Financial ratio analysis

A reading prepared by Pamela Peterson Drake

O U T L I N E

1. Introduction

As a manager, you may want to reward employees based on their performance. How do you know how well they have done? How can you determine what departments or divisions have performed well? As a lender, how do decide the borrower will be able to pay back as promised? As a manager of a corporation how do you know when existing capacity will be exceeded and enlarged capacity will be needed? As an investor, how do you predict how well the securities of one company will perform relative to that of another? How can you tell whether one security is riskier than another? We can address all of these questions through financial analysis.

Financial analysis is the selection, evaluation, and interpretation of financial data, along with other pertinent information, to assist in investment and financial decision-making. Financial analysis may be used internally to evaluate issues such as employee performance, the efficiency of operations, and credit policies, and externally to evaluate potential investments and the credit-worthiness of borrowers, among other things.

The analyst draws the financial data needed in financial analysis from many sources. The primary source is the data provided by the company itself in its annual report and required disclosures. The annual report comprises the income statement, the balance sheet, and the statement of cash flows, as well as footnotes to these statements. Certain businesses are required by securities laws to disclose additional information.

Besides information that companies are required to disclose through financial statements, other information is readily available for financial analysis. For example, information such as the market prices of securities of publicly-traded corporations can be found in the financial press and the electronic media daily. Similarly, information on stock price indices for industries and for the market as a whole is available in the financial press.

Another source of information is economic data, such as the Gross Domestic Product and Consumer Price Index, which may be useful in assessing the recent performance or future prospects of a company or industry. Suppose you are evaluating a company that owns a chain of retail outlets. What information do you need to judge the company's performance and financial condition? You need financial data, but it doesn't tell the whole story. You also need information on consumer

spending, producer prices, consumer prices, and the competition. This is economic data that is readily available from government and private sources.

Besides financial statement data, market data, and economic data, in financial analysis you also need to examine events that may help explain the company's present condition and may have a bearing on its future prospects. For example, did the company recently incur some extraordinary losses? Is the company developing a new product? Or acquiring another company? Is the company regulated? Current events can provide information that may be incorporated in financial analysis.

The financial analyst must select the pertinent information, analyze it, and interpret the analysis, enabling judgments on the current and future financial condition and operating performance of the company. In this reading, we introduce you to financial ratios -- the tool of financial analysis. In financial ratio analysis we select the relevant information -- primarily the financial statement data -- and evaluate it. We show how to incorporate market data and economic data in the analysis and interpretation of financial ratios. And we show how to interpret financial ratio analysis, warning you of the pitfalls that occur when it's not used properly.

We use Microsoft Corporation's 2004 financial statements for illustration purposes throughout this reading. You can obtain the 2004 and any other year's statements directly from Microsoft. Be sure to save these statements for future reference.

Classification of ratios

A ratio is a mathematical relation between one quantity and another. Suppose you have 200 apples and 100 oranges. The ratio of apples to oranges is 200 / 100, which we can more conveniently express as 2:1 or 2. A financial ratio is a comparison between one bit of financial information and another. Consider the ratio of current assets to current liabilities, which we refer to as the current ratio. This ratio is a comparison between assets that can be readily turned into cash -- current assets -- and the obligations that are due in the near future -- current liabilities. A current ratio of 2:1 or 2 means that we have twice as much in current assets as we need to satisfy obligations due in the near future.

Ratios can be classified according to the way they are constructed and their general characteristics. By construction, ratios can be classified as a coverage ratio, a return ratio, a turnover ratio, or a component percentage:

1. A ***coverage ratio*** is a measure of a company's ability to satisfy (meet) particular obligations.
2. A ***return ratio*** is a measure of the net benefit, relative to the resources expended.
3. A ***turnover ratio*** is a measure of the gross benefit, relative to the resources expended.
4. A ***component percentage*** is the ratio of a component of an item to the item.

When we assess a company's operating performance, we want to know if it is applying its assets in an efficient and profitable manner. When we assess a company's financial condition, we want to know if it is able to meet its financial obligations.

There are six aspects of operating performance and financial condition we can evaluate from financial ratios:

1. A ***liquidity ratio*** provides information on a company's ability to meet its short–term, immediate obligations.
2. A ***profitability ratio*** provides information on the amount of income from each dollar of sales.

3. An ***activity ratio*** relates information on a company's ability to manage its resources (that is, its assets) efficiently.
4. A ***financial leverage ratio*** provides information on the degree of a company's fixed financing obligations and its ability to satisfy these financing obligations.
5. A ***shareholder ratio*** describes the company's financial condition in terms of amounts per share of stock.
6. A ***return on investment ratio*** provides information on the amount of profit, relative to the assets employed to produce that profit.

We cover each type of ratio, providing examples of ratios that fall into each of these classifications.

2. Liquidity Ratios

Liquidity reflects the ability of a company to meet its short-term obligations using assets that are most readily converted into cash. Assets that may be converted into cash in a short period of time are referred to as ***liquid assets***; they are listed in financial statements as current assets. Current assets are often referred to as working capital because these assets represent the resources needed for the day-to-day operations of the company's long-term, capital investments. Current assets are used to satisfy short-term obligations, or current liabilities. The amount by which current assets exceed current liabilities is referred to as the net working capital.[1]

The role of the operating cycle

How much liquidity a company needs depends on its operating cycle. The operating cycle is the duration between the time cash is invested in goods and services to the time that investment produces cash. For example, a company that produces and sells goods has an operating cycle comprising four phases:

(1) purchase raw material and produce goods, investing in inventory;

(2) sell goods, generating sales, which may or may not be for cash;

(3) extend credit, creating accounts receivables, and

(4) collect accounts receivables, generating cash.

The ***operating cycle*** is the length of time it takes to convert an investment of cash in inventory back into cash (through collections of sales). The net operating cycle is the length of time it takes to convert an investment of cash in inventory and back into cash considering that some purchases are made on credit.

The number of days a company ties up funds in inventory is determine by:

(1) the total amount of money represented in inventory, and

(2) the average day's cost of goods sold.

The current investment in inventory -- that is, the money "tied up" in inventory -- is the ending balance of inventory on the balance sheet. The average day's cost of goods sold is the cost of goods

[1] You will see reference to the net working capital (i.e., current assets – current liabilities) as simply *working capital*, which may be confusing. Always check the definition for the particular usage because both are common uses of the term *working capital*.

sold on an average day in the year, which can be estimated by dividing the cost of goods sold found on the income statement by the number of days in the year.

We compute the number of days of inventory by calculating the ratio of the amount of inventory on hand (in dollars) to the average day's Cost of Goods Sold (in dollars per day):

$$\text{Number of days inventory} = \frac{\text{Inventory}}{\text{Average day's cost of goods sold}} = \frac{\text{Inventory}}{\text{Cost of goods sold / 365}}$$

If the ending inventory is representative of the inventory throughout the year, the number of days inventory tells us the time it takes to convert the investment in inventory into sold goods. Why worry about whether the year-end inventory is representative of inventory at any day throughout the year? Well, if inventory at the end of the fiscal year-end is lower than on any other day of the year, we have understated the number of days of inventory.

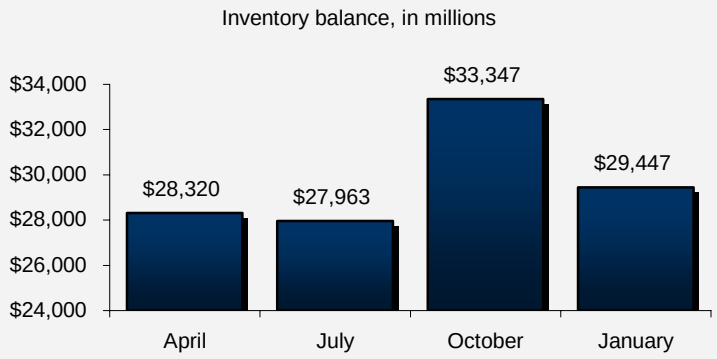
Indeed, in practice most companies try to choose fiscal year-ends that coincide with the slow period of their business. That means the ending balance of inventory would be lower than the typical daily inventory of the year. We could, for example, look at quarterly financial statements and take averages of quarterly inventory balances to get a better idea of the typical inventory. However, here for simplicity in this and other ratios, we will make a note of this problem and deal with it later in the discussion of financial ratios.

We can extend the same logic for calculating the number of days between a sale -- when an account receivable is created -- to the time it is collected in cash. If the ending balance of receivables at the end of the year is representative of the receivables on any day throughout the year, then it takes, on average, approximately the "number of days credit" to collect the accounts receivable, or the number of days receivables:

$$\text{Number of days receivables} = \frac{\text{Accounts receivable}}{\text{Average day's sales on credit}} = \frac{\text{Accounts receivable}}{\text{Sales on credit / 365}}$$

Try it!

Wal-Mart Stores, Inc., had cost of revenue of $219,793 million for the fiscal year ended January 31, 2005. It had an inventory balance of $29,447 million at the end of this fiscal year. Using the quarterly information, Wal-Mart's average inventory balance during the fiscal year is $29,769.25:



Source: Wal-Mart Stores 10-K and 10-Q filings

Based on this information, what is Wal-Mart's inventory turnover for fiscal year 2004 (ending January 31, 2005)?

Solution:

Using the fiscal year end balance of inventory:

$$\text{Number of days inventory} = \frac{\$29{,}447}{\$219{,}793/365} = \frac{\$29{,}447}{\$602.173} = 48.9 \text{ days}$$

Using the average of the quarterly balances:

$$\text{Number of days inventory} = \frac{\$29{,}769.25}{\$219{,}793/365} = \frac{\$29{,}769.25}{\$602.173} = 49.436 \text{ days}$$

In other words, it takes Wal-Mart approximately 50 days to sell its merchandise from the time it acquires it.

What does the operating cycle have to do with liquidity? The longer the operating cycle, the more current assets needed (relative to current liabilities) because it takes longer to convert inventories and receivables into cash. In other words, the longer the operating cycle, the more net working capital required.

We also need to look at the liabilities on the balance sheet to see how long it takes a company to pay its short-term obligations. We can apply the same logic to accounts payable as we did to accounts receivable and inventories. How long does it take a company, on average, to go from creating a payable (buying on credit) to paying for it in cash?

$$\text{Number of days payables} = \frac{\text{Accounts payable}}{\text{Average day's purchases}} = \frac{\text{Accounts payable}}{\text{Purchases / 365}}$$

First, we need to determine the amount of an average day's purchases on credit. If we assume all purchases are made on credit, then the total purchases for the year would be the Cost of Goods Sold, less any amounts included in this Cost of Goods Sold that are not purchases.[2]

The operating cycle tells us how long it takes to convert an investment in cash back into cash (by way of inventory and accounts receivable):

$$\text{Operating cycle} = \begin{matrix}\text{Number of days}\\ \text{of inventory}\end{matrix} + \begin{matrix}\text{Number of days}\\ \text{of receivables}\end{matrix}$$

The number of days of purchases tells us how long it takes use to pay on purchases made to create the inventory. If we put these two pieces of information together, we can see how long, on net, we tie up cash. The difference between the operating cycle and the number of days of payables is the net operating cycle:

Net operating cycle = Operating Cycle - Number of days of purchases

or, substituting for the operating cycle,

$$\text{Net operating cycle} = \begin{matrix}\text{Number of days}\\ \text{of inventory}\end{matrix} + \begin{matrix}\text{Number of days}\\ \text{of receivables}\end{matrix} - \begin{matrix}\text{Number of days}\\ \text{of purchases}\end{matrix}$$

The net operating cycle therefore tells us how long it takes for the company to get cash back from its investment in inventory and accounts receivable, considering that purchases may be made on credit. By not paying for purchases immediately (that is, using trade credit), the company reduces its liquidity needs. Therefore, the longer the net operating cycle, the greater the company's need for liquidity.

Microsoft's Number of Days Receivables

2004:

Average day's receivables = $36,835 million / 365 = $100.9178 million

Number of days receivables = $5,890 million / $100.9178 million = **58.3643 days**

Now try it for 2005 using the 2005 data from Microsoft's financial statements.

Answer: **65.9400 days**

Source of data: Income Statement and Balance Sheet, Microsoft Corporation Annual Report 2005

[2] For example, depreciation is included in the Cost of Goods Sold, yet it not a purchase. However, as a quite proxy for purchases, we can use the accounting relationship: beginning inventory + purchases = COGS + ending inventory.

Measures of liquidity

Liquidity ratios provide a measure of a company's ability to generate cash to meet its immediate needs. There are three commonly used liquidity ratios:

1. The ***current ratio*** is the ratio of current assets to current liabilities; Indicates a company's ability to satisfy its current liabilities with its current assets:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

2. The ***quick ratio*** is the ratio of quick assets (generally current assets less inventory) to current liabilities; Indicates a company's ability to satisfy current liabilities with its most liquid assets

$$\text{Quick ratio} = \frac{\text{Current assets - Inventory}}{\text{Current liabilities}}$$

3. The ***net working capital to sales ratio*** is the ratio of net working capital (current assets minus current liabilities) to sales; Indicates a company's liquid assets (after meeting short–term obligations) relative to its need for liquidity (represented by sales)

$$\text{Net working capital to sales ratio} = \frac{\text{Current assets - Current liabilities}}{\text{Sales}}$$

Generally, the larger these liquidity ratios, the better the ability of the company to satisfy its immediate obligations. Is there a magic number that defines good or bad? Not really.

Consider the current ratio. A large amount of current assets relative to current liabilities provides assurance that the company will be able to satisfy its immediate obligations. However, if there are more current assets than the company needs to provide this assurance, the company may be investing too heavily in these non- or low-earning assets and therefore not putting the assets to the most productive use.

Microsoft Liquidity Ratios -- 2004

Current ratio = $70,566 million / $14,696 million = **4.8017**

Quick ratio = ($70,566-421) / $14,696 = **4.7731**

Net working capital-to-sales = ($70,566-14,969) / $36,835 = **1.5515**

Source of data: Balance Sheet and Income Statement, Microsoft Corporation Annual Report 2005

Another consideration is the operating cycle. A company with a long operating cycle may have more need to liquid assets than a company with a short operating cycle. That's because a long operating cycle indicate that money is tied up in inventory (and then receivables) for a longer length of time.

3. Profitability ratios

Profitability ratios (also referred to as *profit margin ratios*) compare components of income with sales. They give us an idea of what makes up a company's income and are usually expressed as a portion of each dollar of sales. The profit margin ratios we discuss here differ only by the numerator. It's in the numerator that we reflect and thus evaluate performance for different aspects of the business:

The ***gross profit margin*** is the ratio of gross income or profit to sales. This ratio indicates how much of every dollar of sales is left after costs of goods sold:

$$\text{Gross profit margin} = \frac{\text{Gross income}}{\text{Sales}}$$

Microsoft's 1998 Profit Margins

Gross profit margin = ($14,484 - 1,197)/$14,484 = **91.736%**

Operating profit margin = $6,414 / $14,484 = **44.283%**

Net profit margin = $4,490 / $14,484 = **31%**

Source of data: Microsoft Corporation Annual Report 1998

Microsoft's 2004 Profit Margins

Gross profit margin = ($36,835 – 6,716)/$36,835 = **81.767%**

Operating profit margin = $9,034 / $36,835 = **24.526%**

Net profit margin = $8,168 / $36,835 = **22.175%**

Source of data: Income Statement, Microsoft Corporation Annual Report 2005

The ***operating profit margin*** is the ratio of operating profit (a.k.a. EBIT, operating income, income before interest and taxes) to sales. This is a ratio that indicates how much of each dollar of sales is left over after operating expenses:

$$\text{Operating profit margin} = \frac{\text{Operating income}}{\text{Sales}}$$

The ***net profit margin*** is the ratio of net income (a.k.a. net profit) to sales, and indicates how much of each dollar of sales is left over after all expenses:

$$\text{Net profit margin} = \frac{\text{Net income}}{\text{Sales}}.$$

4. Activity ratios

Activity ratios are measures of how well assets are used. Activity ratios -- which are, for the most part, turnover ratios -- can be used to evaluate the benefits produced by specific assets, such as inventory or accounts receivable. Or they can be use to evaluate the benefits produced by all a company's assets collectively.

These measures help us gauge how effectively the company is at putting its investment to work. A company will invest in assets – e.g., inventory or plant and equipment – and then use these assets to generate revenues. The greater the turnover, the more effectively the company is at producing a benefit from its investment in assets.

The most common turnover ratios are the following:

1. ***Inventory turnover*** is the ratio of cost of goods sold to inventory. This ratio indicates how many times inventory is created and sold during the period:

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Inventory}}$$

2. ***Accounts receivable turnover*** is the ratio of net credit sales to accounts receivable. This ratio indicates how many times in the period credit sales have been created and collected on:

$$\text{Accounts receivable turnover} = \frac{\text{Sales on credit}}{\text{Accounts receivable}}$$

3. ***Total asset turnover*** is the ratio of sales to total assets. This ratio indicates the extent that the investment in total assets results in sales.

$$\text{Total asset turnover} = \frac{\text{Sales}}{\text{Total assets}}$$

4. ***Fixed asset turnover*** is the ratio of sales to fixed assets. This ratio indicates the ability of the company's management to put the fixed assets to work to generate sales:

$$\text{Fixed asset turnover} = \frac{\text{Sales}}{\text{Fixed assets}}$$

Microsoft's Activity Ratios – 2004

Accounts receivable turnover = $36,835 / $5,890 = **6.2538 times**

Total asset turnover = $36,835 / $92,389 = **0.3987 times**

Source of data: Income Statement and Balance Sheet, Microsoft Corporation Annual Report 2005

Turnovers and numbers of days

You may have noticed that there is a relation between the measures of the operating cycle and activity ratios. This is because they use the same information and look at this information from different angles. Consider the number of days inventory and the inventory turnover:

$$\text{Number of days inventory} = \frac{\text{Inventory}}{\text{Average day's cost of goods sold}}$$

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Inventory}}$$

The number of days inventory is how long the inventory stays with the company, whereas the inventory turnover is the number of times that the inventory comes and leaves – the complete cycle – within a period. So if the number of days inventory is 30 days, this means that the turnover within the year is 365 / 30 = 12.167 times. In other words,

$$\text{Inventory turnover} = \frac{365}{\text{Number of days inventory}} = \frac{365}{\dfrac{\text{Inventory}}{\text{Cost of goods sold / 365}}} = \frac{\text{Cost of goods sold}}{\text{Inventory}}$$

Try it!

Wal-Mart Stores, Inc., had cost of revenue of $219,793 million for the fiscal year ended January 31, 2005. It had an inventory balance of $29,447 million at the end of this fiscal year.

Source: Wal-Mart Stores 10-K

Wal-Mart's number of days inventory for fiscal year 2004 (ending January 31, 2005) is

$$\text{Number of days inventory} = \frac{\$29{,}447}{\$219{,}793/365} = \frac{\$29{,}447}{\$602.173} = 48.9 \text{ days}$$

Wal-Mart's inventory turnover is:

$$\text{Inventory turnover} = \frac{\$219{,}793}{\$29{,}447} = 7.464 \text{ times}$$

And the number of days and turnover are related as follows:

Inventory turnover = 365 / 48.9 = 7.464 times

Number of days inventory = 365 / 7.464 = 48.9 days

5. Financial leverage ratios

A company can finance its assets either with equity or debt. Financing through debt involves risk because debt legally obligates the company to pay interest and to repay the principal as promised. Equity financing does not obligate the company to pay anything -- dividends are paid at the discretion of the board of directors. There is always some risk, which we refer to as business risk, inherent in any operating segment of a business. But how a company chooses to finance its operations -- the particular mix of debt and equity -- may add financial risk on top of business risk **Financial risk** is the extent that debt financing is used relative to equity.

Financial leverage ratios are used to assess how much financial risk the company has taken on. There are two types of financial leverage ratios: component percentages and coverage ratios. Component percentages compare a company's debt with either its total capital (debt plus equity) or its equity capital. Coverage ratios reflect a company's ability to satisfy fixed obligations, such as interest, principal repayment, or lease payments.

Component-percentage financial leverage ratios

The component-percentage financial leverage ratios convey how reliant a company is on debt financing. These ratios compare the amount of debt to either the total capital of the company or to the equity capital.

1. The ***total debt to assets ratio*** indicates the proportion of assets that are financed with debt (both short–term and long–term debt):

$$\text{Total debt to assets ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

   Remember from your study of accounting that total assets are equal to the sum of total debt and equity. This is the familiar ***accounting identity***: assets = liabilities + equity.

2. The ***long–term debt to assets ratio*** indicates the proportion of the company's assets that are financed with long–term debt.

$$\text{Long - term debt to assets ratio} = \frac{\text{Long - term debt}}{\text{Total assets}}$$

3. The ***debt to equity ratio*** (a.k.a. ***debt-equity ratio***) indicates the relative uses of debt and equity as sources of capital to finance the company's assets, evaluated using book values of the capital sources:

$$\text{Total debt to equity ratio} = \frac{\text{Total debt}}{\text{Total shareholders' equity}}$$

One problem (as we shall see) with looking at risk through a financial ratio that uses the book value of equity (the stock) is that most often there is little relation between the book value and its market value. The book value of equity consists of:

- the proceeds to the company of all the stock issued since it was first incorporated, less any treasury stock (stock repurchased by the company); and
- the accumulation of all the earnings of the company, less any dividends, since it was first incorporated.

Let's look at an example of the book value vs. market value of equity. IBM was incorporated in 1911. So its book value of equity represents the sum of all its stock issued and all its earnings, less all dividends paid since 1911. As of the end of 2003, IBM's book value of equity was approximately $28 billion and its market value of equity was approximately $162 billion. The book value understates its market value by over $130 billion. The book value generally does not give a true picture of the investment of shareholders in the company because:

- earnings are recorded according to accounting principles, which may not reflect the true economics of transactions, and
- due to inflation, the dollars from earnings and proceeds from stock issued in the past do not reflect today's values.

The market value, on the other hand, is the value of equity as perceived by investors. It is what investors are willing to pay, its worth. So why bother with the book value of equity? For two reasons: first, it is easier to obtain the book value than the market value of a company's securities, and second, many financial services report ratios using the book value, rather than the market value.

We may use the market value of equity in the denominator, replacing the book value of equity. To do this, we need to know the current number of shares outstanding and the current market price per share of stock and multiply to get the market value of equity.

Note that the debt-equity ratio is related to the debt-to-total assets ratio because they are both measures of the company's capital structure. The ***capital structure*** is the mix of debt and equity that the company uses to finance its assets.

Let's use short-hand notation to demonstrate this relationship. Let D represent total debt and E represent equity. Therefore, total assets are equal to D+E.

If a company has a debt-equity ratio of 0.25, this means that is debt-to-asset ratio is 0.2. We calculate it by using the ratio relationships and Algebra:

$$D/E = 0.25$$

$$D = 0.25\ E$$

Substituting 0.25 E for D in the debt-to-assets ratio D/(D+E):

$$D/(D+E) = 0.25\ E / (0.25\ E + E) = 0.25\ E / 1.25\ E = 0.2$$

In other words, a debt-equity ratio of 0.25 is equivalent to a debt-to-assets ratio of 0.2

This is a handy device: if you are given a debt-equity ratio and need the debt-assets ratio, simply:

$$D/(D+E) = (D/E) / (1 + D/E)$$

Why do we bother to show this? Because many financial analysts discuss or report a company's debt-equity ratio and you are left on your own to determine what this means in terms of the proportion of debt in the company's capital structure.

Coverage financial leverage ratios

In addition to the leverage ratios that use information about how debt is related to either assets or equity, there are a number of financial leverage ratios that capture the ability of the company to satisfy its debt obligations. There are many ratios that accomplish this, but the two most common ratios are the times interest coverage ratio and the fixed charge coverage ratio.

The times-interest-coverage ratio, also referred to as the interest coverage ratio, compares the earnings available to meet the interest obligation with the interest obligation:

$$\text{Times - interest - coverage ratio} = \frac{\text{Earnings before interest and taxes}}{\text{Interest}}$$

The fixed charge coverage ratio expands on the obligations covered and can be specified to include any fixed charges, such as lease payments and preferred dividends. For example, to gauge a company's ability to cover its interest and lease payments, you could use the following ratio:

$$\text{Fixed - charge coverage ratio} = \frac{\text{Earnings before interest and taxes} + \text{Lease payment}}{\text{Interest} + \text{Lease payment}}$$

Coverage ratios are often used in debt covenants to help protect the creditors.

Microsoft's Financial Leverage Ratios – 2004

Total debt to total assets = ($94,368 - 74,825) / $94,368 = 0.20709 or **20.709%**

Debt to equity ratio = ($94,368 - 74,825) / $74,825 = 0.26118 or **26.118%**

Source of data: Balance sheet, Microsoft Corporation Annual Report 2005

6. Shareholder ratios

The ratios we have explained to this point deal with the performance and financial condition of the company. These ratios provide information for managers (who are interested in evaluating the performance of the company) and for creditors (who are interested in the company's ability to pay its obligations). We will now take a look at ratios that focus on the interests of the owners -- shareholder ratios. These ratios translate the overall results of operations so that they can be compared in terms of a share of stock:

Earnings per share (EPS) is the amount of income earned during a period per share of common stock.

$$\text{Earnings per share} = \frac{\text{Net income available to shareholders}}{\text{Number of shares outstanding}}$$

As we learned earlier in the study of Financial Statement Information, two numbers of earnings per share are currently disclosed in financial reports: basic and diluted. These numbers differ with respect to the definition of available net income and the number of shares outstanding. ***Basic earnings per share*** are computed using reported earnings and the average number of shares outstanding. ***Diluted earnings per share*** are computed assuming that all potentially dilutive securities are issued. That means we look at a "worst case" scenario in terms of the dilution of earnings from factors such as executive stock options, convertible bonds, convertible preferred stock, and warrants.

Suppose a company has convertible securities outstanding, such as convertible bonds. In calculating diluted earnings per share, we consider what would happen to both earnings and the number of

shares outstanding if these bonds were converted into common shares. This is a "What if?" scenario: what if all the bonds are converted into stock this period. To carry out this "What if?" we calculate earnings considering that the company does not have to pay the interest on the bonds that period (which increases the numerator of earnings per share), but we also add to the denominator the number of shares that would be issued if these bonds were converted into shares.[3]

Another source of dilution is executive stock options. Suppose a company has 1 million shares of stock outstanding, but has also given its executives stock options that would result in 0.5 million new shares issued if they chose to exercise these options. This would not affect the numerator of the earnings per share, but would change the denominator to 1.5 million shares. If the company had earnings of $5 million, its basic earnings per share would be $5 million / 1 million shares = $5.00 per share and its diluted earnings per share would be $5 million / 1.5 million shares = $3.33 per share.

What's a convertible security?

A ***convertible security*** is a security – debt or equity – that gives the investor the option to convert—that is, exchange – the security into another security (typically, common stock). Convertible bonds and convertible preferred stocks are common.

Suppose you buy a convertible bond with a face value of $1,000 that is convertible into 100 shares of stock. This means that you own the bond and receive interest, but you have the option to exchange it for 100 shares of stock. You can hold the bond until it matures, collecting interest meanwhile and then receiving the face value at maturity, *or* you can exchange it for the 100 shares of stock at any time. Your choice. Once you convert your bond into stock, however, you no longer receive any interest on the bond.

Some issuers will limit conversion such that the bond cannot be converted for a fixed number of years from issuance.

As an example, consider Yahoo!'s earnings per share reported in their 2004 annual report:

Item	2003	2004
Basic EPS	$0.19	$0.62
Diluted EPS	$0.18	$0.58

The difference between the basic and diluted earnings per share in Yahoo!'s case is attributable to its extensive use of stock options in compensation programs.

Book value equity per share is the amount of the book value (a.k.a. carrying value) of common equity per share of common stock, calculated by dividing the book value of shareholders' equity by the number of shares of stock outstanding. As we discussed earlier, the book value of equity may differ from the market value of equity. The market value per share, if available, is a much better indicator of the investment of shareholders in the company.

The ***price–earnings ratio*** (P/E or PE ratio) is the ratio of the price per share of common stock to the earnings per share of common stock:

$$\text{Price-earnings ratio} = \frac{\text{Market price per share}}{\text{Earnings per share}}$$

Though earnings per share are reported in the income statement, the market price per share of stock is not reported in the financial statements and must be obtained from financial news sources. The

[3] A "catch" is that diluted earnings per share can *never* be reported to be greater than basic earnings per share. In some cases (when a company has many convertible securities outstanding), we may calculate a diluted earnings per share greater than basic earnings per share, but in this case we cannot report diluted earnings per share because it would be anti-dilutive.

P/E ratio is sometimes used as a proxy for investors' assessment of the company's ability to generate cash flows in the future. Historically, P/E ratios for U.S. companies tend to fall in the 10-25 range, but in recent periods (e.g., 2000-2001) P/E ratios have reached much higher. Examples of P/E ratios (P/E ratios at the end of 2004): [4]

Company	Ticker symbol	P/E ratio
Amazon.com	AMZN	57
Time Warner Inc.	TWX	29
IBM	IBM	21
Coca-Cola	KO	22
Microsoft	MSFT	36
Yahoo!	YHOO	98
3M Co.	MMM	23
General Electric	GE	24

We are often interested in the returns to shareholders in the form of cash dividends. ***Cash dividends*** are payments made by the company directly to its owners. There is no requirement that a company pay dividends to its shareholders, but many companies pay regular quarterly or annual dividends to the owners. The decision to pay a dividend is made by the company's board of directors. Note that not all companies pay dividends.

Dividends per share (DPS) is the dollar amount of cash dividends paid during a period, per share of common stock:

$$\text{Dividends per share} = \frac{\text{Dividends paid to shareholders}}{\text{Number of shares outstanding}}$$

The ***dividend payout ratio*** is the ratio of cash dividends paid to earnings for a period:

$$\text{Dividend payout ratio} = \frac{\text{Dividends}}{\text{Earnings}}$$

The complement to the dividend payout ratio is the ***retention ratio*** or the ***plowback ratio***:

$$\text{Retention ratio} = \frac{\text{Earnings - Dividends}}{\text{Earnings}}$$

We can also convey information about dividends in the form of a yield, in which we compare the dividends per share with the market price per share:

$$\text{Dividend yield} = \frac{\text{Dividends per share}}{\text{Market price per share}}$$

The ***dividend yield*** is the return to shareholders measured in terms of the dividends paid during the period.

We often describe a company's dividend policy in terms of its dividend per share, its dividend payout ratio, or its dividend yield. Some companies' dividends appear to follow a pattern of constant or

[4] Source: Yahoo! Finance

constantly growing dividends per share. And some companies' dividends appear to be a constant percentage of earnings.

Summary

You've been introduced to a few of the financial ratios that a financial analyst has in his or her toolkit. There are hundreds of ratios that can be formed using available financial statement data. The ratios selected for analysis depend on the type of analysis (e.g., credit worthiness) and the type of company. You'll see in the next reading how to use these ratios to get an understanding of a company's condition and performance.