Financial Ratios Tutorial

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1) Liquidity Measurement Ratios

The first ratios we'll take a look at in this tutorial are the liquidity ratios. Liquidity ratios attempt to measure a company's ability to pay off its short-term debt obligations. This is done by comparing a company's most liquid assets (or, those that can be easily converted to cash), its short-term liabilities.

In general, the greater the coverage of liquid assets to short-term liabilities the better as it is a clear signal that a company can pay its debts that are coming due in the near future and still fund its ongoing operations. On the other hand, a company with a low coverage rate should raise a red flag for investors as it may be a sign that the company will have difficulty meeting running its operations, as well as meeting its obligations.

The biggest difference between each ratio is the type of assets used in the calculation. While each ratio includes current assets, the more conservative ratios will exclude some current assets as they aren't as easily converted to cash.

The ratios that we'll look at are the current, quick and cash ratios and we will also go over the cash conversion cycle, which goes into how the company turns its inventory into cash.

To find the data used in the examples in this section, please see the Securities and Exchange Commission's website to view the 2005 Annual Statement of Zimmer Holdings.

a) Current Ratio

The current ratio is a popular financial ratio used to test a company's liquidity (also referred to as its current or working capital position) by deriving the proportion of current assets available to cover current liabilities.

The concept behind this ratio is to ascertain whether a company's short-term assets (cash, cash equivalents, marketable securities, receivables and inventory) are readily available to pay off its short-term liabilities (notes payable, current portion of term debt, payables, accrued expenses and taxes). In theory, the higher the current ratio, the better.

Formula:

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

Components:

$$\text{Current Ratio} = \frac{\$1{,}575.6}{\$606.9} = 2.6$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings' current assets amounted to $1,575.60 (balance sheet), which is the numerator; while current liabilities amounted to $606.90 (balance sheet), which is the denominator. By dividing, the equation gives us a current ratio of 2.6.

Variations:
None

Commentary:
The current ratio is used extensively in financial reporting. However, while easy to understand, it can be misleading in both a positive and negative sense - i.e., a high current ratio is not necessarily good, and a low current ratio is not necessarily bad (see chart below).

Here's why: Contrary to popular perception, the ubiquitous current ratio, as an indicator of liquidity, is flawed because it's conceptually based on the liquidation of all of a company's current assets to meet all of its current liabilities. In reality, this is not likely to occur. Investors have to look at a company as a going concern. It's the time it takes to convert a company's working capital assets into cash to pay its current obligations that is the key to its liquidity. In a word, the current ratio can be "misleading."

A simplistic, but accurate, comparison of two companies' current position will illustrate the weakness of relying on the current ratio or a working capital number (current assets minus current liabilities) as a sole indicator of liquidity:

--	Company ABC	Company XYZ
Current Assets	$600	$300
Current Liabilities	$300	$300
Working Capital	$300	$0
Current Ratio	2.0	1.0

Company ABC looks like an easy winner in a liquidity contest. It has an ample margin of current assets over current liabilities, a seemingly good current ratio,

and working capital of $300. Company XYZ has no current asset/liability margin of safety, a weak current ratio, and no working capital.

However, to prove the point, what if: (1) both companies' current liabilities have an average payment period of 30 days; (2) Company ABC needs six months (180 days) to collect its account receivables, and its inventory turns over just once a year (365 days); and (3) Company XYZ is paid cash by its customers, and its inventory turns over 24 times a year (every 15 days).

In this contrived example, Company ABC is very *illiquid* and would not be able to operate under the conditions described. Its bills are coming due faster than its generation of cash. You can't pay bills with working capital; you pay bills with cash! Company's XYZ's seemingly tight current position is, in effect, much more liquid because of its quicker cash conversion.

When looking at the current ratio, it is important that a company's current assets can cover its current liabilities; however, investors should be aware that this is not the whole story on company liquidity. Try to understand the types of current assets the company has and how quickly these can be converted into cash to meet current liabilities. This important perspective can be seen through the cash conversion cycle. By digging deeper into the current assets, you will gain a greater understanding of a company's true liquidity.

b) Quick Ratio

The quick ratio - aka the quick assets ratio or the acid-test ratio - is a liquidity indicator that further refines the current ratio by measuring the amount of the most liquid current assets there are to cover current liabilities. The quick ratio is more conservative than the current ratio because it excludes inventory and other current assets, which are more difficult to turn into cash. Therefore, a higher ratio means a more liquid current position.

Formula:

$$\text{Quick Ratio} = \frac{\text{Cash \& Equivalents} + \text{Short - term Investments} + \text{Accounts Receivable}}{\text{Current Liabilities}}$$

Components:

$$\text{Quick Ratio} = \frac{\$233.2 + \$524.2}{\$606.9} = 1.3$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings' quick assets amounted to $756.40 (balance sheet); while current liabilities amounted to $606.90 (balance sheet). By dividing, the equation gives us a quick ratio of 1.3.

Variations:
Some presentations of the quick ratio calculate quick assets (the formula's numerator) by simply subtracting the inventory figure from the total current assets figure. The assumption is that by excluding relatively less-liquid (harder to turn into cash) inventory, the remaining current assets are all of the more-liquid variety. Generally, this is close to the truth, but not always.

Zimmer Holdings is a good example of what can happen if you take the aforementioned "inventory shortcut" to calculating the quick ratio:

Standard Approach: $233.2 plus $524.2 = $756 ÷ $606.9 =1.3

Shortcut Approach: $1,575.6 minus $583.7 = $991.9 ÷ $606.9 = 1.6

Restricted cash, prepaid expenses and deferred income taxes do not pass the test of truly liquid assets. Thus, using the shortcut approach artificially overstates Zimmer Holdings' more liquid assets and inflates its quick ratio.

Commentary:
As previously mentioned, the quick ratio is a more conservative measure of liquidity than the current ratio as it removes inventory from the current assets used in the ratio's formula. By excluding inventory, the quick ratio focuses on the more-liquid assets of a company.

The basics and use of this ratio are similar to the current ratio in that it gives users an idea of the ability of a company to meet its short-term liabilities with its short-term assets. Another beneficial use is to compare the quick ratio with the current ratio. If the current ratio is significantly higher, it is a clear indication that the company's current assets are dependent on inventory.

While considered more stringent than the current ratio, the quick ratio, because of its accounts receivable component, suffers from the same deficiencies as the current ratio - albeit somewhat less. To understand these "deficiencies", readers should refer to the commentary section of the Current Ratio chapter. In brief, both the quick and the current ratios assume a liquidation of accounts receivable and inventory as the basis for measuring liquidity.

While theoretically feasible, as a going concern a company must focus on the time it takes to convert its working capital assets to cash - that is the true measure of liquidity. Thus, if accounts receivable, as a component of the quick ratio, have, let's say, a conversion time of several months rather than several days, the "quickness" attribute of this ratio is questionable.

Investors need to be aware that the conventional wisdom regarding both the

current and quick ratios as indicators of a company's liquidity can be misleading.

c) Cash Ratio
The cash ratio is an indicator of a company's liquidity that further refines both the current ratio and the quick ratio by measuring the amount of cash, cash equivalents or invested funds there are in current assets to cover current liabilities.

Formula:

$$\text{Cash Ratio} = \frac{\text{Cash} + \text{Cash Equivalents} + \text{Invested Funds}}{\text{Current Liabilities}}$$

Components:

$$\text{Cash Ratio} = \frac{\$233.2}{\$606.9} = 0.4$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings' cash assets amounted to $233.20 (balance sheet); while current liabilities amounted to $606.90 (balance sheet). By dividing, the equation gives us a cash ratio of 0.4

Variations:
None

Commentary:
The cash ratio is the most stringent and conservative of the three short-term liquidity ratios (current, quick and cash). It only looks at the most liquid short-term assets of the company, which are those that can be most easily used to pay off current obligations. It also ignores inventory and receivables, as there are no assurances that these two accounts can be converted to cash in a timely matter to meet current liabilities.

Very few companies will have enough cash and cash equivalents to fully cover current liabilities, which isn't necessarily a bad thing, so don't focus on this ratio being above 1:1.

The cash ratio is seldom used in financial reporting or by analysts in the fundamental analysis of a company. It is not realistic for a company to purposefully maintain high levels of cash assets to cover current liabilities. The reason being that it's often seen as poor asset utilization for a company to hold large amounts of cash on its balance sheet, as this money could be returned to shareholders or used elsewhere to generate higher returns. While providing an

interesting liquidity perspective, the usefulness of this ratio is limited.

d) Cash Conversion Cycle

This liquidity metric expresses the length of time (in days) that a company uses to sell inventory, collect receivables and pay its accounts payable. The cash conversion cycle (CCC) measures the number of days a company's cash is tied up in the the production and sales process of its operations and the benefit it gets from payment terms from its creditors. The shorter this cycle, the more liquid the company's working capital position is. The CCC is also known as the "cash" or "operating" cycle.

Formula:

Cash Conversion Cycle = DIO + DSO - DPO

Where:
DIO = Days Inventory Outstanding
DSO = Days Sales Outstanding
DPO = Days Payables Outstanding

Components:

DIO is computed by:

1. Dividing the cost of sales (income statement) by 365 to get a cost of sales per day figure;
2. Calculating the average inventory figure by adding the year's beginning (previous yearend amount) and ending inventory figure (both are in the balance sheet) and dividing by 2 to obtain an average amount of inventory for any given year; and
3. Dividing the average inventory figure by the cost of sales per day figure.

For Zimmer's FY 2005 (in $ millions), its DIO would be computed with these figures:

(1) cost of sales per day	739.4 ÷ 365 = 2.0
(2) average inventory 2005	536.0 + 583.7 = 1,119.7 ÷ 2 = 559.9
(3) days inventory outstanding	559.9 ÷ 2.0 = 279.9

DIO gives a measure of the number of days it takes for the company's inventory to turn over, i.e., to be converted to sales, either as cash or accounts receivable.

DSO is computed by:

1. Dividing net sales (income statement) by 365 to get a net sales per day figure;
2. Calculating the average accounts receivable figure by adding the year's beginning (previous yearend amount) and ending accounts receivable amount (both figures are in the balance sheet) and dividing by 2 to obtain an average amount of accounts receivable for any given year; and
3. Dividing the average accounts receivable figure by the net sales per day figure.

For Zimmer's FY 2005 (in $ millions), its DSO would be computed with these figures:

(1) net sales per day	3,286.1 ÷ 365 = 9.0
(2) average accounts receivable	524.8 + 524.2 = 1,049 ÷ 2 = 524.5
(3) days sales outstanding	524.5 ÷ 9.0 = 58.3

DSO gives a measure of the number of days it takes a company to collect on sales that go into accounts receivables (credit purchases).

DPO is computed by:

1. Dividing the cost of sales (income statement) by 365 to get a cost of sales per day figure;
2. Calculating the average accounts payable figure by adding the year's beginning (previous yearend amount) and ending accounts payable amount (both figures are in the balance sheet), and dividing by 2 to get an average accounts payable amount for any given year; and
3. Dividing the average accounts payable figure by the cost of sales per day figure.

For Zimmer's FY 2005 (in $ millions), its DPO would be computed with these figures:

(1) cost of sales	739.4 ÷ 365

per day	= 2.0
(2) average accounts payable	131.6 + 123.6 = 255.2 ÷ 125.6
(3) days payable outstanding	125.6 ÷ 2.0 = 63

DPO gives a measure of how long it takes the company to pay its obligations to suppliers.

CCC computed:
Zimmer's cash conversion cycle for FY 2005 would be computed with these numbers (rounded):

DIO	280 days
DSO	+58 days
DPO	-63 days
CCC	**275 days**

Variations:
Often the components of the cash conversion cycle - DIO, DSO and DPO - are expressed in terms of turnover as a times (x) factor. For example, in the case of Zimmer, its days inventory outstanding of 280 days would be expressed as turning over 1.3x annually (365 days ÷ 280 days = 1.3 times). However, actually counting days is more literal and easier to understand when considering how fast assets turn into cash.

Commentary:
An often-overlooked metric, the cash conversion cycle is vital for two reasons. First, it's an indicator of the company's efficiency in managing its important working capital assets; second, it provides a clear view of a company's ability to pay off its current liabilities.

It does this by looking at how quickly the company turns its inventory into sales, and its sales into cash, which is then used to pay its suppliers for goods and services. Again, while the quick and current ratios are more often mentioned in financial reporting, investors would be well advised to measure true liquidity by paying attention to a company's cash conversion cycle.

The longer the duration of inventory on hand and of the collection of receivables, coupled with a shorter duration for payments to a company's suppliers, means that cash is being tied up in inventory and receivables and used more quickly in paying off trade payables. If this circumstance becomes a trend, it will reduce, or squeeze, a company's cash availabilities. Conversely, a positive trend in the cash

conversion cycle will add to a company's liquidity.

By tracking the individual components of the CCC (as well as the CCC as a whole), an investor is able to discern positive and negative trends in a company's all-important working capital assets and liabilities.

For example, an increasing trend in DIO could mean decreasing demand for a company's products. Decreasing DSO could indicate an increasingly competitive product, which allows a company to tighten its buyers' payment terms.

As a whole, a shorter CCC means greater liquidity, which translates into less of a need to borrow, more opportunity to realize price discounts with cash purchases for raw materials, and an increased capacity to fund the expansion of the business into new product lines and markets. Conversely, a longer CCC increases a company's cash needs and negates all the positive liquidity qualities just mentioned.

Note: In the realm of free or low-cost investment research websites, the only one we've found that provides complete CCC data for stocks is Morningstar, which also requires a paid premier membership subscription.

Current Ratio Vs. The CCC

The obvious limitations of the current ratio as an indicator of true liquidity clearly establish a strong case for greater recognition, and use, of the cash conversion cycle in any analysis of a company's working capital position.

Nevertheless, corporate financial reporting, investment literature and investment research services seem to be stuck on using the current ratio as an indicator of liquidity. This circumstance is similar to the financial media's and the general public's attachment to the Dow Jones Industrial Average. Most investment professionals see this index as unrepresentative of the stock market or the national economy. And yet, the popular Dow marches on as the market indicator of choice.

The current ratio seems to occupy a similar position with the investment community regarding financial ratios that measure liquidity. However, it will probably work better for investors to pay more attention to the cash-cycle concept as a more accurate and meaningful measurement of a company's liquidity.

2) Profitability Indicator Ratios

This section of the tutorial discusses the different measures of corporate profitability and financial performance. These ratios, much like the operational performance ratios, give users a good understanding of how well the company utilized its resources in generating profit and shareholder value.

The long-term profitability of a company is vital for both the survivability of the company as well as the benefit received by shareholders. It is these ratios that can give insight into the all important "profit".

In this section, we will look at four important profit margins, which display the amount of profit a company generates on its sales at the different stages of an income statement. We'll also show you how to calculate the effective tax rate of a company. The last three ratios covered in this section - Return on Assets, Return on Equity and Return on Capital Employed - detail how effective a company is at generating income from its resources.

To find the data used in the examples in this section, please see the Securities and Exchange Commission's website to view the 2005 Annual Statement of Zimmer Holdings.

a) Profit Margin Analysis

In the income statement, there are four levels of profit or profit margins - gross profit, operating profit, pretax profit and net profit. The term "margin" can apply to the absolute number for a given profit level and/or the number as a percentage of net sales/revenues. Profit margin analysis uses the percentage calculation to provide a comprehensive measure of a company's profitability on a historical basis (3-5 years) and in comparison to peer companies and industry benchmarks.

Basically, it is the amount of profit (at the gross, operating, pretax or net income level) generated by the company as a percent of the sales generated. The objective of margin analysis is to detect consistency or positive/negative trends in a company's earnings. Positive profit margin analysis translates into positive investment quality. To a large degree, it is the quality, and growth, of a company's earnings that drive its stock price.

Formulas:

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Net Sales (Revenue)}}$$

$$\text{Operating Profit Margin} = \frac{\text{Operating Profit}}{\text{Net Sales (Revenue)}}$$

$$\text{Pretax Profit Margin} = \frac{\text{Pretax Profit}}{\text{Net Sales (Revenue)}}$$

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

Components:

$$\text{Gross Profit Margin} = \frac{\$2,546.7}{\$3,286.1} = 77.5\%$$

$$\text{Operating Profit Margin} = \frac{\$1,055.0}{\$3,286.1} = 32.1\%$$

$$\text{Pretax Profit Margin} = \frac{\$1,040.7}{\$3,286.1} = 31.7\%$$

$$\text{Net Profit Margin} = \frac{\$732.5}{\$3,286.1} = 22.3\%$$

All the dollar amounts in these ratios are found in the income statement. As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had net sales, or revenue, of $3,286.10, which is the denominator in all of the profit margin ratios. The numerators for Zimmer Holdings' ratios are captioned as "gross profit", "operating profit", "earnings before income taxes, minority interest and cumulative effect of change in accounting principle", and "net earnings", respectively. By simply dividing, the equations give us the percentage profit margins indicated.

Variations:
None

Commentary:
First, a few remarks about the mechanics of these ratios are in order. When it comes to finding the relevant numbers for margin analysis, we remind readers that the terms: "income", "profits" and "earnings" are used interchangeably in financial reporting. Also, the account captions for the various profit levels can vary, but generally are self-evident no matter what terminology is used. For example, Zimmer Holdings' pretax (our shorthand for profit before the provision for the payment of taxes) is a literal, but rather lengthy, description of the account.

Second, income statements in the multi-step format clearly identify the four profit levels. However, with the single-step format the investor must calculate the gross profit and operating profit margin numbers.

To obtain the gross profit amount, simply subtract the cost of sales (cost of goods sold) from net sales/revenues. The operating profit amount is obtained by

subtracting the sum of the company's operating expenses from the gross profit amount. Generally, operating expenses would include such account captions as selling, marketing and administrative, research and development, depreciation and amortization, rental properties, etc.

Third, investors need to understand that the absolute numbers in the income statement don't tell us very much, which is why we must look to margin analysis to discern a company's true profitability. These ratios help us to keep score, as measured over time, of management's ability to manage costs and expenses and generate profits. The success, or lack thereof, of this important management function is what determines a company's profitability. A large growth in sales will do little for a company's earnings if costs and expenses grow disproportionately.

Lastly, the profit margin percentage for all the levels of income can easily be translated into a handy metric used frequently by analysts and often mentioned in investment literature. The ratio's percentage represents the number of pennies there are in each dollar of sales. For example, using Zimmer Holdings' numbers, in every sales dollar for the company in 2005, there's roughly 78¢, 32¢, 32¢, and 22¢ cents of gross, operating, pretax, and net income, respectively.

Let's look at each of the profit margin ratios individually:

Gross Profit Margin - A company's cost of sales, or cost of goods sold, represents the expense related to labor, raw materials and manufacturing overhead involved in its production process. This expense is deducted from the company's net sales/revenue, which results in a company's first level of profit, or gross profit. The gross profit margin is used to analyze how efficiently a company is using its raw materials, labor and manufacturing-related fixed assets to generate profits. A higher margin percentage is a favorable profit indicator.

Industry characteristics of raw material costs, particularly as these relate to the stability or lack thereof, have a major effect on a company's gross margin. Generally, management cannot exercise complete control over such costs. Companies without a production process (ex., retailers and service businesses) don't have a cost of sales exactly. In these instances, the expense is recorded as a "cost of merchandise" and a "cost of services", respectively. With this type of company, the gross profit margin does not carry the same weight as a producer-type company.

Operating Profit Margin - By subtracting selling, general and administrative (SG&A), or operating, expenses from a company's gross profit number, we get operating income. Management has much more control over operating expenses than its cost of sales outlays. Thus, investors need to scrutinize the operating profit margin carefully. Positive and negative trends in this ratio are, for the most part, directly attributable to management decisions.

A company's operating income figure is often the preferred metric (deemed to be more reliable) of investment analysts, versus its net income figure, for making inter-company comparisons and financial projections.

Pretax Profit Margin - Again many investment analysts prefer to use a pretax income number for reasons similar to those mentioned for operating income. In this case a company has access to a variety of tax-management techniques, which allow it to manipulate the timing and magnitude of its taxable income.

Net Profit Margin - Often referred to simply as a company's profit margin, the so-called bottom line is the most often mentioned when discussing a company's profitability. While undeniably an important number, investors can easily see from a complete profit margin analysis that there are several income and expense operating elements in an income statement that determine a net profit margin. It behooves investors to take a comprehensive look at a company's profit margins on a systematic basis.

b) Effective Tax Rate

This ratio is a measurement of a company's tax rate, which is calculated by comparing its income tax expense to its pretax income. This amount will often differ from the company's stated jurisdictional rate due to many accounting factors, including foreign exchange provisions. This effective tax rate gives a good understanding of the tax rate the company faces.

Formula:

$$\text{Effective Tax Rate (\%)} = \frac{\text{Income Tax Expense}}{\text{Pretax Income}}$$

Components:

$$\text{Effective Tax Rate (\%)} = \frac{\$307.3}{\$1{,}040.7} = 29.5\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had a provision for income taxes in its income statement of $307.30 (income statement), and pretax income of $1,040.70 (income statement). By dividing, the equation gives us an effective tax rate of 29.5% for FY 2005.

Variations:

None

Commentary:

The variances in this percentage can have a material effect on the net-income figure.

Peer company comparisons of net profit margins can be problematic as a result of the impact of the effective tax rate on net profit margins. The same can be said of year-over-year comparisons for the same company. This circumstance is one of the reasons some financial analysts prefer to use the operating or pretax profit figures instead of the net profit number for profitability ratio calculation purposes.

One could argue that any event that improves a company's net profit margin is a good one. However, from a quality of earnings perspective, tax management maneuverings (while certainly legitimate) are less desirable than straight-forward positive operational results.

For example, Zimmer Holdings' effective tax rates have been erratic over the three years reported in their 2005 income statement. From 33.6% in 2003, down to 25.9% in 2004 and back up to 29.5% in 2005. Obviously, this tax provision volatility makes an objective judgment of its true, or operational, net profit performance difficult to determine.

Tax management techniques to lessen the tax burden are practiced, to one degree or another, by many companies. Nevertheless, a relatively stable effective tax rate percentage, and resulting net profit margin, would seem to indicate that the company's operational managers are more responsible for a company's profitability than the company's tax accountants.

c) Return On Assets

This ratio indicates how profitable a company is relative to its total assets. The return on assets (ROA) ratio illustrates how well management is employing the company's total assets to make a profit. The higher the return, the more efficient management is in utilizing its asset base. The ROA ratio is calculated by comparing net income to average total assets, and is expressed as a percentage.

Formula:

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

Components:

$$\text{Return on Assets} = \frac{\$732.5}{(\$5{,}695.5 + \$5{,}721.9)/2} = 12.8\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had net income of $732.50 (income statement), and average total assets of

$5,708.70 (balance sheet). By dividing, the equation gives us an ROA of 12.8% for FY 2005.

Variations:
Some investment analysts use the operating-income figure instead of the net-income figure when calculating the ROA ratio.

Commentary:
The need for investment in current and non-current assets varies greatly among companies. Capital-intensive businesses (with a large investment in fixed assets) are going to be more asset heavy than technology or service businesses.

In the case of capital-intensive businesses, which have to carry a relatively large asset base, will calculate their ROA based on a large number in the denominator of this ratio. Conversely, non-capital-intensive businesses (with a small investment in fixed assets) will be generally favored with a relatively high ROA because of a low denominator number.

It is precisely because businesses require different-sized asset bases that investors need to think about how they use the ROA ratio. For the most part, the ROA measurement should be used historically for the company being analyzed. If peer company comparisons are made, it is imperative that the companies being reviewed are similar in product line and business type. Simply being categorized in the same industry will not automatically make a company comparable. Illustrations (as of FY 2005) of the variability of the ROA ratio can be found in such companies as General Electric, 2.3%; Proctor & Gamble, 8.8%; and Microsoft, 18.0%.

As a rule of thumb, investment professionals like to see a company's ROA come in at no less than 5%. Of course, there are exceptions to this rule. An important one would apply to banks, which strive to record an ROA of 1.5% or above.

d) Return On Equity
This ratio indicates how profitable a company is by comparing its net income to its average shareholders' equity. The return on equity ratio (ROE) measures how much the shareholders earned for their investment in the company. The higher the ratio percentage, the more efficient management is in utilizing its equity base and the better return is to investors.

Formula:

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

Components:

$$\text{Return on Equity} = \frac{\$732.5}{(\$3{,}942.5 + \$4{,}682.8)/2} = 17\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had net income of $732.5 (income statement), and average shareholders' equity of $4,312.7 (balance sheet). By dividing, the equation gives us an ROE of 17% for FY 2005.

Variations:
If the company has issued preferred stock, investors wishing to see the return on just common equity may modify the formula by subtracting the preferred dividends, which are not paid to common shareholders, from net income and reducing shareholders' equity by the outstanding amount of preferred equity.

Commentary:
Widely used by investors, the ROE ratio is an important measure of a company's earnings performance. The ROE tells common shareholders how effectively their money is being employed. Peer company, industry and overall market comparisons are appropriate; however, it should be recognized that there are variations in ROEs among some types of businesses. In general, financial analysts consider return on equity ratios in the 15-20% range as representing attractive levels of investment quality.

While highly regarded as a profitability indicator, the ROE metric does have a recognized weakness. Investors need to be aware that a disproportionate amount of debt in a company's capital structure would translate into a smaller equity base. Thus, a small amount of net income (the numerator) could still produce a high ROE off a modest equity base (the denominator).

For example, let's reconfigure Zimmer Holdings' debt and equity numbers to illustrate this circumstance. If we reduce the company's equity amount by $2 million and increase its long-term debt by a corresponding amount, the reconfigured debt-equity relationship will be (figures in millions) $2,081.6 and $2,682.8, respectively. Zimmer's financial position is obviously much more highly leveraged, i.e., carrying a lot more debt. However, its ROE would now register a whopping 27.3% ($732.5 ÷ $2,682.8), which is quite an improvement over the 17% ROE of the almost debt-free FY 2005 position of Zimmer indicated above. Of course, that improvement in Zimmer's profitability, as measured by its ROE, comes with a price...a lot more debt.

The lesson here for investors is that they cannot look at a company's return on equity in isolation. A high, or low, ROE needs to be interpreted in the context of a company's debt-equity relationship. The answer to this analytical dilemma can be found by using the return on capital employed (ROCE) ratio.

e) Return On Capital Employed

The return on capital employed (ROCE) ratio, expressed as a percentage, complements the return on equity (ROE) ratio by adding a company's debt liabilities, or funded debt, to equity to reflect a company's total "capital employed". This measure narrows the focus to gain a better understanding of a company's ability to generate returns from its available capital base.

By comparing net income to the sum of a company's debt and equity capital, investors can get a clear picture of how the use of leverage impacts a company's profitability. Financial analysts consider the ROCE measurement to be a more comprehensive profitability indicator because it gauges management's ability to generate earnings from a company's total pool of capital.

Formula:

$$\text{Return on Capital Employed (ROCE)} = \frac{\text{Net Income}}{\text{Capital Employed}}$$

$$\text{Capital Employed} = \text{Average Debt Liabilites} + \text{Average Shareholders' Equity}$$

Components:

$$\text{ROCE} = \frac{\$732.50}{\$366.60 + \$4{,}312.70} = 16.4\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had net income of $732.50 (income statement). The company's average short-term and long-term borrowings were $366.60 and the average shareholders' equity was $4,312.70 (all the necessary figures are in the 2004 and 2005 balance sheets), the sum of which, $4,479.30 is the capital employed. By dividing, the equation gives us an ROCE of 16.4% for FY 2005.

Variations:

Often, financial analysts will use operating income (earnings before interest and taxes or EBIT) as the numerator. There are various takes on what should constitute the debt element in the ROCE equation, which can be quite confusing. Our suggestion is to stick with debt liabilities that represent interest-bearing, documented credit obligations (short-term borrowings, current portion of long-term debt, and long-term debt) as the debt capital in the formula.

Commentary:

The return on capital employed is an important measure of a company's profitability. Many investment analysts think that factoring debt into a company's

total capital provides a more comprehensive evaluation of how well management is using the debt and equity it has at its disposal. Investors would be well served by focusing on ROCE as a key, if not the key, factor to gauge a company's profitability. An ROCE ratio, as a very general rule of thumb, should be at or above a company's average borrowing rate.

Unfortunately, there are a number of similar ratios to ROCE, as defined herein, that are similar in nature but calculated differently, resulting in dissimilar results. First, the acronym ROCE is sometimes used to identify return on common equity, which can be confusing because that relationship is best known as the return on equity or ROE. Second, the concept behind the terms return on invested capital (ROIC) and return on investment (ROI) portends to represent "invested capital" as the source for supporting a company's assets. However, there is no consistency to what components are included in the formula for invested capital, and it is a measurement that is not commonly used in investment research reporting.

3) Debt Ratios

The third series of ratios in this tutorial are debt ratios. These ratios give users a general idea of the company's overall debt load as well as its mix of equity and debt. Debt ratios can be used to determine the overall level of financial risk a company and its shareholders face. In general, the greater the amount of debt held by a company the greater the financial risk of bankruptcy.

The next chapter of this Debt Ratios section (Overview of Debt) will give readers a good idea of the different classifications of debt. While it is not mandatory in understanding the individual debt ratios, it will give some background information on the debt of a company. The ratios covered in this section include the debt ratio, which is gives a general idea of a company's financial leverage as does the debt-to-equity ratio. The capitalization ratio details the mix of debt and equity while the interest coverage ratio and the cash flow to debt ratio show how well a company can meet its obligations.

To find the data used in the examples in this section, please see the Securities and Exchange Commission's website to view the 2005 Annual Statement of Zimmer Holdings.

a) Overview Of Debt

Before discussing the various financial debt ratios, we need to clear up the terminology used with "debt" as this concept relates to financial statement presentations. In addition, the debt-related topics of "funded debt" and credit ratings are discussed below.

There are two types of liabilities - operational and debt. The former includes balance sheet accounts, such as accounts payable, accrued expenses, taxes

payable, pension obligations, etc. The latter includes notes payable and other short-term borrowings, the current portion of long-term borrowings, and long-term borrowings. Often times, in investment literature, "debt" is used synonymously with total liabilities. In other instances, it only refers to a company's indebtedness.

The debt ratios that are explained herein are those that are most commonly used. However, what companies, financial analysts and investment research services use as components to calculate these ratios is far from standardized. In the definition paragraph for each ratio, no matter how the ratio is titled, we will clearly indicate what type of debt is being used in our measurements.

Getting the Terms Straight
In general, debt analysis can be broken down into three categories, or interpretations: liberal, moderate and conservative. Since we will use this language in our commentary paragraphs, it's worthwhile explaining how these interpretations of debt apply.

- **Liberal** - This approach tends to minimize the amount of debt. It includes only long-term debt as it is recorded in the balance sheet under non-current liabilities.
- **Moderate** - This approach includes current borrowings (notes payable) and the current portion of long-term debt, which appear in the balance sheet's current liabilities; and, of course, the long-term debt recorded in non-current liabilities previously mentioned. In addition, redeemable preferred stock, because of its debt-like quality, is considered to be debt. Lastly, as general rule, two-thirds (roughly one-third goes to interest expense) of the outstanding balance of operating leases, which do not appear in the balance sheet, are considered debt principal. The relevant figure will be found in the notes to financial statements and identified as "future minimum lease payments required under operating leases that have initial or remaining non-cancel-able lease terms in excess of one year."
- **Conservative** - This approach includes all the items used in the moderate interpretation of debt, as well as such non-current operational liabilities such as deferred taxes, pension liabilities and other post-retirement employee benefits.

Note: New accounting standards, which are currently under active consideration in the U.S. by the Financial Accounting Standards Board (FASB) and internationally by the International Accounting Standards Board (IASB), will eventually put the debt principal of operating leases and unfunded pension liabilities in the balance sheet as debt liabilities. Formal "Discussion Papers" on these issues are planned by FASB and IASB in 2008, with adoption of the changes following the discussion phase expected in 2009.

Investors may want to look to the middle ground when deciding what to include in a company's debt position. With the exception of unfunded pension liabilities, a company's non-current operational liabilities represent obligations that will be around, at one level or another, forever - at least until the company ceases to be a going concern and is liquidated.

Also, unlike debt, there are no fixed payments or interest expenses associated with non-current operational liabilities. In other words, it is more meaningful for investors to view a company's indebtedness and obligations through the company as a going concern, and therefore, to use the moderate approach to defining debt in their leverage calculations.

So-called "funded debt" is a term that is seldom used in financial reporting. Technically, funded debt refers to that portion of a company's debt comprised, generally, of long-term, fixed maturity, contractual borrowings. No matter how problematic a company's financial condition, holders of these obligations, typically bonds, cannot demand payment as long as the company pays the interest on its funded debt. In contrast, long-term bank debt is usually subject to acceleration clauses and/or restrictive covenants that allow a lender to call its loan, i.e., demand its immediate payment. From an investor's perspective, the greater the percentage of funded debt in the company's total debt, the better.

Lastly, credit ratings are formal risk evaluations by credit agencies - Moody's, Standard & Poor's, Duff & Phelps, and Fitch - of a company's ability to repay principal and interest on its debt obligations, principally bonds and commercial paper. Obviously, investors in both bonds and stocks follow these ratings rather closely as indicators of a company's investment quality. If the company's credit ratings are not mentioned in their financial reporting, it's easy to obtain them from the company's investor relations department.

b) The Debt Ratio

The debt ratio compares a company's total debt to its total assets, which is used to gain a general idea as to the amount of leverage being used by a company. A low percentage means that the company is less dependent on leverage, i.e., money borrowed from and/or owed to others. The lower the percentage, the less leverage a company is using and the stronger its equity position. In general, the higher the ratio, the more risk that company is considered to have taken on.

Formula:

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

Components:

$$\text{Debt Ratio} = \frac{\$1{,}036.8}{\$5{,}721.9} = 18\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had total liabilities of $1,036.80 (balance sheet) and total assets of $5,721.90 (balance sheet). By dividing, the equation provides the company with a relatively low percentage of leverage as measured by the debt ratio.

Variations:
None

Commentary:
The easy-to-calculate debt ratio is helpful to investors looking for a quick take on a company's leverage. The debt ratio gives users a quick measure of the amount of debt that the company has on its balance sheets compared to its assets. The more debt compared to assets a company has, which is signaled by a high debt ratio, the more leveraged it is and the riskier it is considered to be. Generally, large, well-established companies can push the liability component of their balance sheet structure to higher percentages without getting into trouble.

However, one thing to note with this ratio: it isn't a pure measure of a company's debt (or indebtedness), as it also includes operational liabilities, such as accounts payable and taxes payable. Companies use these operational liabilities as going concerns to fund the day-to-day operations of the business and aren't really "debts" in the leverage sense of this ratio. Basically, even if you took the same company and had one version with zero financial debt and another version with substantial financial debt, these operational liabilities would still be there, which in some sense can muddle this ratio.

For example, IBM and Merck, both large, blue-chip companies, which are components of the Dow Jones Index, have debt ratios (FY 2005) of 69% and 60%, respectively. In contrast, Eagle Materials, a small construction supply company, has a debt ratio (FY 2006) of 48%; Lincoln Electric, a small supplier of welding equipment and products, runs a debt ratio (FY 2005) in the range of 44%. Obviously, Zimmer Holdings' debt ratio of 18% is very much on the low side.

The use of leverage, as displayed by the debt ratio, can be a double-edged sword for companies. If the company manages to generate returns above their cost of capital, investors will benefit. However, with the added risk of the debt on its books, a company can be easily hurt by this leverage if it is unable to generate

returns above the cost of capital. Basically, any gains or losses are magnified by the use of leverage in the company's capital structure.

c) Debt-Equity Ratio

The debt-equity ratio is another leverage ratio that compares a company's total liabilities to its total shareholders' equity. This is a measurement of how much suppliers, lenders, creditors and obligors have committed to the company versus what the shareholders have committed.

To a large degree, the debt-equity ratio provides another vantage point on a company's leverage position, in this case, comparing total liabilities to shareholders' equity, as opposed to total assets in the debt ratio. Similar to the debt ratio, a lower the percentage means that a company is using less leverage and has a stronger equity position.

Formula:

$$\text{Debt - Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Shareholders' Equity}}$$

Components:

$$\text{Debt - Equity Ratio} = \frac{\$1{,}036.8}{\$5{,}721.9} = 22\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had total liabilities of $1,036.80 (balance sheet) and total shareholders' equity of $4,682.80 (balance sheet). By dividing, the equation provides the company with a relatively low percentage of leverage as measured by the debt-equity ratio.

Variations:

A conservative variation of this ratio, which is seldom seen, involves reducing a company's equity position by its intangible assets to arrive at a tangible equity, or tangible net worth, figure. Companies with a large amount of purchased goodwill form heavy acquisition activity can end up with a negative equity position.

Commentary:

The debt-equity ratio appears frequently in investment literature. However, like the debt ratio, this ratio is not a pure measurement of a company's debt because it includes operational liabilities in total liabilities.

Nevertheless, this easy-to-calculate ratio provides a general indication of a company's equity-liability relationship and is helpful to investors looking for a quick take on a company's leverage. Generally, large, well-established companies can push the liability component of their balance sheet structure to

higher percentages without getting into trouble.

The debt-equity ratio percentage provides a much more dramatic perspective on a company's leverage position than the debt ratio percentage. For example, IBM's debt ratio of 69% seems less onerous than its debt-equity ratio of 220%, which means that creditors have more than twice as much money in the company than equity holders (both ratios are for FY 2005).

Merck comes off a little better at 150%. These indicators are not atypical for large companies with prime credit credentials. Relatively small companies, such as Eagle Materials and Lincoln Electric, cannot command these high leverage positions, which is reflected in their debt-equity ratio percentages (FY 2006 and FY 2005) of 91% and 78%, respectively.

d) Capitalization Ratio

The capitalization ratio measures the debt component of a company's capital structure, or capitalization (i.e., the sum of long-term debt liabilities and shareholders' equity) to support a company's operations and growth.

Long-term debt is divided by the sum of long-term debt and shareholders' equity. This ratio is considered to be one of the more meaningful of the "debt" ratios - it delivers the key insight into a company's use of leverage.

There is no right amount of debt. Leverage varies according to industries, a company's line of business and its stage of development. Nevertheless, common sense tells us that low debt and high equity levels in the capitalization ratio indicate investment quality.

Formula:

$$\text{Capitalization Ratio} = \frac{\text{Long - term Debt}}{\text{Long - term Debt + Shareholders' Equity}}$$

Components:

$$\text{Capitalization Ratio} = \frac{\$81.6}{\$81.6 + \$4{,}682.8} = 2\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had total long-term debt of $81.60 (balance sheet), and total long-term debt and shareholders' equity (i.e., its capitalization) of $4,764.40 (balance sheet). By dividing, the equation provides the company with a negligible percentage of leverage as measured by the capitalization ratio.

Variations:

None

Commentary:
A company's capitalization (not to be confused with its market capitalization) is the term used to describe the makeup of a company's permanent or long-term capital, which consists of both long-term debt and shareholders' equity. A low level of debt and a healthy proportion of equity in a company's capital structure is an indication of financial fitness.

Prudent use of leverage (debt) increases the financial resources available to a company for growth and expansion. It assumes that management can earn more on borrowed funds than it pays in interest expense and fees on these funds. However successful this formula may seem, it does require a company to maintain a solid record of complying with its various borrowing commitments.

A company considered too highly leveraged (too much debt) may find its freedom of action restricted by its creditors and/or have its profitability hurt by high interest costs. Of course, the worst of all scenarios is having trouble meeting operating and debt liabilities on time and surviving adverse economic conditions. Lastly, a company in a highly competitive business, if hobbled by high debt, will find its competitors taking advantage of its problems to grab more market share.

As mentioned previously, the capitalization ratio is one of the more meaningful debt ratios because it focuses on the relationship of debt liabilities as a component of a company's total capital base, which is the capital raised by shareholders and lenders.

The examples of IBM and Merck will illustrate this important perspective for investors. As of FY 2005, IBM had a capitalization ratio of 32%, and Merck's was 22%. It is difficult to generalize on what a proper capitalization ratio should be, but, on average, it appears that an indicator on either side of 35% is fairly typical for larger companies. Obviously, Merck's low leverage is a significant balance sheet strength considering its ongoing struggle with product liability claims. Eagle Materials and Lincoln Electric have capitalization ratios (FY 2006 and FY 2005) of 30% and 20%, which most likely fall into the average and low ratio range, respectively. Zimmer Holdings' 2% capitalization ratio needs no further comment.

e) Interest Coverage Ratio
The interest coverage ratio is used to determine how easily a company can pay interest expenses on outstanding debt. The ratio is calculated by dividing a company's earnings before interest and taxes (EBIT) by the company's interest expenses for the same period. The lower the ratio, the more the company is burdened by debt expense. When a company's interest coverage ratio is only 1.5 or lower, its ability to meet interest expenses may be questionable.

Formula:

$$\text{Interest Coverage Ratio} = \frac{\text{Earnings Before Interest and Taxes (EBIT)}}{\text{Interest Expense}}$$

Components:

$$\text{Interest Coverage Ratio} = \frac{\$1{,}055.0}{\$14.3} = 74$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had earnings before interest and taxes (operating income) of $1,055.00 (income statement), and total interest expense of $14.30 (income statement). This equation provides the company with an extremely high margin of safety as measured by the interest coverage ratio.

Variations:
None

Commentary:
The ability to stay current with interest payment obligations is absolutely critical for a company as a going concern. While the non-payment of debt principal is a seriously negative condition, a company finding itself in financial/operational difficulties can stay alive for quite some time as long as it is able to service its interest expenses.

In a more positive sense, prudent borrowing makes sense for most companies, but the operative word here is "prudent." Interest expenses affect a company's profitability, so the cost-benefit analysis dictates that borrowing money to fund a company's assets has to have a positive effect. An ample interest coverage ratio would be an indicator of this circumstance, as well as indicating substantial additional debt capacity. Obviously, in this category of investment quality, Zimmer Holdings would go to the head of the class.

Let's see how the interest coverage ratio works out for IBM, Merck, Eagle Materials and Lincoln Electric: 57, 20, 39 and 20, respectively. By any standard, all of these companies, as measured by their latest FY earnings performances, have very high interest coverage ratios. It is worthwhile noting that this is one of the reasons why companies like IBM and Merck have such large borrowings - because in a word, they can. Creditors have a high comfort level with companies that can easily service debt interest payments. Here again, Zimmer Holdings, in this regard, is in an enviable position.

f) Cash Flow To Debt Ratio

This coverage ratio compares a company's operating cash flow to its total debt, which, for purposes of this ratio, is defined as the sum of short-term borrowings, the current portion of long-term debt and long-term debt. This ratio provides an indication of a company's ability to cover total debt with its yearly cash flow from operations. The higher the percentage ratio, the better the company's ability to carry its total debt.

Formula:

$$\text{Cash Flow to Debt Ratio} = \frac{\text{Operating Cash Flow}}{\text{Total Debt}}$$

Components:

$$\text{Cash Flow to Debt Ratio} = \frac{\$878.2}{\$81.6} = 10.76$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had net cash provided by operating activities (operating cash flow as recorded in the statement of cash flows) of $878.20 (cash flow statement), and total debt of only $81.60 (balance sheet). By dividing, the equation provides the company, in the Zimmer example, with an extremely high margin of debt coverage.

Variations:

A more conservative cash flow figure calculation in the numerator would use a company's free cash flow (operating cash flow minus the amount of cash used for capital expenditures).

A more conservative total debt figure would include, in addition to short-term borrowings, current portion of long-term debt, long-term debt, redeemable preferred stock and two-thirds of the principal of non-cancel-able operating leases.

Commentary:

In the case of Zimmer Holdings, their debt load is so nominal that the resulting cash flow to debt ratio percentage is off the chart. In this instance, this circumstance would indicate that the company has ample capacity to borrow a significant amount of money, if it chose to do so, as opposed to indicating its debt coverage capacity.

Under more typical circumstances, a high double-digit percentage ratio would be a sign of financial strength, while a low percentage ratio could be a negative sign that indicates too much debt or weak cash flow generation. It is important to

investigate the larger factor behind a low ratio. To do this, compare the company's current cash flow to debt ratio to its historic level in order to parse out trends or warning signs.

More conventional cash flow to debt relationships are evidenced in the financial positions of IBM and Merck, which we'll use to illustrate this point. In the case of IBM, its FY 2005 operating cash amounted to $14.9 billion and its total debt, consisting of short/current long-term debt and long-term debt was $22.6 billion. Thus, IBM had a cash flow to debt ratio of 66%. Merck's numbers for FY 2005 were $7.6 billion for operating cash flow and $8.1 billion for total debt, resulting in a cash flow to debt ratio of 94%.

If we refer back to the Capitalization Ratio page, we will see that Merck had a relatively low level of leverage compared to its capital base. Thus, it is not surprising that its cash flow to debt ratio is very high.

4) Operating Performance Ratios

The next series of ratios we'll look at in this tutorial are the operating performance ratios.

Each of these ratios have differing inputs and measure different segments of a company's overall operational performance, but the ratios do give users insight into the company's performance and management during the period being measured.

These ratios look at how well a company turns its assets into revenue as well as how efficiently a company converts its sales into cash. Basically, these ratios look at how efficiently and effectively a company is using its resources to generate sales and increase shareholder value. In general, the better these ratios are, the better it is for shareholders.

In this section, we'll look at the fixed-asset turnover ratio and the sales/revenue per employee ratio, which look at how well the company uses its fixed assets and employees to generate sales. We will also look at the operating cycle measure, which details the company's ability to convert is inventory into cash.

To find the data used in the examples in this section, please see the Securities and Exchange Commission's website to view the 2005 Annual Statement of Zimmer Holdings.

a) Fixed-Asset Turnover

This ratio is a rough measure of the productivity of a company's fixed assets (property, plant and equipment or PP&E) with respect to generating sales. For most companies, their investment in fixed assets represents the single largest component of their total assets. This annual turnover ratio is designed to reflect a

company's efficiency in managing these significant assets. Simply put, the higher the yearly turnover rate, the better.

Formula:

$$\text{Fixed Asset Turnover Ratio} = \frac{\text{Revenue}}{\text{Property, Plant and Equipment}}$$

Components:

$$\text{Fixed Asset Turnover} = \frac{\$3{,}286.1}{\$1{,}337.3/2} = 4.9$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had net sales, or revenue, of $3,286.10 (income statement) and average fixed assets, or PP&E, of $668.70 (balance sheet - the average of yearend 2004 and 2005 PP&E). By dividing, the equation gives us a fixed-asset turnover rate for FY 2005 of 4.9.

Variations:
Instead of using fixed assets, some asset-turnover ratios would use total assets. We prefer to focus on the former because, as a significant component in the balance sheet, it represents a multiplicity of management decisions on capital expenditures. Thus, this capital investment, and more importantly, its results, is a better performance indicator than that evidenced in total asset turnover.

Commentary:
There is no exact number that determines whether a company is doing a good job of generating revenue from its investment in fixed assets. This makes it important to compare the most recent ratio to both the historical levels of the company along with peer company and/or industry averages.

Before putting too much weight into this ratio, it's important to determine the type of company that you are using the ratio on because a company's investment in fixed assets is very much linked to the requirements of the industry in which it conducts its business. Fixed assets vary greatly among companies. For example, an internet company, like Google, has less of a fixed-asset base than a heavy manufacturer like Caterpillar. Obviously, the fixed-asset ratio for Google will have less relevance than that for Caterpillar.

As is the case with Zimmer Holdings, a high fixed-asset turnover ratio is more the product of a relatively low investment in PP&E, rather than a high level of sales. Companies like Zimmer Holdings are fortunate not to be capital intensive, thereby allowing them to generate a high level of sales on a relatively low base of

capital investment. Manufacturers of heavy equipment and other capital goods, and natural resource companies do not enjoy this luxury.

b) Sales/Revenue Per Employee
As a gauge of personnel productivity, this indicator simply measures the amount of dollar sales, or revenue, generated per employee. The higher the dollar figure the better. Here again, labor-intensive businesses (ex. mass market retailers) will be less productive in this metric than a high-tech, high product-value manufacturer.

Formula:

$$\text{Sales/Revenue Per Employee} = \frac{\text{Revenue}}{\text{Number of Employees (Average)}}$$

Components:

$$\text{Sales/Revenue Per Employee} = \frac{\$3,286,100,000}{6,600} = \$497,878$$

As of December 31, 2005, Zimmer Holdings generated almost $3.3 billion in sales with an average personnel complement for the year of approximately 6,600 employees. The sales, or revenue, figure is the numerator (income statement), and the average number of employees for the year is the denominator (annual report or Form 10-K).

Variations:
An earnings per employee ratio could also be calculated using net income (as opposed to net sales) in the numerator.

Commentary:
Industry and product-line characteristics will influence this indicator of employee productivity. Tracking this dollar figure historically and comparing it to peer-group companies will make this quantitative dollar amount more meaningful in an analytical sense.

For example, Zimmer Holdings' sales per employee figure of $497,878 for its 2005 fiscal year compares very favorably to the figure for two of its direct competitors - Biomet, Inc. (NYSE:BMET) and Stryker Corp. (NYSE:SYK). For their 2005 fiscal years, these companies had sales per employee figures of only $320,215 and $293,883, respectively.

The comparison of Microsoft (Nasdaq:MSFT) and Wal-Mart (WMT), two businesses in very different industries, illustrates how the sales per employee ratio can differ because of this circumstance. Microsoft relies on technology and brain power to drive its revenues, and needs a relatively small personnel

complement to accomplish this. On the other hand, a mega-retailer like Wal-Mart is a very labor-intensive operation requiring a large number of employees. These companies' respective sales per employee ratios in 2005 were $670,939 and $172,470, which clearly reflect their industry differences when it comes to personnel requirements.

The sales per employee metric can be a good measure of personnel productivity, with its greatest use being the comparison of industry competitors and the historical performance of the company.

c) Operating Cycle

Expressed as an indicator (days) of management performance efficiency, the operating cycle is a "twin" of the cash conversion cycle. While the parts are the same - receivables, inventory and payables - in the operating cycle, they are analyzed from the perspective of how well the company is managing these critical operational capital assets, as opposed to their impact on cash.

Formula:

Operating Cycle (Days) = DIO + DSO – DPO

DIO = Days Inventory Outstanding
DSO = Days Sales Outstanding
DPO = Days Payable Outstanding

Components:

DIO is computed by:

1. Dividing the cost of sales (income statement) by 365 to get a cost of sales per day figure;
2. Calculating the average inventory figure by adding the year's beginning (previous yearend amount) and ending inventory figure (both are in the balance sheet) and dividing by 2 to obtain an average amount of inventory for any given year; and
3. Dividing the average inventory figure by the cost of sales per day figure.

For Zimmer Holdings' FY 2005 (in $ millions), its DIO would be computed with these figures:

(1) cost of sales per day	739.4 ÷ 365 = 2.0
(2) average inventory 2005	536.0 + 583.7 = 1,119.7 ÷ 2 = 559.9

(3) days inventory outstanding	559.9 ÷ 2.0 = 279.9

DSO is computed by:

1. Dividing net sales (income statement) by 365 to get net sales per day figure;
2. Calculating the average accounts receivable figure by adding the year's beginning (previous yearend amount) and ending accounts receivable amount (both figures are in the balance sheet) and dividing by 2 to obtain an average amount of accounts receivable for any given year; and
3. Dividing the average accounts receivable figure by the net sales per day figure.

For Zimmer Holdings' FY 2005 (in $ millions), its DSO would be computed with these figures:

(1) net sales per day	3,286.1 ÷ 365 = 9.0
(2) average accounts receivable	524.8 + 524.2 = 1,049 ÷ 2 = 524.5
(3) days sales outstanding	524.5 ÷ 9.0 = 58.3

DPO is computed by:

- Dividing the cost of sales (income statement) by 365 to get a cost of sales per day figure;
- Calculating the average accounts payable figure by adding the year's beginning (previous yearend amount) and ending accounts payable amount (both figures are in the balance sheet), and dividing by 2 to get an average accounts payable amount for any given year; and
- Dividing the average accounts payable figure by the cost of sales per day figure.

For Zimmer Holdings' FY 2005 (in $ millions), its DPO would be computed with these figures:

(1) cost of sales per day	739.4 ÷ 365 =2.0
(2) average accounts payable	131.6 + 123.6 = 255.2 ÷ 125.6

(3) days payable outstanding	125.6 ÷ 2.0 = 63

Computing OC
Zimmer Holdings' operating cycle (OC) for FY 2005 would be computed with these numbers (rounded):

DIO	280
DSO	+58
DPO	-63
OC	275

Variations:
Often the components of the operating cycle - DIO, DSO and DPO - are expressed in terms of turnover as a times (x) factor. For example, in the case of Zimmer Holdings, its days inventory outstanding of 280 days would be expressed as turning over 1.3x annually (365 days ÷ 280 days = 1.3 times). However, it appears that the use of actually counting days is more literal and easier to understand.

Commentary:
As we mentioned in its definition, the operating cycle has the same makeup as the cash conversion cycle. Management efficiency is the focus of the operating cycle, while cash flow is the focus of the cash conversion cycle.

To illustrate this difference in perspective, let's use a narrow, simplistic comparison of Zimmer Holdings' operating cycle to that of a competitive peer company, Biomet. Obviously, we would want more background information and a longer review period, but for the sake of this discussion, we'll assume the FY 2005 numbers we have to work with are representative for both companies and their industry.

Days Sales Outstanding (DSO):	
Zimmer	58 Days
Biomet	105 Days

Days Inventory Outstanding (DIO):	
Zimmer	280 Days
Biomet	294 Days

Days Payable Outstanding (DPO):	
Zimmer	63 Days
Biomet	145 Days

Operating Cycle:	
Zimmer	275 Days
Biomet	254 Days

When it comes to collecting on its receivables, it appears from the DSO numbers, that Zimmer Holdings is much more operationally efficient than Biomet. Common sense tells us that the longer a company has money out there on the street (uncollected), the more risk it is taking. Is Biomet remiss in not having tighter control of its collection of receivables? Or could it be trying to pick up market share through easier payment terms to its customers? This would please the sales manager, but the CFO would certainly be happier with a faster collection time.

Zimmer Holdings and Biomet have almost identical days inventory outstanding. For most companies, their DIO periods are, typically, considerably shorter than the almost 10-month periods evidenced here. Our assumption is that this circumstance does not imply poor inventory management but rather reflects product line and industry characteristics. Both companies may be obliged to carry large, high-value inventories in order to satisfy customer requirements.

Biomet has a huge advantage in the DPO category. It is stretching out its payments to suppliers way beyond what Zimmer is able to do. The reasons for this highly beneficial circumstance (being able to use other people's money) would be interesting to know. Questions you should be asking include: Does this indicate that the credit reputation of Biomet is that much better than that of Zimmer? Why doesn't Zimmer enjoy similar terms?

Shorter Is Better?

In summary, one would assume that "shorter is better" when analyzing a company's cash conversion cycle or its operating cycle. While this is certainly true in the case of the former, it isn't necessarily true for the latter. There are numerous variables attached to the management of receivables, inventory and payables that require a variety of decisions as to what's best for the business.

For example, strict (short) payment terms might restrict sales. Minimal inventory levels might mean that a company cannot fulfill orders on a timely basis, resulting in lost sales. Thus, it would appear that if a company is experiencing solid sales

growth and reasonable profits, its operating cycle components should reflect a high degree of historical consistency.

5) Cash Flow Indicator Ratios

This section of the financial ratio tutorial looks at cash flow indicators, which focus on the cash being generated in terms of how much is being generated and the safety net that it provides to the company. These ratios can give users another look at the financial health and performance of a company.

At this point, we all know that profits are very important for a company. However, through the magic of accounting and non-cash-based transactions, companies that appear very profitable can actually be at a financial risk if they are generating little cash from these profits. For example, if a company makes a ton of sales on credit, they will look profitable but haven't actually received cash for the sales, which can hurt their financial health since they have obligations to pay.

The ratios in this section use cash flow compared to other company metrics to determine how much cash they are generating from their sales, the amount of cash they are generating free and clear, and the amount of cash they have to cover obligations. We will look at the operating cash flow/sales ratio, free cash flow/operating cash flow ratio and cash flow coverage ratios.

To find the data used in the examples in this section, please see the Securities and Exchange Commission's website to view the 2005 Annual Statement of Zimmer Holdings.

a) Operating Cash Flow/Sales Ratio

This ratio, which is expressed as a percentage, compares a company's operating cash flow to its net sales or revenues, which gives investors an idea of the company's ability to turn sales into cash.

It would be worrisome to see a company's sales grow without a parallel growth in operating cash flow. Positive and negative changes in a company's terms of sale and/or the collection experience of its accounts receivable will show up in this indicator.

Formula:

$$\text{OCF/Sales Ratio} = \frac{\text{Operating Cash Flow}}{\text{Net Sales (Revenue)}}$$

Components:

$$\text{Operating Cash Flow/Sales Ratio} = \frac{\$878.2}{\$3,286.1} = 26.7\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had net cash provided by operating activities of $878.2 (cash flow statement), and net sales of $3,286.1 (income statement). By dividing, the equation gives us an operating cash flow/sales ratio of 26.7%, or approximately 27 cents of operating cash flow in every sales dollar.

Variations:
None

Commentary:
The statement of cash flows has three distinct sections, each of which relates to an aspect of a company's cash flow activities - operations, investing and financing. In this ratio, we use the figure for operating cash flow, which is also variously described in financial reporting as simply "cash flow", "cash flow provided by operations", "cash flow from operating activities" and "net cash provided (used) by operating activities".

In the operating section of the cash flow statement, the net income figure is adjusted for non-cash charges and increases/decreases in the working capital items in a company's current assets and liabilities. This reconciliation results in an operating cash flow figure, the foremost source of a company's cash generation (which is internally generated by its operating activities).

The greater the amount of operating cash flow, the better. There is no standard guideline for the operating cash flow/sales ratio, but obviously, the ability to generate consistent and/or improving percentage comparisons are positive investment qualities. In the case of Zimmer Holdings, the past three years reflect a healthy consistency in this ratio of 26.0%, 28.9% and 26.7% for FY 2003, 2004 and 2005, respectively.

b) Free Cash Flow/Operating Cash Ratio
The free cash flow/operating cash flow ratio measures the relationship between free cash flow and operating cash flow.

Free cash flow is most often defined as operating cash flow minus capital expenditures, which, in analytical terms, are considered to be an essential outflow of funds to maintain a company's competitiveness and efficiency.

The cash flow remaining after this deduction is considered "free" cash flow,

which becomes available to a company to use for expansion, acquisitions, and/or financial stability to weather difficult market conditions. The higher the percentage of free cash flow embedded in a company's operating cash flow, the greater the financial strength of the company.

Formula:

$$\text{FCF/OCF Ratio} = \frac{\text{Free Cash Flow (Operating Cash Flow - Capital Expenditure)}}{\text{Operating Cash Flow}}$$

Components:

$$\text{Free Cash Flow/Operating Cash Flow Ratio} = \frac{\$622.9}{\$878.2} = 70.9\%$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had free cash flow of $622.9. We calculated this figure by classifying "additions to instruments" and "additions to property, plant and equipment (PP&E)" as capital expenditures (numerator). Operating cash flow, or "net cash provided by operating activities" (denominator), is recorded at $878.2. All the numbers used in the formula are in the cash flow statement. By dividing, the equation gives us a free cash flow/operating cash flow ratio of 70.9%, which is a very high, beneficial relationship for the company.

Variations:
A more stringent, but realistic, alternative calculation of free cash flow would add the payment of cash dividends to the amount for capital expenditures to be deducted from operating cash flow. This added figure would provide a more conservative free cash flow number. Many analysts consider the outlay for a company's cash dividends just as critical as that for capital expenditures. While a company's board of directors can reduce and/or suspend paying a dividend, the investment community would, most likely, severely punish a company's stock price as a result of such an event.

Commentary:
Numerous studies have confirmed that institutional investment firms rank free cash flow ahead of earnings as the single most important financial metric used to measure the investment quality of a company. In simple terms, the larger the number the better.

c) Cash Flow Coverage Ratio

This ratio measures the ability of the company's operating cash flow to meet its obligations - including its liabilities or ongoing concern costs.

The operating cash flow is simply the amount of cash generated by the company from its main operations, which are used to keep the business funded.

The larger the operating cash flow coverage for these items, the greater the company's ability to meet its obligations, along with giving the company more cash flow to expand its business, withstand hard times, and not be burdened by debt servicing and the restrictions typically included in credit agreements.

Formulas:

$$\text{Short - term Debt Coverage} = \frac{\text{Operating Cash Flow}}{\text{Short - term Debt}}$$

$$\text{Capital Expenditure Coverage} = \frac{\text{Operating Cash Flow}}{\text{Capital Expenditures}}$$

$$\text{Dividend Coverage} = \frac{\text{Operating Cash Flow}}{\text{Cash Dividends}}$$

$$\text{CAPEX + Cash Dividends Coverage} = \frac{\text{Operating Cash Flow}}{\text{Capital Expenditures + Cash Dividends}}$$

Components:

$$\text{Short - term Debt Coverage} = \frac{\$878.2}{\$0.0} = \text{N/A}$$

$$\text{Capital Expenditure Coverage} = \frac{\$878.2}{\$255.3} = 3.4$$

$$\text{Dividend Coverage} = \frac{\$878.2}{\$0.0} = \text{N/A}$$

$$\text{Capital Expenditure + Cash Dividend Coverage} = \frac{\$878.2}{\$255.3} = 3.4$$

As of December 31, 2005, with amounts expressed in millions, Zimmer Holdings had no short-term debt and did not pay any cash dividends. The

only cash outlay the company had to cover was for capital expenditures, which amounted to $255.3 (all numbers for the cash flow coverage ratios are found in the cash flow statement), which is the denominator. Operating cash is always the numerator. By dividing, the operative equations give us a coverage of 3.4. Obviously, Zimmer is a cash cow. It has ample free cash flow which, if the FY 2003-2005 period is indicative, has steadily built up the cash it carries in its balance sheet.

Variations:
None

Commentary:
The short-term debt coverage ratio compares the sum of a company's short-term borrowings and the current portion of its long-term debt to operating cash flow. Zimmer Holdings has the good fortune of having none of the former and only a nominal amount of the latter in its FY 2005 balance sheet. So, in this instance, the ratio is not meaningful in the conventional sense but clearly indicates that the company need not worry about short-term debt servicing in 2006.

The capital expenditure coverage ratio compares a company's outlays for its property, plant and equipment (PP&E) to operating cash flow. In the case of Zimmer Holdings, as mentioned above, it has ample margin to fund the acquisition of needed capital assets. For most analysts and investors, a positive difference between operating cash flow and capital expenditures defines free cash flow. Therefore, the larger this ratio is, the more cash assets a company has to work with.

The dividend coverage ratio provides dividend investors with a narrow look at the safety of the company's dividend payment. Zimmer is not paying a dividend, although with its cash buildup and cash generation capacity, it certainly looks like it could easily become a dividend payer.

For conservative investors focused on cash flow coverage, comparing the sum of a company's capital expenditures and cash dividends to its operating cash flow is a stringent measurement that puts cash flow to the ultimate test. If a company is able to cover both of these outlays of funds from internal sources and still have cash left over, it is producing what might be called "free cash flow on steroids". This circumstance is a highly favorable investment quality.

d) Dividend Payout Ratio

This ratio identifies the percentage of earnings (net income) per common share allocated to paying cash dividends to shareholders. The dividend payout ratio is an indicator of how well earnings support the dividend

payment.

Here's how dividends "start" and "end." During a fiscal year quarter, a company's board of directors declares a dividend. This event triggers the posting of a current liability for "dividends payable." At the end of the quarter, net income is credited to a company's retained earnings, and assuming there's sufficient cash on hand and/or from current operating cash flow, the dividend is paid out. This reduces cash, and the dividends payable liability is eliminated.

The payment of a cash dividend is recorded in the statement of cash flows under the "financing activities" section.

Formula:

$$\text{Dividend Payout Ratio (\%)} = \frac{\text{Dividends per Common Share}}{\text{Earnings per Share}}$$

6) **Components:**
Note: Zimmer Holdings does not pay a dividend. An assumed dividend amount, as of December 31, 2005, is provided to illustrate the ratio's calculation:

0.80 ÷ 2.96 = 27%

7)
The numerator (annual report or Form 10-K) represents the annual dividend per share paid in cash and the denominator (income statement) represents the net income per share for FY 2005.

Variations:
At the bottom of the income statement, after the stated amount for net income (net earnings), the per share amounts for "basic" net income per common share and "diluted" net income per common share are provided. The basic per share amount does not take into consideration the possible effects of stock options, which would increase the number of shares outstanding. The diluted per share amount does take into account precisely this possible dilution. Conservative analysis would use the diluted net income per share figure in the denominator.

In another version of the dividend payout ratio, total amounts are used rather than per share amounts. Nevertheless, an investor should arrive at the same ratio percentage.

Note: In the U.K. there is a similar dividend payout ratio, which is known

as "dividend cover". It's calculated using earnings per share divided by dividends per share.

Commentary:
Our first observation states the obvious - you only use this ratio with dividend-paying companies. Investors in dividend-paying stocks like to see consistent and/or gradually increasing dividend payout ratios. It should also be noted that exaggerated (i.e. very high) dividend ratios should be looked at skeptically.

The question to ask is: Can the level of dividends be sustained? Many investors are initially attracted to high dividend-paying stocks, only to be disappointed down the road by a substantial dividend reduction (see remarks below). If this circumstance happens, the stock's price most likely will take a hit.

Secondly, dividend payout ratios vary widely among companies. Stable, large, mature companies (i.e. public utilities and "blue chips") tend to have larger dividend payouts. Growth-oriented companies tend to keep their cash for expansion purposes, have modest payout ratios or choose not to pay dividends.

Lastly, investors need to remember that dividends actually get paid with cash - not earnings. From the definition of this ratio, some investors may assume that dividend payouts imply that earnings represent cash, however, with accrual accounting, they do not. A company will not be able to pay a cash dividend, even with an adequate unrestricted balance in retained earnings, unless it has adequate cash.

In view of this accounting treatment of dividends, it is incumbent upon investors to check a company's dividend payout ratio against an adequate margin of free cash flow to ensure that the payout percentage (ratio) is sustainable.

Proceed to the next chapter on Investment Valuation Ratios here.
Or, click here to return to the Financial Ratio Tutorial main menu.

8) Investment Valuation Ratios

This last section of the ratio analysis tutorial looks at a wide array of ratios that can be used by investors to estimate the attractiveness of a potential or existing investment and get an idea of its valuation.

However, when looking at the financial statements of a company many users can

suffer from information overload as there are so many different financial values. This includes revenue, gross margin, operating cash flow, EBITDA, pro forma earnings and the list goes on. Investment valuation ratios attempt to simplify this evaluation process by comparing relevant data that help users gain an estimate of valuation.

For example, the most well-known investment valuation ratio is the P/E ratio, which compares the current price of company's shares to the amount of earnings it generates. The purpose of this ratio is to give users a quick idea of how much they are paying for each $1 of earnings. And with one simplified ratio, you can easily compare the P/E ratio of one company to its competition and to the market.

The first part of this tutorial gives a great overview of "per share" data and the major considerations that one should be aware of when using these ratios. The rest of this section covers the various valuation tools that can help you determine if that stock you are interested in is looking under or overvalued.

To find the data used in the examples in this section, please see the Securities and Exchange Commission's website to view the 2005 Annual Statement of Zimmer Holdings.

a) Per Share Data

Before discussing valuation ratios, it's worthwhile to briefly review some concepts that are integral to the interpretation and calculation of the most commonly used per share indicators.

Per-share data can involve any number of items in a company's financial position. In corporate financial reporting - such as the annual report, Forms 10-K and 10-Q (annual and quarterly reports, respectively, to the SEC) - most per-share data can be found in these statements, including earnings and dividends.

Additional per-share items (which are often reported by investment research services) also include sales (revenue), earnings growth and cash flow. To calculate sales, earnings and cash flow per share, a weighted average of the number of shares outstanding is used. For book value per share, the fiscal yearend number of shares is used. Investors can rely on companies and investment research services to report earnings per share on this basis.

In the case of earnings per share, a distinction is made between *basic* and *diluted* income per share. In the case of the latter, companies with outstanding warrants, stock options, and convertible preferred shares and bonds would report diluted earnings per share in addition to their basic earnings per share.

The concept behind this treatment is that if converted to common shares, all these convertible securities would increase a company's shares outstanding. While it is unlikely for any or all of these items to be exchanged for common stock in their entirety at the same time, conservative accounting conventions dictate that this potential dilution (an increase in a company's shares outstanding) be reported. Therefore, earnings per share come in two varieties - basic and diluted (also referred to as fully diluted).

An investor should carefully consider the diluted share amount if it differs significantly from the basic share amount. A company's share price could suffer if a large number of the option holders of its convertible securities decide to switch to stock.

For example, let's say that XYZ Corp. currently has one million shares outstanding, one million in convertible options outstanding (assumes each option gives the right to buy one share), and the company's earnings per share are $3. If all the options were exercised (converted), there would be two million shares outstanding. In this extreme example, XYZ's earnings per share would drop from $3 to $1.50 and its share place would plummet.

While it is not very common, when companies sell off and/or shut down a component of their operations, their earnings per share (both basic and diluted) will be reported with an additional qualification, which is presented as being based on continuing and discontinued operations.

The absolute dollar amounts for earnings, sales, cash flow and book value are worthwhile for investors to review on a year-to-year basis. However, in order for this data to be used in calculating investment valuations, these dollar amounts must be converted to a per-share basis and compared to a stock's current price. It is this comparison that gives rise to the common use of the expression "multiple" when referring to the relationship of a company's stock price (per share) to its per-share metrics of earnings, sales, cash flow and book value. These so-called valuation ratios provide investors with an estimation, albeit a simplistic one, of whether a stock price is too high, reasonable, or a bargain as an investment opportunity.

Lastly, it is very important to once again to remind investors that while some financial ratios have general rules (or a broad application), in most instances it is a prudent practice to look at a company's historical performance and use peer company/industry comparisons to put any given company's ratio in perspective. This is particularly true of investment valuation ratios. This paragraph, therefore, should be considered as an integral part of the discussion of each of the following ratios.

b) Price/Book Value Ratio

A valuation ratio used by investors which compares a stock's per-share price (market value) to its book value (shareholders' equity). The price-to-book value ratio, expressed as a multiple (i.e. how many times a company's stock is trading per share compared to the company's book value per share), is an indication of how much shareholders are paying for the net assets of a company.

The book value of a company is the value of a company's assets expressed on the balance sheet. It is the difference between the balance sheet assets and balance sheet liabilities and is an estimation of the value if it were to be liquidated.

The price/book value ratio, often expressed simply as "price-to-book", provides investors a way to compare the market value, or what they are paying for each share, to a conservative measure of the value of the firm.

Formula:

$$\text{Price/Book Value Ratio} = \frac{\text{Stock Price per Share}}{\text{Shareholders' Equity per Share}}$$

Components:

$$\text{Price/Book Value Ratio} = \frac{\$67.44}{\$4{,}682.8/247.1} = 3.6$$

c)

The dollar amount in the numerator, $67.44, is the closing stock price for Zimmer Holdings as of December 30, 2005, as reported in the financial press or over the Internet in online quotes. In the denominator, the book value per share is calculated by dividing the reported shareholders' equity (balance sheet) by the number of common shares outstanding (balance sheet) to obtain the $18.90 book value per-share figure. By simply dividing, the equation gives us the price/book value ratio indicating that, as of Zimmer Holdings' 2005 fiscal yearend, its stock was trading at 3.6-times the company's book value of $18.90 per share.

Variations:

A conservative alternative to using a company's reported shareholders' equity (book value) figure would be to deduct a company's intangible assets from its reported shareholders' equity to arrive at a tangible shareholders' equity (tangible book value) amount. For example, Zimmer Holdings' FY 2005 balance sheet reports goodwill (in millions $) of $2,428.8 and net intangible assets of $756.6, which total $3,185.4. If we deduct these intangible assets from its shareholders' equity of $4,682.8 of the same date, Zimmer Holdings

is left with a significantly reduced tangible shareholders' equity of $1,497.4. Factoring this amount into our equation, the company has a book value per share of only $6.04, and the price/book value ratio then skyrockets to 11.2 times.

Commentary:
If a company's stock price (market value) is lower than its book value, it can indicate one of two possibilities. The first scenario is that the stock is being unfairly or incorrectly undervalued by investors because of some transitory circumstance and represents an attractive buying opportunity at a bargain price. That's the way value investors think. It is assumed that the company's positive fundamentals are still in place and will eventually lift it to a much higher price level.

On the other hand, if the market's low opinion and valuation of the company are correct (the way growth investors think), at least over the foreseeable future, as a stock investment, it will be perceived at its worst as a losing proposition and at its best as being a stagnant investment.

Some analysts feel that because a company's assets are recorded at historical cost that its book value is of limited use. Outside the United States, some countries' accounting standards allow for the revaluation of the property, plant and equipment components of fixed assets in accordance with prescribed adjustments for inflation. Depending on the age of these assets and their physical location, the difference between current market value and book value can be substantial, and most likely favor the former with a much higher value than the latter.

Also, intellectual property, particularly as we progress at a fast pace into the so-called "information age", is difficult to assess in terms of value. Book value may well grossly undervalue these kinds of assets, both tangible and intangible.

The P/B ratio therefore has its shortcomings but is still widely used as a valuation metric. It is probably more relevant for use by investors looking at capital-intensive or finance-related businesses, such as banks.

In terms of general usage, it appears that the price-to-earnings (P/E) ratio is firmly entrenched as the valuation of choice by the investment community. (Skip ahead to the P/E chapter here.)

d) Price/Cash Flow Ratio

The price/cash flow ratio is used by investors to evaluate the investment attractiveness, from a value standpoint, of a company's stock. This metric

compares the stock's market price to the amount of cash flow the company generates on a per-share basis.

This ratio is similar to the price/earnings ratio, except that the price/cash flow ratio (P/CF) is seen by some as a more reliable basis than earnings per share to evaluate the acceptability, or lack thereof, of a stock's current pricing. The argument for using cash flow over earnings is that the former is not easily manipulated, while the same cannot be said for earnings, which, unlike cash flow, are affected by depreciation and other non-cash factors.

Formula:

$$\text{Price/Cash Flow Ratio} = \frac{\text{Stock Price per Share}}{\text{Operating Cash Flow per Share}}$$

9)

Components:

$$\text{Price/Cash Flow Ratio} = \frac{\$67.44}{\$878.2/247.1} = 19$$

10)

The dollar amount in the numerator is the closing stock price for Zimmer Holdings as of December 30, 2005 as reported in the financial press or over the Internet in online quotes. In the denominator, the cash flow per share is calculated by dividing the reported net cash provided by operating activities (cash flow statement) by the weighted average number of common shares outstanding (income statement) to obtain the $3.55 cash flow per share figure. By simply dividing, the equation gives us the price/cash flow ratio that indicates as of Zimmer Holdings' 2005 fiscal yearend, its stock (at $67.44) was trading at 19.0-times the company's cash flow of $3.55 per share.

Variations:
Sometimes free cash flow is used instead of operating cash flow to calculate the cash flow per share figure.

Commentary:
Just as many financial professionals prefer to focus on a company's cash flow as opposed to its earnings as a profitability indicator, it's only logical that analysts in this camp presume that the price/cash flow ratio is a better investment valuation indicator than the P/E ratio.

Investors need to remind themselves that there are a number of non-cash charges in the income statement that lower reported earnings.

Recognizing the primacy of cash flow over earnings leads some analysts to prefer using the P/CF ratio rather than, or in addition to, the company's P/E ratio.

Despite these considerations, there's no question that the P/E measurement is the most widely used and recognized valuation ratio.

a) Price/Earnings Ratio

The price/earnings ratio (P/E) is the best known of the investment valuation indicators. The P/E ratio has its imperfections, but it is nevertheless the most widely reported and used valuation by investment professionals and the investing public. The financial reporting of both companies and investment research services use a basic earnings per share (EPS) figure divided into the current stock price to calculate the P/E multiple (i.e. how many times a stock is trading (its price) per each dollar of EPS).

It's not surprising that estimated EPS figures are often very optimistic during bull markets, while reflecting pessimism during bear markets. Also, as a matter of historical record, it's no secret that the accuracy of stock analyst earnings estimates should be looked at skeptically by investors. Nevertheless, analyst estimates and opinions based on forward-looking projections of a company's earnings do play a role in Wall Street's stock-pricing considerations.

Historically, the average P/E ratio for the broad market has been around 15, although it can fluctuate significantly depending on economic and market conditions. The ratio will also vary widely among different companies and industries.

Formula:

$$\text{Price/Earnings Ratio} = \frac{\text{Stock Price per Share}}{\text{Earnings per Share (EPS)}}$$

Components:

$$\text{Price/Earnings Ratio} = \frac{\$67.44}{\$732.5/247.1} = 22.8$$

The dollar amount in the numerator is the closing stock price for Zimmer Holdings as of December 31, 2005 as reported in the financial press or over the Internet in online quotes. In the denominator, the EPS figure is calculated by dividing the company's reported net earnings (income statement) by the weighted average number of common shares outstanding (income statement) to obtain the $2.96 EPS figure. By simply dividing, the equation gives us the P/E ratio that

indicates (as of Zimmer Holdings' 2005 fiscal yearend) its stock (at $67.44) was trading at 22.8-times the company's basic net earnings of $2.96 per share. This means that investors would be paying $22.80 for every dollar of Zimmer Holdings' earnings.

Variations:
The basic formula for calculating the P/E ratio is fairly standard. There is never a problem with the numerator - an investor can obtain a current closing stock price from various sources, and they'll all generate the same dollar figure, which, of course, is a per-share number.

However, there are a number of variations in the numbers used for the EPS figure in the denominator. The most commonly used EPS dollar figures include the following:

- **Basic earnings per share** - based on the past 12 months as of the most recent reported quarterly net income. In investment research materials, this period is often identified as trailing twelve months (TTM). As noted previously, diluted earnings per share could also be used, but this is not a common practice. The term "trailing P/E" is used to identify a P/E ratio calculated on this basis.
- **Estimated basic earnings per share** - based on a forward 12-month projection as of the most recent quarter. This EPS calculation is not a "hard number", but rather an estimate generated by investment research analysts. The term, estimated P/E ratio, is used to identify a P/E ratio calculated on this basis.
- **The Value Line Investment Survey's combination approach** - This well-known and respected independent stock research firm has popularized a P/E ratio that uses six months of actual trailing EPS and six months of forward, or estimated, EPS as its earnings per share component in this ratio.
- **Cash Earnings Per Share** - Some businesses will report cash earnings per share, which uses operating cash flow instead of net income to calculate EPS.
- **Other Earnings Per Share** - Often referred to as "headline EPS", "whisper numbers", and "pro forma", these other earnings per shares metrics are all based on assumptions due to special circumstances. While the intention here is to highlight the impact of some particular operating aspect of a company that is not part of its conventional financial reporting, investors should remember that the reliability of these forms of EPS is questionable.

Commentary:
A stock with a high P/E ratio suggests that investors are expecting higher earnings growth in the future compared to the overall market, as investors are paying more for today's earnings in anticipation of future earnings growth. Hence,

as a generalization, stocks with this characteristic are considered to be growth stocks. Conversely, a stock with a low P/E ratio suggests that investors have more modest expectations for its future growth compared to the market as a whole.

The growth investor views high P/E ratio stocks as attractive buys and low P/E stocks as flawed, unattractive prospects. Value investors are not inclined to buy growth stocks at what they consider to be overpriced values, preferring instead to buy what they see as underappreciated and undervalued stocks, at a bargain price, which, over time, will hopefully perform well.

Note: Though this indicator gets a lot of investor attention, there is an important problem that arises with this valuation indicator and investors should avoid basing an investment decision solely on this measure. The ratio's denominator (earnings per share) is based on accounting conventions related to a determination of earnings that is susceptible to assumptions, interpretations and management manipulation. This means that the quality of the P/E ratio is only as good as the quality of the underlying earnings number.

Whatever the limitations of the P/E ratio, the investment community makes extensive use of this valuation metric. It will appear in most stock quote presentations on an updated basis, i.e., the latest 12-months earnings (based on the most recent reported quarter) divided by the current stock price. Investors considering a stock purchase should then compare this current P/E ratio against the stock's long-term (three to five years) historical record. This information is readily available in Value Line or S&P stock reports, as well as from most financial websites, such as Yahoo!Finance and MarketWatch.

It's also worthwhile to look at the current P/E ratio for the overall market (S&P 500), the company's industry segment, and two or three direct competitor companies. This comparative exercise can help investors evaluate the P/E of their prospective stock purchase as being in a high, low or moderate price range.

To learn more, check out *Understanding The P/E Ratio*,*Analyze Investments Quickly With Ratios* and *Move Over P/E, Make Way For The PEG*.

b) Price/Earnings To Growth Ratio

The price/earnings to growth ratio, commonly referred to as the PEG ratio, is obviously closely related to the P/E ratio. The PEG ratio is a refinement of the P/E ratio and factors in a stock's estimated earnings growth into its current valuation. By comparing a stock's P/E ratio with its projected, or estimated, earnings per share (EPS) growth, investors are given insight into the degree of overpricing or underpricing of a stock's current valuation, as indicated by the traditional P/E ratio.

The general consensus is that if the PEG ratio indicates a value of 1, this means that the market is correctly valuing (the current P/E ratio) a stock in accordance with the stock's current estimated earnings per share growth. If the PEG ratio is less than 1, this means that EPS growth is potentially able to surpass the market's current valuation. In other words, the stock's price is being undervalued. On the other hand, stocks with high PEG ratios can indicate just the opposite - that the stock is currently overvalued.

Formula:

$$\text{PEG Ratio} = \frac{\text{Price/Earnings (P/E) Ratio}}{\text{Earnings Per Share (EPS) Growth}}$$

Components:

$$\text{Price/Earnings to Growth Ratio} = \frac{22.8}{11\% \times 100} = 2.1$$

For the numerator, we are using Zimmer Holdings' P/E ratio, as calculated in the last chapter, for its fiscal yearend, December 30, 2005. The denominator, estimated earnings per share growth in 2006, is based on data found in a Value Line stock report on Zimmer Holdings.

Variations:
None

Commentary:
While the P/E ratio represents a very simple and widely used method of valuing a stock, it does lack one very important variable. The assumption with high P/E stocks (generally of the growth variety) is that investors are willing to buy at a high price because they believe that the stock has significant growth potential. The PEG ratio helps investors determine the degree of reliability of that growth assumption.

Although the PEG ratio improves upon (i.e. provides additional valuation insight) the P/E ratio, it is still far from perfect. The problem lies with the numerator and the denominator in the equation. Misreading of a company's and/or analysts' predictions of future earnings are very common. Also, investor sentiment regarding a stock's pricing and earnings prospects is usually overly optimistic during bull markets and overly pessimistic in bear markets.

The question of where investors can source the data necessary to calculate the PEG ratio focuses entirely on the estimated future growth of per-share earnings.

A stock's P/E ratio appears in virtually all price quotes regardless of their origin. Estimated earnings growth shows up in investment research reports and financial analysts' comments in the financial press but may require some digging to find it.

In this regard, the historical and estimated performance of a company's earnings per share is easily obtained from Value Line stock reports, which are available by subscription to the Value Line Investment Survey. It should also be noted that most public libraries carry a Value Line subscription, which, therefore, makes its stock reports available free of charge to the general public.

Using Zimmer Holdings as an illustration, let's take a look at the data in question in a December 1, 2006 Value Line stock report on the company. At the top of the report, Value Line reports a trailing P/E ratio of 22.6. Zimmer Holdings went public in 2001, so we have five years of actual EPS, as well as Value Line's one, two, and three-to-five year EPS estimates in the per share data box.

Value Line estimates a +11% EPS growth for the 2005-2006 period and +14% growth rate for 2007. So, at yearend 2006 we are looking at a PEG ratio for Zimmer of 1.61 (22.6 P/E ratio ÷ 14% EPS growth). Some peer company PEG ratio comparisons would give investors an idea of the strength or weakness of this valuation indicator at that point in time.

To learn more, check out *Understanding The P/E Ratio*,*Analyze Investments Quickly With Ratios* and *Move Over P/E, Make Way For The PEG*.

c) Price/Sales Ratio

A stock's price/sales ratio (P/S ratio) is another stock valuation indicator similar to the P/E ratio. The P/S ratio measures the price of a company's stock against its annual sales, instead of earnings.

Like the P/E ratio, the P/S reflects how many times investors are paying for every dollar of a company's sales. Since earnings are subject, to one degree or another, to accounting estimates and management manipulation, many investors consider a company's sales (revenue) figure a more reliable ratio component in calculating a stock's price multiple than the earnings figure.

Formula:

$$\text{Price/Sales Ratio} = \frac{\text{Stock Price per Share}}{\text{Net Sales (Revenue) per Share}}$$

Components:

$$\text{Price/Sales Ratio} = \frac{\$67.44}{\$3,286.1/247.1} = 5.1$$

The dollar amount in the numerator is the closing stock price for Zimmer Holdings as of December 31, 2005, as reported in the financial press or over the internet in online quotes. In the denominator, the sales per share figure is calculated by dividing the reported net earnings (income statement) by the weighted average number of common shares outstanding (income statement) to obtain the $13.30 sales per share figure. By simply dividing, the equation gives us a P/S ratio indicating that, as of Zimmer Holdings 2005 fiscal yearend, its stock (at $67.44) was trading at 5.1-times the company's sales of $13.30 per share. This means that investors would be paying $5.10 for every dollar of Zimmer Holdings' sales.

Variations:
None

Commentary:
"The king of the value factors" is how James O'Shaughnessy describes the P/S ratio in his seminal book on investing strategies, *What Works on Wall Street* (McGraw-Hill, 1997). Using Standard & Poor's CompuStat database, his exhaustive analysis makes clear that "the stock market methodically rewards certain investment strategies while punishing others." No matter what your style of investing, O'Shaughnessy's research concludes that "low price-to-sales ratios beat the market more than any other value ratio, and do so more consistently."

As powerful a valuation metric as the P/S ratio may be, it would be a mistake for investors to put all their stock price valuation eggs in one basket. However, the P/S ratio does provide another perspective that complements the other valuation indicators - particularly the P/E ratio - and is a worthwhile addition to an investor's stock analysis toolbox.

d) Dividend Yield
A stock's dividend yield is expressed as an annual percentage and is calculated as the company's annual cash dividend per share divided by the current price of the stock. The dividend yield is found in the stock quotes of dividend-paying companies. Investors should note that stock quotes record the per share dollar amount of a company's latest quarterly declared dividend. This quarterly dollar amount is annualized and compared to the current stock price to generate the per annum dividend yield, which represents an expected return.

Income investors value a dividend-paying stock, while growth investors have little interest in dividends, preferring to capture large capital gains. Whatever your

investing style, it is a matter of historical record that dividend-paying stocks have performed better than non-paying-dividend stocks over the long term.

Formula:

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

Components:

$$\text{Dividend Yield} = \frac{\$1}{\$67.44} = 1.48\%$$

Zimmer Holdings does not pay a dividend, so the $1.00 dividend per share amount is being used for illustration purposes. In the company's stock quote the latest quarterly dividend would be recorded as $0.25 (per share) and the share price as $67.44 as of yearend 2005. On this basis, the stock would have a dividend yield of 1.48%.

Variations:
None

Commentary:
A stock's dividend yield depends on the nature of a company's business, its posture in the marketplace (value or growth oriented), its earnings and cash flow, and its dividend policy. For example, steady, mature businesses, such as utilities and banks, are generally good dividend payers. REIT stocks, with their relatively stable inflow of rental payments, are also recognized for their attractive dividend yields. If you're an income investor, a stock's dividend yield might well be the only valuation measurement that matters to you. On the other hand, if you're in the growth stock camp, dividend yield (or the lack of one) will be meaningless.

e) Enterprise Value Multiple
This valuation metric is calculated by dividing a company's "enterprise value" by its earnings before interest expense, taxes, depreciation and amortization (EBITDA).

Overall, this measurement allows investors to assess a company on the same basis as that of an acquirer. As a rough calculation, enterprise value multiple serves as a proxy for how long it would take for an acquisition to earn enough to pay off its costs (assuming no change in EBITDA).

Formula:

$$\text{Enterprise Value Multiple} = \frac{\text{Enterprise Value}}{\text{EBITDA}}$$

Components:

Market Capitalization ($67.44 x 247.8 MM)	**$16,712**
--	--
Debt	82
Minority Interest	2
--	**$16,796**
Less Cash/Cash Equivalents	(233)
Enterprise Value	**$16,563**

$$\text{Enterprise Value Multiple} = \frac{\$16{,}563}{\$1{,}055} = 15.7$$

Enterprise value is calculated by adding a company's debt, minority interest, and preferred stock to its market capitalization (stock price times number of shares outstanding). The data for Zimmer Holdings' enterprise value and earnings before interest, taxes, depreciation and amortization (EBITDA) were obtained from its stock quote, income statement and balance sheet as of December 31, 2005. By simply dividing, the equation gives us the company's enterprise multiple of 15.7, which means that it would take roughly 16 years for earnings (assuming EBITDA doesn't change) to pay off the acquisition cost of Zimmer Holdings.

Variations:
None

Commentary:
Enterprise value, also referred to as the value of the enterprise, is basically a modification of market capitalization, which is determined by simply multiplying a company's number of shares outstanding by the current price of its stock. Obviously, a company's stock price is heavily influenced by investor sentiment and market conditions, which, in turn, will be determined by a company's market-cap value.

On the other hand, a company's enterprise value, which is the metric used by the acquiring party in an acquisition, is a term used by financial analysts to arrive at a value of a company viewed as a going concern rather than market capitalization. For example, in simple terms, long-term debt and cash in a company's balance

sheet are important factors in arriving at enterprise value - both effectively serve to enhance company's value for the acquiring company.

As mentioned previously, enterprise value considerations seldom find their way into standard stock analysis reporting. However, it is true that by using enterprise value, instead of market capitalization, to look at the book or market-cap value of a company, investors can get a sense of whether or not a company is undervalued.

For more information on acquisitions, see *The Basics Of Mergers And Acquisitions*, *Mergers And Acquisitions - Another Tool For Traders* and *The Wacky World of M&As*.