CHAPTER

2

Introduction to Financial Statement Analysis

AS WE DISCUSSED IN CHAPTER 1, ONE OF THE GREAT ADVANTAGES of the corporate organizational form is that it places no restriction on who can own shares in the corporation. Anyone with money to invest is a potential investor. As a result, corporations are often widely held, with investors ranging from individuals who hold 100 shares to mutual funds and institutional investors who own millions of shares. For example, in 2012, International Business Machines Corporation (IBM) had about 980 million shares outstanding held by nearly 600,000 shareholders. Most shareholders were small. Warren Buffett's Berkshire Hathaway was the largest shareholder with about an 8% stake. Less than 1% of the company was owned by insiders (IBM executives).

Although the corporate organizational structure greatly facilitates the firm's access to investment capital, it also means that stock ownership is most investors' sole tie to the company. How, then, do investors learn enough about a company to know whether or not they should invest in it? How can financial managers assess the success of their own firm and compare it to the performance of competitors? One way firms evaluate their performance and communicate this information to investors is through their *financial statements*.

Firms issue financial statements regularly to communicate financial information to the investment community. A detailed description of the preparation and analysis of these statements is sufficiently complicated that to do it justice would require an entire book. Here, we briefly review the subject, emphasizing only the material that investors and corporate financial managers need in order to make the corporate-finance decisions we discuss in the text.

We review the four main types of financial statements, present examples of these statements for a firm, and discuss where an investor or manager might find various types of information about the company. We also discuss some of the financial ratios that investors and analysts use to assess a firm's performance and value. We close the chapter with a look at a few highly publicized financial reporting abuses.

2.1 Firms' Disclosure of Financial Information

Financial statements are accounting reports with past performance information that a firm issues periodically (usually quarterly and annually). U.S. public companies are required to file their financial statements with the U.S. Securities and Exchange Commission (SEC) on a quarterly basis on form **10-Q** and annually on form **10-K**. They must also send an **annual report** with their financial statements to their shareholders each year. Private companies often prepare financial statements as well, but they usually do not have to disclose these reports to the public. Financial statements are important tools through which investors, financial analysts, and other interested outside parties (such as creditors) obtain information about a corporation. They are also useful for managers within the firm as a source of information for corporate financial decisions. In this section, we examine the guidelines for preparing financial statements and introduce the types of financial statements.

Preparation of Financial Statements

Reports about a company's performance must be understandable and accurate. **Generally Accepted Accounting Principles (GAAP)** provide a common set of rules and a standard format for public companies to use when they prepare their reports. This standardization also makes it easier to compare the financial results of different firms.

Investors also need some assurance that the financial statements are prepared accurately. Corporations are required to hire a neutral third party, known as an **auditor**, to check the annual financial statements, to ensure that the annual financial statements are reliable and prepared according to GAAP.

International Financial Reporting Standards

Because Generally Accepted Accounting Principles (GAAP) differ among countries, companies operating internationally face tremendous accounting complexity. Investors also face difficulty interpreting financial statements of foreign companies, which is often considered a major barrier to international capital mobility. As companies and capital markets become more global, however, interest in harmonizing accounting standards across countries has increased.

The most important harmonization project began in 1973 when representatives of 10 countries (including the United States) established the International Accounting Standards Committee. This effort led to the creation of the International Accounting Standards Board (IASB) in 2001, with headquarters in London. Now the IASB has issued a set of International Financial Reporting Standards (IFRS).

The IFRS are taking root throughout the world. The European Union (EU) approved an accounting regulation in 2002 requiring all publicly traded EU companies to follow IFRS in their consolidated financial statements starting in 2005. As of 2012, over 120 jurisdictions either require or permit the use of IFRS, including the EU, Australia, Brazil, Canada, Russia, Hong Kong, Taiwan, and Singapore. China, India and Japan will soon follow suit. Indeed, currently all major stock exchanges around the world accept IFRS except the United States and Japan, which maintain their local GAAP.

The main difference between U.S. GAAP and IFRS is conceptual—U.S. GAAP are based primarily on accounting rules with specific guidance in applying them, whereas IFRS are based more on principles requiring professional judgment by accountants, and specific guidance in application is limited. Even so, some differences in rules also exist. For example, U.S. GAAP generally prohibit the upward revaluation of non-financial assets, whereas the IFRS allow the revaluation of some such assets to fair value. U.S. GAAP also rely more heavily on historical cost, as opposed to "fair value," to estimate the value of assets and liabilities.

Effort to achieve convergence between U.S. GAAP and IFRS was spurred by the Sarbanes-Oxley Act of 2002. It included a provision that U.S. accounting standards move toward international convergence on high-quality accounting standards. Currently SEC regulations still require public U.S. firms to report using U.S. GAAP. That said, modifications to both IFRS and U.S. GAAP have brought the two closer together, with the key remaining differences in the areas of impairment charges, leasing, insurance, and the treatment of financial instruments. As of mid-2015, the SEC looks likely to allow U.S. companies to use IFRS to provide supplemental information, but it will still require them to file their financials in accordance with U.S. GAAP.

INTERVIEW WITH RUTH PORAT

Ruth Porat is Senior Vice President and Chief Financial Officer of Alphabet and Google. Previously she spent 27 years at Morgan Stanley, where she last was Executive Vice President and Chief Financial Officer. As Morgan Stanley's Vice Chairman of Investment Banking and Global Head of the Financial Institutions Group, she advised the U.S. Treasury and the New York Federal Reserve Bank.

QUESTION: *What best practices do you recommend for financial managers?*

ANSWER:

1. *Maintain a tight financial control environment with respect to accounting controls and process.* Incorporate a strategic approach to IT architecture to ensure data integrity, consistency, and process controls while reducing reliance on human, manual processes—a source of risk and errors.
2. *Ensure a robust budgeting and capital allocation process built on a strong Financial Planning & Analysis team that is well integrated into the business.* Push data transparency to business leaders. They are best positioned to make difficult trade-offs in the budgeting process, but often lack data granularity to make those choices (and to see the imperative).
3. *Culture matters.* A culture of honest, frank debate that challenges the status quo and avoids homogeneity of thought makes the job more fun and leads to better results. A broad range of experience, and even some "battle scars," ensures the organization recognizes patterns to foresee emerging risks. In that regard, a diverse team with respect to gender, race, and socioeconomic background brings differentiated perspectives, contributing to effective risk management.
4. *Make tough calls early and, ideally, once.* Lead.

QUESTION: *How has the crisis shaped the role of the CFO, or your view of it?*

ANSWER: In financial services, it redefined the perception of a CFO. Beyond focusing on accounting and external reporting functions, the CFO is now also the firm's most senior global manager for guardianship and risk management. Guardianship includes accounting (the controller function) and overseeing a comprehensive approach to IT systems. Risk management requires identifying sources of vulnerability, stress testing, and planning against them. The CFO has become a trusted adviser to the CEO, board and business leaders, which includes budgeting, capital allocation, and sensitivity analyses. Finally, in certain industries the CFO is the point person with regulators.

QUESTION: *What key lessons did you take from the financial crisis? What advice would you give future CFOs?*

ANSWER: I have three key takeaways from the financial crisis, relevant in both good and bad markets as well as across industries:

1. *Understand your greatest sources of vulnerability and defend against them.* For financial services, liquidity (access to cash) was a weak spot. In that period, we often said, "Liquidity is oxygen for a financial system: without it, you choke." Without sufficient liquidity, banks were forced into a negative cycle of selling assets to raise cash. As Morgan Stanley's CFO, I managed liquidity with the maxim that it was sacrosanct. We invested substantially in the amount and durability of the company's liquidity reserve. Similarly, regulators coming out of the crisis appropriately demanded higher capital, lower leverage, better liquidity, more durable funding, and rigorous stress testing, which imposed transparency on the banks and exposed their weaknesses.
2. *Build a robust control infrastructure ahead of needs, including financial and risk management controls, systems, and processes.* Just as one shouldn't drive a car at 100 mph with mud on the windshield, business leaders must have visibility about their business from accurate, insightful, and timely data consistent with strong financial controls. Rapid growth industries need to invest in infrastructure early because the business requirements continue to grow so rapidly.
3. *Recognize that time is your enemy.* Treasury Secretary Paulson told me during the financial crisis that you must have the will and the means to solve problems; too often, by the time you have the will, you no longer have the means. He was talking about policy, but that rule applies to any decision maker. The glaring examples, in retrospect, were the clear signs of crisis in August 2007 and the March 2008 collapse of Bear Stearns, but reactions were slow or nonexistent. Even in good times, business leaders must focus on resource optimization to maximize the potential for highest returns on investment.

Types of Financial Statements

Every public company is required to produce four financial statements: the *balance sheet*, the *income statement*, the *statement of cash flows*, and the *statement of stockholders' equity*. These financial statements provide investors and creditors with an overview of the firm's financial performance. In the sections that follow, we take a close look at the content of these financial statements.

CONCEPT CHECK

1. What are the four financial statements that all public companies must produce?
2. What is the role of an auditor?

2.2 The Balance Sheet

The **balance sheet**, or **statement of financial position**,[1] lists the firm's *assets* and *liabilities*, providing a snapshot of the firm's financial position at a given point in time. Table 2.1 shows the balance sheet for a fictitious company, Global Conglomerate Corporation. Notice that the balance sheet is divided into two parts ("sides"), with the assets on the left side and the liabilities on the right. The **assets** list the cash, inventory, property, plant, and equipment, and other investments the company has made; the **liabilities** show the firm's obligations to creditors. Also shown with liabilities on the right side of the balance sheet is

TABLE 2.1 Global Conglomerate Corporation Balance Sheet

GLOBAL CONGLOMERATE CORPORATION

Consolidated Balance Sheet
Year Ended December 31 (in $ million)

Assets	2015	2014	Liabilities and Stockholders' Equity	2015	2014
Current Assets			**Current Liabilities**		
Cash	21.2	19.5	Accounts payable	29.2	24.5
Accounts receivable	18.5	13.2	Notes payable/short-term debt	3.5	3.2
Inventories	15.3	14.3	Current maturities of long-term debt	13.3	12.3
Other current assets	2.0	1.0	Other current liabilities	2.0	4.0
Total current assets	57.0	48.0	Total current liabilities	48.0	44.0
Long-Term Assets			**Long-Term Liabilities**		
Land	22.2	20.7	Long-term debt	99.9	76.3
Buildings	36.5	30.5	Capital lease obligations	—	—
Equipment	39.7	33.2	Total debt	99.9	76.3
Less accumulated depreciation	(18.7)	(17.5)	Deferred taxes	7.6	7.4
Net property, plant, and equipment	79.7	66.9	Other long-term liabilities	—	—
Goodwill and intangible assets	20.0	20.0	Total long-term liabilities	107.5	83.7
Other long-term assets	21.0	14.0	**Total Liabilities**	**155.5**	**127.7**
Total long-term assets	120.7	100.9	**Stockholders' Equity**	**22.2**	**21.2**
Total Assets	**177.7**	**148.9**	**Total Liabilities and Stockholders' Equity**	**177.7**	**148.9**

[1] In IFRS and recent U.S. GAAP pronouncements, the balance sheet is referred to as the *statement of financial position*.

the *stockholders' equity*. **Stockholders' equity**, the difference between the firm's assets and liabilities, is an accounting measure of the firm's net worth.

The assets on the left side show how the firm uses its capital (its investments), and the right side summarizes the sources of capital, or how a firm raises the money it needs. Because of the way stockholders' equity is calculated, the left and right sides must balance:

The Balance Sheet Identity

$$\text{Assets} = \text{Liabilities} + \text{Stockholders' Equity} \tag{2.1}$$

In Table 2.1, total assets for 2015 ($177.7 million) are equal to total liabilities ($155.5 million) plus stockholders' equity ($22.2 million).

Let's examine Global's assets, liabilities, and stockholders' equity in more detail.

Assets

In Table 2.1, Global's assets are divided into current and long-term assets. We discuss each in turn.

Current Assets. **Current assets** are either cash or assets that could be converted into cash within one year. This category includes the following:

1. Cash and other **marketable securities**, which are short-term, low-risk investments that can be easily sold and converted to cash (such as money market investments like government debt that matures within a year);
2. **Accounts receivable**, which are amounts owed to the firm by customers who have purchased goods or services on credit;
3. **Inventories**, which are composed of raw materials as well as work-in-progress and finished goods;
4. Other current assets, which is a catch-all category that includes items such as prepaid expenses (such as rent or insurance paid in advance).

Long-Term Assets. The first category of **long-term assets** is net property, plant, and equipment. These include assets such as real estate or machinery that produce tangible benefits for more than one year. If Global spends $2 million on new equipment, this $2 million will be included with property, plant, and equipment on the balance sheet. Because equipment tends to wear out or become obsolete over time, Global will reduce the value recorded for this equipment each year by deducting a **depreciation expense**. An asset's **accumulated depreciation** is the total amount deducted over its life. The firm reduces the value of fixed assets (other than land) over time according to a depreciation schedule that depends on the asset's life span. Depreciation is not an actual cash expense that the firm pays; it is a way of recognizing that buildings and equipment wear out and thus become less valuable the older they get. The **book value** of an asset, which is the value shown in the firm's financial statements, is equal to its acquisition cost less accumulated depreciation. Net property, plant, and equipment shows the book value of these assets.

When a firm acquires another company, it will acquire a set of tangible assets (such as inventory or property, plant, and equipment) that will then be included on its balance sheet. In many cases, however, the firm may pay more for the company than the total book value of the assets it acquires. In this case, the difference between the price paid for the company and the book value assigned to its tangible assets is recorded separately as **goodwill** and **intangible assets**. For example, Global paid $25 million in 2013 for a firm whose tangible assets had a book value of $5 million. The remaining $20 million appears

as goodwill and intangible assets in Table 2.1. This entry in the balance sheet captures the value of other "intangibles" that the firm acquired through the acquisition (e.g., brand names and trademarks, patents, customer relationships, and employees). If the firm assesses that the value of these intangible assets declined over time, it will reduce the amount listed on the balance sheet by an **amortization** or **impairment charge** that captures the change in value of the acquired assets. Like depreciation, amortization is not an actual cash expense.

Other long-term assets can include such items as property not used in business operations, start-up costs in connection with a new business, investments in long-term securities, and property held for sale. The sum of all the firms' assets is the total assets at the bottom of the left side of the balance sheet in Table 2.1.

Liabilities

We now examine the liabilities shown on the right side of the balance sheet, which are divided into *current* and *long-term liabilities*.

Current Liabilities. Liabilities that will be satisfied within one year are known as **current liabilities**. They include the following:

1. **Accounts payable**, the amounts owed to suppliers for products or services purchased with credit;
2. **Short-term debt** or notes payable, and current maturities of *long-term debt*, which are all repayments of debt that will occur within the next year;
3. Items such as salary or taxes that are owed but have not yet been paid, and deferred or unearned revenue, which is revenue that has been received for products that have not yet been delivered.

The difference between current assets and current liabilities is the firm's **net working capital**, the capital available in the short term to run the business. For example, in 2015, Global's net working capital totaled $9 million ($57 million in current assets – $48 million in current liabilities). Firms with low (or negative) net working capital may face a shortage of funds unless they generate sufficient cash from their ongoing activities.

Long-Term Liabilities. Long-term liabilities are liabilities that extend beyond one year. We describe the main types as follows:

1. **Long-term debt** is any loan or debt obligation with a maturity of more than a year. When a firm needs to raise funds to purchase an asset or make an investment, it may borrow those funds through a long-term loan.
2. **Capital leases** are long-term lease contracts that obligate the firm to make regular lease payments in exchange for use of an asset.[2] They allow a firm to gain use of an asset by leasing it from the asset's owner. For example, a firm may lease a building to serve as its corporate headquarters.
3. **Deferred taxes** are taxes that are owed but have not yet been paid. Firms generally keep two sets of financial statements: one for financial reporting and one for tax purposes. Occasionally, the rules for the two types of statements differ. Deferred tax liabilities generally arise when the firm's financial income exceeds its income for tax purposes. Because deferred taxes will eventually be paid, they appear as a liability on the balance sheet.[3]

[2]See Chapter 25 for a precise definition of a capital lease.

[3]A firm may also have deferred tax assets related to tax credits it has earned that it will receive in the future.

Stockholders' Equity

The sum of the current liabilities and long-term liabilities is total liabilities. The difference between the firm's assets and liabilities is the stockholders' equity; it is also called the **book value of equity**. As we stated earlier, it is an accounting measure of the net worth of the firm.

Ideally, the balance sheet would provide us with an accurate assessment of the true value of the firm's equity. Unfortunately, this is unlikely to be the case. First, many of the assets listed on the balance sheet are valued based on their historical cost rather than their true value today. For example, an office building is listed on the balance sheet according to its historical cost net of depreciation. But the actual value of the office building today may be very different (and possibly much *more*) than the amount the firm paid for it years ago. The same is true for other property, plant, and equipment, as well as goodwill: The true value today of an asset may be very different from, and even exceed, its book value. A second, and probably more important, problem is that *many of the firm's valuable assets are not captured on the balance sheet*. Consider, for example, the expertise of the firm's employees, the firm's reputation in the marketplace, the relationships with customers and suppliers, the value of future research and development innovations, and the quality of the management team. These are all assets that add to the value of the firm that do not appear on the balance sheet.

Market Value Versus Book Value

For the reasons cited above, the book value of equity, while accurate from an accounting perspective, is an inaccurate assessment of the true value of the firm's equity. Successful firms are often able to borrow in excess of the book value of their assets because creditors recognize that the market value of the assets is far higher than the book value. Thus, it is not surprising that the book value of equity will often differ substantially from the amount investors are willing to pay for the equity. The total *market* value of a firm's equity equals the number of shares outstanding times the firm's market price per share:

$$\text{Market Value of Equity} = \text{Shares outstanding} \times \text{Market price per share} \qquad (2.2)$$

The market value of equity is often referred to as the company's **market capitalization** (or "market cap"). The market value of a stock does not depend on the historical cost of the firm's assets; instead, it depends on what investors expect those assets to produce in the future.

EXAMPLE 2.1 **Market Versus Book Value**

Problem

If Global has 3.6 million shares outstanding, and these shares are trading for a price of $14 per share, what is Global's market capitalization? How does the market capitalization compare to Global's book value of equity in 2015?

Solution

Global's market capitalization is (3.6 million shares) × ($14/share) = $50.4 million. This market capitalization is significantly higher than Global's book value of equity of $22.2 million. Thus, investors are willing to pay 50.4/22.2 = 2.27 times the amount Global's shares are "worth" according to their book value.

Market-to-Book Ratio. In Example 2.1, we computed the **market-to-book ratio** (also called the **price-to-book [P/B] ratio**) for Global, which is the ratio of its market capitalization to the book value of stockholders' equity.

$$\text{Market-to-Book Ratio} = \frac{\text{Market Value of Equity}}{\text{Book Value of Equity}} \tag{2.3}$$

The market-to-book ratio for most successful firms substantially exceeds 1, indicating that the value of the firm's assets when put to use exceeds their historical cost. Variations in this ratio reflect differences in fundamental firm characteristics as well as the value added by management.

In Fall 2015, Citigroup (C) had a market-to-book ratio of 0.76, a reflection of investors' assessment that many of Citigroup's assets (such as some mortgage securities) were worth far less than their book value. At the same time, the average market-to-book ratio for major U.S. banks and financial firms was 1.9, and for all large U.S. firms it was 2.9. In contrast, Pepsico (PEP) had a market-to-book ratio of 8.3, and IBM had a market-to-book ratio of 11.3. Analysts often classify firms with low market-to-book ratios as **value stocks**, and those with high market-to-book ratios as **growth stocks**.

Enterprise Value

A firm's market capitalization measures the market value of the firm's equity, or the value that remains after the firm has paid its debts. But what is the value of the business itself? The **enterprise value** of a firm (also called the **total enterprise value** or **TEV**) assesses the value of the underlying business assets, unencumbered by debt and separate from any cash and marketable securities. We compute it as follows:

$$\text{Enterprise Value} = \text{Market Value of Equity} + \text{Debt} - \text{Cash} \tag{2.4}$$

From Example 2.1, Global's market capitalization in 2015 is $50.4 million. Its debt is $116.7 million ($3.5 million of notes payable, $13.3 million of current maturities of long-term debt, and remaining long-term debt of $99.9 million). Therefore, given its cash balance of $21.2 million, Global's enterprise value is $50.4 + 116.7 - 21.2 = $145.9 million. The enterprise value can be interpreted as the cost to take over the business. That is, it would cost 50.4 + 116.7 = $167.1 million to buy all of Global's equity and pay off its debts, but because we would acquire Global's $21.2 million in cash, the net cost of the business is only 167.1 - 21.2 = $145.9 million.

CONCEPT CHECK

1. What is the balance sheet identity?
2. The book value of a company's assets usually does not equal the market value of those assets. What are some reasons for this difference?
3. What is a firm's enterprise value, and what does it measure?

2.3 The Income Statement

When you want somebody to get to the point, you might ask him or her for the "bottom line." This expression comes from the *income statement*. The **income statement** or **statement of financial performance**[4] lists the firm's revenues and expenses over a period of time. The last or "bottom" line of the income statement shows the firm's **net income**, which is a measure of its profitability during the period. The income statement is sometimes called a profit and loss, or "P&L" statement, and the net income is also referred to as the firm's **earnings**. In this section, we examine the components of the income statement in detail and introduce ratios we can use to analyze this data.

[4]In IFRS and recent U.S. GAAP pronouncements, the income statement is referred to as the *statement of financial performance*.

Earnings Calculations

Whereas the balance sheet shows the firm's assets and liabilities at a given point in time, the income statement shows the flow of revenues and expenses generated by those assets and liabilities between two dates. Table 2.2 shows Global's income statement for 2015. We examine each category on the statement.

Gross Profit. The first two lines of the income statement list the revenues from sales of products and the costs incurred to make and sell the products. Cost of sales shows costs directly related to producing the goods or services being sold, such as manufacturing costs. Other costs such as administrative expenses, research and development, and interest expenses are not included in the cost of sales. The third line is **gross profit**, which is the difference between sales revenues and the costs.

Operating Expenses. The next group of items is operating expenses. These are expenses from the ordinary course of running the business that are not directly related to producing the goods or services being sold. They include administrative expenses and overhead, salaries, marketing costs, and research and development expenses. The third type of operating expense, depreciation and amortization, is not an actual cash expense but represents an estimate of the costs that arise from wear and tear or obsolescence of the firm's assets.[5] The firm's gross profit net of operating expenses is called **operating income**.

TABLE 2.2 Global Conglomerate Corporation Income Statement Sheet

GLOBAL CONGLOMERATE CORPORATION

Income Statement
Year Ended December 31 (in $ million)

	2015	2014
Total sales	186.7	176.1
Cost of sales	(153.4)	(147.3)
Gross Profit	33.3	28.8
Selling, general, and administrative expenses	(13.5)	(13.0)
Research and development	(8.2)	(7.6)
Depreciation and amortization	(1.2)	(1.1)
Operating Income	10.4	7.1
Other income	—	—
Earnings Before Interest and Taxes (EBIT)	10.4	7.1
Interest income (expense)	(7.7)	(4.6)
Pretax Income	2.7	2.5
Taxes	(0.7)	(0.6)
Net Income	2.0	1.9
Earnings per share:	$0.556	$0.528
Diluted earnings per share:	$0.526	$0.500

[5]Only certain types of amortization are deductible as a pretax expense (e.g., amortization of the cost of an acquired patent). Also, firms often do not separately list depreciation and amortization on the income statement, but rather include them with the expenses by function (e.g., depreciation of R&D equipment would be included with R&D expenses). When depreciation and amortization has been separated in this way, practitioners often refer to the expense items as "clean" (e.g., "clean R&D" is R&D expenses excluding any depreciation or amortization).

Earnings before Interest and Taxes. We next include other sources of income or expenses that arise from activities that are not the central part of a company's business. Income from the firm's financial investments is one example of other income that would be listed here. After we have adjusted for other sources of income or expenses, we have the firm's earnings before interest and taxes, or **EBIT**.

Pretax and Net Income. From EBIT, we deduct the interest expense related to outstanding debt to compute Global's pretax income, and then we deduct corporate taxes to determine the firm's net income.

Net income represents the total earnings of the firm's equity holders. It is often reported on a per-share basis as the firm's **earnings per share (EPS)**, which we compute by dividing net income by the total number of shares outstanding:

$$\text{EPS} = \frac{\text{Net Income}}{\text{Shares Outstanding}} = \frac{\$2.0 \text{ Million}}{3.6 \text{ Million Shares}} = \$0.556 \text{ per Share} \qquad (2.5)$$

Although Global has only 3.6 million shares outstanding as of the end of 2015, the number of shares outstanding may grow if Global compensates its employees or executives with **stock options** that give the holder the right to buy a certain number of shares by a specific date at a specific price. If the options are "exercised," the company issues new stock and the number of shares outstanding will grow. The number of shares may also grow if the firm issues **convertible bonds**, a form of debt that can be converted to shares. Because there will be more total shares to divide the same earnings, this growth in the number of shares is referred to as **dilution**. Firms disclose the potential for dilution by reporting **diluted EPS**, which represents earnings per share for the company calculated as though, for example, in-the-money stock options or other stock-based compensation had been exercised or dilutive convertible debt had been converted. For example, in 2014, Global awarded 200,000 shares of restricted stock to its key executives. While these are currently unvested, they will ultimately increase the number of shares outstanding, so Global's diluted EPS is \$2 million/3.8 million shares = \$0.526.[6]

CONCEPT CHECK

1. What it is the difference between a firm's gross profit and its net income?
2. What is the diluted earnings per share?

2.4 The Statement of Cash Flows

The income statement provides a measure of the firm's profit over a given time period. However, it does not indicate the amount of *cash* the firm has generated. There are two reasons that net income does not correspond to cash earned. First, there are non-cash entries on the income statement, such as depreciation and amortization. Second, certain uses of cash, such as the purchase of a building or expenditures on inventory, are not reported on the income statement. The firm's **statement of cash flows** utilizes the information

[6] In the case of stock options, the diluted share count is typically calculated using the *treasury stock method*, in which the number of shares added has the same value as the profit from exercising the option. For example, given Global's share price of \$14 per share, an option giving an employee the right to purchase a share for \$7 would add (\$14 − \$7)/\$14 = 0.5 shares to the diluted share count.

from the income statement and balance sheet to determine how much cash the firm has generated, and how that cash has been allocated, during a set period. As we will see, from the perspective of an investor attempting to value the firm, the statement of cash flows provides what may be the most important information of the four financial statements.

The statement of cash flows is divided into three sections: operating activities, investment activities, and financing activities. The first section, operating activity, starts with net income from the income statement. It then adjusts this number by adding back all non-cash entries related to the firm's operating activities. The next section, investment activity, lists the cash used for investment. The third section, financing activity, shows the flow of cash between the firm and its investors. Global Conglomerate's statement of cash flows is shown in Table 2.3. In this section, we take a close look at each component of the statement of cash flows.

Operating Activity

The first section of Global's statement of cash flows adjusts net income by all non-cash items related to operating activity. For instance, depreciation is deducted when computing net income, but it is not an actual cash outflow. Thus, we add it back to net income when determining the amount of cash the firm has generated. Similarly, we add back any other non-cash expenses (for example, deferred taxes or expenses related to stock-based compensation).

TABLE 2.3 Global Conglomerate Corporation Statement of Cash Flows

GLOBAL CONGLOMERATE CORPORATION

Statement of Cash Flows
Year Ended December 31 (in $ million)

	2015	2014
Operating activities		
Net income	2.0	1.9
Depreciation and amortization	1.2	1.1
Other non-cash items	(2.8)	(1.0)
Cash effect of changes in		
Accounts receivable	(5.3)	(0.3)
Accounts payable	4.7	(0.5)
Inventory	(1.0)	(1.0)
Cash from operating activities	**(1.2)**	**0.2**
Investment activities		
Capital expenditures	(14.0)	(4.0)
Acquisitions and other investing activity	(7.0)	(2.0)
Cash from investing activities	**(21.0)**	**(6.0)**
Financing activities		
Dividends paid	(1.0)	(1.0)
Sale (or purchase) of stock	—	—
Increase in borrowing	24.9	5.5
Cash from financing activities	**23.9**	**4.5**
Change in cash and cash equivalents	**1.7**	**(1.3)**

Next, we adjust for changes to net working capital that arise from changes to accounts receivable, accounts payable, or inventory. When a firm sells a product, it records the revenue as income even though it may not receive the cash from that sale immediately. Instead, it may grant the customer credit and let the customer pay in the future. The customer's obligation adds to the firm's accounts receivable. We use the following guidelines to adjust for changes in working capital:

1. *Accounts Receivable*: When a sale is recorded as part of net income, but the cash has not yet been received from the customer, we must adjust the cash flows by *deducting* the increases in accounts receivable. This increase represents additional lending by the firm to its customers, and it reduces the cash available to the firm.
2. *Accounts Payable*: Conversely, we *add* increases in accounts payable. Accounts payable represents borrowing by the firm from its suppliers. This borrowing increases the cash available to the firm.
3. *Inventory*: Finally, we *deduct* increases to inventory. Increases to inventory are not recorded as an expense and do not contribute to net income (the cost of the goods are only included in net income when the goods are actually sold). However, the cost of increasing inventory is a cash expense for the firm and must be deducted.

We can identify the changes in these working capital items from the balance sheet. For example, from Table 2.1, Global's accounts receivable increased from $13.2 million in 2014 to $18.5 million in 2015. We deduct the increase of $18.5 - 13.2 = $5.3 million on the statement of cash flows. Note that although Global showed positive net income on the income statement, it actually had a negative $1.2 million cash flow from operating activity, in large part because of the increase in accounts receivable.

Investment Activity

The next section of the statement of cash flows shows the cash required for investment activities. Purchases of new property, plant, and equipment are referred to as **capital expenditures**. Recall that capital expenditures do not appear immediately as expenses on the income statement. Instead, firms recognize these expenditures over time as depreciation expenses. To determine the firm's cash flow, we already added back depreciation because it is not an actual cash outflow. Now, we subtract the actual capital expenditure that the firm made. Similarly, we also deduct other assets purchased or long-term investments made by the firm, such as acquisitions or purchases of marketable securities. In Table 2.3, we see that in 2015, Global spent $21 million in cash on investing activities.

Financing Activity

The last section of the statement of cash flows shows the cash flows from financing activities. Dividends paid to shareholders are a cash outflow. Global paid $1 million to its shareholders as dividends in 2015. The difference between a firm's net income and the amount it spends on dividends is referred to as the firm's **retained earnings** for that year:

$$\text{Retained Earnings} = \text{Net Income} - \text{Dividends} \tag{2.6}$$

Global retained $2 million - $1 million = $1 million, or 50% of its earnings in 2015.

Also listed under financing activity is any cash the company received from the sale of its own stock, or cash spent buying (repurchasing) its own stock. Global did not issue or repurchase stock during this period. The last items to include in this section result from

changes to Global's short-term and long-term borrowing. Global raised money by issuing debt, so the increases in borrowing represent cash inflows.

The final line of the statement of cash flows combines the cash flows from these three activities to calculate the overall change in the firm's cash balance over the period of the statement. In this case, Global had cash inflows of $1.7 million, which matches the change in cash from 2014 to 2015 shown earlier in the balance sheet. By looking at the statement in Table 2.3 as a whole, we can determine that Global chose to borrow to cover the cost of its investment and operating activities. Although the firm's cash balance has increased, Global's negative operating cash flows and relatively high expenditures on investment activities might give investors some reasons for concern. If that pattern continues, Global will need to raise capital, by continuing to borrow or issuing equity, to remain in business.

EXAMPLE 2.2 **The Impact of Depreciation on Cash Flow**

Problem

Suppose Global had an additional $1 million depreciation expense in 2015. If Global's tax rate on pretax income is 26%, what would be the impact of this expense on Global's earnings? How would it impact Global's cash balance at the end of the year?

Solution

Depreciation is an operating expense, so Global's operating income, EBIT, and pretax income would fall by $1 million. This decrease in pretax income would reduce Global's tax bill by $26\% \times \$1 \text{ million} = \$0.26 \text{ million}$. Therefore, net income would fall by $1 - 0.26 = \$0.74$ million.

On the statement of cash flows, net income would fall by $0.74 million, but we would add back the additional depreciation of $1 million because it is not a cash expense. Thus, cash from operating activities would rise by $-0.74 + 1 = \$0.26$ million. Thus, Global's cash balance at the end of the year would increase by $0.26 million, the amount of the tax savings that resulted from the additional depreciation expense.

CONCEPT CHECK

1. Why does a firm's net income not correspond to cash generated?
2. What are the components of the statement of cash flows?

2.5 Other Financial Statement Information

The most important elements of a firm's financial statements are the balance sheet, income statement, and the statement of cash flows, which we have already discussed. Several other pieces of information contained in the financial statements warrant brief mention: the statement of stockholders' equity, the management discussion and analysis, and notes to the financial statements.

Statement of Stockholders' Equity

The **statement of stockholders' equity** breaks down the stockholders' equity computed on the balance sheet into the amount that came from issuing shares (par value plus paid-in capital) versus retained earnings. Because the book value of stockholders' equity is not a useful assessment of value for financial purposes, financial managers use the statement of stockholders' equity infrequently (so we will skip the computational details here). We can,

however, determine the change in stockholders' equity using information from the firm's other financial statements as follows:[7]

$$\begin{aligned}\text{Change in Stockholders' Equity} &= \text{Retained Earnings} + \text{Net sales of stock} \\ &= \text{Net Income} - \text{Dividends} + \\ &\quad \text{Sales of stock} - \text{Repurchases of stock}\end{aligned} \tag{2.7}$$

For example, because Global had no stock sales or repurchases, its stockholders' equity increased by the amount of its retained earnings, or $1.0 million, in 2015. Note that this result matches the change in stockholders' equity shown earlier on Global's balance sheet.

Management Discussion and Analysis

The **management discussion and analysis (MD&A)** is a preface to the financial statements in which the company's management discusses the recent year (or quarter), providing a background on the company and any significant events that may have occurred. Management may also discuss the coming year, and outline goals, new projects, and future plans.

Management should also discuss any important risks that the firm faces or issues that may affect the firm's liquidity or resources. Management is also required to disclose any **off-balance sheet transactions**, which are transactions or arrangements that can have a material impact on the firm's future performance yet do not appear on the balance sheet. For example, if a firm has made guarantees that it will compensate a buyer for losses related to an asset purchased from the firm, these guarantees represent a potential future liability for the firm that must be disclosed as part of the MD&A.

Notes to the Financial Statements

In addition to the four financial statements, companies provide extensive notes with further details on the information provided in the statements. For example, the notes document important accounting assumptions that were used in preparing the statements. They often provide information specific to a firm's subsidiaries or its separate product lines. They show the details of the firm's stock-based compensation plans for employees and the different types of debt the firm has outstanding. Details of acquisitions, spin-offs, leases, taxes, debt repayment schedules, and risk management activities are also given. The information provided in the notes is often very important to interpret fully the firm's financial statements.

EXAMPLE 2.3 **Sales by Product Category**

Problem

In the Segment Results section of its financial statements, Hormel Foods Corp (HRL) reported the following sales revenues by reportable segment/product category ($ million):

	2014	2013
Grocery Products	$1,558	$1,518
Refrigerated Foods	4,644	4,252
Jennie-O Turkey Store	1,672	1,602
Specialty Foods	907	932
International & Other	534	448

Which category showed the highest percentage growth? If Hormel has the same percentage growth by category from 2014 to 2015, what will its total revenues be in 2015?

[7] Sales of stock would also include any stock-based compensation.

Solution

The percentage growth in the sales of grocery products was 1558/1518 − 1 = 2.6%. Similarly, growth in Refrigerated Foods was 9.2%, Jennie-O Turkey Store was 4.4%, Specialty Foods was −2.7%, and International and Other categories were 19.2%. Thus, International and Other categories showed the highest growth.

If these growth rates continue for another year, sales of Grocery Products will be 1558 × 1.026 = $1598 million, and the other categories will be $5071 million, $1746 million, $883 million, and $637 million, respectively, for total revenues of $9.9 billion, a 6.7% increase over 2014.

CONCEPT CHECK

1. Where do off-balance sheet transactions appear in a firm's financial statements?
2. What information do the notes to financial statements provide?

2.6 Financial Statement Analysis

Investors often use accounting statements to evaluate a firm in one of two ways:

1. Compare the firm with itself by analyzing how the firm has changed over time.
2. Compare the firm to other similar firms using a common set of financial ratios.

In this section we will describe the most commonly used ratios—related to profitability, liquidity, working capital, interest coverage, leverage, valuation, and operating returns—and explain how each one is used in practice.

Profitability Ratios

The income statement provides very useful information regarding the profitability of a firm's business and how it relates to the value of the firm's shares. The **gross margin** of a firm is the ratio of gross profit to revenues (sales):

$$\text{Gross Margin} = \frac{\text{Gross Profit}}{\text{Sales}} \tag{2.8}$$

A firm's gross margin reflects its ability to sell a product for more than the cost of producing it. For example, in 2015, Global had gross margin of 33.3/186.7 = 17.8%.

Because there are additional expenses of operating a business beyond the direct costs of goods sold, another important profitability ratio is the **operating margin**, the ratio of operating income to revenues:

$$\text{Operating Margin} = \frac{\text{Operating Income}}{\text{Sales}} \tag{2.9}$$

The operating margin reveals how much a company earns before interest and taxes from each dollar of sales. In 2015, Global's operating margin was 10.4/186.7 = 5.57%, an increase from its 2014 operating margin of 7.1/176.1 = 4.03%. We can similarly compute a firm's **EBIT margin** = (EBIT/Sales).

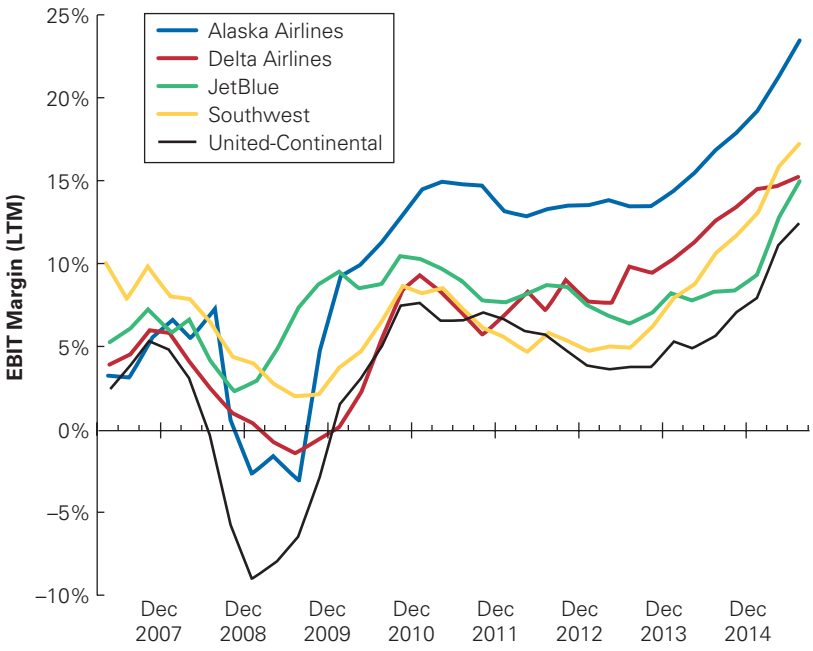
By comparing operating or EBIT margins across firms within an industry, we can assess the relative efficiency of the firms' operations. For example, Figure 2.1 compares the EBIT margins of five major U.S. airlines from 2007 to 2012. Notice the impact on profitability from the financial crisis during 2008–2009, as well as the consistently low profits of the largest and oldest of the carriers, United-Continental (UAL), relative to its competitors.

FIGURE 2.1

EBIT Margins for Five U.S. Airlines

Annual (last twelve month) EBIT margins for five U.S. airlines: Alaska Airlines, Delta Airlines, JetBlue, Southwest, and United-Continental. Note the decline in profitability for all airlines in the wake of the 2008 financial crisis, followed by a recovery by mid-2010. Note also the consistently lower profitability of the legacy carrier, United-Continental, relative to its younger peers.

Source: Capital IQ



In addition to the efficiency of operations, differences in operating margins can result from corporate strategy. For example, in 2014, high-end retailer Nordstrom (JWN) had an operating margin of 9.8%; Wal-Mart Stores (WMT, brand name Walmart) had an operating margin of only 5.6%. In this case, Walmart's lower operating margin was not a result of its inefficiency. Rather, the low operating margin is part of Walmart's strategy of offering low prices to sell common products in high volume. Indeed, Walmart's sales were nearly 36 times higher than those of Nordstrom.

Finally, a firm's **net profit margin** is the ratio of net income to revenues:

$$\text{Net Profit Margin} = \frac{\text{Net Income}}{\text{Sales}} \tag{2.10}$$

The net profit margin shows the fraction of each dollar in revenues that is available to equity holders after the firm pays interest and taxes. In 2015, Global's net profit margin was 2.0/186.7 = 1.07%. One must be cautious when comparing net profit margins: While differences in net profit margins can be due to differences in efficiency, they can also result from differences in leverage, which determines the amount of interest expense, as well as differences in accounting assumptions.

Liquidity Ratios

Financial analysts often use the information in the firm's balance sheet to assess its financial solvency or liquidity. Specifically, creditors often compare a firm's current assets and current

liabilities to assess whether the firm has sufficient working capital to meet its short-term needs. This comparison can be summarized in the firm's **current ratio**, the ratio of current assets to current liabilities:

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

Notice that Global's current ratio increased from 48/44 = 1.09 in 2014 to 57/48 = 1.19 in 2015.

A more stringent test of the firm's liquidity is the **quick ratio**, which compares only cash and "near cash" assets, such as short-term investments and accounts receivable, to current liabilities. In 2015, Global's quick ratio was (21.2 + 18.5)/48 = 0.83. A higher current or quick ratio implies less risk of the firm experiencing a cash shortfall in the near future. A reason to exclude inventory is that it may not be that liquid; indeed an increase in the current ratio that results from an unusual increase in inventory could be an indicator that the firm is having difficulty selling its products.

Ultimately, firms need cash to pay employees and meet other obligations. Running out of cash can be very costly for a firm, so firms often gauge their cash position by calculating the **cash ratio**, which is the most stringent liquidity ratio:

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

Of course, all of these liquidity ratios are limited in that they only consider the firm's current assets. If the firm is able to generate significant cash quickly from its ongoing activities, it might be highly liquid even if these ratios are poor.

EXAMPLE 2.4 **Computing Liquidity Ratios**

Problem

Calculate Global's quick ratio and cash ratio. Based on these measures, how has its liquidity changed between 2014 and 2015?

Solution

In 2014, Global's quick ratio was (19.5 + 13.2)/44 = 0.74 and its cash ratio was 19.5/44 = 0.44. In 2015, these ratios were 0.83 and 21.2/48 = 0.44, respectively. Thus, Global's cash ratio remained stable over this period, while its quick ratio improved slightly. But although these liquidity measures have not deteriorated, a more worrisome indicator for investors regarding Global's liquidity might be its ongoing negative cash flow from operating and investing activities, shown in the statement of cash flows.

Working Capital Ratios

We can use the combined information in the firm's income statement and balance sheet to gauge how efficiently the firm is utilizing its net working capital. To evaluate the speed at which a company turns sales into cash, firms often compute the number of

accounts receivable days—that is, the number of days' worth of sales accounts receivable represents:[8]

$$\text{Accounts Receivable Days} = \frac{\text{Accounts Receivable}}{\text{Average Daily Sales}} \tag{2.11}$$

Given average daily sales of \$186.7 million/365 = \$0.51 million in 2015, Global's receivables of \$18.5 million represent 18.5/0.51 = 36 days' worth of sales. In other words, on average, Global takes a little over one month to collect payment from its customers. In 2014, Global's accounts receivable represented only 27 days' worth of sales. Although the number of receivable days can fluctuate seasonally, a significant unexplained increase could be a cause for concern (perhaps indicating the firm is doing a poor job of collecting from its customers or is trying to boost sales by offering generous credit terms).

There are similar ratios for accounts payable and inventory. For these items, it is natural to compare them to the firm's cost of sales, which should reflect the total amount paid to suppliers and inventory sold. Therefore, **accounts payable days** is defined as:

$$\text{Accounts Payable Days} = \frac{\text{Accounts Payable}}{\text{Average Daily Cost of Sales}} \tag{2.12}$$

Similarly, **inventory days** = (inventory/average daily cost of sales).[9]

Turnover ratios are an alternative way to measure working capital. We compute turnover ratios by expressing annual revenues or costs as a multiple of the corresponding working capital account. For example,

$$\text{Inventory Turnover} = \frac{\text{Annual Cost of Sales}}{\text{Inventory}} \tag{2.13}$$

Global's **inventory turnover** in 2015 is 153.4/15.3 = 10.0×, indicating that Global sold roughly 10 times its current stock of inventory during the year. Similarly, **accounts receivable turnover** = (annual sales/accounts receivable) and **accounts payable turnover** = (annual cost of sales/accounts payable). Note that higher turnover corresponds to shorter days, and thus a more efficient use of working capital.

While working capital ratios can be meaningfully compared over time or within an industry, there are wide differences across industries. While the average large U.S. firm had about 49 days' worth of receivables and 54 days' worth of inventory in 2015, airlines tend to have minimal accounts receivable or inventory, as their customers pay in advance and they sell a transportation service as opposed to a physical commodity. On the other hand, distillers and wine producers tend to have very large inventory (over 300 days on average), as their products are often aged prior to sale.

Interest Coverage Ratios

Lenders often assess a firm's ability to meet its interest obligations by comparing its earnings with its interest expenses using an **interest coverage ratio**. One common ratio to consider is the firm's EBIT as a multiple of its interest expenses. A high ratio indicates that the firm is earning much more than is necessary to meet its required interest payments.

[8]Accounts receivable days can also be calculated based on the *average* accounts receivable at the end of the current and prior year.

[9]As with accounts receivable days, these ratios can also be calculated using the average accounts payable or inventory balance from the current and prior year.

As a benchmark, creditors often look for an EBIT/Interest coverage ratio in excess of 5× for high-quality borrowers. When EBIT/Interest falls below 1.5, lenders may begin to question a company's ability to repay its debts.

Depreciation and amortization expenses are deducted when computing EBIT, but they are not actually cash expenses for the firm. Consequently, financial analysts often compute a firm's earnings before interest, taxes, depreciation, and amortization, or **EBITDA**, as a measure of the cash a firm generates from its operations and has available to make interest payments:[10]

$$\text{EBITDA} = \text{EBIT} + \text{Depreciation and Amortization} \tag{2.14}$$

We can similarly compute the firm's EBITDA/Interest coverage ratio.

EXAMPLE 2.5 **Computing Interest Coverage Ratios**

Problem

Assess Global's ability to meet its interest obligations by calculating interest coverage ratios using both EBIT and EBITDA.

Solution

In 2014 and 2015, Global had the following interest coverage ratios:

$$\text{2014:}\quad \frac{\text{EBIT}}{\text{Interest}} = \frac{7.1}{4.6} = 1.54 \quad \text{and} \quad \frac{\text{EBITDA}}{\text{Interest}} = \frac{7.1 + 1.1}{4.6} = 1.78$$

$$\text{2015:}\quad \frac{\text{EBIT}}{\text{Interest}} = \frac{10.4}{7.7} = 1.35 \quad \text{and} \quad \frac{\text{EBITDA}}{\text{Interest}} = \frac{10.4 + 1.2}{7.7} = 1.51$$

In this case Global's low—and declining—interest coverage could be a source of concern for its creditors.

Leverage Ratios

An important piece of information that we can learn from a firm's balance sheet is the firm's **leverage**, or the extent to which it relies on debt as a source of financing. The **debt-equity ratio** is a common ratio used to assess a firm's leverage. We calculate this ratio by dividing the total amount of short- and long-term debt (including current maturities) by the total stockholders' equity:

$$\text{Debt-Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Equity}} \tag{2.15}$$

We can calculate the debt-equity ratio using either book or market values for equity and debt. From Table 2.1, Global's debt in 2015 includes notes payable ($3.5 million), current

[10] Because firms often do not separately list depreciation and amortization expenses on the income statement, EBITDA is generally calculated by combining EBIT from the income statement and depreciation and amortization from the statement of cash flows. Note also that because the firm may ultimately need to invest to replace depreciating assets, EBITDA is best viewed as a measure of the firm's *short-run* ability to meet interest payments.

maturities of long-term debt ($13.3 million), and long-term debt ($99.9 million), for a total of $116.7 million. Therefore, its *book* debt-equity ratio is 116.7/22.2 = 5.3, using the book value of equity. Note the increase from 2014, when the book debt-equity ratio was only (3.2 + 12.3 + 76.3)/21.2 = 91.8/21.2 = 4.3.

Because of the difficulty interpreting the book value of equity, the book debt-equity ratio is not especially useful. Indeed, the book value of equity might even be negative, making the ratio meaningless. For example, Domino's Pizza (DPZ) has, based on the strength of its cash flow, consistently borrowed in excess of the book value of its assets. In 2014, it had debt of $1.8 billion, with a total book value of assets of only $600 million and an equity book value of −$1.2 billion!

It is therefore most informative to compare the firm's debt to the market value of its equity. Recall from Example 2.1 that in 2015, the total market value of Global's equity, its market capitalization, is 3.6 million shares × $14/share = $50.4 million. Therefore, Global's *market* debt-equity ratio in 2015 is 116.7/50.4 = 2.3, which means Global's debt is a bit more than double the market value of its equity.[11] As we show later in the text, a firm's market debt-equity ratio has important consequences for the risk and return of its stock.

We can also calculate the fraction of the firm financed by debt in terms of its **debt-to-capital ratio**:

$$\text{Debt-to-Capital Ratio} = \frac{\text{Total Debt}}{\text{Total Equity} + \text{Total Debt}} \tag{2.16}$$

Again, this ratio can be computed using book or market values.

While leverage increases the risk to the firm's equity holders, firms may also hold cash reserves in order to reduce risk. Thus, another useful measure to consider is the firm's **net debt**, or debt in excess of its cash reserves:

$$\text{Net Debt} = \text{Total Debt} - \text{Excess Cash \& Short-term Investments} \tag{2.17}$$

To understand why net debt may be a more relevant measure of leverage, consider a firm with more cash than debt outstanding: Because such a firm could pay off its debts immediately using its available cash, it has not increased its risk and has no effective leverage.

Analogous to the debt-to-capital ratio, we can use the concept of net debt to compute the firm's **debt-to-enterprise value ratio**:

$$\begin{aligned}\text{Debt-to-Enterprise Value Ratio} &= \frac{\text{Net Debt}}{\text{Market Value of Equity} + \text{Net Debt}} \\ &= \frac{\text{Net Debt}}{\text{Enterprise Value}}\end{aligned} \tag{2.18}$$

Given Global's 2015 cash balance of $21.2 million, and total long- and short-term debt of $116.7 million, its net debt is 116.7 − 21.2 = $95.5 million.[12] Given its market value of equity of $50.4 million, Global's enterprise value in 2015 is 50.4 + 95.5 = $145.9 million,

[11] In this calculation, we have compared the market value of equity to the book value of debt. Strictly speaking, it would be best to use the market value of debt. But because the market value of debt is generally not very different from its book value, this distinction is often ignored in practice.

[12] While net debt should ideally be calculated by deducting cash in excess of the firm's operating needs, absent additional information, it is typical in practice to deduct all cash on the balance sheet.

and thus its debt-to-enterprise value ratio is 95.5/145.9 = 65.5%. That is, 65.5% of Global's underlying business activity is financed via debt.

A final measure of leverage is a firm's **equity multiplier**, measured in book value terms as Total Assets/Book Value of Equity. As we will see shortly, this measure captures the amplification of the firm's accounting returns that results from leverage. The market value equity multiplier, which is generally measured as Enterprise Value/Market Value of Equity, indicates the amplification of shareholders' financial risk that results from leverage.

Valuation Ratios

Analysts use a number of ratios to gauge the market value of the firm. The most common is the firm's **price-earnings ratio (P/E)**:

$$\text{P/E Ratio} = \frac{\text{Market Capitalization}}{\text{Net Income}} = \frac{\text{Share Price}}{\text{Earnings per Share}} \tag{2.19}$$

That is, the P/E ratio is the ratio of the value of equity to the firm's earnings, either on a total basis or on a per-share basis. For example, Global's P/E ratio in 2015 was 50.4/2.0 = 14/0.556 = 25.2. In other words, investors are willing to pay over 25 times Global's earnings to purchase a share.

The P/E ratio is a simple measure that is used to assess whether a stock is over- or undervalued based on the idea that the value of a stock should be proportional to the level of earnings it can generate for its shareholders. P/E ratios can vary widely across industries and tend to be highest for industries with high expected growth rates. For example, in late 2015, the median large U.S. firm had a P/E ratio of about 21. But software firms, which tend to have above-average growth rates, had an average P/E ratio of 38, while automotive firms, which have experienced slower growth since the recession, had an average P/E ratio of about 15. The risk of the firm will also affect this ratio—all else equal, riskier firms have lower P/E ratios.

Because the P/E ratio considers the value of the firm's equity, it is sensitive to the firm's choice of leverage. The P/E ratio is therefore of limited usefulness when comparing firms with markedly different leverage. We can avoid this limitation by instead assessing the market value of the underlying business using valuation ratios based on the firm's enterprise value. Common ratios include the ratio of enterprise value to revenue, or enterprise value to operating income, EBIT, or EBITDA. These ratios compare the value of the business to its sales, operating profits, or cash flow. Like the P/E ratio, these ratios are used to make intra-industry comparisons of how firms are priced in the market.

COMMON MISTAKE Mismatched Ratios

When considering valuation (and other) ratios, be sure that the items you are comparing both represent amounts related to the entire firm or that both represent amounts related solely to equity holders. For example, a firm's share price and market capitalization are values associated with the firm's equity. Thus, it makes sense to compare them to the firm's earnings per share or net income, which are amounts to equity holders after interest has been paid to debt holders. We must be careful, however, if we compare a firm's market capitalization to its revenues, operating income, or EBITDA because these amounts are related to the whole firm, and both debt and equity holders have a claim to them. Thus, it is better to compare revenues, operating income, or EBITDA to the enterprise value of the firm, which includes both debt and equity.

EXAMPLE 2.6 Computing Profitability and Valuation Ratios

Problem

Consider the following data as of July 2015 for Walmart and Target Corporation (in $ billion):

	Walmart (WMT)	Target (TGT)
Sales	485.7	73.1
EBIT	26.6	4.5
Depreciation and Amortization	9.2	2.1
Net Income	16.2	2.5
Market Capitalization	235.6	52.9
Cash	9.1	2.2
Debt	48.8	12.8

Compare Walmart's and Target's EBIT margins, net profit margins, P/E ratios, and the ratio of enterprise value to sales, EBIT, and EBITDA.

Solution

Walmart had an EBIT Margin of 26.6/485.7 = 5.5%, a net profit margin of 16.2/485.7 = 3.3%, and a P/E ratio of 235.6/16.2 = 14.5. Its enterprise value was 235.6 + 48.8 − 9.1 = 275.3 billion, which has a ratio of 275.3/485.7 = 0.57 to sales, 275.3/26.6 = 10.3 to EBIT, and 275.3/(26.6 + 9.2) = 7.7 to EBITDA.

Target had an EBIT margin of 4.5/73.3 = 6.2%, a net profit margin of 2.5/73.1 = 3.4%, and a P/E ratio of 52.9/2.5 = 21.2. Its enterprise value was 52.9 = 12.8 − 2.2 = $63.5 billion, which has a ratio of 63.4/73.1 = 0.87 to sales, 63.5/4.5 = 14.1 to EBIT, and 63.5/(4.5 + 2.1) = 9.6 to EBITDA.

Note that despite the large difference in the size of the two firms, Target trades at higher, though comparable, multiples.

The P/E ratio, or ratios to EBIT or EBITDA, are not meaningful if the firm's earnings are negative. In this case, it is common to look at the firm's enterprise value relative to sales. The risk in doing so, however, is that earnings might be negative because the firm's underlying business model is fundamentally flawed, as was the case for many Internet firms in the late 1990s.

Operating Returns

Analysts often evaluate the firm's return on investment by comparing its income to its investment using ratios such as the firm's **return on equity (ROE)**:[13]

$$\text{Return on Equity} = \frac{\text{Net Income}}{\text{Book Value of Equity}} \tag{2.20}$$

Global's ROE in 2015 was 2.0/22.2 = 9.0%. The ROE provides a measure of the return that the firm has earned on its past investments. A high ROE may indicate the firm is able to find investment opportunities that are very profitable.

[13]Because net income is measured over the year, the ROE can also be calculated based on the average book value of equity at the end of the current and prior year.

Another common measure is **return on assets (ROA)**, which we calculate as:[14]

$$\text{Return on Assets} = \frac{\text{Net Income} + \text{Interest Expense}}{\text{Book Value of Assets}} \tag{2.21}$$

The ROA calculation includes interest expense in the numerator because the assets in the denominator have been funded by both debt and equity investors.

As a performance measure, ROA has the benefit that it is less sensitive to leverage than ROE. However, it is sensitive to working capital—for example, an equal increase in the firm's receivables and payables will increase total assets and thus lower ROA. To avoid this problem, we can consider the firm's **return on invested capital (ROIC)**:

$$\text{Return on Invested Capital} = \frac{\text{EBIT}\,(1 - \text{tax rate})}{\text{Book Value of Equity} + \text{Net Debt}} \tag{2.22}$$

The return on invested capital measures the after-tax profit generated by the business itself, excluding any interest expenses (or interest income), and compares it to the capital raised from equity and debt holders that has already been deployed (i.e., is not held as cash). Of the three measures of operating returns, ROIC is the most useful in assessing the performance of the underlying business.

EXAMPLE 2.7 Computing Operating Returns

Problem

Assess how Global's ability to use its assets effectively has changed in the last year by computing the change in its return on assets and return on invested capital.

Solution

In 2015, Global's ROA was $(2.0 + 7.7)/177.7 = 5.5\%$, compared to an ROA in 2014 of $(1.9 + 4.6)/148.9 = 4.4\%$.

To compute the return on invested capital, we need to calculate after-tax EBIT, which requires an estimate of Global's tax rate. Because Net income = Pretax income × (1 − tax rate), we can estimate (1 − tax rate) = Net income/Pretax income. Thus, EBIT × (1 − tax rate) = $10.4 \times (2.0/2.7) = 7.7$ in 2015, and $7.1 \times (1.9/2.5) = 5.4$ in 2014.

To compute invested capital, note first that Global's net debt was $3.2 + 12.3 + 76.3 - 19.5 = 72.3$ in 2014 and $3.5 + 13.3 + 99.9 - 21.2 = 95.5$ in 2015. Thus, ROIC in 2015 was $7.7/(22.2 + 95.5) = 6.5\%$, compared with $5.4/(21.2 + 72.3) = 5.8\%$ in 2014.

The improvement in Global's ROA and ROIC from 2014 to 2015 suggests that Global was able to use its assets more effectively and increase its return over this period.

[14] ROA is sometimes calculated as Net Income/Assets, inappropriately ignoring the returns generated by the assets that are being used to support the firm's debt obligations (see also the box on Mismatched Ratios on page 75). Also, the interest expense that is added back is sometimes done on an after-tax basis in order to eliminate the benefit of the tax savings provided by debt. Finally, as with ROE, the *average* book value of assets at the beginning and end of the year may be used.

The DuPont Identity

We can gain further insight into a firm's ROE using a tool called the **DuPont Identity** (named for the company that popularized its use), which expresses the ROE in terms of the firm's profitability, asset efficiency, and leverage:

$$\text{ROE} = \underbrace{\left(\frac{\text{Net Income}}{\text{Sales}}\right)}_{\text{Net Profit Margin}} \times \underbrace{\left(\frac{\text{Sales}}{\text{Total Assets}}\right)}_{\text{Asset Turnover}} \times \underbrace{\left(\frac{\text{Total Assets}}{\text{Book Value of Equity}}\right)}_{\text{Equity Multiplier}} \tag{2.23}$$

The first term in the DuPont Identity is the firm's net profit margin, which measures its overall profitability. The second term is the firm's **asset turnover**, which measures how efficiently the firm is utilizing its assets to generate sales. Together, these terms determine the firm's return on assets. We compute ROE by multiplying by a measure of leverage called the equity multiplier, which indicates the value of assets held per dollar of shareholder equity. The greater the firm's reliance on debt financing, the higher the equity multiplier will be. Applying this identity to Global, we see that in 2015 its asset turnover is 186.7/177.7 = 1.05, with an equity multiplier of 177.7/22.2 = 8. Given its net profit margin of 1.07%, we can compute its ROE as

$$\text{ROE} = 9.0\% = 1.07\% \times 1.05 \times 8$$

EXAMPLE 2.8 Determinants of ROE

Problem

For the year ended January 2015, Walmart (WMT) had sales of $485.7 billion, net income of $16.2 billion, assets of $203.7 billion, and a book value of equity of $85.9 billion. For the same period, Target (TGT) had sales of $73.1 billion, net income of $2.5 billion, total assets of $41.4 billion, and a a book value of equity of $14 billion. Compare these firms' profitability, asset turnover, equity multipliers, and return on equity during this period. If Target had been able to match Walmart's asset turnover during this period, what would its ROE have been?

Solution

Walmart's net profit margin (from Example 2.6) was 16.2/485.7 = 3.34%, which was just below Target's net profit margin of 2.5/73.1 = 3.42%. On the other hand, Walmart used its assets more efficiently, with an asset turnover of 485.7/203.7 = 2.38, compared to only 73.1/41.4 = 1.77 for Target. Finally, Target had greater leverage (in terms of book value), with an equity multiplier of 41.4/14 = 2.96, relative to Walmart's equity multiplier of 203.7/85.9 = 2.37. Next, let's compute the ROE of each firm directly, and using the DuPont Identity:

$$\text{Walmart ROE} = \frac{16.2}{85.9} = 18.8\% = 3.34\% \times 2.38 \times 2.37$$

$$\text{Target ROE} = \frac{2.5}{14} = 17.9\% = 3.42\% \times 1.77 \times 2.96$$

Note that due to its lower asset turnover, Target had a lower ROE than Walmart despite its higher net profit margin and leverage. If Target had been able to match Walmart's asset turnover, its ROE would have been significantly higher: $3.42\% \times 2.38 \times 2.96 = 24.1\%$.

To conclude our discussion of financial ratios, Table 2.4 presents the various measures of profitability, liquidity, working capital, interest coverage, leverage, valuation, and operating returns.

TABLE 2.4 **Key Financial Ratios for Large U.S. Firms, Fall 2015**
(Data shows quartiles [25%, median, 75%] for U.S. stocks with market capitalization over $1 billion)

Profitability Ratios	
Gross Margin [28%, 42%, 65%]	$\frac{\text{Gross Profit}}{\text{Sales}}$
Operating Margin [7%, 13%, 22%]	$\frac{\text{Operating Income}}{\text{Sales}}$
EBIT Margin [6%, 12%, 20%]	$\frac{\text{EBIT}}{\text{Sales}}$
Net Profit Margin [2%, 7%, 14%]	$\frac{\text{Net Income}}{\text{Sales}}$
Liquidity Ratios	
Current Ratio [1.2x, 1.8x, 2.9x]	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$
Quick Ratio [0.7x, 1.2x, 2.0x]	$\frac{\text{Cash \& Short-term Investments + Accounts Receivable}}{\text{Current Liabilities}}$
Cash Ratio [0.1x, 0.4x, 0.8x]	$\frac{\text{Cash}}{\text{Current Liabilities}}$
Working Capital Ratios	
Accounts Receivable Days [32, 49, 67]	$\frac{\text{Accounts Receivable}}{\text{Average Daily Sales}}$
Accounts Payable Days [25, 42, 62]	$\frac{\text{Accounts Payable}}{\text{Average Daily Cost of Sales}}$
Inventory Days [24, 54, 92]	$\frac{\text{Inventory}}{\text{Average Daily Cost of Sales}}$
Interest Coverage Ratios	
EBIT/Interest Coverage [2.9x, 6.7x, 15.8x]	$\frac{\text{EBIT}}{\text{Interest Expense}}$
EBITDA/Interest Coverage [5.2x, 9.8x, 20.2x]	$\frac{\text{EBITDA}}{\text{Interest Expense}}$
Leverage Ratios	
Debt-Equity Ratio (book) [21%, 60%, 121%]	$\frac{\text{Total Debt}}{\text{Book Value of Equity}}$
Debt-Equity Ratio (market) [6%, 21%, 51%]	$\frac{\text{Total Debt}}{\text{Market Value of Equity}}$
Leverage Ratios (continued)	
Debt-to-Capital Ratio [18%, 38%, 56%]	$\frac{\text{Total Debt}}{\text{Total Equity + Total Debt}}$
Debt-to-Enterprise Value Ratio [–4%, 9%, 25%]	$\frac{\text{Net Debt}}{\text{Enterprise Value}}$
Equity Multiplier (book) [1.7x, 2.5x, 4.0x]	$\frac{\text{Total Assets}}{\text{Book Value of Equity}}$
Equity Multiplier (market) [1.0x, 1.1x, 1.5x]	$\frac{\text{Enterprise Value}}{\text{Market Value of Equity}}$
Valuation Ratios	
Market-to-Book Ratio [1.6x, 2.9x, 5.5x]	$\frac{\text{Market Value of Equity}}{\text{Book Value of Equity}}$
Price-Earnings Ratio [15.7x, 21.6x, 32.6x]	$\frac{\text{Share Price}}{\text{Earnings per Share}}$
Enterprise Value to Sales [1.3x, 2.4x, 4.3x]	$\frac{\text{Enterprise Value}}{\text{Sales}}$
Enterprise Value to EBIT [11.9x, 15.7x, 22.2x]	$\frac{\text{Enterprise Value}}{\text{EBIT}}$
Enterprise Value to EBITDA [8.8x, 11.5x, 15.4x]	$\frac{\text{Enterprise Value}}{\text{EBITDA}}$
Operating Returns	
Asset Turnover [0.3x, 0.6x, 1.1x]	$\frac{\text{Sales}}{\text{Total Assets}}$
Return on Equity (ROE) [4%, 11%, 19%]	$\frac{\text{Net Income}}{\text{Book Value of Equity}}$
Return on Assets (ROA) [–1%, 3%, 8%]	$\frac{\text{Net Income + Interest Expense}}{\text{Book Value of Assets}}$
Return on Invested Capital (ROIC) [7%, 12%, 21%]	$\frac{\text{EBIT (1 − Tax Rate)}}{\text{Book Value of Equity + Net Deb}}$

CONCEPT CHECK

1. Why is EBITDA used to assess a firm's ability to meet its interest obligations?
2. What is the difference between a firm's book debt-equity ratio and its market debt-equity ratio?
3. To compare the valuations of firms with very different leverage, which valuation multiples would be most appropriate?
4. What is the DuPont Identity?

2.7 Financial Reporting in Practice

The various financial statements we have examined are of critical importance to investors and financial managers alike. Even with safeguards such as GAAP and auditors, though, financial reporting abuses unfortunately do take place. We now review two of the most infamous examples.

Enron

Enron was the most well known of the accounting scandals of the early 2000s. Enron started as an operator of natural-gas pipelines but evolved into a global trader dealing in a range of products including gas, oil, electricity, and even broadband Internet capacity. A series of events unfolded that, in December 2001, led Enron to file what was, at the time, the largest bankruptcy filing in U.S. history. By the end of that year, the market value of Enron's shares had fallen by over $60 billion.

Interestingly, throughout the 1990s and up to late 2001, Enron was touted as one of the most successful and profitable companies in America. *Fortune* rated Enron "The Most Innovative Company in America" for six straight years, from 1995 to 2000. But while many aspects of Enron's business were successful, subsequent investigations suggest that Enron executives had been manipulating Enron's financial statements to mislead investors and artificially inflate the price of Enron's stock and maintain its credit rating. In 2000, for example, 96% of Enron's reported earnings were the result of accounting manipulation.[15]

Although the accounting manipulations that Enron used were quite sophisticated, the essence of most of the deceptive transactions was surprisingly simple. Enron sold assets at inflated prices to other firms (or, in many cases, business entities that Enron's CFO Andrew Fastow had created), together with a promise to buy back those assets at an even higher future price. Thus, Enron was effectively borrowing money, receiving cash today in exchange for a promise to pay more cash in the future. But Enron recorded the incoming cash as revenue and then hid the promises to buy them back in a variety of ways.[16] In the end, much of Enron's revenue growth and profits in the late 1990s were the result of this type of manipulation.

WorldCom

Enron's record as the largest bankruptcy of all time lasted only until July 21, 2002, when WorldCom, which at its peak had a market capitalization of $120 billion, filed for bankruptcy. Again, a series of accounting manipulations beginning in 1998 hid the firm's financial problems from investors.

In WorldCom's case, the fraud was to reclassify $3.85 billion in operating expenses as long-term capital expenditures. The immediate impact of this change was to boost

[15]John R. Kroger, "Enron, Fraud and Securities Reform: An Enron Prosecutor's Perspective," *University of Colorado Law Review* (December 2009): pp. 57–138.

[16]In some cases, these promises were called "price risk management liabilities" and hidden with other trading activities; in other cases they were off-balance sheet transactions that were not fully disclosed.

WorldCom's reported earnings: Operating expenses are deducted from earnings immediately, whereas capital expenditures are depreciated slowly over time. Of course, this manipulation would not boost WorldCom's cash flows, because long-term investments must be deducted on the cash flow statement at the time they are made.

Some investors were concerned by WorldCom's excessive investment compared to the rest of the industry. As one investment advisor commented, "Red flags [were] things like big deviations between reported earnings and excess cash flow . . . [and] excessive capital expenditures for a long period of time. That was what got us out of WorldCom in 1999."[17]

Sarbanes-Oxley Act

The Enron and Worldcom scandals had an immediate and tangible impact on the accounting world. Both firms had been audited by the same accounting firm, Arthur Andersen, and accusations begin to emerge about their business practices in late 2001. By March 2002, Arthur Andersen was indicted on charges following from the Enron case, and it was convicted in June. With its reputation destroyed, the firm quickly collapsed, leaving its clients to find new auditors. These new auditors had a strong incentive to "clean house" and as a result new instances of errors and/or outright fraud were uncovered. Professors Alexander Dyck, Adair Morse, and Luigi Zingales used this event to estimate that nearly 15% of firms may have engaged in some form of financial misrepresentation, and that such fraud costs investors on average 22% of the firm's enterprise value.[18]

In an attempt to improve the reliability of financial reporting and corporate governance, Congress passed the Sarbanes-Oxley Act (SOX) in 2002. While SOX contains many provisions, the overall intent of the legislation was to improve the accuracy of information given to both boards and shareholders. SOX attempted to achieve this goal in three ways: (1) by overhauling incentives and the independence in the auditing process, (2) by stiffening penalties for providing false information, and (3) by forcing companies to validate their internal financial control processes.

Because auditors often have a long-standing relationship with their clients and receive lucrative auditing and consulting fees from them, their desire to continue earning these fees may make auditors less willing to challenge management. SOX addressed this concern by putting strict limits on the amount of non-audit fees (consulting or otherwise) that an accounting firm can earn from a company that it audits. It also required that audit partners rotate every five years to limit the likelihood that auditing relationships become too cozy over long periods of time. Finally, SOX called on the SEC to force companies to have audit committees that are dominated by outside directors, with at least one outside director having a financial background.

SOX also stiffened the criminal penalties for providing false information to shareholders (fines of up to $5 million and up to 20 years imprisonment), and required both the CEO and CFO to personally attest to the accuracy of the firm's financial statements. Furthermore, CEOs and CFOs must return bonuses or profits from the sale of stock that are later shown to be due to misstated financial reports.

Finally, Section 404 of SOX requires senior management and the boards of public companies to validate and certify the process through which funds are allocated and controlled, and outcomes are monitored. Section 404 has arguably garnered more attention than any other section in SOX because of the large potential compliance costs that it places on firms.

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[17]Robert Olstein, as reported in the *Wall Street Journal*, August 23, 2002.

[18]See "How Pervasive Is Corporate Fraud?" Rotman School of Management Working Paper No. 2222608, 2013.

GLOBAL FINANCIAL CRISIS Bernard Madoff's Ponzi Scheme

"It's only when the tide goes out that you learn who's been swimming naked." —*Warren Buffett*

On December 11, 2008, federal agents arrested Bernie Madoff, one of the largest and most successful hedge fund managers. It turned out that the $65 billion[19] fund he ran was in fact a fraud. His spectacular performance of the last 17 years, generating consistent annual returns between 10% and 15%, was actually a complete fabrication. Madoff had been running the world's largest Ponzi scheme: That is, he used the capital contributed by new investors to pay off old investors. His strategy was so successful that for more than a decade investors ranging from Steven Spielberg to New York University, as well as a number of large banks and investment advisors, lined up to invest with him. Indeed, Madoff quite likely would have been able to hide the fraud until his deathbed had not the global financial crisis spurred many investors to seek to withdraw funds from their Madoff accounts in order to raise cash and cover losses elsewhere in their portfolios. In addition, the financial crisis meant there were few new investors with both the cash and the willingness to invest. As a result, Madoff did not have enough new capital to pay off the investors who wanted to withdraw their capital, and the scheme finally collapsed.*

How was Madoff able to hide perhaps the largest fraud of all time for so long? Rather than simply manipulate his accounting statements, Madoff *made them up* with the assistance of a virtually unknown accounting firm with only one active accountant. Although many investors may have questioned why such a large fund, with $65 billion in assets, would choose an unknown and tiny audit firm, not enough of them recognized this choice as a potential red flag. In addition, because Madoff's firm was private, it was not subject to the strict regulatory requirements for public companies (such as the Sarbanes-Oxley Act) and so had weak reporting requirements. As this case makes clear, when making an investment decision, it is important not only to review the firm's financial statements, but also to consider the reliability and reputation of the auditors who prepared them.

*For reasons why fraud may be more likely to occur in booms, and then exposed in downturns, see P. Povel, R. Singh, and A. Winton, "Booms, Busts, and Fraud," *Review of Financial Studies* 20 (2007): 1219–1254.

These costs can be especially significant (in percentage terms) for small companies, and critics have argued that they are sufficiently onerous to cause some firms to avoid them by remaining privately held.[20]

Dodd-Frank Act

To mitigate the compliance burden on small firms, the Dodd-Frank Wall Street Reform and Consumer Protection Act passed in 2010 exempts firms with less than $75 million in publicly held shares from the SOX Section 404 requirements. It also requires the SEC to study how it might reduce cost for medium-sized firms with a public float of less than $250 million, and to assess whether such measures would encourage more firms to list on U.S. exchanges.

Dodd-Frank also broadened the whistleblower provisions of SOX, so that an individual who provides "information related to a possible violation of the federal securities laws (including any rules or regulations thereunder)" that results in penalties or recoveries by the SEC or agencies is eligible to receive from 10 to 30% of that penalty or recovery.

CONCEPT CHECK

1. Describe the transactions Enron used to increase its reported earnings.
2. What is the Sarbanes-Oxley Act, and how was it modified by the Dodd-Frank Act?

[19] $65 billion is the total amount Madoff had reported to his investors, including (fictitious) returns; investigators are still trying to determine the exact amount that investors had actually contributed to the fund, but it appears to be in excess of $17 billion (see www.madofftrustee.com).

[20] See Chapter 29 for a more detailed discussion of these and other corporate governance issues.