CHAPTER THIRTEEN

Understanding Financial Statements

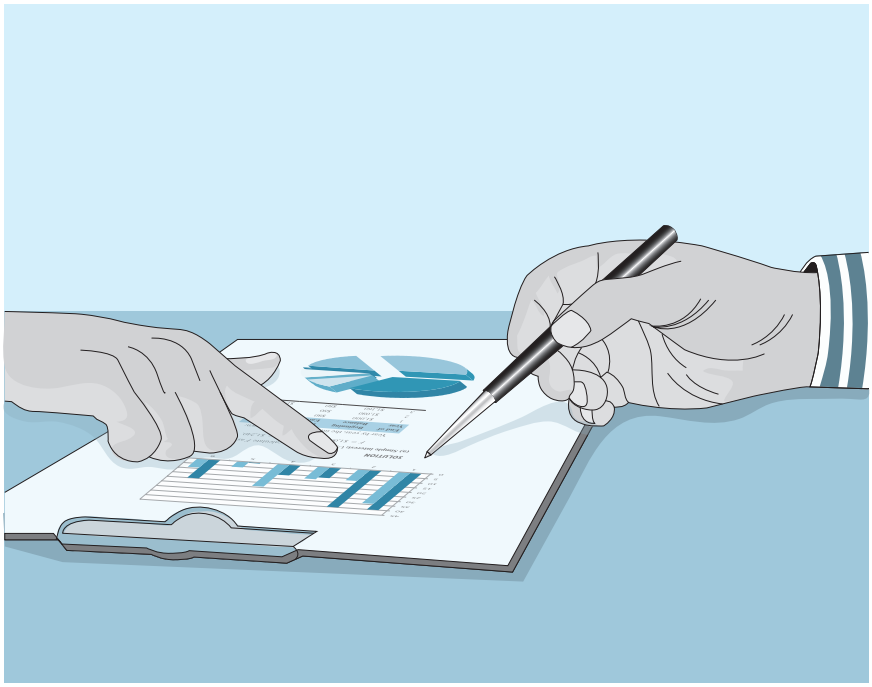
Broadcom Agrees to Acquire Brocade Communications for $5.9 billion[1] Semiconductor industry leader, Broadcom Limited, has made another powerful reach in entering into an agreement to acquire Brocade Communications Systems for $5.9 billion. In an effort to expand their market penetration as a world leading global supplier of state-of the-art digital and analog components to companies like Cisco, Apple, Extreme Networks and Hewlett Packard, the move should help Broadcom command a larger slice of the market, become more competitive and readily add about $900 million in non GAAP EBITA in fiscal 2018.

Why would a component industry giant purchase part of a network business that is experiencing market and performance challenges? It appears to be all about opportunity, competition and assessing value. Berkshire Hathaway founder and CEO, Warren Buffet, made an immense fortune by analyzing the numbers and seizing the moment by investing in companies restructuring or conducting sizeable corporate mergers and acquisitions. Understanding the $12.75 per share price breaks of this deal and Broadcom's ability to complete a cash transaction and readily absorb $0.4 million in Brocade debt, the Buffet model of analysis and investment decision making can be used to explain the economics of this acquisition.

[1] Catlin Huston, "Broadcom Agrees to Acquire Brocade Communications for $5.9 Billion," *MarketWatch*, November 2, 2016. (http://www.marketwatch.com/story/broadcom-agrees-to-acquire-brocade-communications-for-59-billion-2016-11-02).

[2] Mary Buffett and David Clark, "The New Buffettology," *Scribner*, September 24, 2002.

[3] "The World's Billionaires 2016," *Forbes,* May 17, 2017. (www.forbes.com/wealth/billionaires/list).



Buffett's philosophy on business investing is a modification of the value investing approach of his mentor Benjamin Graham.[4] Graham bought companies because they were inexpensive compared to their intrinsic value. He was of the belief that as long as the market undervalued them relative to their intrinsic value, he was making a solid investment. Buffett reasoned that the market will eventually realize it has undervalued the company and will correct its course regardless of what type of business the company was in. In addition, he believed that the business has to have solid economics behind it.

In order to determine whether an investment is viable, he considered the following factors:

- Is the company a world leader in the business they are in, are they innovative, and do they maintain a solid, quality reputation in their industry?

[4] Benjamin Graham, Jason Zweig, and Warren E. Buffett, *The Intelligent Investor: The Definitive Book on Value Investing* (Harper Business Essentials, 2003).

- Are company financials currently trending upward (i.e. increased earnings and above average gross margins and appreciable return on investments).
- Does the company have a healthy balance sheet that show operational costs well under control and properly balanced capital investments aligned with profitable returns?
- Is the company in a financial state where it can readily repay its debt and maintain low debt-to-equity and high earnings-to-debt ratios?
- Does the company have good cash position and a dedicated customer base that it can weather market changes and be able to adjust pricing during periods of inflation?
- Is there market momentum, product portfolio and management structure in place to predict and expect good future growth?

Where would Buffett collect all these pieces of information for a company to purchase? And what do all these pieces of information have to do with the topic of engineering economics?

While knowledge of PW criterion, AE analysis, and the other topics we have covered are essential, understanding how a project impacts the firm's bottom line (profit) is also important. In this chapter, we begin by discussing the characteristics of these financial statements and the factors that each comprises. Our purpose is not to present bookkeeping aspects of accounting but to acquaint you with financial statements and to give you the basic information you need to make sound engineering economic decisions. Good economic decisions will in turn improve the market value of the corporation, as investors like Warren Buffett will bid on the company's stock.

13.1 Accounting: The Basis of Decision Making

We need financial information to make business decisions. Virtually all businesses and most individuals keep accounting records to aid them in making decisions. As illustrated in Figure 13.1, accounting is the information system that measures business activities, processes that information into reports, and communicates the results to decision makers. For this reason, we call accounting "the language of business." The better you understand this language, the better you can manage your financial well-being and make financial decisions.

Personal financial planning, education expenses, loans, car payments, income taxes, and investments are all determined on the basis of the information system we call accounting. The use of accounting information is diverse and varied:

- Business managers use accounting information to set goals for their organizations, to evaluate progress toward those goals, and to take corrective actions if necessary. Decisions based on accounting information may include which building or equipment to purchase, how much merchandise inventory to keep on hand, and how much cash to borrow.

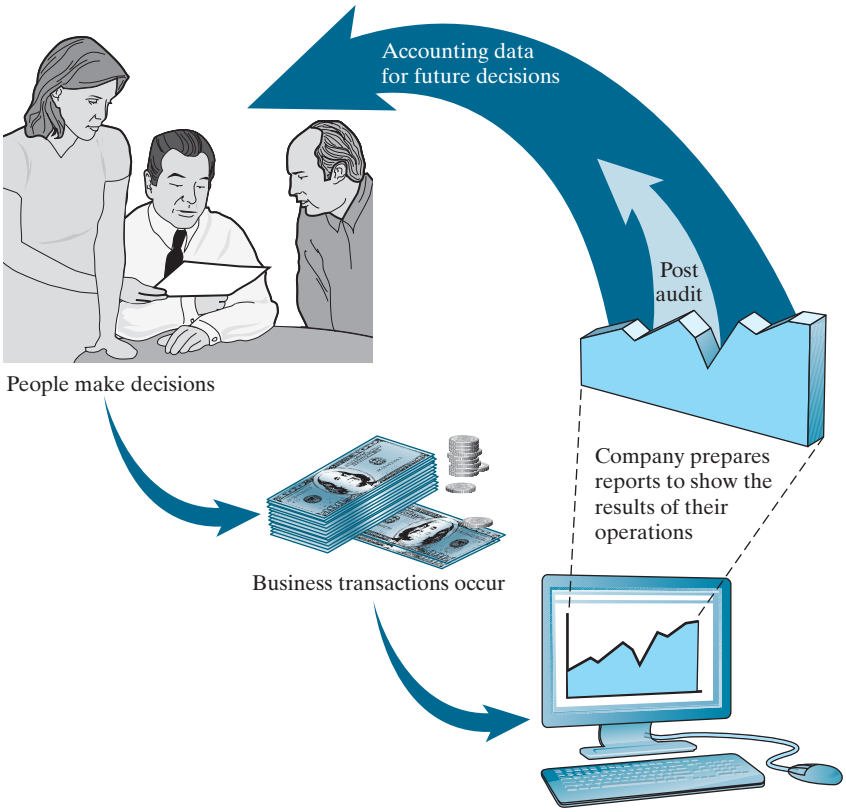


Figure 13.1 An illustration of the flow of information in the accounting system.

- Investors and creditors provide the money a business needs to begin operations. To decide whether to help start a new venture, potential investors evaluate what income they can expect on their investment. This means analyzing the financial statements of the business. Before making a loan, banks determine the borrower's ability to meet scheduled payments. This evaluation includes a projection of future operations and revenue, which is based on accounting information.

An essential product of accounting is a series of financial statements that allow people to make informed decisions. For business use, these statements are the documents that report financial information about a business entity to decision makers. They tell us how a business is performing and where it stands financially. These financial statements include the balance sheet, income statement, and statement of cash flows.

13.2 Financial Status for Businesses

All businesses must record and report on their financial status. Of the various reports corporations issue to their stockholders, the annual report is by far the most important. The annual report contains basic financial statements as well as management's opinion of the past year's operations and the firm's future prospects. What would managers and investors want to know about a company at the end of the fiscal year (or another fiscal

period, such as a quarter)? Managers or investors are likely to ask the following four basic questions:

- What is the company's financial position at the end of the fiscal period?
- How much profit did the company make during the fiscal period?
- How did the company decide to use its profits?
- How much cash did the company generate and spend during the period?

As illustrated in Figure 13.2, the answer to each question is provided by one of the financial statements. The fiscal year (or operating cycle) can be any 12-month term but is usually January 1 through December 31 of a calendar year.

As mentioned in Section 1.2.1, one of the primary business responsibilities for engineers is to plan for the acquisition of equipment (capital expenditure) that will enable the firm to design and produce products economically. This task requires estimation of savings and costs associated with the equipment acquisition and the degree of risk associated with project execution. These amounts affect the business's bottom line (profitability), which eventually affects the firm's stock price in the marketplace as illustrated in Figure 13.3. Therefore, engineers should understand the meanings of various financial statements in order to communicate with upper management about the nature of a project's profitability.

For illustration purposes, we consider the financial statements of J&M Company, (J&M has been substituted for the real name of the company to maintain anonymity) a small-sized power equipment manufacturer whose major product lines include gas pressure washers and water pumps. Some of the key financial highlights in the 2017 annual report are as follows:

- Revenue topped $300 million, an increase of 22.45% year-over-year.
- Closing total net cash balance reached $2.4 million.

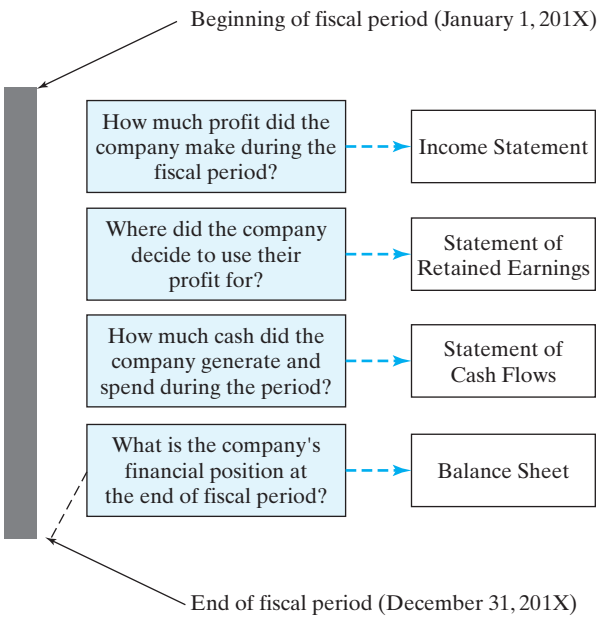


Figure 13.2 Information reported on a company's financial statements.

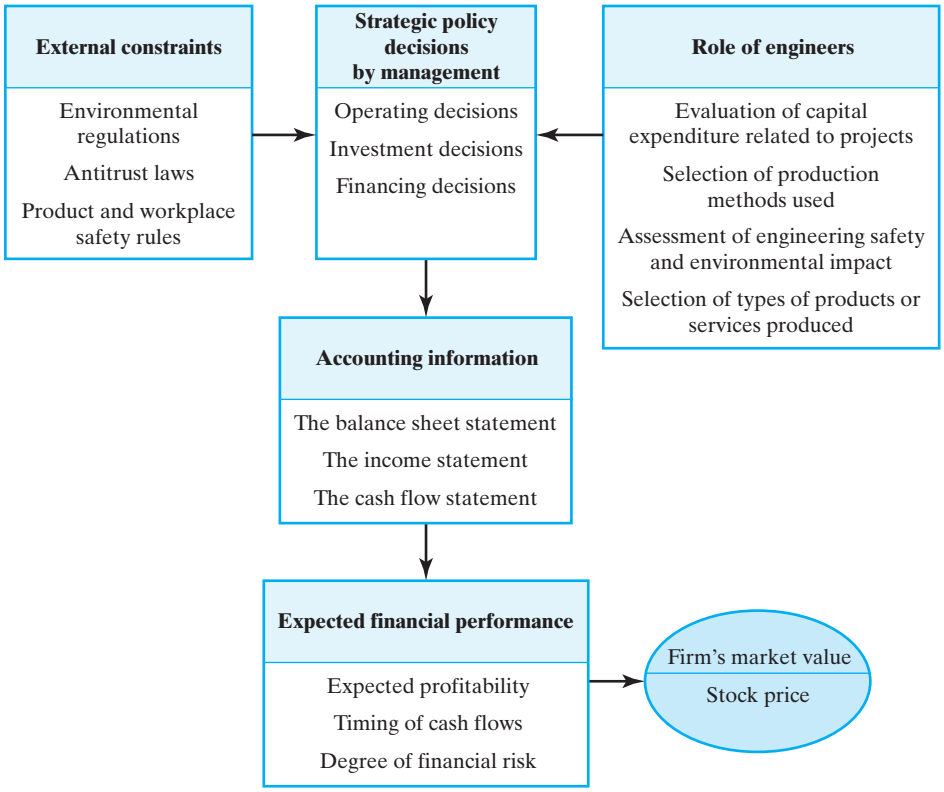


Figure 13.3 Summary of major factors affecting stock price.

- Gross margins exceeded 37.33% of revenue.
- Operating margin were 11.09%.
- Net income rose to $22.8 million, an increase of 57% year-over-year.
- Closing stock price was $31.25 per share on December 29, 2017.

As you will see, investors use the information contained in an annual report to form expectations about future earnings and dividends. Therefore, the annual report is certainly of great interest to investors.

13.2.1 The Balance Sheet

What is a company's financial position at the end of a reporting period? A company's **balance sheet statement** will provide the answer. A balance sheet, sometimes called a **statement of financial position**, reports three main categories of items: assets, liabilities, and stockholders' equity. Figure 13.4 illustrates the relationship between assets and liabilities, including equity, and how these items appear in the balance sheet. The financial statements are based on the most basic tool of accounting, the **accounting equation**. The accounting equation shows the relationship among assets, liabilities, and owners' equity:

$$\text{Assets} = \text{Liabilities} + \text{Stockholder's Equity}.$$

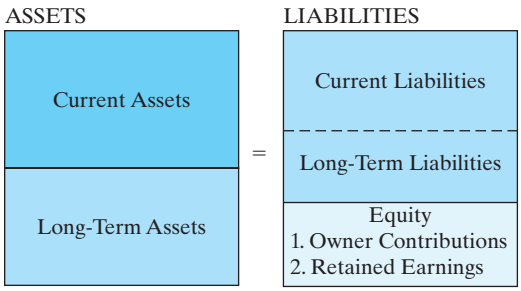


Figure 13.4 The four quadrants of the balance sheet.

Every business transaction, no matter how simple or complex, can be expressed in terms of its effect on the accounting equation. Regardless of whether a business grows or contracts, this equality between its assets and the claims against those assets is always maintained. In other words, any change in the amount of total assets is necessarily accompanied by an equal change on the other side of the equation—that is, by an increase or decrease in either the liabilities or the owners' equity.

As shown in Table 13.1, the first half of J&M's year-end 2017 and 2016 balance sheets lists the firm's assets while the remaining portion shows the liabilities and equity, or claims against these assets.

Assets

The dollar amounts shown under the Assets column in Table 13.1 represent how much the company owns at the time of reporting. We list the asset items in the order of their "liquidity," or the length of time it takes to convert them to cash, according to the following three categories:

- **Current assets** can be converted to cash or its equivalent in less than one year. This type of asset generally includes four major accounts:

  1. The first account is *cash and cash equivalents.* A firm typically has a cash account at a bank to provide for the funds needed to conduct day-to-day business. Although we state all the assets in terms of dollars, only items labeled as cash represent actual money. Cash-equivalent items include marketable securities such as stocks and bonds.
  2. The second account includes *short-term investments* such as savings accounts, money market funds, certificates of deposit, and U.S. Treasury securities.
  3. The third account is *accounts receivable*, which is money that is owed to the firm but has not yet been received. For example, when J&M receives an order from a manufacturer, it will send an invoice along with the shipment to the manufacturer. Then the unpaid bill immediately falls into the accounts-receivable category. When this bill is paid, it is deducted from the accounts-receivable category and placed into the cash category. Normally, a typical firm will have 30- to 45-day accounts receivable, depending on the frequency of its bills and the payment terms for customers. We can treat sales on credit cards in a similar category.
  4. The fourth account is *inventories*, which show the dollars the company has invested in raw materials, work-in-process, and finished goods available for sale.

TABLE 13.1 Consolidated Statement of Financial Position

J&M CORPORATION
CONSOLIDATED BALANCE SHEETS
(in thousands, except per share data)

PERIOD ENDING	31-Dec-17	31-Dec-16	CHANGES
ASSETS			
Current Assets:			
Cash and Cash Equivalents	$8,500	$6,100	$2,400
Short-Term Investments	$3,000	$5,000	$(2,000)
Accounts Receivables	$23,700	$19,500	$4,200
Inventories	$37,700	$39,800	$(2,100)
Prepaid Expenses	$2,000	$1,500	$500
Deferred Charges	$2,500	$3,000	$(500)
Total Current Assets	**$77,400**	**$74,900**	**$2,500**
Long-Term Assets			–
Property Plant and Equipment	$154,000	$145,000	$9,000
Less Accumulated Depreciation	$(70,000)	$(50,000)	$(20,000)
Total Assets	**$161,400**	**$169,900**	**$(8,500)**
LIABILITIES AND STOCKHOLDERS' EQUITY			
Current Liabilities:			
Accounts Payable	$10,000	$26,000	$(16,000)
Wages Payable	$16,000	$15,000	$1,000
Accrued Taxes	$2,000	$3,500	$(1,500)
Total Current Liabilities	**$28,000**	**$44,500**	**$(16,500)**
Long-Term Liabilities			
Long-Term Debt	$30,000	$32,000	$(2,000)
Total Liabilities	**$58,000**	**$76,500**	**$(18,500)**
Stockholders' Equity:			
Preferred Stock (100,000 shares at par value of $100)	$10,000	$10,000	–
Common Stock (10,000,000 shares at par value of $4)	$40,000	$40,000	–
Treasury Stock	–	–	–
Paid-In Capital (Capital Surplus)	$11,000	$11,000	–
Retained Earnings	$42,400	$32,400	$10,000
Total Stockholder Equity	**$103,400**	**$93,400**	**$10,000**
Total Liabilities and Stockholders' Equity	**$161,400**	**$169,900**	**$(8,500)**

- **Fixed assets** are relatively permanent and take time to convert into cash. Fixed assets reflect the amount of money a company has paid for its plant and equipment acquired at some time in the past. The most common fixed assets include the physical investment in the business, such as land, buildings, factory machinery, office equipment, and automobiles. With the exception of land, most fixed assets have a limited useful life. For example, buildings and equipment are expended over a period of years. Each year, a portion of the usefulness of these assets expires, and a portion of their total cost should thus be recognized as a depreciation expense. As stated previously in this book, the term *depreciation* refers to the accounting process for this gradual conversion of fixed assets into expenses. Thus the item, *accumulated depreciation*, means that a portion of the original cost of the buildings and equipment has already been allocated as a cost of doing business. Sometimes, these two items are combined and listed as a single item, "property, plant, and equipment, net." It simply represents the current book value of these assets after such depreciation expenses have been deducted.
- **Other assets** are listed at the end of this category. Typical assets in this category include investments made in other companies and intangible assets such as goodwill, copyrights, franchises, and so forth. Goodwill appears on the balance sheet only when an operating business is purchased in its entirety. This item indicates any additional amount paid for the business above the fair market value of the business. (Here, the fair market value is defined as the price that a buyer is willing to pay when the business is offered for sale.)

Liabilities and Stockholders' Equity (Owners' Net Worth)

The claims against assets are of two types: liabilities and stockholders' equity. Liabilities refer to money the company owes. Stockholders' equity indicates the portion of the assets of a company that is provided by the investors (owners). Therefore, stockholders' equity is also the liability of a company to its owners. (Recall Figure 13.4, which illustrates the relationship between assets and liabilities, including equity.) The different categories of liabilities and stockholders' equity are described as follows:

- **Current liabilities** are what a company currently owes to its suppliers and creditors. Major current liabilities include accounts and notes payable within a year as well as accrued expenses (wages, salaries, interest, rent, taxes, etc., owed but not yet due for payment) and advance payments and deposits from customers. Accrued expenses are bills that the company has incurred that it has not yet paid. In other words, accrued expenses are the opposite of prepaid expenses.
- **Other liabilities** include *long-term liabilities* such as bonds, mortgages, and long-term notes, which are due and payable more than one year in the future. Another example is *Income Tax Payable*, which is the income tax a company accrues over the years that it does not have to pay yet according to various federal, state, and local tax schedules.
- **Stockholders' equity** represents the amount that is available to the stockholders (owners) after all other debts have been paid. It generally consists of preferred and common stock, treasury stock, capital surplus, and retained earnings.
  1. **Preferred stock** is a hybrid between common stock and debt. Such stock promises a fixed dividend (much like a bond's interest payment) but often limited voting rights. In the case of bankruptcy, preferred stockholders receive money after debt holders and before common stockholders are paid. Many firms do

not use any preferred stock. The common stockholders' equity, or **net worth**, is a residual and is calculated as follows:

$$\text{Assets} - \text{Liabilities} - \text{Preferred stock} = \text{Common stockholders' equity}.$$

2. **Common stock** is the aggregate par value of the company's issued stock. Companies rarely issue stocks at a discount (i.e., at an amount below the stated par). Corporations normally set the par value low enough so that, in practice, stock is usually sold at a premium.
3. **Treasury stock:** If the corporation buys back part of its own issued stock, the value of the repurchase is listed as *treasury stock* on the balance sheet. Companies buy back their shares for a variety of reasons. In most cases, it is a sign that management believes the stock is undervalued. Depending upon its objectives, a company can either retire the shares it purchases or hold them with the intention of reselling them to raise cash when the stock price rises.
4. **Paid-in capital** (capital surplus) is the amount of money received from the sale of stock over the par value. Outstanding stock is the number of shares issued that actually is held by the public.
5. **Retained earnings** represent the cumulative net income of the firm since its beginning, less the total dividends that have been paid to stockholders. In other words, retained earnings indicate the amount of assets that the company has financed by plowing profits back into the business. Therefore, these retained earnings belong to the stockholders.

What to Read from J&M's Balance Sheet

Recall that all financial data related to the annual report is shown in thousands of dollars, except share value. J&M generated revenue of $300,000 (this number means $300 million) for fiscal year 2017. The $161,400 of total assets shown in Table 13.1 were necessary to support the sales of $300,000.

- **Acquisition of Fixed Assets:** One way we can determine the amount of new fixed assets added during FY 2017 is to observe the change in the Property Plant and Equipment account, which shows a net increase in the amount of $9,000.
- **Debt:** J&M had a total long-term debt of $30,000 that consisted of the several bonds issued in previous years. The interest payments associated with these long-term debts were about $5,200.
- **Equity:** J&M had 100,000 shares of preferred stock and 10,000,000 shares of common stock outstanding. Investors initially provided the company with a total capital of $61,000 (= $10,000 + $40,000 + $11,000). However, J&M has retained the current, as well as previous earnings of $42,400, since it was incorporated. These earnings belong to J&M's common stockholders. At the end of 2017, the combined net stockholder's equity was $103,400. (This net equity figure typically includes treasury stock if any.)
- **Share value:** Stockholders on average have a total investment of $10.34 per share ($103,400,000/10,000,000 shares) in the company; this investment is known as the stock's book value. In December 2017, the stock was traded in the general range of $28 to $32 per share. Note that this market price is quite different from the stock's book value. Many factors affect the market price—most importantly, how investors expect the company to do in the future. Certainly, the company's unique etch products have had a major influence on the market value of its stock.

13.2.2 The Income Statement

The second financial report is the **income statement**, which indicates whether the company is making or losing money during a stated *period*. Most businesses prepare quarterly and monthly income statements in addition to annual ones. For J&M's income statement, the accounting period begins on January 1, 2017 and ends on December 31, 2017. Table 13.2 gives the 2017 and 2016 income statements for J&M.

Net Income

Typical elements that are itemized in the income statement are as follows:

- The **total revenue** (or **net sales**) figure represents the gross sales less any sales return and allowances.

TABLE 13.2 The Income Statement for J&M Corporation

J&M CORPORATION
INCOME STATEMENT
(in thousands, except per share data)

PERIOD ENDING	31-Dec-17	31-Dec-16
Total Revenue	$300,000	$245,000
Cost of Goods Sold	$188,000	$153,000
Gross Profit (Margin)	$112,000	$92,000
Selling General and Administrative	$44,720	$38,000
Depreciation	$20,000	$18,000
Lease Payment	$14,000	$14,000
Operating Income or Loss	$33,280	$22,000
Interest Expense, Net	$(2,400)	$(2,560)
Income Before Tax	$30,880	$19,440
Income Tax Expense	$8,080	$4,920
Net Income	**$22,800**	**$14,520**
Cash Dividends		
Preferred Stock	$600	$600
Common Stock	$12,200	$8,200
Total Cash Dividends	$12,800	$8,800
Retained Earnings	**$10,000**	**$5,720**
Number of Shares Outstanding		
Preferred Stock	100,000	100,000
Common Stock	10,000,000	10,000,000

- The expenses and costs of doing business are listed on the next several lines as deductions from the revenues. The largest expense for a typical manufacturing firm is its production expense for making a product (such as labor, materials, and overhead) called the **cost of goods sold** (or **cost of revenue**).
- Total revenue less the cost of goods sold indicates the **gross profit (margin)**.
- Next, we subtract any other **operating expenses** from operating income. These other operating expenses are items such as interest, lease, selling, research and development (R&D), and administration expenses. This operation results in the operating income period.
- If the company generated **other income** from investments or any nonoperating activities, this item will be a part of income subject to income taxes as well.
- Finally, we determine the **net income** (or net profit) by subtracting the income taxes from the taxable income. This net income is also commonly known as the *accounting income*.

Earnings per Share

Another important piece of financial information provided in the income statement is the **earnings per share** (EPS) figure. In simple situations, we compute this amount by dividing the available earnings to common stockholders by the number of shares of common stock outstanding. Stockholders and potential investors want to know what their relative share of profits is, not just the total dollar amount. Presentation of profits on a per-share basis allows stockholders to relate earnings to what they paid for a share of stock. Naturally, companies want to report a higher EPS to their investors as a means of summarizing how well they managed their businesses for the benefit of their owners.

Dividends and Retained Earnings

As a supplement to the income statement, corporations also report their retained earnings during the accounting period. When a corporation makes some profits, it has to decide what to do with these profits. The corporation may decide to pay out some of the profits as dividends to its stockholders. Alternatively, it may retain the remaining profits in the business in order to finance expansion or support other business activities.

When the corporation declares dividends, preferred stock has priority over common stock in regard to the receipt of dividends. Preferred stock pays a stated dividend much like the interest payment on bonds. The dividend is not a legal liability until the board of directors has declared it. However, many corporations view the dividend payments to preferred stockholders as a liability. Therefore, the term "available earnings for common stockholders" reflects the net earnings of the corporation less the preferred-stock dividends. When preferred- and common-stock dividends are subtracted from net income, the remainder is retained earnings (profits) for the year. As mentioned previously, these retained earnings are reinvested in the business.

What to Read from J&M's Income Statement

(All numbers in thousands except per share data.) Net sales were $300,000 in 2017, compared with $245,000 in 2016, a whopping gain of 22.45%. Profits from operations

(operating income) rose to $33,280, and net income was up to a profit of $22,800 from $14,520 a year ago. We can infer the following:

1. **Dividends:** J&M issued 100,000 shares of preferred stock, so there is required cash dividend in the amount of $600. In fact, J&M declared also cash dividends of $12,200 to its common stockholders during this reporting period.
2. **EPS:** Earnings per common share climbed at a faster pace to $2.22 from $1.39 in 2016. We can see that J&M had earnings available to common stockholders of $22,200 (= $22,800 − $600). However, after paying $12,200 cash dividends, the remaining $10,000 was retained for future business activities. The beginning balance of the retained earnings was $32,400. See Table 13.1 for the retained earning entry in 2016, so the ending balance increased to $42,400.
3. **Profit margins:** Table 13.3 illustrates the calculation of the gross margin, operating margin, and net margin, which are expressed as percentages of total sales. J&M's net margin is about 7.60%, meaning that for every dollar of sales, J&M is making 7.4 cents of net profit.

13.2.3 The Cash-Flow Statement

The income statement explained in the previous section indicates only whether the company was making or losing money during the reporting period. Therefore, the emphasis was on determining the net income (profits) of the firm, mainly for the operating

TABLE 13.3 Understanding Operating Margin and Net Margin

J&M CORPORATION
Operating and Profit Margins
(in thousands, except percentage data)

PERIOD ENDING	31-Dec-2017	% of Total Revenue
Total Revenue	$300,000	100.00%
Cost of Goods Sold	$188,000	62.67%
Gross Profit (Gross Margin)	$112,000	**37.33%**
Selling General and Administrative	$44,720	14.91%
Depreciation	$20,000	6.67%
Lease Payment	$14,000	4.67%
Operating Profit (Operating Margin)	$33,280	**11.09%**
Earnings before Interest and Taxes	$33,280	11.09%
Interest Expense, Net	$(2,400)	0.80%
Income before Tax	$30,880	10.29%
Income Tax Expense	$8,080	2.69%
Net Income (Net Margin)	**$22,800**	**7.60%**
Net Income Available to Common Stockholders	$22,200	7.40%

activities. However, the income statement ignores two other important business activities for the period: financing and investing activities. Therefore, we need another financial statement—the **cash-flow statement**—that details how the company generated cash and how the company used its cash during the reporting period. This statement is concerned with how the company actually used its cash in its period, thus explaining how the firm went from the level of cash in its accounts reported at the start of the year to the level of cash it had at the end of the year.

Sources and Uses of Cash

The difference between the sources (inflows) and uses (outflows) of cash represents the net cash flow during the reporting period. This is a very important piece of information because investors determine the value of an asset (or a whole firm) by the cash flows it generates. Figure 13.5 illustrates how a firm generates cash flows and summarizes the sources and uses of cash during its business cycle. We may also summarize the sources and uses of funds according to the changes in account activities (see Figure 13.6).

Certainly, a firm's net income is important, but cash flows are even more important because we need cash to pay dividends and to purchase the assets required for continuing operations. As we mentioned previously, the goal of the firm should be to maximize the price of its stock. Since the value of any asset depends on the

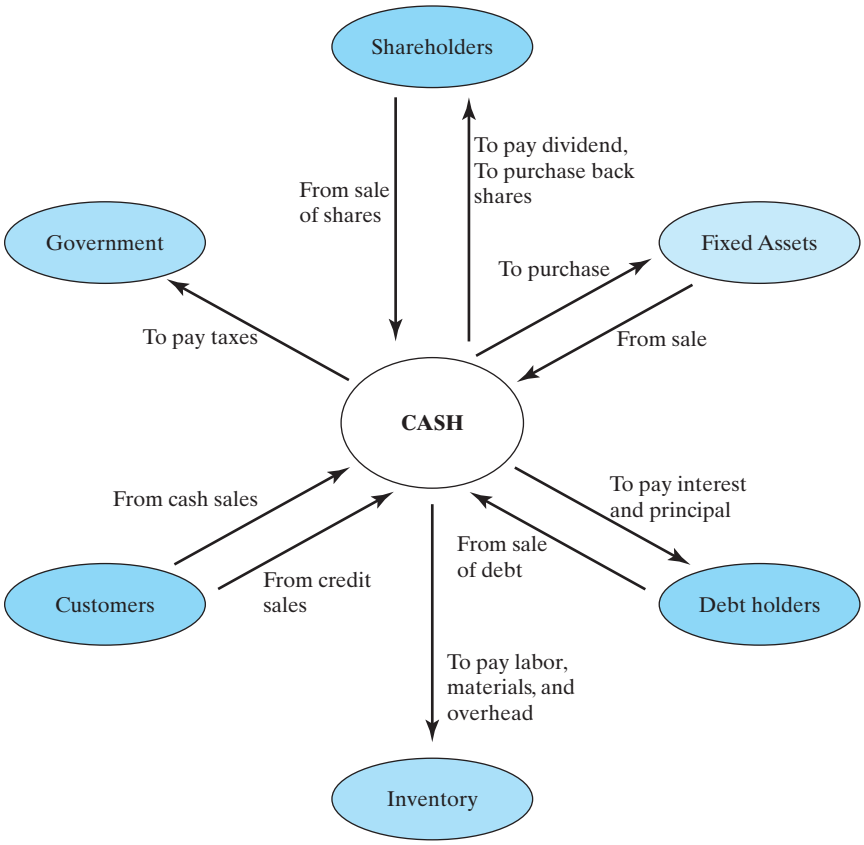


Figure 13.5 The cash flow cycle in a typical manufacturing firm.

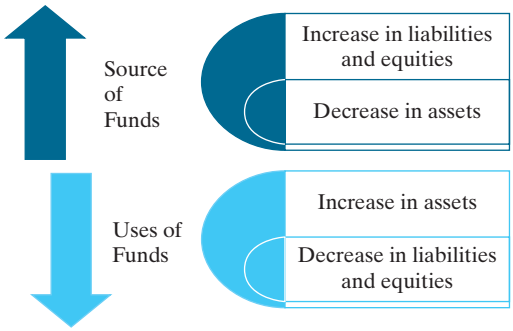


Figure 13.6 Summary of sources and uses of funds according to changes in account activities.

cash flows produced by the asset, managers want to maximize cash flows available to its investors over the long run. Therefore, managers should make investment decisions on the basis of cash flows rather than profits. For such investment decisions, it is necessary to convert profits (as determined in the income statement) to cash flows. Table 13.4 is J&M's statement of cash flows as it would appear in the company's annual report.

TABLE 13.4 The Cash-Flow Statement for J&M Corporation

J&M CORPORATION
CASH FLOW STATEMENT
(in thousands, except per share data)

PERIOD ENDING	**31-Dec-17**
Cash Flows from Operating Activities	
Net Income	**$22,800**
Depreciation	$20,000
Working Capital Requirement	$(16,600)
Total Cash Flow from Operating Activities	**$26,200**
Cash Flows from Investing Activities	
Capital Expenditures	$(9,000)
Total Cash Flows from Investing Activities	**$(9,000)**
Cash Flows from Financing Activities	
Reduction of Long-term Debt	$(2,000)
Dividends Paid	$(12,800)
Total Cash Flows from Financing Activities	**$(14,800)**
Change in Cash and Cash Equivalents	**$2,400**

Reporting Format

In preparing a cash-flow statement such as the one in Table 13.4, many companies identify the sources and uses of cash according to the types of business activities. There are three types of activities:

- **Operating activities:** We start with the net change in operating cash flows from the income statement. Here, operating cash flows represent those cash flows related to the production and sales of goods or services. All noncash expenses are added back to net income (or after-tax profits). For example, an expense such as depreciation is only an accounting expense (bookkeeping entry). While we may charge such an item against current income as an expense, it does not involve an actual cash outflow. The actual cash flow may have occurred when the asset was purchased. Any adjustments in working-capital terms will also be listed here. Once again, **working capital** is defined as the difference between current assets and current liabilities. Furthermore, we can determine the net change in **working capital requirement** by the difference between "change in current assets" and "change in current liabilities."
  - If this net change is *positive*, the working capital requirement appears as *uses* of cash in the cash flow statement.
  - If this net change is *negative*, the working capital requirement appears as *sources* of cash in the cash flow statement. This concept is illustrated in Figure 13.7.

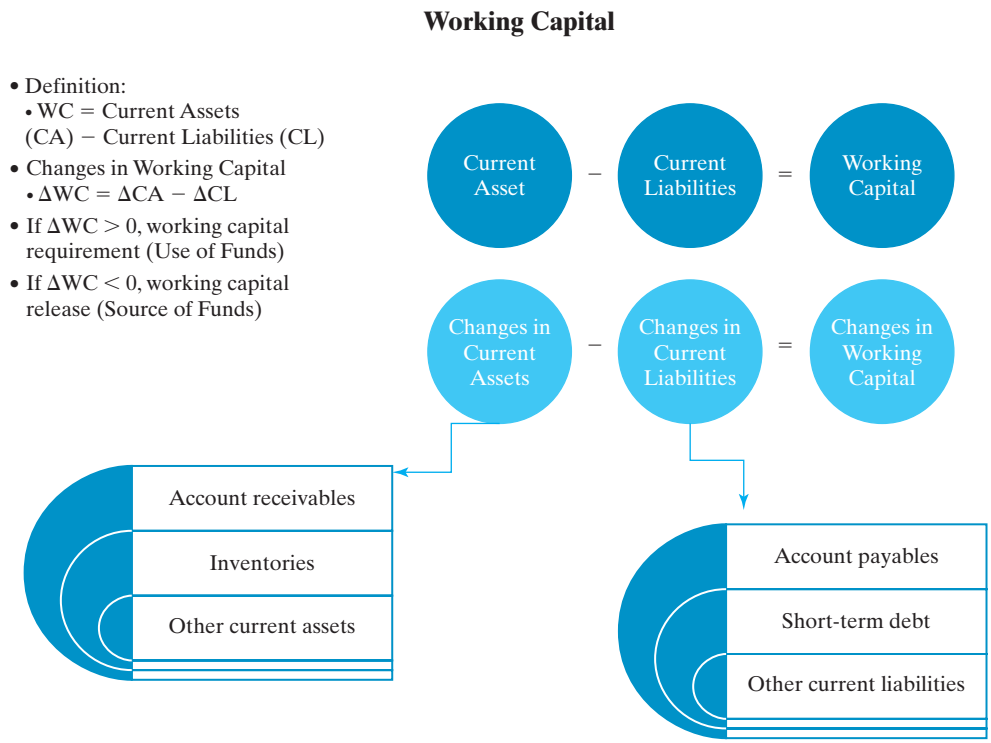


Figure 13.7 Working capital and its impact on cash flow statement.

- **Investing activities:** After determining the operating cash flows, we consider any cash flow transactions related to investment activities. Investment activities include transactions such as purchasing new fixed assets (cash outflow), reselling old equipment (cash inflow), and buying and selling financial assets.
- **Financing activities:** Finally, we detail cash transactions related to financing any capital used in business. For example, the company could borrow or sell more stock, resulting in cash inflows. Paying off existing debt would result in cash outflows.

By summarizing cash inflows and outflows from these three types of activities for a given accounting period, we obtain the net changes in cash flow position of the company.

What to Read from J&M's Cash Flow Statement

As shown in Table 13.4, J&M's cash flow from operations in fiscal year 2017 amounted to $2,400. Note that this amount is much different from the net income of $20,000 earned during the reporting period. Where did the rest of the money come from or go to? Basically, we are trying to explain the sources and uses of funds during the business cycle, as depicted in Figure 13.8, a graphical presentation similar to Figure 13.5, with emphasis on cash flow from operational activities.

1. **Cash flow from operations:** The main reason for the difference (net income versus cash flow from operations) is the accrual-basis accounting principle used by J&M Corporation. In **accrual-basis accounting**, an accountant recognizes the impact of a business event as it occurs. When the business performs a service, makes a sale, or incurs an expense, the accountant enters the transaction into the books, no matter whether cash has been received or paid. For example, the $4,200 increase in accounts receivable during 2017 from $19,500 to $23,700 (in Table 13.1) represents the increased amount of total sales on credit. Since this figure was

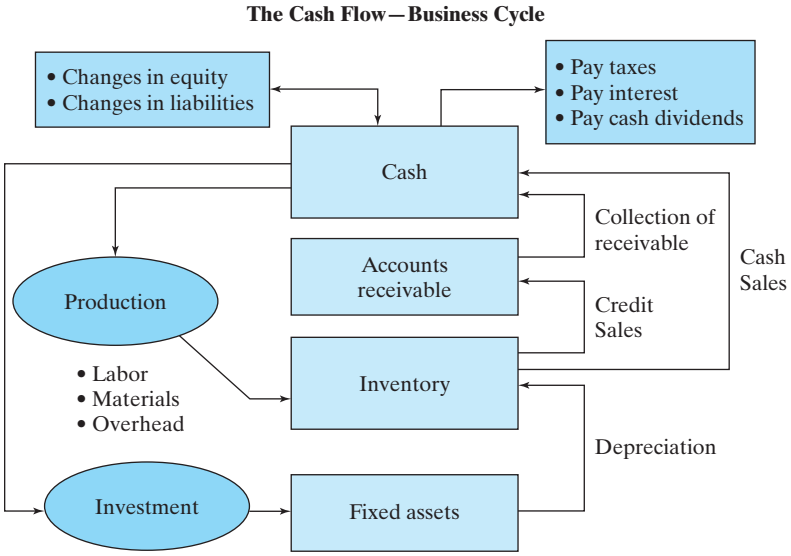


Figure 13.8 Explaining the cash flow activities by the business cycle, showing where the cash is generated and where the cash is spent.

included in the total sales in determining the net income, we need to subtract this figure in order to determine the true cash position. In general,

- Sources of funds are indicated by increase in equities and decrease in assets.
- Uses of funds are indicated by increases in assets and decreases in equities.

The working capital requirement in the amount of $16,600 in Table 13.4 may be calculated based on these principles.

- Net change in current assets (excluding the cash account) = $100
- Net change in current liabilities = −$16,500
- Net change in working capital = $100 − (−$16,500) = +$16,600 (requirement)

Change in Current Assets:		
Change in Short-term Marketable Securities	$(2,000)	
Change in Account Receivables	$4,200	
Change in Inventory	$(2,100)	
Change in Prepaid Expenses	$500	
Change in Deferred Charges	$(500)	
Net Change in Current Assets	**$100**	
Change in Current Liabilities		
Change in Accounts Payable	$(16,000)	
Change in Wage Payable	$1,000	
Change in Accrued Taxes	$(1,500)	
Net Change in Current Liabilities	**$(16,500)**	
Working Capital Requirement		$(16,600)

After making similar adjustments in other operating cash flows, the net cash provided from operating activities is $23,400.

2. **Cash flow from investing activities:** From the investment activities, J&M purchased capital assets worth $9,000. It made no other investments during the period. Also there were no sales proceeds from equipment disposal. Therefore, the net cash flow used from these investing activities amounted to just $9,000, which means that there was an outflow.
3. **Cash flow from financing activities:** A repayment of long-term debt and payment of cash dividends resulted in a net cash outflow of $14,800. If J&M ever repurchases their own stock, it will be shown as a part of financing activities. (This repurchase of its own stock is equivalent to investing its idle cash from operations in the stock market. J&M could have bought another company's stock, such as that of Apple or Microsoft, with the money. However, it could view its own stock undervalued, so it might end up buying it instead.)

Together, the three types of activities generated a total cash flow of $2,400 in 2017. With the initial cash balance of $6,100, the ending cash balance now increases to $8,500. This amount appears as the change in cash and cash equivalent in J&M's balance sheet statement in Table 13.1.

13.3 Using Ratios to Make Business Decisions

Financial statements tell us what has happened during a particular period. In that sense, financial statements are essentially historical documents. However, most users of financial statements are concerned about what will happen in the future. For example,

- Stockholders are concerned with future earnings and dividends.
- Creditors are concerned with the company's ability to repay its future debts.
- Managers are concerned with the company's ability to finance future expansion.
- Engineers are concerned with planning actions that will influence the future course of business events.

Despite the fact that financial statements are historical documents, they can still provide valuable information that addresses all of these concerns. An important part of financial analysis is the calculation and interpretation of various financial ratios,[5] which provide insight into a firm's future status. In this section, we consider some of the widely used ratios that analysts use in attempting to predict the future course of events in business organizations. We may group these ratios in five categories (debt management, liquidity, asset management, profitability, and market trend) as outlined in Figure 13.9. In all of the upcoming financial-ratio calculations, we will use the 2017 financial statements for J&M Corporation as summarized in Tables 13.1, 13.2, and 13.4.

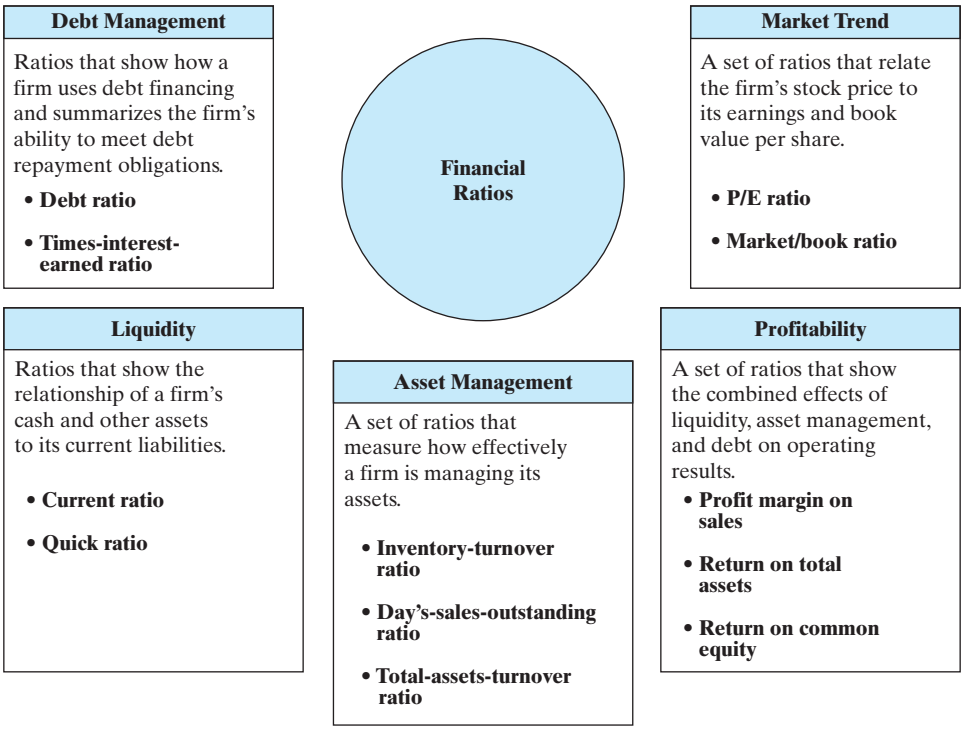


Figure 13.9 Types of financial ratios used in evaluating a firm's financial health.

[5] Financial ratios can be calculated in several different ways. Therefore, financial ratios that we calculate for J&M might be different from some other published figures. So be warned: You should not accept a ratio at face value without knowing how it has been calculated.

We often compare a company's financial ratios with industry average figures; however, we should note at this point that an industry average is not an absolute number that all firms should strive to maintain. In fact, some very well-managed firms will be above the average while other good firms will be below it. However, if a firm's ratios are quite different from the average for its industry, we should examine the reason that this variance occurs.

13.3.1 Debt Management Analysis

All businesses need assets in order to operate. To acquire assets, a firm must raise capital. When the firm finances its long-term needs externally, it may obtain funds from the capital markets. Capital comes in two forms, **debt** and **equity**. Debt capital refers to borrowed capital from financial institutions and bond markets. Equity capital refers to capital obtained from the owners of the company. Use of debt increases returns to shareholders in good times (if money is put to use in creating profits) and reduces them in bad times. Therefore, the degree to which a business is utilizing borrowed money is known as **financial leverage**.

The basic methods of debt financing include bank loans and bond sales. For example, say that a firm needs $10,000 to purchase a computer. In this situation, the firm could borrow the money from a bank and repay the loan and the specified interest in a few years, an approach known as a *short-term debt financing*. Now suppose that the firm needs $100 million for a construction project. It would normally be very expensive (or require a substantial amount of mortgage) to borrow the money directly from a bank. In this situation, the firm would go public in order to borrow money on a long-term basis. When investors lend capital to a company and the company agrees to repay the loan at an agreed interest rate, the investor is a creditor of the corporation. The document that records the nature of the arrangement between the issuing company and the investor is called a **bond**. Raising capital through issuing bonds is called *long-term debt financing*.

Similarly, there are different types of equity capital. For example, the equity of a proprietorship represents the money provided by the owner. For a corporation, equity capital comes in two forms: *preferred* and *common stock*. Investors provide capital to a corporation, and the company agrees to provide the investor with fractional ownership in the corporation.

Since a company must pay its creditors on time and in full to remain solvent and out of bankruptcy, one primary concern of financial analysis is to determine how able a firm is to cover its required debt payments. To do so, we first examine the extent to which a company uses debt financing (or financial leverage) in business operations, as follows:

- Check the balance sheet to determine the extent to which borrowed funds have been used to finance assets, and
- Review the income statement to see the extent to which fixed charges (interests) are covered by operating profits.

Two essential indicators of a business' ability to pay its long-term liabilities are the *debt ratio* and the *times-interest-earned ratio*.

Debt Ratio

The relationship between total liabilities and total assets, generally called the **debt ratio**, which tells us the proportion of the company's assets that it has financed with debt:

$$\text{Debt ratio} = \frac{\text{total debt}}{\text{total assets}}. \tag{13.1a}$$

For example, J&M's debt ratio for 2017 can be calculated from Table 13.1 as follows:

$$\text{Debt ratio} = \frac{\$58{,}000}{\$161{,}400} = 35.94\%.$$

Total debt includes both current liabilities and long-term debt. If the debt ratio is 1, then the company has used debt to finance all of its assets. As of December 31, 2017 J&M's debt ratio was 35.94%; this means that its creditors have supplied close to 36% of the firm's total financing. Certainly, most creditors prefer low debt ratios because the lower the ratio, the higher will be the cushion against the creditor's losses in case of liquidation. If a company seeking financing already has large liabilities, then additional debt payments may be too much for the business to handle. For this highly leveraged company, creditors generally charge higher interest rates on new borrowing in order to help protect them.

Another way to express financial leverage is in terms of company's **debt-to-equity** ratio:

$$\text{Debt-equity ratio} = \frac{\text{long-term debt}}{\text{equity}}. \tag{13.1b}$$

If this ratio is more than 1, the majority of assets are financed through debt. If it is less than 1, assets are primarily financed through equity. For J&M, the debt-equity ratio in 2017 was

$$\text{Debt-equity ratio} = \frac{\$30{,}000}{\$103{,}400} = 0.2901.$$

This indicates that almost 71% of J&M's assets were financed through equity.

Times-Interest-Earned Ratio

The most common measure of the ability of a company's operations to provide protection to the long-term creditor is the **times-interest-earned ratio**. We find this ratio by dividing earnings before interest and income taxes (EBIT) by the yearly interest charges that must be met. For example, J&M issued $30,000 worth of senior notes and long-term bonds. This results in $2,400 in interest expenses due in the year 2017, so we calculate the following:

$$\begin{aligned}\text{Times-interest-earned ratio} &= \frac{\text{EBIT}}{\text{Interest expense}} \\ &= \frac{\$33{,}280}{\$2{,}400} \\ &= 13.87 \text{ times}.\end{aligned} \tag{13.2}$$

The ratio measures the extent to which operating income can decline before the firm is unable to meet its annual interest costs. Failure to meet this obligation can lead to legal action by the firm's creditors, possibly resulting in bankruptcy. Note that we use the earnings before interest and income taxes ($33,280), rather than net income in the numerator. Because J&M must pay interest with pretax dollars, J&M's ability to pay current interest is not affected by income taxes. Only those earnings remaining after all interest charges have been incurred are subject to income taxes. For J&M, the times-interest-earned ratio for 2017 is almost 13.87 times.

13.3.2 Liquidity Analysis

J&M's short-term suppliers and creditors are also concerned with the level of liabilities. Short-term creditors want to be repaid on time. Therefore, they focus on J&M's cash flows and on its working capital, as these quantities are J&M's primary sources of cash in the near future. The excess of current assets over current liabilities is known as **working capital**. This figure indicates the extent to which current assets can be converted to cash in order to meet current obligations. Therefore, we view a firm's net working capital as a measure of its *liquidity position*. In general, the larger the working capital, the better able the business will be to pay its debts.

Current Ratio

We calculate the current ratio by dividing current assets by current liabilities:

$$\text{Current ratio} = \frac{\text{current assets}}{\text{current liabilities}}. \tag{13.3}$$

For example, J&M's current ratio in 2017 can be calculated as follows:

$$\text{Current ratio} = \frac{\$77{,}400}{\$28{,}000} = 2.76 \text{ times}.$$

If a company is getting into financial difficulty, it begins paying its bills (accounts payable) more slowly, borrowing from its bank, and so on. If current liabilities are rising faster than current assets, the current ratio will fall, and this could spell trouble. What is an acceptable current ratio? The answer depends on the nature of the industry. The general rule calls for a current ratio of 2 to 1. This rule, of course, is subject to many exceptions, depending heavily on the composition of the assets involved.

Quick (Acid Test) Ratio

The quick ratio tells us whether the company could pay all its current liabilities if they came due immediately. We calculate the quick ratio by deducting inventories from current assets and then dividing the remainder by current liabilities:

$$\text{Quick ratio} = \frac{\text{current assets} - \text{inventories}}{\text{current liabilities}}. \tag{13.4}$$

For example, J&M's quick ratio in 2017 can be calculated as follows:

$$\text{Quick ratio} = \frac{\$77{,}400 - \$37{,}700}{\$28{,}000} = 1.42 \text{ times}.$$

The quick ratio measures how well a company can meet its obligations without having to liquidate or depend too heavily on selling its inventory. Inventories are typically the least liquid of a firm's current assets; hence, they are the assets on which losses are most likely to occur in case of liquidation. Since J&M's current ratio for 2017 is 2.76, its liquidity position is relatively weak, as it carried a large amount of inventory in its current assets ($37,700 out of $77,400 of current assets).

13.3.3 Asset Management Analysis

The ability to sell inventory and collect accounts receivable is fundamental to business success. Therefore, the third group of ratios measures how effectively the firm is managing its assets. We will review three ratios related to a firm's asset management:

(1) inventory-turnover ratio, (2) days-sale-outstanding ratio, and (3) total-assets-turnover ratio. The purpose of these ratios is to answer the following question: Does the total amount of each type of asset as reported on the balance sheet seem reasonable in view of current and projected sales levels? Any asset acquisition requires the use of funds. If a firm has an excess of assets, its cost of capital will be too high; as a result, its profits will be depressed. On the other hand, if assets are too low, the firm is likely to lose profitable sales.

Inventory-Turnover Ratio

We find this by measuring how many times a company has sold and replaced its inventory during the year. We compute the ratio by dividing sales by the average level of inventories on hand. We compute the average inventory figure by taking the average of the beginning and ending inventory figures. Since J&M has a beginning inventory amount of $39,800 and an ending inventory amount of $37,700, its average inventory for the year would be $38,750. Then we compute J&M's inventory-turnover ratio for 2017 as follows:

$$\text{Inventory-turnover ratio} = \frac{\text{sales}}{\text{average inventory balance}} \tag{13.5}$$

$$= \frac{\$300{,}000}{\$38{,}750} = 7.74 \text{ times}.$$

As a rough approximation, J&M was able to sell and restock its inventory 7.74 times in 2017. Its turnover of 7.74 times is faster than that of its industry average, 4.05 times, during the same operating period. This result suggests that J&M's competitors are holding a little more excessive stocks of inventory; excess stocks are, of course, unproductive, and they represent an investment with a low or zero rate of return. A relatively high ratio compared with those of competitors in the same industry may indicate that the firm is working close to capacity, signaling that it would need additional investment to generate additional business.

Days-Sales-Outstanding (Accounts Receivable Turnover) Ratio

The days-sales-outstanding (DSO) ratio is a rough measure of how many times a company's accounts receivable have been turned into cash during the year. We determine the ratio, also called the **average collection period**, by dividing accounts receivable by average sales per day. In other words, this ratio indicates the average length of time the firm must wait after making a sale before receiving cash. For J&M in 2017, we have

$$\text{DSO} = \frac{\text{accounts receivables}}{\text{average sales per day}} = \frac{\text{accounts receivables}}{\text{annual sales}/365} \tag{13.6}$$

$$= \frac{\$23{,}700}{\$300{,}000/365} = 28.84 \text{ days}.$$

Thus, for J&M, on average, it takes about 28.84 days to collect on a credit sale. Whether its average of 28.84 days taken to collect on an account is good or bad depends on the credit terms J&M is offering its customers. If credit terms are 30 days, we can say that J&M's customers, on average, are paying their bills on time. In order to improve their working-capital position, most customers tend to withhold payment for as long as the credit terms will allow and may even go over by a few days. The long

collection period may signal that customers are in financial trouble or the company has poor credit management.

Total-Assets-Turnover Ratio

The total-assets-turnover ratio measures how effectively a firm uses its total assets in generating its revenues. It is the ratio of sales to all of the firm's assets. For J&M in 2017,

$$\begin{aligned}\text{Total-assets-turn over ratio} &= \frac{\text{sales}}{\text{total assets}} \qquad (13.7)\\ &= \frac{\$300{,}000}{\$161{,}400}\\ &= 1.86 \text{ times}.\end{aligned}$$

J&M's ratio of 1.86 times, when compared with the industry average ratio of 0.37 times, is almost five times faster, indicating that J&M is using its total assets much more intensively than its peers. If this ratio does not improve, we can say that J&M has relatively high investment in inventory, plant, and equipment compared with the size of sales.

13.3.4 Profitability Analysis

One of the most important goals for any business is to earn a profit. The ratios examined thus far provide useful clues as to the effectiveness of a firm's operations, but profitability ratios show the combined effects of liquidity, asset management, and debt on operating results. Therefore, ratios that measure profitability play a large role in decision making.

Profit Margin on Sales

We calculate the profit margin on sales by dividing net income by sales. This ratio indicates the profit per dollar of sales. For J&M in 2017,

$$\begin{aligned}\text{Profit margin on sales} &= \frac{\text{net income available to common stockholders}}{\text{sales}} \qquad (13.8)\\ &= \frac{\$22{,}800 - \$600}{\$300{,}000} = 7.4\%.\end{aligned}$$

Thus, J&M's profit margin is equivalent to 7.4 cents for each sales dollar generated. J&M's net profit margin is lower than the industry average of 8.14%. This difference indicates that J&M's operation needs more cost cutting to be competitive with its competitors, even though they had much faster inventory turn overs. Recall that net income is income after taxes. Thus, if two firms have identical operations in the sense that their sales, operating costs, and earnings before income tax are the same but one company uses more debt than the other, then the company with more debt will have higher interest charges. Those interest charges will pull net income down, and because sales are the same, the result will be a relatively low profit margin for the indebted company.

Return on Total Assets

The return on total assets (ROA), or simply return on assets, measures a company's success in using its assets to earn a profit. The ratio of net income to total assets measures the return on total assets after interest and taxes. For J&M in 2017,

$$\text{Return on total assets} = \frac{\text{net income} + \text{interest expense}\ (1 - \text{tax rate})}{\text{average total assets}} \quad (13.9)$$

$$= \frac{\$22{,}800 + \$2{,}400(1 - 0.2617)}{(\$161{,}400 + \$169{,}900)/2} = 14.83\%.$$

Adding a portion of interest expenses back to net income results in an adjusted earnings figure that shows what earnings would have been if the assets had been acquired solely through equity. (Note that J&M's effective tax rate is 26.17% in 2017.) With this adjustment, we may be able to compare the return on total assets among companies with differing amounts of debt. Again, J&M's 14.83% return on assets is well above the industry average of 2.97%. This high return results from (1) the company's high basic earning power and (2) its low use of debt, both of which cause its net income to be relatively high.

Return on Common Equity

Another popular measure of profitability is the rate of return on common equity (ROE). This ratio shows the relationship between net income and the common stockholders' investment in the company. That is, it answers the following question: How much income is earned for every $1 invested by common shareholders? To compute this ratio, we first subtract preferred dividends from net income; the result is known as "net income available to common stockholders." We then divide this net income available to common stockholders by the average common (stockholders) equity during the year. We compute average common equity by using the beginning and ending balances. At the beginning of fiscal year 2017, J&M's common equity balance was $83,400, and its ending balance was $93,400 (common equity = total stockholder equity − preferred stock). The average balance is, then, simply $88,400. So, we find the following:

$$\text{Return on common equity} = \frac{\text{net income available to common stockholders}}{\text{average common equity}} \quad (13.10)$$

$$= \frac{\$22{,}800 - \$600}{(\$83{,}400 + \$93{,}400)/2}$$

$$= \frac{\$22{,}200}{\$88{,}400} = 25.11\%.$$

The rate of return on common equity for J&M was 25.11% during 2017.

To learn more about what management can do to increase ROE, we may rewrite ROE in terms of the following three components:

$$\text{ROE} = \frac{\text{Net income}}{\text{Average shareholders' equity}} \quad (13.11)$$

$$= \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Average shareholders' equity}}.$$

The three principal components can be described as the profit margin, asset turnover, and financial leverage, respectively.

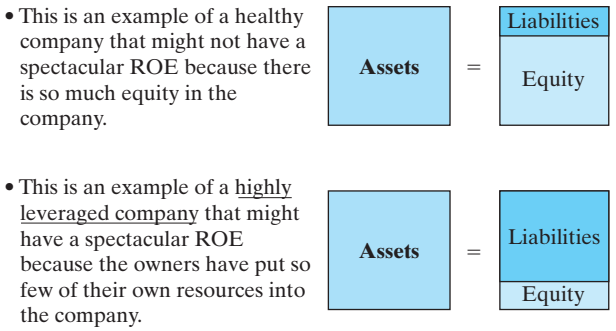


Figure 13.10 How the debt-to-equity ratio affects the return on equity.

$$\begin{aligned}\text{ROE} &= (\text{Profit margin}) \times (\text{Asset turnover}) \times (\text{Financial leverage}) \\ &= (7.4\%) \times (1.86) \times \left(\frac{\$161{,}400}{\$88{,}400}\right) \\ &= 25.13\%.\end{aligned}$$

The slight difference is due to rounding errors. This expression tells us that management has only three key ratios for controlling the ROE: (1) the earnings from sales (profit margin), (2) the revenue generated from each dollar of assets employed (asset turnover), and (3) the amount of equity used to finance the assets in business operation (financial leverage).

Figure 13.10 illustrates how the debt-to-equity ratio (total debt over total equity) (distinct from the debt ratio) impacts the return on equity.

13.3.5 Market-Value Analysis

When purchasing a company's stock, what would be your primary factors in valuing that stock? In general, investors purchase stock to earn a return on their investment. This return consists of two parts: (1) gains (or losses) from selling the stock at a price that is higher (or lower) than the purchase price and (2) dividends, the periodic distributions of profits to stockholders. The market-value ratios, such as price–earnings ratio and market–book ratio, relate the firm's stock price to its earnings and book value per share. These ratios give management an indication of what investors think of the company's past performance and future prospects. If a firm's asset management and debt management are sound and its profit is rising, then its market-value ratios and stock price will be high.

Price/Earnings Ratio

The price/earnings (P/E) ratio shows how much investors are willing to pay per dollar of reported profits. J&M's stock sold for $31.25 (closing price) on December 29, 2017, so with an EPS of $2.22, its P/E ratio is

$$\begin{aligned}\text{Earnings per share} &= \frac{\text{Net income avaialbe to common stockholders}}{\text{Average number of shares outstanding}} \\ &= \frac{(\$22{,}800{,}000 - \$600{,}000)}{10{,}000{,}000} = \$2.22\end{aligned} \tag{13.12}$$

$$\begin{aligned} \text{P/E ratio} &= \frac{\text{price per share}}{\text{earnings per share}} \\ &= \frac{\$31.25}{\$2.22} = 14.08. \end{aligned} \tag{13.13}$$

That is, the stock was selling for about 14.08 times its current earnings per share. In general, P/E ratios are higher for firms with high growth prospects with all other things held constant but lower for firms with lower expected earnings. J&M's expected annual increase in operating earnings is 15% over the next three to five years. Since J&M's expected growth is more than 4.5%, the average for the power equipment industry, we may infer that investors value J&M's stock more highly than most other stocks in the industry. However, all stocks with high P/E ratios will also carry high risk whenever the expected growth does not materialize. Any slight earnings disappointment tends to punish the market price significantly.

Book Value per Share

Another ratio frequently used in assessing the well-being of common stockholders is book value per share. The book value per share measures the amount that would be distributed to holders of each share of common stock if all assets were sold at their balance sheet carrying amounts and if all creditors were paid off. We compute the book value per share for J&M's common stock in 2017 as follows:

$$\begin{aligned} \text{Book value per share} &= \frac{\text{total stockholders' equity} - \text{preferred stock}}{\text{shares outstanding}} \\ &= \frac{\$103{,}400{,}000 - \$10{,}000{,}000}{10{,}000{,}000} = \$9.34. \end{aligned} \tag{13.14}$$

If we compare this book value with the market price of $31.25 at the end of fiscal year, then we may say that the stock appears to be overpriced. Once again, market prices reflect expectations about future earnings and dividends whereas book value largely reflects the results of events that occurred in the past. Therefore, the market value of a stock tends to exceed its book value.

There are many sources of financial ratio information in addition to those we have examined here. For example, www.reuters.com shows a variety of financial ratios for publically traded companies. Table 13.5 summarizes the financial ratios for J&M Corporation in reference to industry and the S&P averages. In looking at numbers such as these, you may find the figures that we have calculated could be different from the published numbers. The reason is that different sources frequently do their calculations somewhat differently even if the ratio names are the same. Table 13.6 summarizes the financial ratios introduced in this section.

13.3.6 Limitations of Financial Ratios in Business Decisions

Business decisions are made in an uncertain world. As useful as ratios are, they have limitations. We can draw an analogy between the use of financial ratios in decision making and a physician's use of a thermometer. A reading of 102°F

TABLE 13.5 **Comparisons of Key Financial Ratios for J&M Corporation with the Industry Average and the S&P 500 (as of May 18, 2017)**

Category	Financial Ratios	J&M	Industry	S&P 500
	Debt/Equity ratio	$0.2901	$1.22	$1.2
Debt Management	Time-interest-earned ratio	$13.87	$18.85	$83.4
	Current ratio	$2.76	$1.86	$1.4
Liquidity Analysis	Quick ratio	$1.42	$1.55	$0.73
	Inventory-turnover ratio	$7.74	$4.05	$14.2
Asset Management	Days-sales-outstanding ratio	$28.84	$50.69	$8.33
	Total-assets turnover ratio	$1.86	$0.37	$2
	Profit margin	7.40%	8.14%	8.0%
Profitability	Return on total assets	14.83%	2.97%	2.29%
	Return on common equity	22.56%	13.27%	12.72%
	P/E ratio	$14.22	$26.18	$19.6
Market Trend	Book value/share	$9.34	$12.29	$25.23

Data from MSN Finance – http://money.msn.com.

indicates that something is wrong with the patient, but the temperature alone does not indicate what the problem is or how to cure it. In other words, ratio analysis is useful, but analysts should be aware of ever-changing market conditions and make adjustments as necessary. It is also difficult to generalize about whether a particular ratio is "good" or "bad." For example, a high current ratio may indicate a strong liquidity position, which is good, but holding too much cash in a bank account (which will increase the current ratio) may not be the best use of funds. In addition, ratio analysis based on any one year may not represent the true business condition. It is important to analyze trends in various financial ratios as well as their absolute levels, for trends give clues as to whether the financial situation is likely to improve or to deteriorate. To do a **trend analysis**, we simply plot a ratio over time. As a typical engineering student, your judgment in interpreting a set of financial ratios is understandably weak at this point, but it will improve as you encounter many facets of business decision making in the real world. Again, accounting is a language of business, and as you speak it more often, it will provide useful insights into a firm's operations.

TABLE 13.6 Summary of Key Financial Ratios

Category	Formula	Comments
Debt Management	• Debt ratio $= \frac{\text{total debt}}{\text{total assets}}$. • Debt-equity ratio $= \frac{\text{long-term debt}}{\text{equity}}$	Debt ratio may be measured in many different forms.
	• Times-interest-earned ratio $= \frac{\text{EBIT}}{\text{Interest expense}}$	EBIT: Earnings before interest and taxes. This ratio is also known as the *interest coverage ratio*.
Liquidity Analysis	• Current ratio $= \frac{\text{current assets}}{\text{current liabilities}}$.	
	• Quick ratio $= \frac{\text{current assets} - \text{inventories}}{\text{current liabilities}}$	
Asset Management	• Inventory-turnover ratio $= \frac{\text{sales}}{\text{average inventory balance}}$	As a variation, "*sales*" may be replaced by "*cost of goods sold*" in ratio calculation.
	• DSO $= \frac{\text{receivables}}{\text{average sales per day}} = \frac{\text{receivables}}{\text{annual sales}/365}$	
	• Total-assets-turnover ratio $= \frac{\text{sales}}{\text{total assets}}$	As a variation, the "*total assets*" may be replaced by the "*average of the assets*."
Profitability Analysis	• Profit margin on sales $= \frac{\text{net income available to common stockholders}}{\text{sales}}$	
	• Return on total assets $= \frac{\text{net income} + \text{interest expense}(1 - \text{tax rate})}{\text{average total assets}}$	
	• Return on common equity $= \frac{\text{net income available to common stockholders}}{\text{average common equity}}$ • $= \frac{\text{Net income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Average common equity}}$	
Market Trend Analysis	• P/E ratio $= \frac{\text{price per share}}{\text{earnings per share}}$	
	• Book value per share $= \frac{\text{total stockholders' equity} - \text{preferred stock}}{\text{shares outstanding}}$	

13.3.7 Where We Get the Most Up-to-Date Financial Information

Recall that all the financial ratio analyses given in the previous section were based on J&M's 2017 Annual Report, as of December 31, 2017. This is a historical document that allows us to examine the past performance of the corporation as well as some business outlooks portrayed by the management. To get the most up-to-date financial information, you may visit many online financial information sources such as Google Finance or Yahoo Finance or the company's website under the heading "Investor Relations." Certainly, you need to find out how other competitors did during the same period before making a financial decision.

13.4 Principle of Investing in Financial Assets

When you want to invest in an individual company, the financial analysis such as we have done for J&M Company in the previous sections would be a starting point. Once you understand the implications of financial risk associated with the company, you need to come up with an investment strategy that tells you what to do as far as putting together an appropriate investment portfolio. The next question involves how do you go about actually implementing the decisions you have made. Because investing is an inexact science, *it is better to be approximately right than precisely wrong*. This is the approach taken in this section. The technique that is commonly practiced in financial investment is the concept of asset diversification. The same concept also applies to the creation of an investment project portfolio.

13.4.1 Trade-Off between Risk and Reward

When it comes to investing, trying to weigh risk and reward can be a challenging task. Investors do not know the actual returns that project or financial assets will deliver or the difficulties that will occur along the way. Risk and reward are the two key words that will form the foundation for much of this section. This is what investing is all about: the trade-off between the opportunity to earn higher returns and the consequences of trying to do so and failing. The greater the risk, the more you stand to gain or lose. There is no such thing as a truly risk-free investment with higher return. So, the real task is not to try to find "risk-free" investments; strictly speaking, there are not any. (The U.S. Treasury Notes come close to be a risk-free investment but with lower return.) The challenge is to decide what level of risk you are willing to assume and then, having decided on your risk tolerance, to understand the implications of that choice. Your range of investment choices—and their relative risk factors—may be classified into three types of investment groups: cash, debt, and equities.

13.4.2 Broader Diversification Reduces Risk

Even if you find risk exciting sometimes, you will probably sleep better if you have your money spread among different assets; do not put all your eggs in one basket. Your best protection against risk is **diversification**—spreading your investments around instead of investing in only one thing. For example, you can balance cash investments such as certificates of deposit (CDs) and money-market funds with stocks, bonds, and mutual funds. Even within equity investments, you can buy stocks of small, growing

companies while also investing in large and well-established companies. What would you gain from this diversification practice? Well, you would hope to reduce the effect of market volatility on your holdings.

Usually, when returns are low in one area, you would like to see returns go up in another area. We may explain the concept of diversification graphically as shown in Figure 13.11. This figure shows three different investment scenarios explained as follows:

- **Case (A)—Invest in two assets with similar return characteristics:** Suppose you have the two types of investments shown in Figure 13.11(a). These two investments

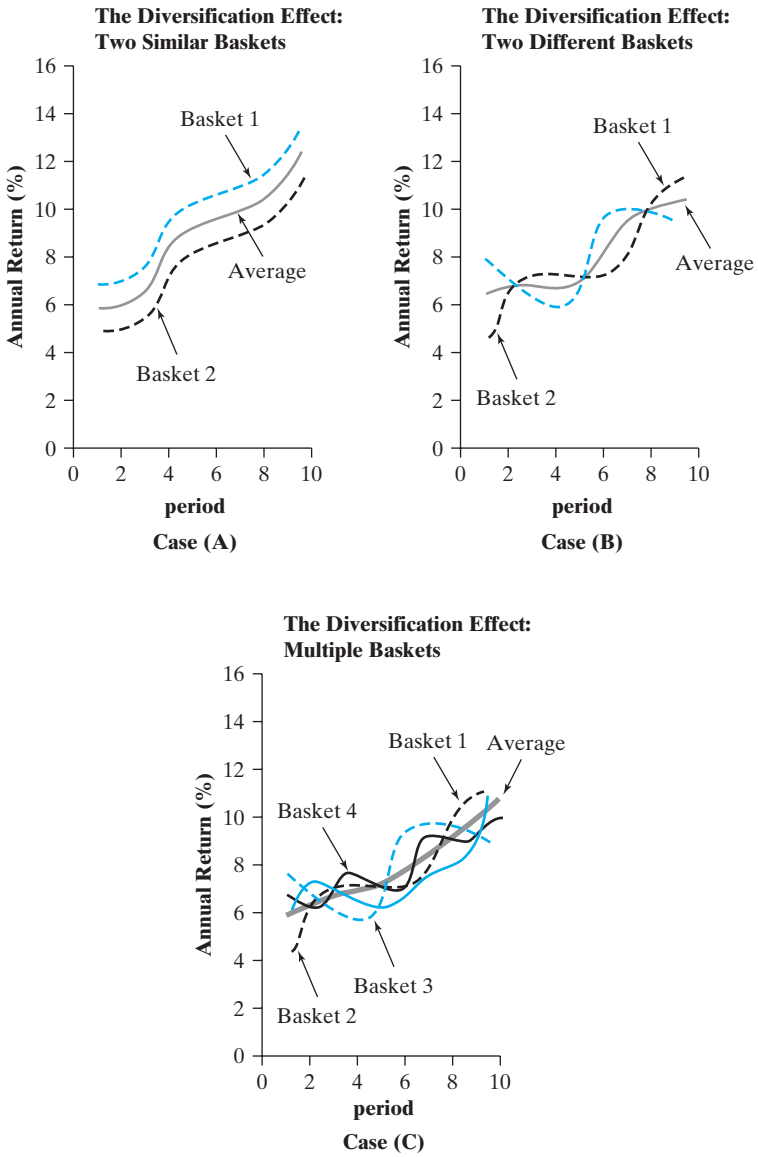


Figure 13.11 Reducing investment risks by asset diversification.

are similar in their pattern of return; that is, they fluctuate to the same degree such that as one goes up or down, so does the other.[6] In other words, you will experience a great deal of volatility while you are in the market. If you keep both investments, your expected rate of return is simply the weighted average of their returns.

- **Case (B)—Invest in two assets with dissimilar return characteristics:** Suppose you find the set of investments shown in Figure 13.11(b). The investments both have the same potential return, but the returns come at opposite times. That is, as one goes down, the other goes up.[7] Again, the return would be the weighted average of the returns of the two investments, but we may control the risk (fluctuation) considerably. All the negative returns of one investment would be offset by the positive returns of the other.
- **Case (C)—Invest in multiple assets with dissimilar return characteristics:** Of course, in the real world, we are not likely to find either of the foregoing scenarios. The more likely situation is that larger portfolios will have a number of assets in them with differing, but not necessarily opposite, patterns of return. Then the results could be as shown in Figure 13.11(c). The overall yield of the portfolio is the weighted average of the individual assets, but the fluctuation—the risk—is dampened. It is therefore possible to achieve a higher rate of return without considerably increasing the risk by building a multiple-asset portfolio. This is exactly what we achieve in asset investment through diversification. This principle is equally applicable to real assets such as investment projects.

13.4.3 Broader Diversification Increases Expected Return

As we observe in Figure 13.11, diversification reduces risk. However, there is far more to the power of diversification than simply spreading your assets over a number of investments. Well-diversified portfolios contain various mixes of stocks, bonds, mutual funds, and cash equivalents such as treasury bills. With such portfolios, over lengthy periods, you do not have to sacrifice much in the way of returns in order to get that reduced volatility. Finding the right mix depends on your assets, your age, and your risk tolerance. Diversification also requires regularly evaluating your assets and realigning the investment mix. For example, if your stocks increase in value, they will make up a larger percentage of your portfolio. To maintain a certain level of risk tolerance, you may want to decrease your stock holdings and increase your cash or bond holdings. Example 13.1 illustrates the difference an asset allocation makes for a long-term investor.

EXAMPLE 13.1 Broader Diversification Increases Return

Suppose you have $10,000 in cash and are considering the following two options for investing money:

- Option 1: You put the entire $10,000 into a secure-investment mutual fund consisting of a long-term U.S. Treasury bond with a yield of 7%.

[6] Mathematicians refer to such a relationship as a *perfect positive* cross correlation.

[7] This relationship is technically called a *perfect negative* cross correlation.

- Option 2: You split the $10,000 into equal amounts of $2,000 and diversify among five investment opportunities with varying degrees of risk from, say, extremely risky to very conservative and with potential returns ranging from −100% to 15%.

Amount	Investment	Expected Return
$2,000	Buying lottery tickets	−100% (?)
$2,000	Under the mattress	0%
$2,000	Term deposit (CD)	5%
$2,000	Corporate bond	10%
$2,000	Mutual fund (stocks)	15%

Given these two options, which would you choose? Our time horizon is 25 years. Would that make a difference?

DISSECTING THE PROBLEM

The $10,000 bond investment, which earns 7%, poses virtually no risk. With the diversified approach, you are going to lose the first $2,000 with practical certainty, make nothing on the next $2,000, make only 5% on the third $2,000, make 10% on the fourth $2,000, and make 15% on the last $2,000. At first glance, you might think Option 1 is a more rational strategy because of the very limited risk potential. Indeed, that might well be the best alternative for many short-term investors. However, say that we add one more element to our scenario.

Given: Rate of return for each investment option.
Find: Value of the investments at the end of 25 years.

METHODOLOGY

Create a table of expected returns and values in 25 years for both options.

SOLUTION

As you will see, the longer the time horizon, the better choice certain investments, such as stocks (represented by the mutual fund in this example), become. First, we can find the value of the government bond in 25 years as follows:

$$F = \$10{,}000(F/P, 7\%, 25) = \$54{,}274.$$

Similarly, we can find the value for each investment class in Option 2:

Option	Amount	Investment	Expected Return	Value in 25 Years
1	$10,000	Bond	7%	$54,274
	$2,000	Lottery tickets	−100%	$0
	$2,000	Under mattress	0%	$2,000
2	$2,000	Term deposit (CD)	5%	$6,773
	$2,000	Corporate bond	10%	$21,669
	$2,000	Mutual fund (stocks)	15%	$65,838
				$96,280

At the outset, Option 2 appears to be a losing proposition, but you would end up with about 77% more money despite the fact that the first two choices you made were, at best, unproductive. Of course, you can come up with a counterexample where Option 1 would be a better choice. However, the message is clear: Diversification among properly chosen assets can increase your return without unnecessary risks as long as you keep the assets invested in the market over a long period.

COMMENTS: In an extreme case, if you invested the entire $10,000 in the stock, the expected return over 25 years would be $\$10{,}000(1 + 0.15)^{25} = \$329{,}190$, which is much more than the return expected from the diversification. Therefore, it is commonly suggested that if you are a long-term investor, you can increase your exposure to riskier assets, such as stocks. This is one of the strategies used in asset allocations for retirement funds - in other words, stocks are one of the main elements in a typical retirement portfolio.

SUMMARY

- The primary purposes of this chapter were (1) to describe basic financial statements, (2) to present some background information on cash flows and corporate profitability, and (3) to discuss techniques used by investors and managers to analyze financial statements.
- Before making any major business decisions, it is important to understand the impact of the decisions on the firm's financial statements.
- The three basic financial statements contained in a company's annual report are the balance sheet, the income statement, and the statement of cash flows. Investors use the information provided in these statements to form expectations about future levels of earnings and dividends and about the firm's riskiness.
- A firm's balance sheet shows a snapshot of the firm's financial position at a particular point in time.
- A firm's income statement reports the results of operations over a certain period, and it shows earnings per share as its "bottom line."

- A firm's statement of cash flows reports the impact of operating, investing, and financing activities on cash flows over an accounting period.
- The purpose of calculating a set of financial ratios is twofold: (1) to examine the relative strengths and weaknesses of a company compared with other companies in the same industry and (2) to show whether the company's financial position has been improving or deteriorating over time.
- Liquidity ratios show the relationship of a firm's current assets to its current liabilities, and thus its ability to meet maturing debts. Two commonly used liquidity ratios are the current ratio and the quick (acid test) ratio.
- Asset management ratios measure how effectively a firm is managing its assets. Some of the major ratios include the inventory-turnover ratio, the collection period, and the total-assets-turnover ratio.
- Debt management ratios reveal (1) the extent to which a firm is financed with debt and (2) the firm's likelihood of defaulting on its debt obligations. In this category, we may include the debt ratio and the times-interest-earned ratio.
- Profitability ratios show the combined effects of liquidity, asset management, and debt management policies on operating results. Profitability ratios include the profit margin on sales, the return on total assets, and the return on common equity.
- Market-value ratios relate a firm's stock price to its earnings and book value per share and give management an indication of what investors think of the company's past performance and future prospects. Market value ratios include the price/earnings ratio and the market/book ratio.
- Trend analysis, where a ratio over time is plotted, is important because it reveals whether a firm's ratios are improving or deteriorating over time.
- Once you set your risk tolerance, you are establishing an upper-bound limit on the portfolio's long-term expected rate of return.
- There is no such thing as a risk-free investment with higher return. The challenge is to decide what level of risk you are willing to assume and then, having decided on your risk tolerance, to understand the implications of that choice.
- There is far more to the power of **diversification** than simply spreading your assets over a number of investments to reduce risk. By combining assets with different patterns of return, it is possible to achieve a higher rate of return without significantly increasing risk.

SELF-TEST QUESTIONS

13s.1 Which of the following statements is most correct?

(a) The balance sheet statement summarizes how much the firm owns as well as owes for a typical operating period.

(b) The income statement summarizes the net income produced by the corporation at a specified reporting date.

(c) The cash flow statement summarizes how the corporation generated cash during the operating period.

(d) None of the above.

13s.2 Which of the following statements is most correct?

(a) Working capital measures the company's ability to repay current liabilities using only current assets.

(b) The days sales outstanding (DSO) represents the average length of time that the firm must wait after making a sale before receiving cash.

(c) The lower debt ratio, the more the protection afforded creditors in the event of liquidation.

(d) All of the above.

13s.3 Which of the following statements is most correct?

(a) P/E ratios are higher for firms with high growth prospects, other things held constant, but they are lower for riskier firms.

(b) Higher market/book (MB) ratios are generally associated with firms that have a high rate of return on common equity.

(c) A high quick ratio is not always a good indication of a well-managed liquidity position.

(d) All of the above.

13s.4 Which of the following statements is most correct?

(a) A decline in inventory turnover ratio suggests that the firm's liquidity position is improving.

(b) The profit margin on sales is calculated by dividing net operating income by sales.

(c) When a corporation buys back its own stock, this is called Treasury Stock. The firm's cash and equity are both reduced.

(d) None of the above.

13s.5 Which of the following statements is most correct?

(a) Generally, firms with high profit margins have high asset turnover ratios.

(b) Having a high current ratio and a high quick ratio is always a good indication a firm is managing its liquidity position well.

(c) Knowing that return on assets (ROA) measures the firm's effective utilization of assets without considering how these assets are financed, two firms with the same EBIT must have the same ROA.

(d) One way to improve the current ratio is to use cash to pay off current liabilities.

The following data apply to the next six problems. Consider Lear Corporation's financial data as follows (unit: millions of dollars except ratio figures or where mentioned otherwise):

Cash and marketable securities	$128
Fixed assets	$360
Sales	$2,100
Net income	$672
Inventory	$225
Current ratio	3.2
Average collection period	36 days
Average common equity	$650

13s.6 Find Lear's accounts receivable.
(a) $147.95 (b) $207.12
(c) $232.75 (d) $265.42

13s.7 Calculate the amount of current assets.
(a) $428 (b) $487
(c) $560 (d) $625

13s.8 Determine the amount of current liabilities.
(a) $128 (b) $134
(c) $156 (d) $175

13s.9 Determine the amount of total assets.
(a) $720 (b) $845
(c) $920 (d) $958

13s.10 Calculate the amount of the long-term debt.
(a) $134 (b) $95
(c) $74 (d) $208

13s.11 Calculate the net profit margin.
(a) 25% (b) 28%
(c) 30% (d) 32%

The following financial statements apply to the next six problems, 13s.12–13s.18.

Inland Manufacturing Balance Sheet
(Dollars in millions)

	December 31, 2017	December 31, 2016
Cash	$400	$300
Account receivables	$560	$450
Inventory	$790	$550
Total current assets	$1,750	$1,300
Total fixed assets	$1,200	$1,210
Total assets	$2,950	$2,510
Account payable	$350	$250
Note payable	$470	$330
Other current liabilities	$220	$130
Total current liabilities	$1,040	$710
Long-term debt	$580	$580
Common equity	$1,330	$1,220
Total liabilities and equity	$2,950	$2,510

Inland Manufacturing Income Statement December 31, 2017
(Dollars in Millions)

Gross sales		$2,450
Cost of goods sold:		
Materials	$230	

Inland Manufacturing Income Statement December 31, 2017 *(continued)* (Dollars in Millions)		
Labor	$850	
Overhead	$230	
Depreciation	$400	$1,710
Gross profit		$740
Selling expenses		$40
General and administrative expenses		$60
Earnings before interest and taxes (EBIT)		$640
Interest expenses		$25
Earnings before income taxes		$615
Provision for income taxes (40%)		$246
Net income		$369

13s.12 Calculate the liquidity ratios, that is, the current and quick ratios.
(a) (1.68, 0.92) (b) (1.56, 0.92)
(c) (1.68, 0.82) (d) None of the above

13s.13 Calculate the debt management ratios, that is, the debt and times-interest-earned ratios.
(a) (1.22, 12.56) (b) (0.55, 26.60)
(c) (0.75, 26.60) (d) (1.22, 22.55)

13s.14 Calculate the inventory-turnover ratio.
(a) 3.66 (b) 7.33
(c) 2.88 (d) 4.21

13s.15 Calculate the return on equity.
(a) 14% (b) 29%
(c) 15% (d) None of the above

13s.16 Calculate the price/earnings ratio. Inland had an average of 100 million shares outstanding during 2017, and the stock price on December 31, 2017, was $35.
(a) 2.63 (b) 13.3
(c) 9.49 (d) 5.23

13s.17 If Inland uses $350 of cash to pay off $350 of its accounts payable, what is the new current ratio after this action?
(a) 1.68 (b) 2.03
(c) 3.12 (d) 1.45

13s.18 If Inland uses its $400 cash balance to pay off $400 of its long-term debt, what will be its new current ratio?
(a) 1.68 (b) 2.03
(c) 1.35 (d) 3.12

13s.19 The table that follows summarizes the financial performances of four companies in the year 2018. From the given information, which company generated the highest return on equity?

Company	Profit Margin (%)	Asset Turnover (times)	Total Assets (millions)	Total Equity (millions)
A	12%	0.5	$12,510	$4,500
B	5.6%	1.6	$6,890	$3,250
C	7%	1.3	$7,791	$4,900
D	10%	0.8	$10,368	$7,200

(a) Company *A*
(b) Company *B*
(c) Company *C*
(d) Company *D*

PROBLEMS

Financial Statements

13.1 Definitional problems: Listed are eight terms that relate to financial statements:

1. Balance-sheet statement
2. Income statement
3. Cash-flow statement
4. Operating activities
5. Investment activities
6. Financing activities
7. Treasury account
8. Capital account

Choose the term from the list that most appropriately completes each of the following statements:

- As an outside investor, you would view a firm's _____ as the most important financial report for gauging the quality of earnings.
- Retained earnings as reported in the _____ represent income earned by the firm in past years that has not been paid out as dividends.
- The _____ is designed to show how a firm's operations have affected its cash position by providing actual net cash flows into or out of the firm during some specified period.
- Typically, a firm's cash flow statement is categorized into three activities: _____, _____, and _____.
- When you issue stock, the money raised beyond the par value is shown in the _____ in the balance-sheet statement.

13.2 Definitional problems: Listed are 11 terms that relate to ratio analysis:

1. Book value per share
2. Inventory turnover
3. Debt-to-equity ratio
4. Average collection period
5. Average sales period
6. Return on common equity

7. Earnings per share
8. Price/earnings ratio
9. Return on total assets
10. Current ratio
11. Accounts-receivable turnover

Choose the financial ratio or term from the list that most appropriately completes each of the following statements:

- The _____ tends to have an effect on the market price per share as reflected in the price/earnings ratio.
- The _____ indicates whether a stock is relatively cheap or relatively expensive in relation to current earnings.
- The _____ measures the amount that would be distributed to holders of common stock if all assets were sold at their balance-sheet carrying amount and if all creditors were paid off.
- The _____ is a rough measure of how many times a company's accounts receivable have been turned into cash during the year.
- The _____ is a measure of the amount of assets being provided by creditors for each dollar of assets being provided by the stockholders.
- The _____ measures how well management has employed its assets.

13.3 Consider the balance-sheet entries for War Eagle Corporation in Table P13.3.

TABLE P13.3 Balance Sheet Statement as of December 31, 2015

Assets		
Cash		$150,000
Marketable securities		$200,000
Accounts receivable		$150,000
Inventories		$50,000
Prepaid taxes and insurance		$30,000
Manufacturing plant at cost	$600,000	
Less accumulated depreciation	$100,000	
Net fixed assets		$500,000
Goodwill		$20,000
Liabilities and Shareholders' Equity		
Notes payable		$50,000
Accounts payable		$100,000
Income taxes payable		$80,000
Long-term mortgage bonds		$400,000
Preferred stock, 6%, $100 par value (1,000 shares)		$100,000
Common stock, $15 par value (10,000 shares)		$150,000
Capital surplus		$150,000
Retained earnings		$70,000

(a) Compute the firm's
Current assets: $_____
Current liabilities: $_____
Working capital: $_____
Shareholders' equity: $_____

(b) If the firm had a net income of $500,000 after taxes, what are the earnings per share?

(c) When the firm issued its common stock, what was the market price of the stock per share?

13.4 Nucor Corporation has the following (incomplete) balance sheet and income statement.

Balance Sheet

Assets	2018	2017
Current assets	$180	$140
Fixed assets	$670	$580
Liabilities and Shareholders' Equity		
Current liabilities	$85	$70
Long-term debt	$520	$485

Income Statement, 2018

Revenue	$2,180
Cost of revenue	$1,310
Depreciation	$350
Interest expense	$160
All figures in million dollars	

(a) Determine the shareholders' equity in 2017 and 2018.

(b) Determine the net working capital in 2017 and 2018.

(c) Assuming that Nucor Corporation has a 35% tax rate, determine the income taxes paid in year 2018.

(d) What is cash generated from operation in year 2018?

Financial-Ratio Analysis

13.5 The following data are available for two companies, Apple and Oracle, all stated in thousands of dollars.

Description	Apple	Oracle
Total revenue	$42,905,000	$23,253,000
Earnings before interest and taxes	$12,066,000	$8,464,000
Interest expenses	$0	$630,000
Earnings before tax	$12,066,000	$7,834,000
Taxes at 40%	$3,831,000	$2,241,000
Earnings after tax (net income)	$8,235,000	$5,593,000
Debt	$15,861,000	$22,326,000
Equity	$31,640,000	$25,090,000

(a) Calculate each company's return on equity (ROE) and return on assets (ROA).
(b) Which company has performed better in terms of profitability?
(c) If the two companies were combined (merged), what would be the impact on the results on ROE? Under what conditions would such a combination make sense?

13.6 The following data were taken from the income statements of Infocom Corporation.

	2018	2017
Total revenue	$6,557,450	$6,825,260
Beginning inventory	$326,780	$287,650
Purchases	$819,452	$582,220
Ending inventory	$308,840	$300,780

Compute the inventory-turnover ratio for each year. What conclusions concerning the management of the inventory can be drawn from the data?

13.7 If Company P uses less debt than Company Q and both companies have identical operations in terms of sales, operating costs, etc., which of the following statements is *true*?
(a) Company Q will definitely have a higher current ratio.
(b) Company Q has a higher profit margin on sales than Company P.
(c) Both companies have identical profit margins on sales.
(d) Company Q has a lower profit margin on sales than Company P.

13.8 You are looking to buy stock in a high-growth company. Which of the following ratios best indicates the company's growth potential?
(a) Debt ratio
(b) Price-to-earnings ratio
(c) Profit margin
(d) Total asset turnover

13.9 Which of the following statements is *incorrect*?

(a) The quickest way to determine whether the firm has too much debt is to calculate the debt ratio.

(b) The best rule of thumb for determining the firm's liquidity is to calculate the current ratio.

(c) From an investor's point of view, the rate of return on common equity is a good indicator of whether or not a firm is generating an acceptable return to the investor.

(d) The operating margin is determined by expressing net income as a percentage of total sales.

13.10 R.C. had earnings per share of $8 in year 2018, and it paid a $4 dividend. Book value per share at year's end was $80. During the same period, the total retained earnings increased by $24 million. R.C. has no preferred stock, and no new common stock was issued during the year. If R.C.'s year-end debt (which equals its total liabilities) was $240 million, what was the company's year-end debt ratio?

13.11 Consider the following financial statements:

Income Statement (All numbers in thousands)

Period Ending	Jan 28, 2018	Jan 29, 2017
Total Revenue	**$61,494,000**	**$52,902,000**
Cost of Revenue	**$50,098,000**	**$52,902,000**
Gross Profit	**$11,396,000**	**$43,641,000**
Operating Expenses		
Research and Development	$661,000	$44,745
Selling General and Administrative	$7,302,000	$743,142
Operating Income or Loss	**$3,433,000**	**$2,172,000**
Earnings before Interest and Taxes	$3,350,000	$2,024,000
Interest Expense	$0	$0
Income before Tax	$3,350,000	$2,024,000
Income Tax Expense	$715,000	$2,024,000
Net Income	$2,635,000	$1,433,000
Net Income Applicable to Common Shares	$2,635,000	**$1,433,000**
Outstanding Shares		

Balance Sheet Statement (All numbers in thousands)

Period Ending	Jan 28, 2018	Jan 29, 2017
Assets		
Current Assets		
Cash and Cash Equivalents	$13,913,000	$10,635,000
Short-Term Investments	$452,000	$373,000
Net Receivables	$10,136,000	$8,543,000
Inventory	$1,301,000	$1,051,000

Period Ending	Jan 28, 2018	Jan 29, 2017
Other Current Assets	$3,219,000	$3,643,000
Total Current Assets	**$29,021,000**	**$24,245,000**
Long-Term Investments	$1,503,000	$1,113,000
Property Plant and Equipment	$1,953,000	$2,181,000
Goodwill	$4,365,000	$4,074,000
Intangible Assets	$1,495,000	$1,694,000
Other Assets	$262,000	$345,000
Total Assets	**$38,599,000**	**$33,652,000**
Liabilities		
Current Liabilities		
Accounts Payable	$15,474,000	$15,257,000
Short/Current Long-Term Debt	$851,000	$663,000
Other Current Liabilities	$3,158,000	$3,040,000
Total Current Liabilities	**$19,483,000**	**$18,960,000**
Long-Term Debt	$5,146,000	$3,417,000
Other Liabilities	$2,686,000	$2,605,000
Deferred Long-Term Liability Charges	$3,518,000	$3,029,000
Total Liabilities	**$30,833,000**	**$28,011,000**
Stockholders' Equity		
Preferred Stock	-	-
Common Stock	$11,797,000	$11,472,000
Retained Earnings	$24,744,000	$22,110,000
Treasury Stock Capital Surplus	$(28,704,000)	$(27,904,000)
Other Stockholder Equity	$(71,000)	$(37,000)
Total Stockholder Equity	**$7,766,000**	**$5,641,000**

The firm's closing stock price was $13.47 on January 28, 2018. The numbers of outstanding shares were 1,944 million in 2018 and 1,944 million in 2017, respectively. The income tax rates were 21.3% in 2018 and 29.2% in 2017. From the financial data presented, compute the following financial ratios for 2018, and make an informed analysis of the firm's financial health:

(a) Debt ratio
(b) Times-interest-earned ratio
(c) Current ratio
(d) Quick (acid test) ratio
(e) Inventory-turnover ratio
(f) Days-sales-outstanding
(g) Total-assets-turnover ratio
(h) Profit margin on sales
(i) Return on total assets

(j) Return on common equity
(k) Price/earnings ratio
(l) Book value per share

13.12 Incomplete financial statements for ABC Company are as follows:

Income Statement

For the Year Ended December 31, 2018

Sales	$1,800,000
Less cost of goods sold	A
Gross margin	$900,000
Less operating expenses	B
Net operating income	C
Less interest expense	$45,000
Net income before taxes	D
Less income taxes (40%)	E
Net income	F

Balance Sheet

	December 31, 2018	January 1, 2018
Current assets:		
Cash	0	
Accounts receivable, net	1	$160,000
Inventory	2	$280,000
Total current assets	3	
Plant and equipment, net	4	
Total assets	5	$1,200,000
Current liabilities	$250,000	
Bonds payable, 10%	6	
Total liabilities	7	
Stockholder's equity:		
Common stock, $2.50 par value	8	
Retained earnings	9	
Total stockholders' equity	10	
Total liabilities and stockholders' equity	5	

The following additional information is available about the company:

(a) Selected financial ratios computed from the preceding statements are given as follows:

- Current ratio 2.40 to 1
- Quick (acid-test) ratio 1.12 to 1
- Average collection period 24.3333 days

- Inventory turnover 6.0 times
- Debt-to-equity ratio 0.875 to 1
- Earnings per share $4.05
- Return on total assets 14%

(b) All sales during the year were on account.

(c) The interest expense on the income statement relates to the bonds payable; the amount of bonds outstanding did not change throughout the year.

(d) There were no issues or retirements of common stock during the year.

Required: Compute the missing amounts on the company's financial statements.

Income Statement:

A	B	C	D	E	F

Balance Sheet:

0	1	2	3	4	5	6	7	8	9	10

Investment Strategies

13.13 Which of the following statements is incorrect?

(a) Holding on to cash is the most risk-free investment option.

(b) To maximize your return on total assets (ignoring financial risk), you must put all your money into the same type of investment category.

(c) Diversification among well-chosen investments can reduce market volatility.

(d) Broader diversification among well-chosen assets always leads to a higher return without increasing additional risk.

Short Case Study with Excel

13.14 Consider the Coca-Cola Company and Pepsi-Cola Company. Both companies compete with each other in the soft-drink sector. Get the most recent annual report for each company, and answer the following questions. (*Note*: You can visit the firms' websites to download their annual reports. Look for "Investor' Relations.")

(a) Review the most recent financial statements and comment on each company's financial performance in the following areas:

- Asset management
- Liquidity
- Debt management
- Profitability
- Market value

(b) Check the current stock prices for both companies. The stock ticker symbols are KO for Coca-Cola and PEP for Pepsi. Based on your analysis in part (a), in which company would you invest your money and why?

13.15 A chemical-processing firm is planning on adding a second polyethylene plant at another location. The financial information for the first project year is provided as follows:

Sales	$1,500,000
Manufacturing costs:	
Direct materials	$150,000
Direct labor	$200,000
Overhead	$100,000
Depreciation	$200,000
Operating expenses	$150,000
Equipment purchase	$400,000
Borrowing to finance equipment	$200,000
Increase in inventories	$100,000
Decrease in accounts receivable	$20,000
Increase in wages payable	$30,000
Decrease in notes payable	$40,000
Income taxes	$272,000
Interest payment on financing	$20,000

(a) Compute the working-capital requirement during this project period.
(b) What is the taxable income during this project period?
(c) What is the net income during this project period?
(d) Compute the net cash flow from this project during the first year.

13.16 Compare Tesla (TSLA) and Ford Motors (F), using a thorough financial ratios analysis.

Part A: For each company, compute all the ratios listed in Figure 13.7 for the current year (or the most recent financial statements available) (i.e., debt management, liquidity, asset management, market trend, and profitability).

Part B: Compare and contrast these companies using the ratios you calculated from part A.

Part C: Carefully read and summarize the "Risk Management" or "hedging" practices described in the financial statements for each company.

Parts D: If you were a mutual fund manager and could invest in only one of these companies, which one would you select and why? Be sure to justify your answer using your results from parts A, B, and C.

I would recommend using the companies' websites to acquire the financial statements. This assignment should be typed, single spaced, with between two and five pages of discussion (not counting any tables or calculations). Include a table that summarizes all comparative ratio calculations.