

# RATIO ANALYSIS

**Objectives:** After reading you will be able to:

1. Construct simple financial statements of a firm.
2. Use ratio analysis in the working capital management.

## 3.1 Balance Sheet Model of a Firm

Business firms require money to run their operations. This money, or *capital*, is provided by the investors. This is mutually beneficial to the firms and to the investors. The investors get a reasonable return on their investment, and the firms get the badly needed capital.

Generally speaking, the firms employ two forms of capital: the debt capital and the equity capital. The firms acquire the capital from two types of investors, the bondholders provide the debt capital and the stockholders the equity capital. From the perspective of the investors, the risk of these investments is different, the bonds being the safer investment relative to the stocks. Similarly, the firms bear more risk when they issue bonds, because the firms must pay interest on the bonds.

Consider a corporation that has no debt. Stockholders provide the entire financing of the company. We call it an *all-equity firm*. Figure 3.1 shows this as Firm A. This firm can borrow some money, by selling long-term bonds. From the proceeds of the sale of the bonds, it buys back some of its outstanding stock. Thus it can replace some equity with debt. Suppose it is able to do so in a judicious way so that its *debt ratio*, or debt-to-assets ratio, becomes 25%. Now it looks like Firm B in the diagram.

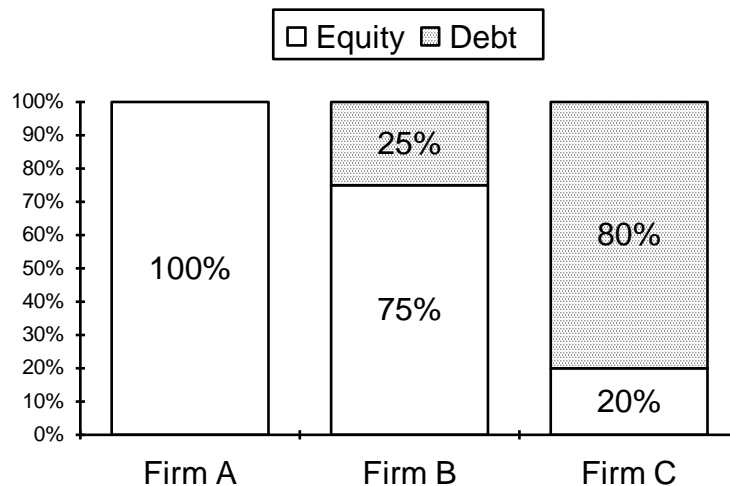


Fig. 3.1: The capital structure of three corporations with differing amounts of debt..

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Occasionally, corporations get too far in debt. For example, Firm C in the diagram has 80% debt, which is too much. Such a company is always worried about its ability to pay interest to the bondholders. If it is unable to pay interest on time, the bondholders can force it into *bankruptcy*. It is the possibility of bankruptcy that makes it a risky company.

Figure 3.1 shows the relative amounts of money invested by the two types of investors, the stockholders, and the bondholders. Their stakes in the company are represented by the two areas, white and gray. We know that the company should employ the debt and the equity in proper proportions. Too much debt can lead to financial failure of a company.

The capital is invested in the assets of the firms. If the debt capital is  $B$ , and the equity capital  $S$ , then the total capital of the company is  $B + S$ . This must also be equal to the total value of the company,  $V$ ,

$$V = B + S \quad (3.1)$$

Now we may look at the financial

condition of a company from a different angle. This time we look at its *balance sheet*. The balance sheet of a company lists its assets and liabilities at a particular time. For example, we may be looking at the balance sheet of a company as of December 31, 1998. The stockholders equity, or just *equity*, by definition, is

$$\text{Stockholders Equity} = \text{Assets} - \text{Liabilities} \quad (3.2)$$

When a corporation

is set up, it clearly spells out the rights and expectations of both types of investors. The bondholders are lending their money to the corporation at a certain rate of interest. They expect to receive their interest on time, along with the final payment of the bonds when they mature. The stockholders cannot demand dividends from the firm. The stockholders, even though they are owners of the firm, have limited liability in case the company gets into serious financial or legal difficulties. They are also the holders of a call option on the assets of the firm, with an exercise price equal to the face value of the bonds of a company. In case of liquidation, they receive whatever the company is left with after *all* other creditors are satisfied. In this sense, they are the last ones in line to receive the benefits from the company. This concept leads us to equation (3.2). We may rewrite this equation as

$$\text{Assets} = \text{Liabilities} + \text{Equity} \quad (3.3)$$

This is exactly the same

as (3.1). The above equation may also be represented by a pie chart, with two pieces belonging to the stockholders and bondholders. The total value of the assets of the firm is simply the whole pie, the sum of liabilities and equity.

What makes up the assets of a firm? First, the obvious physical ones: buildings and lands; factories and warehouses; machinery and equipment; inventories of merchandise and finished goods. Second, we consider the financial assets: money in checking accounts and marketable securities; the money it expects to receive from its customers. The less

obvious assets include the expertise of its managers, the quality of its products, and the reputation of its brand name.

The liabilities of a firm include the money it has borrowed from bondholders, and other lenders. It also includes the money it owes to its suppliers, or any other unpaid bills. Accountants spend a considerable amount of effort in classifying and measuring the assets and liabilities of a corporation.

<b>Assets</b>	<b>Liabilities and Equity</b>
<b>Current Assets</b>	<b>Current Liabilities</b>
<b>Long-term Assets</b>	<b>Long-term Liabilities and Equity</b>

Fig. 3.2 A snapshot of the corporation's financial condition on a given date:

One way to classify the assets and liabilities is whether they are long-term, or short-term. The distinction between long-term and short-term is rather arbitrary. Generally, the assets that are going to last for more than a year are considered to be long-term assets. Similarly, long-term liabilities are due after more than a year. Based on this differentiation, we may slice the balance sheet into four quadrants, as indicated in the following diagram. Again, it is just an aid in visualizing the capital structure of a corporation, with the added dimension of time.

<b>Assets</b>	<b>Liabilities and Equity</b>
<b>Current Assets</b> Cash Marketable Securities Accounts Receivable Inventories	<b>Current Liabilities</b> Accounts Payable Accruals Notes Payable
<b>Long-term Assets</b>  Plant and Equipment Less Accumulated Depreciation = Net Plant and Equipment	<b>Long-term Liabilities</b> Long-term bonds <b>Owners' Equity</b> Common Stock Preferred Stock Retained Earnings
<b>Total Assets</b>	<b>Total Liabilities and Equity</b>

Fig. 3.3: A more detailed picture of assets and liabilities

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Figure 3.3 shows the financial condition of a company in terms of its assets and liabilities, but classifying them whether they are short-term or long-term.

Next, we try to fill out additional details in the picture. We may do so by looking at the assets and liabilities more closely. In the above table, the assets are listed in order of their accounting *liquidity*, that is, the ease with which the assets can be converted into cash.

Cash is the lifeblood of a corporation. If a company does not have enough cash on hand to pay its workers on time, or its suppliers, it can run into serious problems. This can lead to a *liquidity crisis*, otherwise known as a *cash crunch*. Careful management of the cash position of a company is one of the basic problems in the working capital management.

Let us revisit equation (3.3) to develop another important concept, namely the *cash equation*. Let us write

$$\text{Assets} = \text{Liabilities} + \text{Equity} \quad (3.3)$$

as follows:

$$\begin{aligned} \text{Cash} + \text{Current assets (except cash)} + \text{Fixed assets} \\ = \text{Short-term liabilities} + \text{Long-term debt} + \text{Equity} \end{aligned}$$

Rearranging terms, we find

$$\begin{aligned} \text{Cash} = \text{Short-term liabilities} + \text{Long-term debt} + \text{Equity} - \text{Fixed assets} \\ - \text{Current assets (except cash)} \end{aligned} \quad (3.4)$$

The above equation isolates cash as one factor, and the other financial parameters that cash depends upon. By examining the above equation we notice, for example, increasing long-term debt and equity will *increase* the cash position of a company. Further, increasing the fixed assets, or the net working capital (except cash) will *decrease* the cash position of a company.

## 3.2 Net Working Capital

By definition, the *net working capital* of a company is the difference between the current assets and the current liabilities of a firm:

$$\text{Net working capital} = \text{Current assets} - \text{Current liabilities} \quad (4.1)$$

The changes in current assets and current liabilities will create a change in the net working capital of a company. We also recall that the four main items in the current assets of a firm are: (1) cash, (2) marketable securities, (3) accounts receivable, and (4) inventories. The three principal items in the current liabilities are (1) account payable, (2) accrued wages, taxes, and other accrued expenses, and (3) notes payable. Any change in these seven items will lead to a change in the net working capital of a corporation.

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### 3.3 Ratio Analysis

It is possible to look at the financial health of a corporation by looking at some of its key financial ratios. Ratio analysis can also be used as a diagnostic tool to find the sources of financial trouble at a company.

The ratios may be divided into these types:

1. **Liquidity ratios**, that look at the availability of cash for operations.
2. **Asset management ratios** evaluate the efficient utilization of the resources.
3. **Debt management ratios** keep track of debt to be within reasonable bounds, and keep the debt level at its optimal level.
4. **Profitability ratios** measure the degree of accounting profits.
5. **Market value ratios** help investors discriminate between overvalued and undervalued securities while making investment decisions.

Let us review these ratios and their significance.

#### **Liquidity Ratios:**

First we look at the liquidity ratios of a company. These ratios focus on the availability of cash to manage the day to day operations of the company. In particular, we define the current ratio as

$$\text{Current ratio} = \frac{\text{Total current assets}}{\text{Total current liabilities}} \quad (3.5)$$

The current ratio of a company gives us a quick way to look at its current assets and current liabilities. They should be nearly equal to one another. Next, we look at a more stringent ratio that gives us the cash position of the firm more accurately by removing the value of the inventories from the current assets. This gives us the quick ratio, or the acid test ratio, as follows:

$$\text{Quick, or Acid Test} = \frac{\text{Current assets} - \text{inventories}}{\text{Current liabilities}} \quad (3.6)$$

#### **Asset Management Ratios:**

The asset management ratios evaluate the efficiency of use of the principal assets of a company, such as its inventory.

$$\text{Inventory Turnover} = \frac{\text{Cost of goods sold}}{\text{Inventories (average)}} \quad (3.7)$$

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This ratio measures the efficient use of inventories. A firm should have a high turnover ratio, which is managed through a small amount of inventories. This means that a firm should have a small inventory and try to sell it as quickly as possible. Unfortunately, a small inventory also means lower sales.

Closely related to the inventory management is the management of receivables. A company should have a small amount invested in the receivables. That is, the company should try to sell the goods for cash. To measure the efficiency of this operation, we define the Days Sales Outstanding as

$$\text{Days sales outstanding} = \frac{\text{Receivables}}{\text{Sales per day}} \quad (3.8)$$

A broader measure of the efficiency of use of assets is the fixed assets turnover. This ratio is defined as follows.

$$\text{Fixed assets turnover} = \frac{\text{Annual sales}}{\text{Net fixed assets (average)}} \quad (3.9)$$

Some corporations have a huge investment in fixed assets, plant and equipment. This is the case of electric utilities or real estate investment trusts, for instance. Other corporations, such as software development companies, may have a rather small investment in equipment. It is proper to compare firms with one another that are in the same line of business.

A broader measure of asset utilization is the following ratio

$$\text{Total assets turnover} = \frac{\text{Annual sales}}{\text{Total assets (average)}} \quad (3.10)$$

This ratio looks at the aggregate assets of a company and measures the way the company utilizes them.

### **Debt Management Ratios:**

The corporations borrow money to do their business because debt capital is cheaper than the equity capital. On the other hand, excessive amount of debt can create problems for the company. To see the debt level of a company, we define its debt ratio, or leverage ratio as follows

$$\text{Debt ratio} = \frac{\text{Total debt}}{\text{Total assets}} \quad (3.11)$$

Of course, the companies must maintain their debt at an optimal level.

Another ratio that looks at the ability of a company to pay its interest when due is its *interest coverage ratio*, or *times interest earned*. This is defined as

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$$\text{Interest coverage} = \frac{\text{EBIT}}{\text{Interest charges}} \quad (3.12)$$

If this ratio is 4, then for each dollar of interest due, the company has \$4 available. This is a fairly safe ratio, and the probability of default is quite low.

### **Profitability Ratios:**

The next set of ratios measure the ability of a company to generate profits. These ratios are of interest to investors who would like to invest in the most profitable companies around. The first ratio is the net profit margin, defined as

$$\text{Net profit margin} = \frac{\text{Net income}}{\text{Total operating revenue}} \quad (3.13)$$

In this ratio, net income is defined to be the income after taxes, available to the stockholders of the company.

The next ratio looks at the profitability from the point of view of the management of a firm. In this case the denominator is EBIT, meaning earnings before interest and taxes. If the EBIT is too small, then the financial managers at a corporation will have difficulty in paying the interest on time. We define gross profit margin as follows:

$$\text{Gross profit margin} = \frac{\text{EBIT}}{\text{Total operating revenue}} \quad (3.14)$$

Another ratio that the investors like to review is net return on assets. We may define it as

$$\text{Net return on assets} = \frac{\text{Net income}}{\text{Total average assets}} \quad (3.15)$$

The similar ratio that the management wants to review is gross return on assets, defined as follows

$$\text{Gross return on assets} = \frac{\text{EBIT}}{\text{Total average assets}} \quad (3.16)$$

The stockholders are particularly interested in the following three ratios. First, return on common equity, that measures the return to the stockholders on stockholders' investment in the company. This is defined as

$$\text{Return on common equity} = \frac{\text{Net income to stockholders}}{\text{Average common equity}} \quad (3.17)$$

Second, is the dividend payout ratio. This represents the fraction of money paid to the stockholders out of the income after taxed. We may define it as

$$\text{Dividend payout ratio} = \frac{\text{Total cash dividends}}{\text{Net income}} \quad (3.18)$$

The dividend payout ratio is important to the management as well. They cannot afford to pay large dividends when the company needs the money to finance new profitable projects. The growth of a company depends upon the retention rate, that is, the money that is not paid out as dividends. So, we define the third quantity, the sustainable growth rate as

$$\text{Sustainable growth rate} = \text{ROE} \times \text{Retention ratio} \quad (3.19)$$

where ROE stands for the return on equity for a firm.

### **Market Value:**

From an investor's point of view, it is important to see the difference between the market value of the stock of a company, and its accounting value, or book value. To get a perspective on this difference, we define the Market/Book ratio as

$$\text{Market/Book ratio} = \frac{\text{Market price/share}}{\text{Book value/share}} \quad (3.21)$$

The investors hunting for bargains like to see this ratio as small as possible. We complete our list by including two more ratios, defined as follows:

$$\text{P-E ratio} = \frac{\text{Market price/share}}{\text{Earnings/share}} \quad (3.22)$$

and

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Market price per share}} \quad (3.23)$$

## **3.4 Sources of Information**

By far the best source of information is the Internet. Once you are able to surf the net, you can reach over and get the financial news and information about companies from several sites. The information is quite reliable, current, and accurate. If you cannot find it on the Internet, there are still several print media to fall back on. The information about Microsoft was taken from the Internet.

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## Microsoft Profile, January 1, 2001

One Microsoft Way  
Redmond, WA 98052 Tel: (452) 882-8080, Fax: (425) 936-7329  
Website - <http://www.microsoft.com>

### **Company Calendar**

Earnings report announcement: January 15, 2001

### **Profile**

Microsoft Corporation, incorporated in 1981, develops, manufactures, licenses and supports a wide range of software products for a multitude of computing devices. Microsoft software includes scalable operating systems for servers, personal computers (PCs) and intelligent devices, server applications for client/server environments, knowledge worker productivity applications, and software development tools. The Company's online efforts include the MSN network of Internet products and services and alliances with companies involved with broadband access and various forms of digital interactivity. Microsoft also licenses consumer software programs, sells hardware devices, provides consulting services, trains and certifies system integrators, and researches and develops advanced technologies for future software products.

The Company is divided into three main areas: the Business Divisions, the Sales, Marketing and Support Group, and the Operations Group. The Business Divisions work in close partnership in order to create powerful software services and solutions built around the Internet, Windows and new devices. The product segments, based on these business divisions, are the Windows Platforms segment, the Business Productivity Applications and Developer segment, and the Consumer and other segment. The Sales, Marketing and Support Group is responsible for building long-term business relationships with original equipment manufacturers (OEMs), enterprises, small and medium-sized businesses, application developers, educational institutions and consumers. Enterprises are offered tailored license programs, enterprise-wide support, consulting services and other specialized services. The Operations Group is responsible for managing business operations and overall business planning. This includes the process of manufacturing and delivering finished goods and licenses, corporate functions such as finance, administration, human resources and legal.

### **Windows Platforms**

The Windows Platforms segment is responsible for the development of PC and server platforms, including the Microsoft Windows and Windows 2000 operating systems. The segment is also responsible for developing the Microsoft Internet Explorer browsing software and Microsoft Windows Media Technologies. Specific products of the Windows Platforms segment include the Windows Millennium Edition (Me) operating system, Windows 2000 Professional operating system, Windows NT Workstation and Windows 2000 Server, Advanced Server and Datacenter Server. Other products in this segment include Windows NT Server, other servers (Microsoft Proxy Server, Microsoft SNA Server and Microsoft Systems Management Server), and Windows Media Technologies.

### **Productivity Applications and Developer**

The Productivity Applications and Developer segment has two primary divisions, the Business Productivity Group and the Developer Group. The Business Productivity Division delivers integrated business productivity solutions for the knowledge worker, including the Office family of products, other desktop applications, server applications and the Windows CE operating system for productivity appliances. Specific products include the Microsoft Office (Microsoft Word, Microsoft Excel, Microsoft Outlook, Microsoft PowerPoint, Microsoft Access, etc), other desktop application products (such as Microsoft

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Project, Microsoft Visio and Microsoft Publisher), server applications (Microsoft BackOffice family of servers), Microsoft Exchange Server, Windows CE and bCentral.

The Developer Group provides software development tools and distributed application platforms to developers of Windows-based applications and Internet applications. These products and services empower independent software developers, corporate developers, solutions developers and Webmasters to create a broad spectrum of applications. Microsoft Windows Distributed interNet Applications (DNA) Architecture is the application development model for the Windows platform. Specific products include Developer Tools (Microsoft Visual C++, Microsoft Visual Basic, Microsoft Visual InterDev), Microsoft Visual J++, and Microsoft Visual Studio, and the Microsoft SQL Server.

### **Consumer**

The Consumer Group supplies services and content to consumers over the Internet including MSN Internet Access, WebTV Internet Service, MSN Portal and vertical properties, and develops software and hardware products that are designed to meet the needs of consumers in the home environment. MSN Internet Access provides dial-up Internet access, free Web-based e-mail through MSN Hotmail and Microsoft MSN Messenger Service. WebTV Networks is an online service that enables consumers to experience the Internet through their televisions via set-top terminals based on WebTV technologies. The MSN Portal business provides services on the Internet, encompassing the home page as well as the vertical services, and includes the Microsoft CarPoint online automotive service, Microsoft HomeAdvisor online real estate service, Expedia, Inc., MSNBC, Microsoft Passport and TransPoint.

Major product categories include learning, productivity, entertainment and hardware peripherals. Learning titles include Microsoft Encarta multimedia encyclopedia and Microsoft Bookshelf CD-ROM reference library. Microsoft's productivity offerings include Microsoft Works, Microsoft Money and the Works Suite. The Company offers a line of entertainment products from classical software games to online games (Microsoft Internet Gaming Zone), simulations, sport products and strategy games. These products include the Microsoft Flight Simulator, Combat Flight Simulator, Age of Empires, Monster Truck Madness racing simulation, Microsoft Baseball, Microsoft Links and other sports and action titles. Hardware peripherals include the Microsoft Mouse, Microsoft IntelliMouse, Microsoft Natural Keyboard and Microsoft SideWinder game controllers.

### **Microsoft Press**

Microsoft Press offers comprehensive learning and training resources to help new users, power users and professionals get the most from Microsoft technology through books, CDs, self-paced training kits and videos that are created to accommodate different learning styles and preferences. Microsoft Press books are authored by professional and technical writers, Microsoft employees and independent authors. Books are marketed by independent sales representatives and by Microsoft Press sales personnel. Internationally, Microsoft Press has numerous agreements with publishers for the worldwide distribution of its books. Microsoft Press has granted a publisher in England the right to distribute English language versions of its books in all countries except the United States, Canada, Latin America and certain Asian countries.

The Company's sales and marketing group seeks to build long-term relationships with customers of Microsoft products. The OEM sales group includes the sales force that works with original equipment manufacturers that preinstall Microsoft software on their PCs. In addition to the OEM channel, Microsoft has three major geographic sales and marketing organizations: the South Pacific and Americas, Europe, Middle East and Africa, and Asia. The Company's customers include consumers, small and medium-sized organizations, enterprises, dotcoms, educational institutions, ISPs, application developers and OEMs. Most consumers of Microsoft products are individuals in businesses, government agencies, educational institutions and at home.

Microsoft's most significant competitors include IBM, Sun Microsystems, Oracle and AOL.

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## Microsoft Profile, January 1, 2001

### Ratios & Statistics

<b>Ratios</b>	<b>Company</b>	<b>Industry</b>	<b>S&amp;P 500</b>
P/E Ratio (TTM)	27.81	28.93	32.46
P/E High - Last 5 Yrs.	86.12	85.56	48.25
P/E Low - Last 5 Yrs.	32.43	27.35	17.13
Beta	1.80	1.71	1.00
Price to Sales (TTM)	11.67	17.04	5.48
Price to Book (MRQ)	5.77	13.25	7.84
Price to Tangible Book (MRQ)	5.77	16.20	11.63
Price to Cash Flow (TTM)	26.07	28.65	25.43
Price to Free Cash Flow (TTM)	20.86	45.99	45.81
% Owned Institutions	41.01	38.20	57.72

<b>Dividends</b>	<b>Company</b>	<b>Industry</b>	<b>S&amp;P 500</b>
Dividend Yield	0.00	0.27	1.60
Dividend Yield - 5 Year Avg.	0.00	0.02	1.26
Dividend 5 Year Growth Rate	-	( 10.39)	8.87
Payout Ratio	0.00	0.21	24.73

<b>Growth Rates (%)</b>	<b>Company</b>	<b>Industry</b>	<b>S&amp;P 500</b>
Revenue (MRQ) vs Qtr 1 Yr. Ago	7.73	37.28	22.83
Revenue (TTM) vs TTM 1 Yr Ago	16.25	40.76	22.34
Revenue - 5 Yr. Growth Rate	30.46	43.19	19.73
EPS (MRQ) vs Qtr. 1 Yr. Ago	17.72	34.94	31.16
EPS (TTM) vs TTM 1 Yr. Ago	17.78	19.15	26.31
EPS - 5 Yr. Growth Rate	42.42	47.91	20.41
Capital Spending - 5 Yr. Growth Rate	12.17	20.35	17.18

<b>Financial Strength</b>	<b>Company</b>	<b>Industry</b>	<b>S&amp;P 500</b>
Quick Ratio (MRQ)	3.00	2.99	1.21
Current Ratio (MRQ)	3.37	3.22	1.71
LT Debt to Equity (MRQ)	0.00	0.11	0.60
Total Debt to Equity	0.00	0.12	0.91
Interest Coverage (TTM)	-	( 12.55)	10.65

<b>Profitability Ratios (%)</b>	<b>Company</b>	<b>Industry</b>	<b>S&amp;P 500</b>
Gross Margin (TTM)	86.53	77.35	50.12
Gross Margin 5 Yr. Avg.	2.23	74.98	48.27
EBITD Margin (TTM)	49.54	25.17	23.77
EBITD - 5 Yr. Avg.	47.92	23.78	21.69
Operating Margin (TTM)	46.74	19.38	18.53
Operating Margin 5 - Yr. Avg	42.91	16.07	17.64

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<b>Profitability Ratios (%)</b>	<b>Company</b>	<b>Industry</b>	<b>S&amp;P 500</b>
Pre-Tax Margin (TTM)	63.35	9.00	18.49
Pre-Tax Margin - 5 Yr. Avg.	50.18	21.62	16.86
Net Profit Margin (TTM)	41.98	23.41	13.07
Net Profit Margin - 5 Yr. Avg.	32.62	13.23	10.64
Effective Tax Rate (TTM)	33.74	36.86	34.64
Effective Tax Rate - 5 Yr. Avg.	35.10	35.23	35.38

<b>Management Effectiveness (%)</b>	<b>Company</b>	<b>Industry</b>	<b>S&amp;P 500</b>
Return On Assets (TTM)	20.11	17.21	9.83
Return On Assets 5 Yr. Avg.	24.86	12.33	8.55
Return On Investment (TTM)	25.17	6.86	13.76
Return On Investment - 5 Yr. Avg.	24.86	24.58	13.57
Return on Equity (TTM)	25.61	7.17	23.16
Return on Equity - 5 Yr. Avg.	35.09	28.90	22.06

<b>Efficiency</b>	<b>Company</b>	<b>Industry</b>	<b>S&amp;P 500</b>
Revenue/Employee (TTM)	597,749.00	394,756.81	677,268.23
Net Income/Employee (TTM)	250,921.00	167,225.70	103,161.13
Receivable Turnover (TTM)	7.89	6.29	8.76
Inventory Turnover (TTM)	-	26.85	9.53
Asset Turnover (TTM)	0.48	0.68	0.99

MRQ = Most Recent Quarter, TTM = Trailing Twelve Months

**Note:** Reported in Thousands of U.S. Dollars

**Assignment:** The above financial statement of Microsoft is several years old. Get a current financial statement for this company on the Internet and compare the two. Can you spot any significant change?

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## Key Terms

Accounts payable, 31	Debt capital, 29	Market value ratios, 33
Accounts receivable, 31	Debt management ratios, 33	Marketable securities, 31
Accruals, 31	debt ratio, 29	Notes payable, 31
all-equity firm, 29	Equity, 30	Preferred stock, 31
Asset management ratios, 32	Equity capital, 29	Profitability ratios, 33
Assets, 30	Inventories, 31	Retained earnings, 31
Balance sheet, 29	Liabilities, 30	Risk, 29
Bondholders, 29	Liquidity, 32	Stockholders, 29
Capital, 29	Liquidity crisis, 32	
Cash, 31	Liquidity ratios, 32	
Common stock, 31	Long-term bonds, 31	

## Examples

**3.1.** Danube Trucking and Storage Company had revenue of \$11.12 million in 1999 from transportation operations, and \$1.23 million in warehousing fees. The main expenses were, diesel fuel \$2.55 million, salary of the truck drivers \$6.96 million, truck repairs \$1.03 million, tires and other parts \$1.73 million. The company had depreciation of \$1.45 million. The company has a \$2.5 million note at the bank, with 8% interest rate. The company had income tax rate of 28%. Prepare an income statement of Danube.

Revenues	\$ million
Transportation	11.12
Warehouse fees	1.23
Total Revenues	12.35

Expenses	\$ million
Diesel fuel	2.55
Salaries	6.96
Repairs	1.03
Tires, parts	1.73
Depreciation	1.45
EBIT	$12.35 - 13.72 = -1.37$
Interest	$.08 \times 2.5 = 0.2$
EBT	-1.57
Taxes paid	0
Earnings after taxes	-1.57

Note that the depreciation is a non-cash expense. The company had to use some of its cash reserves, or perhaps sell marketable securities to pay the \$0.2 million in interest. The company had a net loss of \$1.57 million.

**3.2.** Elbe Chemical Company sold 8672 tons of ammonium sulfate in 1999 at \$155 a ton. The production cost of the chemical was \$102 a ton, on the average. Mr. Elbe, the owner,

took a salary of \$55,000, while the workers were paid \$283,000. The company paid \$24,000 in warehouse rent, and \$38,000 in office expenses. The company has a \$100,000 note at the bank, with 8% interest rate. The company had income tax rate of 28%. Prepare an income statement of Elbe.

A compact income statement is shown as following.

**Elbe Chemical Company**  
Income Statement, 1999

Quantity	Calculation	Amount
<b>Revenues</b>	8672 tons * \$155/ton	<b>\$1,344,160</b>
Production cost	8672 tons * \$102/ton	-\$884,544
Salaries	Owner \$55,000 Workers \$283,000	-\$338,000
Rent		-\$24,000
Office expense		-\$38,000
<b>EBIT</b>		<b>\$59,616</b>
Interest	\$100,000 @ 8%	-\$8,000
<b>EBT</b>		<b>\$51,616</b>
Income tax	.28 * EBT	-\$14,452
<b>Net income</b>		<b>\$37,164</b>

**3.3.** The following information is available about Don Company.

Accounts payable	\$10 million
Accounts receivable	\$5.48 million
Average inventory	\$30 million
Buildings and land	?
Cash	\$5 million
Cost of goods sold	\$80 million
EBIT	\$18 million
Long-term bonds	\$25 million with 10% coupon
Price per share	\$72
Price/Earnings ratio	18
Stockholders equity	?
Total assets	\$100 million
Total sales	\$125 million

(A) Calculate the following:

1. Days sales outstanding
2. Interest coverage ratio

- 
3. Debt ratio
  4. Inventory turnover ratio
  5. Earnings per share

(B) Prepare a balance sheet for Don Company.

(A) 1. By definition,

$$\text{Days sales outstanding} = \frac{\text{Receivables}}{\text{Sales per day}} = 365 \times \frac{\text{Receivables}}{\text{Annual sales}} = 365 \times 5.48 / 125 = 16 \text{ days} \quad \heartsuit$$

$$2. \text{ By definition, Interest coverage ratio} = \frac{\text{EBIT}}{\text{Interest charges}} = 18 / (25 \times .1) = 7.2 \quad \heartsuit$$

$$3. \text{ By definition, Debt ratio} = \frac{\text{Total debt}}{\text{Total assets}} = 25 / 100 = 25\% \quad \heartsuit$$

The debt of a corporation consists of its long-term bonds, and its short-term notes. Although a company may also have other short-term obligations, such as accounts payable, they are not included in its debt.

$$4. \text{ By definition, Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Inventories (average)}} = 80 / 30 = 2.67 \quad \heartsuit$$

$$5. \text{ By definition, Earnings/share} = \frac{\text{Market price/share}}{\text{P-E ratio}} = 72 / 18 = \$4 \quad \heartsuit$$

(B)

### Don Company

Current Assets	\$million	Current Liabilities	\$million
Cash	5.00	Accounts payable	10.00
Accounts receivable	5.48		
Inventory	30.00		
Total current assets	40.48	Total current liabilities	10.00
Long-term Assets		Long-term liabilities	
Buildings & land	59.52	Bonds (B)	25.00
		Stockholders equity (S)	65.00
<b>Total assets (V)</b>	<b>100.00</b>	<b>Total (B + S)</b>	<b>100.00</b>

The above balance sheet has the following features:

1. It is simple and easy to read. It has all items given in the problem and includes the unknown quantities, buildings and land, and stockholders equity.

- 
2. It separates the items in terms of time: long-term and short-term.
  3. It shows that the total assets of the company are equal to its liabilities and stockholders equity.

**3.4.** The following information is available about Dnieper Company.

Number of shares = 100,000	Income tax rate = 30%
EBIT = \$200,000	Price per share = \$4.20
Long-term debt = \$1 million	Coupon rate on bonds = 8%

Find its (A) P/E ratio, (B) Interest coverage ratio, and (C) Debt ratio

(A) The interest on the bonds is  $.08 \times 1,000,000 = \$80,000$ . From EBIT, we first pay the interest on the bonds. This gives us  $200,000 - 80,000 = \$120,000$ . This is earnings before taxes. The taxes due on this amount are  $.3 \times 120,000 = \$36,000$ . After paying taxes, we are left with  $120,000 - 36,000 = \$84,000$ . This is earnings after taxes. If we divide it by the number of shares, 100,000, we get the EPS as  $84,000/100,000 = \$0.84$ .

A short-cut method is to use the formula

$$\text{EPS} = \frac{(\text{EBIT} - I)(1 - t)}{N} = \frac{(200,000 - .08 \times 1,000,000)(1 - .3)}{100,000} = \$0.84$$

The P/E ratio is  $\$4.20/\$0.84 = 5$  ♥

(B) The interest coverage ratio is  $\text{EBIT}/I = 200,000/80,000 = 2.5$  ♥

The total assets of the firm = total debt + total equity =  $1,000,000 + 4.2 \times 100,000 = \$1,420,000$

$$\text{The debt ratio} = \frac{\text{total debt}}{\text{Total assets}} = \frac{1,000,000}{1,420,000} = 70.42\% \text{ ♥}$$

## Problems

**3.5. Income statement:** Drava Salt Company sold 8672 tons of common salt in 2008 at \$55 a ton. The purchase price of the salt was \$32 a ton, on the average. Mr. Drava, the owner, took a salary of \$55,000, while the workers were paid \$63,000. The company paid \$24,000 in warehouse rent, and \$10,000 in office expenses. The company has a \$100,000 note at the bank, with 8% interest rate. The company had income tax rate of 33%. Prepare an income statement of Drava Salt.

**3.6. Balance sheet:** Prepare the balance sheet of Isar Company using the following data:

Accounts payable	\$6,000
Accounts receivable	8,000
Accumulated retained earnings	6,000
Bonds payable	7,000
Capital surplus	19,000
Cash	4,000
Machinery	34,000
Patents	82,000
Taxes payable	2,000

**3.7. Balance sheet:** A portion of Maritsa Company's balance sheet as of 12/31/2008 is shown below:

	12/31/2008	12/31/2009
Long-term debt	\$50 million	
Preferred stock	\$30 million	
Common stock	\$100 million	
Retained earnings	\$20 million	

In 2009, the company sold \$10 million of new bonds, but also bought back \$5 million of its common stock. It had net income of \$14 million, and paid out \$4 million in dividends. Indicate the changes in its balance sheet as of 12/31/2009.

**3.8. Cash flows:** We have the following information about Moselle Company:

#### Moselle Company

<i>Income statement</i>	2008
Revenues	\$800
Expenses	500
Depreciation	100
Net Income	200
Dividends	100

#### Balance Sheet, Moselle Company

<i>Assets</i>	12/31/08	12/31/07
Current assets	\$300	\$200
Net fixed assets	400	200
<b>Total assets</b>	<b>\$700</b>	<b>\$400</b>
<b>Liabilities and equity</b>	12/31/08	12/31/07
Current liabilities	\$150	\$100
Long-term debt	150	0
Stockholders' equity	400	300
<b>Total liabilities and equity</b>	<b>\$700</b>	<b>\$400</b>

A. Find the change in the net working capital in 2008.

**3.9. Cash position:** Indicate whether the following actions will increase, decrease, or make no change in the cash position of Neva Company:

1. The firm collects payments from previous sales.

- 
2. The company buys a piece of machinery by using long-term debt.
  3. The company buys raw material for inventory on credit.
  4. The company issues common stock.
  5. The firm sells merchandise on credit.
  6. The company declares a dividend.
  7. The company purchases raw materials for inventory and pays in cash.
  8. The firm pays interest on long-term debt.
  9. This year's tax liability is increased.
  10. The firm pays last year's taxes.
  11. The firm uses retained earnings to buy marketable securities.
  12. The corporation buys a piece of furniture using a short-term note.
  13. The company increases the allowance for bad debts.
  14. The company buys back its own stock.
  15. The firm borrows on a short-term note.
  16. The company pays for a previous purchase.
  17. The company sells some merchandise for cash.
  18. The firm increases the accumulated depreciation.
  19. The firm gives away some merchandise to charity.
  20. The firm receives an insurance payment after a fire loss.

**3.10. Financial ratios:** The following information is available about Rhine Company.

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EBIT = \$800,000	Income tax rate = 30%
Total assets = \$10 million	Coupon rate on bonds = 8%
Number of shares = 200,000	Long-term debt = \$4 million
Dividend payout ratio = 50%	Short-term assets = \$2 million
Short-term liabilities = \$1 million	

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Find its (A) Current ratio, (B) Dividend per share, and (C) Price per share

(A) 2 (B) \$0.84 (C) \$25 ♥

**3.11. Financial ratios:** The following information is available about Seine Company.

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Number of shares = 400,000	Long-term debt = \$6 million
EBIT = \$3 million	Income tax rate = 35%
Total assets = \$18 million	Coupon rate on bonds = 6%
Short-term liabilities = \$2 million	Average inventory = \$1.5 million
COGS = \$6 million	

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Find its (A) Inventory turnover ratio	4.00 ♥
(B) Interest coverage ratio	8.333 ♥
(C) Earnings per share	\$4.29 ♥
(D) Price per share	\$25.00 ♥
(E) P-E ratio	5.83 ♥

**3.12. Financial ratios:** The following information is available about Marne Company for 2010. All sales are on credit.

Average cash and marketable securities = \$1 million	EBIT = \$2 million
Average inventory = \$5 million	COGS = \$15 million
Average accounts payable = \$3 million	Long-term bonds = \$8 million
Average accounts receivable = \$3 million	Coupon rate on bonds = 10%
	Total Sales = \$20 million

- Find its (A) Inventory turnover ratio 3.00 ♥  
 (B) Number of days sales outstanding 54.75 days ♥  
 (C) Interest coverage ratio 2.50 ♥  
 (D) Current ratio 3.00 ♥  
 (E) Quick ratio 1.333 ♥

**3.13. Financial ratios:** Ider Corp expects to have \$3.73 as earnings per share next year. The cost of equity for Ider is 16%, whereas its dividend yield is 4%. The price per share of Ider is \$40. Find its dividend payout ratio. Find its current P/E ratio.

DPR = 42.9%, P/E = 12.01 ♥

**3.14. Financial ratios:** Calculate the financial ratios in the following table by using the data of Neisse Corporation given below.

Neisse Corporation	12/31/98	12/31/97
Assets	\$ 000	\$ 000
<b>Current Assets</b>		
Cash and Equivalents	\$ 140	\$ 107
Accounts receivable	294	270
Inventories	269	280
Other	58	50
<b>Total current assets</b>	<b>\$761</b>	<b>\$707</b>

<b>Fixed Assets</b>		
Property, plant and equipment	\$ 1,423	\$ 1,274
Less accumulated depreciation	-550	-460
<b>Net fixed assets</b>	<b>873</b>	<b>814</b>
Intangibles and others	245	221
<b>Total fixed assets</b>	<b>1,118</b>	<b>1,035</b>
<b>Total assets</b>	<b>1,879</b>	<b>1,742</b>

Neisse Corporation	12/31/98	12/31/97
Liabilities	\$ 000	\$ 000
<b>Current liabilities</b>		
Accounts payable	213	197
Notes payable	50	53
Accrued expenses payable	223	205
<b>Total current liabilities</b>	<b>486</b>	<b>455</b>

<b>Long-term liabilities</b>		
Long-term debt	471	458
Deferred taxes	117	104
<b>Total log-term liabilities</b>	<b>588</b>	<b>562</b>
<b>Stockholders' equity</b>		
Common stock, \$1 par value	55	32
Capital surplus	347	327
Accumulated retained earnings	390	347
Preferred stock	39	39
Less treasury stock	-26	-20
<b>Total stockholders equity</b>	<b>805</b>	<b>725</b>
<b>Total liabilities and stockholders equity</b>	<b>\$1,879</b>	<b>\$1,742</b>

**Neisse Corporation Income statement, 1998,**  
**Amounts in \$ thousands**

Total operating revenue	\$2,262
Cost of goods sold	-1,665
Selling, general, and administrative expenses	-327
Depreciation	-90
Operating income	190
Other income	29
Earnings before interest and taxes	219
Interest expense	-49
Pretax income	170
Taxes (current \$71, deferred \$31)	-84
Net income (Dividends \$43, Retained earnings \$43)	86

Ratio	Formula	Calculation	Ratio	Industry Average	Comments
<b>Liquidity</b>					
Current	$\frac{\text{Total current assets}}{\text{Total current liabilities}}$			4.1	Low
Quick, or Acid Test	$\frac{\text{Current assets} - \text{inventories}}{\text{Current liabilities}}$			2.1	
<b>Asset Management</b>					
Inventory Turnover	$\frac{\text{Cost of goods sold}}{\text{Inventories (average)}}$			7.4	
Days sales outstanding	$\frac{\text{Receivables}}{\text{Sales per day}}$			32.1 days	
Fixed assets turnover	$\frac{\text{Annual sales}}{\text{Net fixed assets (average)}}$			4.0	
Total assets turnover	$\frac{\text{Annual sales}}{\text{Total assets (average)}}$			2.1	
<b>Debt Management</b>					
Debt ratio	$\frac{\text{Total debt}}{\text{Total assets}}$			.35	
Interest coverage	$\frac{\text{EBIT}}{\text{Interest charges}}$			4.5	
<b>Profitability</b>					
Net profit margin	$\frac{\text{Net income}}{\text{Total operating revenue}}$				

Gross profit margin	$\frac{\text{EBIT}}{\text{Total operating revenue}}$				
Net return on assets	$\frac{\text{Net income}}{\text{Total average assets}}$				
Gross return on assets	$\frac{\text{EBIT}}{\text{Total average assets}}$				
Return on common equity	$\frac{\text{Net income to stockholders}}{\text{Average common equity}}$				
Dividend payout ratio	$\frac{\text{Total cash dividends}}{\text{Net income}}$				
Sustainable growth rate	ROE $\times$ Retention ratio				
<b>Market Value</b>					
P-E ratio	$\frac{\text{Market price/share}}{\text{Earnings/share}}$			22	
Market/Book	$\frac{\text{Market price/share}}{\text{Book value/share}}$			1.3	
Dividend yield	$\frac{\text{Dividend per share}}{\text{Market price per share}}$			.40	

**3.15.** Which two of the following would be preferable to the bondholders of a company?

- I. A debt ratio of 50% rather than 20%
  - II. A debt ratio of 20% rather than 50%
  - III. A times-interest-earned of 2.0 rather than 5.0
  - IV. A times-interest-earned 5.0 rather than 2.0
- (A) I and III  
 (B) I and IV  
 (C) II and III  
 (D) II and IV

**3.16.** All else being equal, which of the following will increase a company's current ratio?

- (A) An increase in accounts receivable.
- (B) An increase in accounts payable.
- (C) An increase in net fixed assets.
- (D) A decrease in long-term debt.