inventory balance; measures the extent to which the cushion of excess current assets over current liabilities may be threatened by unfavorable changes in inventory.</p>	<p><b>Inventory to NWC Formula:</b> <math display="block">\frac{\text{Inventory}}{(\text{Current Assets} - \text{Current Liabilities})}</math> Decimal</p>
<p><b>Cash Ratio model - method for measuring liquidity</b> Measures the extent to which the company's capital is in cash or cash equivalents; shows how much of the current obligations can be paid from cash of near-cash assets.</p> <p>The <b>Cash Ratio (CR) method</b> is a formula for <b>measuring the liquidity</b> of a company by calculating the ratio between all cash and cash equivalent assets and all current liabilities. It excludes both inventory and accounts receivable in comparison to the <b>Current Ratio</b>. The CR model measures only the most liquid of all assets against current liabilities, and is therefore seen as the most conservative of the three liquidity ratios.</p> <p>This CR ratio is also known as the <b>Liquidity Ratio and Cash Asset Ratio</b>. The formula is an indicator of the extent to which a company can pay current liabilities without relying on the sale of inventory and without relying on the receipt of accounts receivables. A thing to remember when using the Cash Ratio formula is that it <i>ignores timing of both cash received and cash paid out</i>.</p>	<p><b>Cash Ratio Formula</b> <math display="block">\frac{\text{Cash Equivalents} + \text{Cash}}{\text{Current Liabilities}}</math> Decimal</p>
<p><b>Cash Flow from Operations</b> The <b>Cash Flow from Operations ratio</b> (also: <b>Operating Cash Flow</b>) is used to determine the extent to which cash flow differs from the reported level of either Operating Income or Net Income. (Under both IFRS and US GAAP a company can still easily report healthy income figures, even while its cash resources are poor). In other words: it is a check on the quality of a company's earnings. It's arguably a better measure of a business's profits than earnings, because a company can show positive net earnings and still not be able to pay its debts.</p> <p>A difference in this ratio and Reported Earnings is indicative of substantial noncash expenses or sales in the reported</p>	<div style="border: 1px solid black; padding: 10px;"> <p style="text-align: right; font-size: small;">www.valuebasedmanagement.net</p> <p style="text-align: center;"><b>Cash Flow from Operations (CFO)</b></p> <math display="block">1. CFO = \frac{\text{Income from Operations} + \text{Noncash Expenses} - \text{Noncash Sales}}{\text{Income from Operations}}</math>   <math display="block">2. CFO = \frac{\text{Net Income} + \text{Noncash Expenses} - \text{Noncash Sales}}{\text{Net Income}}</math> </div>

## RATIO ANALYSIS DESCRIPTIONS

### LEVERAGE RATIOS (CONTINUED)

income figures and if a firm reports record earnings but negative Operating Cash Flows, it may be using aggressive accounting techniques. If the **Cash Flow from Operations ratio is substantially less than one** or decreasing / poor over a longer period of time, cash flow problems are likely.

An **Operating Cash Flow calculation** can be done in two formats:

1. Divide operational cash flow by income from operations (yields a more accurate view of the proportion of cash being spun off from ongoing operations)
2. Divide cash flow from all transactions (including extraordinary items) by net income (shows the impact of any transactions that are not related to operations)

Both calculations measure the cash generated from operations, not counting capital spending or working capital requirements.

#### Net Working Capital (NWC)

Measures the extent to which the cushion of excess current assets over current liabilities available for debt service and company expansion.

#### NWC Formula:

Current Assets - Current Liabilities  
\$ USD

### PROFITABILITY RATIOS

#### Gross Profit Margin

The **Gross Profit Margin** is ratio that can be derived from an income statement and reveals the profit left over from operations after all variable costs have been subtracted from revenues. It can be used for **determining Operating Performance**, because it shows the **production efficiency** in relation to the **prices and unit volumes at which products or services are sold**. Comparison of the ratio provides the most meaningful information.

For example:

**Comparing the Gross Profit Percentage ratio to an industry average** (ensure the method used of calculating the industry ratio is the same). This provides an indication of whether the company is performing better or worse than the industry as a whole. The comparison is useful when obtaining a preliminary knowledge of the company's business.

**Comparing the Gross Profit Percentage between different divisions within an entity**. This comparison provides an indication of which divisions may require further investigation. The comparison is useful when obtaining a detailed knowledge of the company's business.

**Comparing the Gross Profit Percentage over time**. For example comparing this year with last year. An increase in the ratio over the previous year may be an indication that cost of sales is understated (including, for example, an overstatement of closing inventory) or that revenue is overstated; a decrease may indicate that cost of sales is overstated or that gross revenue is understated. (Where monthly figures are available, an examination of the ratio for the last two months of the financial year could assist in highlighting any adjustments made to revenue and cost of sales at year end.) In many instances, however, a change in the ratio is due to a change in production methods, product mix, or some other legitimate reason.

#### Gross Profit Margin Formula:

$(\text{Gross Sales} - \text{COGS}) / \text{Net Sales}$   
Percentage

## RATIO ANALYSIS DESCRIPTIONS

<b>PROFITABILITY RATIOS (CONTINUED)</b>	
<p>A common <b>Gross Profit Margin ratio calculation</b> goes as follows: Add together the costs of overhead, direct materials and direct labor; subtract the total from revenue; and then divide the result by revenue. A problem with this approach is that many of the production costs are not truly variable.</p> <p>In order to avoid this, an <b>alternate calculation formula</b> only includes direct materials in the formula, shifting the other production costs into operational and administrative costs. This obviously yields a higher gross margin percentage.</p>	
<p><b>Net Profit Margin (NPM)</b> The <b>Net Profit Margin</b> reveals the <b>return from operations</b>. Shows how much before-tax is generated by each dollar of sales. Compare with Operating Profit Percentage: <b>Gross Profit Margin</b></p>	<p><b>Net Profit Margin (NPM) Formula</b> Net Profit Before Taxes (NPBF) / Net Sales Percentage</p>
<p><b>Operating Profit Margin (OPP)</b> The <b>Operating Profit Percentage</b> reveals the <b>return from standard operations</b>, excluding the impact of extraordinary items and other comprehensive income. It shows the extent to which a company is earning a profit from standard operations, as opposed to resorting to asset sales or unique transactions to post an "artificial" profit.</p> <p><b>Calculation of the Operating Profit Percentage</b> is straightforward: subtract the costs of goods sold, as well as all sales, general, and administrative expenses, from sales. Divide the result by sales.</p> <p>To obtain a percentage that is related strictly to operational results, be sure to <b>exclude interest income and expense</b> from the calculation, since these items are related to a company's financing decisions rather than its operational characteristics.</p> <p><b>Expense totals</b> used in the Operating Profit Percentage ratio should <b>exclude extraordinary transactions</b>, as well as <b>asset dispositions</b>, since they do not relate to continuing operations.</p> <p>Compare with Operating Profit Percentage: <b>Gross Profit Margin</b></p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <small>www.valuebasedmanagement.net</small>  <b>Operating Profit Percentage (OPP)</b>   <math display="block">OPP = \frac{\text{Sales} - (\text{Cost of Goods Sold} + \text{Sales, General, and Administrative Expenses})}{\text{Sales}}</math> </div> <p>Percentage</p>
<p><b>Return on Net Working Capital</b> Measures the rate of return on the net working capital of the company.</p>	<p><b>Return on Net Working Capital Formula:</b> NPBF / NWC Percentage</p>
<p><b>Return on Investment (ROI) ) or Return on Assets (ROA) -Measuring Company Success</b> Accounting Value Single period measurement (Traditional Income Measure) Measures the rate of return on the total assets utilized in the company; a measure of management's efficiency, it shows the return on all the assets under its control regardless of source of financing.</p> <p><b>Return on Investment (ROI)</b> is an accounting valuation method. Because the numerator (Net Income) is an unreliable corporate performance measurement, the outcome of the formula for ROI must also be unreliable to determine success or corporate value. However the ROI formula still keeps showing up in many annual reports.</p> <p>The degree to which <b>Return on Investment (ROI)</b> overstates the economic value depends on at least 5 factors:</p> <ol style="list-style-type: none"> <li>1. Length of project life (the longer, the bigger the overstatement)</li> </ol>	<p><b>ROI/ROA Formula:</b> NPBF / Total Assets Percentage</p>

**RATIO ANALYSIS DESCRIPTIONS**

<p><b>PROFITABILITY RATIOS (CONTINUED)</b></p> <ol style="list-style-type: none"> <li>Capitalization policy (the smaller the fraction of total investment capitalized in the books, the greater will be the overstatement)</li> <li>The rate at which depreciation is taken on the books (depreciation rates faster than straight-line basis will result in a higher ROI)</li> <li>The lag between investment outlays and the recoupment of these outlays from cash inflows (the greater the time lag, the greater the degree of overstatement)</li> <li>The growth rate of new investment (faster growing companies will have lower Return On Investment )</li> </ol> <p>Although <b>Return on Investment (ROI)</b> does not explicitly measures capital charges, it does remind managers that there is a cost to acquiring and holding assets.</p>	
<p><b>Return On Equity (ROE) Accounting valuation:</b> ROE, Accounting Value, Single period measurement, Traditional Income Measure</p> <p><b>Return on Equity (ROE)</b> is an accounting valuation method similar to <b>Return on Investment (ROI)</b>. Because the numerator (Net Income) is an unreliable corporate performance measurement, the outcome of the formula for <b>ROE</b> must also be unreliable to determine success or corporate value. However the formula keeps showing up in many annual reports still.</p> <p>The degree to which <b>Return on Equity (ROE)</b> overstates the economic value depends on at least 5 factors:</p> <ol style="list-style-type: none"> <li><b>length of project life</b> (the longer, the bigger the overstatement)</li> <li><b>capitalization policy</b> (the smaller the fraction of total investment capitalized in the books, the greater will be the overstatement)</li> <li>The <b>rate</b> at which <b>depreciation</b> is taken on the books (depreciation rates faster than straight-line basis will result in a higher ROE)</li> <li>The <b>lag between investment outlays and the recoupment of these outlays from cash inflows</b> (the greater the time lag, the greater the degree of overstatement)</li> <li>The <b>growth rate of new investment</b> (faster growing companies will have lower Return On Equity)</li> </ol> <p>On top of this, <b>ROE is sensitive to leverage</b>: assuming that proceeds from debt financing can be invested at a return greater than the borrowing rate; ROE will increase with greater amounts of leverage.</p> <p><b>Formula Return on Equity calculation - Net Income / Book Value of Shareholders' Equity = ROE</b></p>	<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p><small>www.valuebasedmanagement.net</small></p> <p><b>Return on Equity (RoE)</b></p> <math display="block">\text{RoE} = \frac{\text{Net Income}}{\text{Book Value of Shareholders' Equity}}</math> </div>
<p><b>DuPont Equation</b> <b>Measures the relation between ROA , the Asset turnover, and the Net Profit Margin</b> Emphasizes that ROI may be explained in terms of the efficiency of asset management and the Net Profit Margin.</p>	<p><b>DuPont Equation Formula:</b> (NPBF / Total Assets) = (Gross Sales / Total Assets) X (NPBF / Gross Sales) Percentage</p>

## RATIO ANALYSIS DESCRIPTIONS

### EQUITY RATIOS

<p><b>Earnings Per Share (EPS)</b> Measures the Net Profit Margin (Net Income) earned by common shareholders on a per share basis.</p>	<p><b>Earnings Per Share Formula</b> NPBF / Number of Shares Outstanding \$ USD Per Share</p>
<p><b>Price /Earnings Ratio (PE).</b> Show's the current market's evaluation of a stock based on its earnings; shows how much the investor is willing to pay for each dollar of earnings.</p>	<p><b>Price/Earnings Ratio Formula</b> Market Price Per Share / EPS Decimal</p>
<p><b>Dividend Payout Ratio.</b> Indicates the percentage of profit that is paid out as dividends to common stockholders.</p>	<p><b>Dividend Payout Ratio Formula</b> Annual Dividend Per Share / EPS Percentage</p>

### BANKRUPTCY RISK INDICATOR

The **Z-Score formula for Predicting Bankruptcy** of **Edward Altman** is a multivariate formula for a measurement of the financial health of a company and a powerful diagnostic tool that forecasts the probability of a company entering bankruptcy within a 2 year period. Studies measuring the effectiveness of the Z-Score have shown the model is often accurate in predicting bankruptcy (72%-80% reliability)

- The **Z-Score bankruptcy predictor** combines **five common business ratios**, using a weighting system calculated by Altman to determine the likelihood of a company going bankrupt. It was derived based on data from manufacturing firms, but has since proven to be effective as well (with some modifications) in determining the risk a service firm will go bankrupt. How should the results be judged? It depends:

**Original Z-SCORE [For Public Manufacturer]** If the score is 3.0 or above - bankruptcy is not likely. If the Score is 1.8 or less - bankruptcy is likely. A score between 1.8 and 3.0 is the gray area. Probabilities of bankruptcy within the above ranges are 95% for one year and 70% within two years. Obviously, a higher score is desirable.

- **Model A Z'-Score [For Private Manufacturer]** Model A of Altman's Z-Score is appropriate for a private manufacturing firm. Model A should not be applied to other companies. A score of 2.90 or above indicates that bankruptcy is not likely, but a score of 1.23 or below is a strong indicator that bankruptcy is likely. Probabilities of bankruptcy in the above ranges are 95% for one year and 70% within two years. Obviously, a higher score is desirable.

- **Model B Z'-Score [For Private General Firm]** Edward Altman developed this version of the Altman Z-Score to predict the likelihood of a privately owned non-manufacturing company going bankrupt within one or two years. Model B is appropriate for a private general (nonmanufacturing) firm. Model B should not be applied to other companies. A score of 1.10 or lower indicates that bankruptcy is likely, while a score of 2.60 or above can be an indicator that bankruptcy is not likely. A score between the two is the gray area. Probabilities of bankruptcy in the above ranges are 95% for one year and 70% within two years. Again, obviously, a higher score is desirable.

www.valuebasedmanagement.net

### Altman's Z-Score

Working Capital / Total Assets x 1.2	
Retained Earnings / Total Assets x 1.4	
EBIT / Total Assets x 3.3	
Market Value of Equity / Book Value of Total Liabilities x 0.6	
Sales / Total Asset) x 0.999	
+	
Z-Score (Public Companies)	
Working Capital / Total Assets x .717	
Retained Earnings / Total Assets x .847	
EBIT / Total Assets x 3.107	
Market Value of Equity / Market Value of Total Liabilities x 0.420	
Sales / Total Asset) x 0.998	
+	
Z'-Score (Private Companies)	

The Z-Score was developed in 1968 by **Dr. Edward I. Altman, Ph.D.**, a financial economist and professor at New York University's Stern School of Business.

## RATIO ANALYSIS DESCRIPTIONS

### SWOT ANALYSIS IDENTIFYING STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS - SWOT

A **SWOT analysis** is an instrumental framework in Value Based Management and Strategy Formulation to identify the Strengths, Weaknesses, Opportunities and Threats for a particular company. Strengths and Weaknesses are internal value creating (or destroying) factors such as assets, skills or resources a company has at its disposal relatively to its competitors. They can be measured using internal assessments or external benchmarking. Opportunities and Threats are external value creating (or destroying) factors a company cannot control, but emerge from either the competitive dynamics of the industry/market or from demographic, economic, political, technical, social, legal or cultural factors.

Typical examples of **factors in a SWOT Analysis** diagram:

Any organization must try to create a fit with its external environment. The SWOT diagram is a very good tool for analyzing the (internal) strengths and weaknesses of a corporation and the (external) opportunities and threats. However, this analysis is just the first step. Actually creating alignment is often a more hazardous job, because in reality the two sides of the SWOT analysis often point in opposite directions, leaving strategists with the paradox of creating alignment either from the **outside-in** (market-driven strategy) or from the **inside-out** (resource driven strategy).

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>- Specialist marketing expertise</li> <li>- Exclusive access to natural resources</li> <li>- Patents</li> <li>- New, innovative product or service</li> <li>- Location of your business</li> <li>- cost advantage through proprietary know-how</li> <li>- Quality processes and procedures</li> <li>- Strong brand or reputation</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>- Lack of marketing expertise</li> <li>- Undifferentiated products and service (i.e. in relation to your competitors)</li> <li>- Location of your business</li> <li>- Competitors have superior access to distribution channels</li> <li>- Poor quality goods or services</li> <li>- Damaged reputation</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>- developing market (China, the Internet)</li> <li>- Mergers, joint ventures or strategic alliances</li> <li>- moving into new attractive market segments</li> <li>- A new international market</li> <li>- loosening of regulations</li> <li>- Removal of international trade barriers</li> <li>- A market led by a weak competitor</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>- A new competitor in your home market</li> <li>- Price war</li> <li>- Competitor has a new, innovative substitute product or service</li> <li>- New regulations</li> <li>- Increased trade barriers</li> <li>- Taxation may be introduced on your product or service</li> </ul>