

CHAPTER OUTLINE



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In Chapter 1 we made the point that the orientation of finance is toward cash flows rather than accounting results. Because of the importance of cash flow, we need to understand the concept thoroughly and be familiar with the construction of the statement of cash flows as one of a firm's financial statements. We'll develop that understanding in the first half of this chapter.

Then we'll turn our attention to financial analysis, a technique designed to get practical information about business operations out of financial statements. Before attacking either of these topics, however, we need a little background on financial information in general.

FINANCIAL INFORMATION—WHERE DOES IT COME FROM, WHO USES IT, AND WHAT ARE WE LOOKING FOR?

The term “financial information” refers to the results of business operations stated in money terms. The idea largely implies the material in financial statements but isn't entirely limited to those documents. Financial information about a company is important because people inside and outside use it as a basis for making decisions about the firm and their relationships with it.

Financial information is the responsibility of management. It is created by accountants within the company and reviewed by auditors, but neither accountants nor auditors guarantee its correctness.¹

1. Auditors make certain observations and tests which provide a *reasonable level of assurance* that statements are prepared in the proper manner and that all relevant details are disclosed.

This creates a conflict of interest, because managements invariably want to portray results as favorably as possible. We'll discuss this idea shortly.

Once prepared, financial information is published to a variety of audiences, who use it to make decisions about the company. Let's begin our study by looking at these users in a little more detail.

USERS OF FINANCIAL INFORMATION

Financial statements are a report on the issuing company's performance. The main user groups are investors, creditors, and management itself.

Investors and Financial Analysts

The most important function of financial statements is to convey information to outside investors. These are people or organizations that might be interested in buying the company's stock or might be asked to lend it money. Lenders are concerned with the firm's stability and cash flows. The primary focus of stockholders is more likely to be its prospects for growth.

Investors sometimes analyze financial statements themselves, but more often rely on the reports of **financial analysts** who usually work for large brokerage firms or other financial institutions. Their job is to know as much about a particular company and its industry as an outsider can and to use that knowledge to predict the firm's performance. They then make recommendations about its investment value, including whether to buy or sell its stock and whether its debt is safe. Because of their pivotal advisory role, financial analysts can be considered the main audience for investor-oriented information.

A major part of the analyst's job is a careful study of the company's recent financial statements. It's important to realize that published financial statements relate to the past, and the analyst is interested in the future. However, the past factored by current information is usually the best available indicator of the future. In this chapter we'll have a look at the basic tools used by financial analysts and sophisticated investors.

Vendors/Creditors

Vendors asked to do business with the firm on credit are another important group of statement users. Because they're advancing funds in the form of products and services, they tend to be interested in most of the same things that concern lenders. The main issue is whether the firm is likely to have cash available to pay its debts in the immediate future.

Management

The final group of statement users is the firm's own management. Financial results show successes and failures in each of the many facets of running a business. Management can study those results to pinpoint relative strengths and weaknesses in operations. This process shows where to put effort to correct problems and improve performance.

SOURCES OF FINANCIAL INFORMATION

The primary source of financial information about any publicly traded company is its own **annual report**. Annual reports are required of companies that sell their stock to the general public, and typically include several years of historical financial information along with a great deal of verbiage about the firm and its business.

Financial analysts interpret information about companies and make recommendations to investors.

A firm's **annual report** is the **primary source** of financial information about it.

The financial information in an annual report must be audited by an independent accounting firm. That process doesn't guarantee complete accuracy, but it usually gives a fair level of assurance that the numbers are presented with reasonable objectivity and in accordance with **generally accepted accounting principles (GAAP)**. However, there's a lot more latitude in the nature of the information presented in the verbiage.

In fact, there's something of a problem with annual reports. They tend to portray past performance and future prospects in a very favorable light. That is, they're biased toward reporting that the firm has done as well as could be expected in the past year and that it will do even better in the future. Reports tend to minimize or ignore mistakes and failures, exaggerate successes, and build up future opportunities in unrealistically optimistic terms.

The annual report is actually a report to stockholders prepared by the company's management. But management works for the stockholders, so they are in effect writing their own report cards. Naturally the result is biased in favor of the people running the firm.

Along these lines, most annual reports have become advertising vehicles and are prepared to be very visually appealing. They're done on glossy paper, in multicolored inks, and are filled with professional quality photographs. They frequently look more like upscale magazines than business documents.

All this isn't necessarily bad as long as readers understand the biases and don't take everything in reports as strictly true. Outright lies are rare, but the truth can be told more or less attractively, and annual reports tend to present things in a rosy glow.

Companies file a more businesslike document called the 10-K with the Securities and Exchange Commission each year. It gives more detailed information than the annual report. Most companies will send you an annual report and a 10-K for the asking.

Brokerage firms and investment advisory services provide reports on most large companies. These reports are the result of the work of their financial analysts. Brokerage firms provide the information free as a service to clients and prospective clients, while investment advisory services publish it for a fee. The best known advisory service is Value Line which provides information on approximately 1,700 stocks. Advisory services provide information to paid subscribers, but it is often available free in libraries.

Value Line's September 2006 report on General Motors is shown in Figure 3.1. Study the layout of the information it contains for a few minutes. The chart at the top shows the stock's price performance for the last 10 years. Below that 10 to 15 years of history are shown for a variety of financial line items. Notice that some items are stated on a per-share basis.

Moving down the page, there's a short summary of the nature of the company's business followed by a verbal analysis of its current situation and prospects for the future. This section is the heart of the report. It tells investors what the analyst thinks is likely to happen to GM's business and by implication the price of its stock.

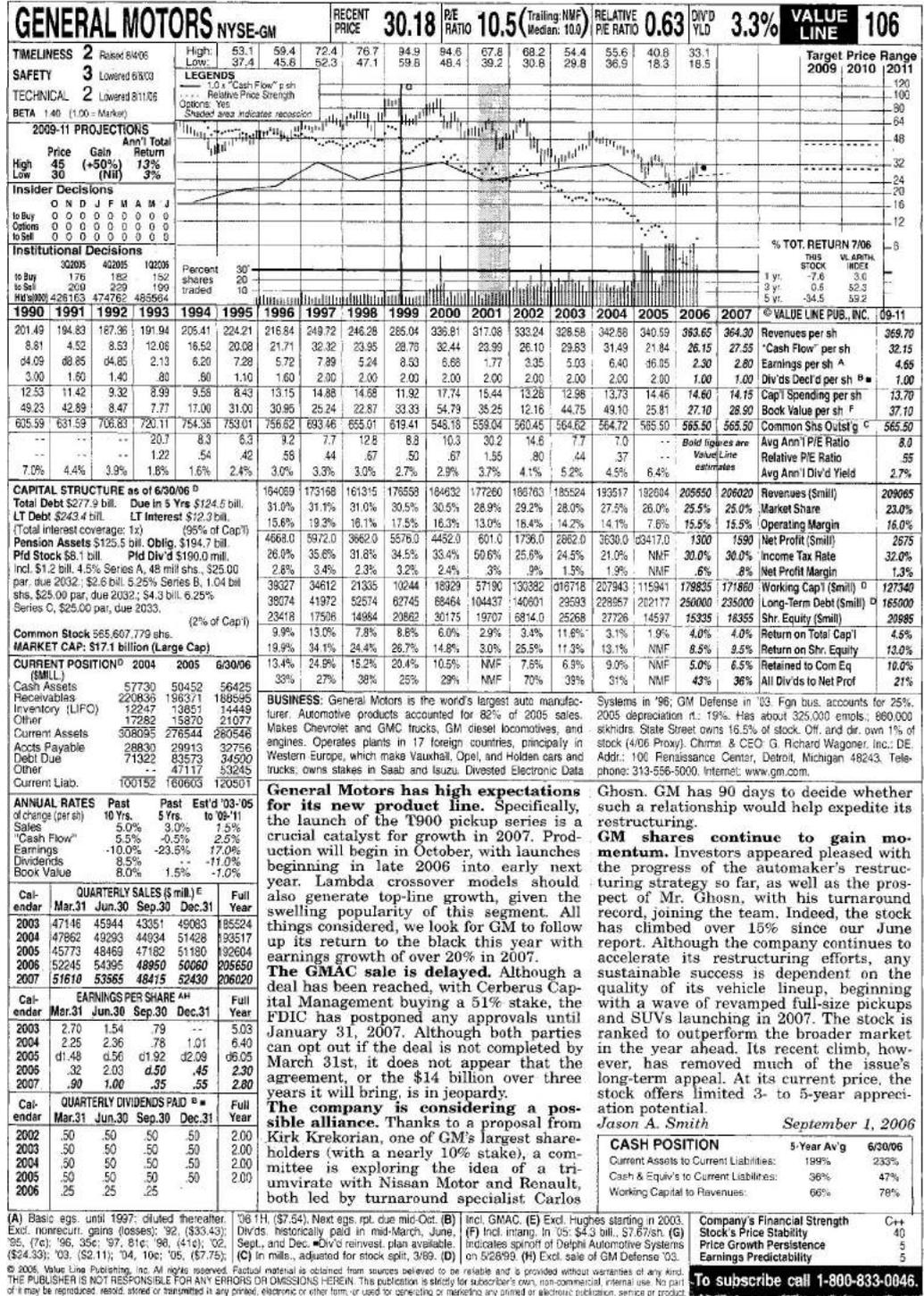
At the time this report was written, General Motors was recovering from a period of serious financial distress. The verbal report focused on the firm's prospects for the future stressing its new products and a possible alliance with Nissan and Renault, Japanese and European auto manufacturers. The report ended with a comment that an investment in the stock at that time was unlikely to yield big gains because GM's share price had risen substantially in the recent past leaving little room for further appreciation.

Annual reports tend to be **biased in favor of management's performance**.

http://

Choose a company from Nasdaq's list at <http://dynamic.nasdaq.com/dynamic/nasdaq100activity.stm> and look at its annual report, usually found under Investor Relations on the company web sites.

Figure 3.1 Value Line's September 2006 Report on General Motors



Source: Reproduced with permission from Value Line.



REAL APPLICATIONS

The Devil Is in the Details . . .

Annual reports are a leading source of information for investors. But since they're prepared by management, they tend to be very favorably biased. The bias takes the form of exaggerating successes and downplaying problems and threats. An annual report of Microsoft, the world's leading software company, provides a good example.

In the late 1990s and early 2000s, Microsoft was under legal attack by the U.S. Justice Department for alleged violation of the Sherman Act, a law that makes certain business behavior illegal if it reduces competition and puts the violator in a monopoly position. The federal government and nineteen states sued Microsoft and demanded, among other things, that it be broken up into two companies to compensate for the alleged anticompetitive effects of its previous behavior.

During one year, the pending lawsuit was in the news constantly, and was undoubtedly a major factor in the investment community's perception of Microsoft stock. Indeed the threat it posed to the company's future probably depressed its stock price considerably. It seems reasonable to expect that a professional analysis of the firm's prospects would have included a thorough discussion of the lawsuit and an assessment of the likelihood that the firm would be damaged by it.

Yet Microsoft's annual report barely mentioned the suit, even though it was still pending when the report was issued. The litigation was given only six lines in the president's discussion of results which is read carefully by most serious investors. It was mentioned in somewhat more detail in the notes to the financial statements where statements about pending litigation are required by law. But many investors don't read the notes, which are similar to "the fine print" in a contract.

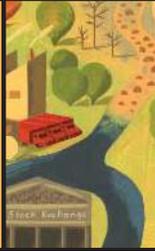
Companies defend their minimal mention of such lawsuits in annual reports saying that management believes the suits are groundless, the companies will eventually win, and that investors therefore shouldn't worry about them. That's the way this case turned out. In the end Microsoft wasn't hurt by the suit. But while the outcomes of such suits are in doubt, aren't investors entitled to fair and thorough disclosure of their risks, and a discussion of both management's and the other side's arguments? Perhaps, but it would be unusual to find it in an annual report.

Source: Microsoft Corporation Annual Report 2000.

The issues addressed in this descriptive section aren't always purely financial. They can be about any area of business that's crucial, such as markets, products, competition, or mergers. In other words, a lot of "financial information" isn't exactly financial. It might be better described as marketing or strategic information. Keep in mind that financial results are numerical representations of what is physically going on in a business. Thus, deciding whether a firm is a good financial investment begins with a judgment about how it's doing in the market for its products. Notice that Value Line ends the discussion by saying that it has a neutral opinion of the stock's investment potential.

THE ORIENTATION OF FINANCIAL ANALYSIS

Much of the information in the rest of this chapter may seem similar to material you've studied in accounting. However, our orientation is different here. In accounting we're



ETHICS

The Ethics of Presenting Financial Information

Recent financial results tend to be good predictors of future performance, so investors bid stock prices up or down based on the content of published financial statements. Earnings and earnings growth are especially important.

Financial statements are reputed to be objective representations of business performance. However, management has a good deal of control over them. That's because there's a lot of latitude and room for interpretation within the accounting guidelines that govern how statements are put together. In other words, management can to some extent "engineer" the financial results that are so crucial to investors and the prices they put on stocks.

At the same time, top managers have an incentive to hold up stock prices. High prices benefit existing shareholders, but more importantly, executive compensation is tied to stock price in ways that make senior executives enormously wealthy when the price of their company's shares rises rapidly.

This creates a conflict of interest between management and investors. Top management gets rich by manipulating reported financial performance to drive stock price up in the short run. But eventually the fact that results were artificially inflated is discovered, and share prices fall rapidly. This has a devastating effect on investors, especially those who bought the stock near its peak.

This phenomenon has been recognized as a problem for many years and is reported in the financial press from time to time. Here are a few of the "tricks" major companies were engaged in starting in the late 1990s as reported in *The Wall Street Journal*. Notice that they "stretch" the truth and muddy the predictive power of past financial results.

Continuing Operations When a company sells or closes a division, its future prospects should be based on *continuing operations* which represent repeatable performance. But financial statements often make separating the results of sold units difficult, creating the impression that what's left is better than it is.

Unusual Activities Profits from activities outside of normal business should be displayed separately because they usually aren't repeatable. For example, a manufacturing firm's one-time gain on the sale of real estate shouldn't be combined with profits from ongoing operations, because that's likely to mislead investors into overvaluing the firm.

Restructuring Charges Restructuring means reorganizing to face changed business conditions, usually by getting smaller. It generally involves charges for severance pay and closing facilities. Companies show income before and after restructuring charges, expecting investors to value firms based on the higher income before the charge because restructurings are rare. But in the 1990s, many companies restructured every few years. Doing that raises a question as to whether the charges are truly one-time events or just cover-ups for bad management.

The Calm before the Storm It's important to realize that the investing community was aware of these arguably unethical practices but didn't consider them too severe. Most people felt that

management might stretch the truth a little, but was basically honest. They also relied on the audits done by public accounting firms, which had excellent reputations for integrity, to police corporate reporting and keep statements from being misleading.

The Ethical Depths—A Major Loss of Confidence All that changed in the early 2000s when several large companies were discovered “cooking their books” to produce grossly misleading financial statements. Practices included recording completely bogus transactions to pump up revenue and profit and supporting operations with borrowed money that didn’t show up on the balance sheet because the debt was held in shadowy “partnerships” with artificially created businesses. While all this was going on, many of the top executives involved increased their individual wealth by hundreds of millions of dollars.

The most widely publicized cases were Enron, a leading player in energy; WorldCom, the telecommunications giant that owned MCI; and Tyco, a firm that participates in a wide variety of businesses. Enron and WorldCom actually went into bankruptcy. Stockholders in all three lost 80% to 100% of their investments.

But perhaps the most startling result of the scandal was the role of public accountants. Not only did they fail to prevent the deceptions allegedly perpetrated by managements, but they were also accused of participating in the deceptions themselves. Arthur Andersen, Enron’s auditor and one of the world’s largest and most respected accounting firms, failed and disappeared entirely as a result of its role in the Enron debacle.

It seems that because accounting firms are paid by the companies they audit, they have an interest in staying in the good graces of management. That creates a conflict of interest with their responsibility to the investing public. Allegations have also been made that some important financial institutions, including investment banks and brokerage houses, contributed to the deception.

The scandal led to a major review of financial reporting and auditing procedures by the accounting profession as well as congressional legislation aimed at preventing a recurrence and punishing knowing deception by senior executives. The legislation passed by Congress in 2001 is known as the Sarbanes-Oxley Act. We’ll discuss it in some detail in Chapter 5.

The Ethical Picture in the Long Run The full effect of the revelations of the early 2000s won’t be understood for a long time. Today’s investors are certainly less willing to trust in the ethics of corporate executives and Wall Street analysts than they were in the past. But it isn’t certain that their skepticism will last. It may, but investors may also shrug it off in a few months or years and chalk up the experience to the frantic stock market boom of the 1990s.

Sources: Ken Brown, “Creative Accounting: How to Buff a Company” *The Wall Street Journal* (February 21, 2002): C1.

John R. Emshwiller and Rebecca Smith, “Murky Waters: A Primer on Enron Partnerships” *The Wall Street Journal* (January 21, 2002): C1.

Aaron Elstein, “‘Unusual Expenses’ Raise Concerns” *The Wall Street Journal* (August 23, 2001): C1.

R. Smith and S. Lipin, “Are Companies Using Restructuring Costs to Fudge the Figures?” *The Wall Street Journal* (January 30, 1996).

from the **CFO**

The **orientation** of the financial analyst is **critical** and **investigative**.

concerned with creating financial statements. In finance we're concerned with using them to evaluate businesses and their prospects for the future. *In particular, financial analysis looks for problems, places where things aren't as they seem, or where results indicate the firm may be heading for trouble.*

For example, a statement of cash flows might indicate that a firm borrowed a lot of money last year. Accounting per se stops with the presentation of that fact along with information on the things money was spent on during the period. The financial analyst, however, must go further and ask why the borrowing occurred and what it implies for the future.

Perhaps the borrowing was to finance expansion into an exciting new venture. That might seem great, but the analyst wants to know if the firm will be able to support the interest payments and whether the venture will need more borrowing later before it starts to generate a profit. On the other hand, the borrowing might be because the firm isn't collecting its receivables or is holding significant useless inventory. In that case, the analyst will want to know how the problem will be resolved and what its impact on long-run profitability will be.

Keep this orientation in mind. In finance our attitude is critical and investigative.

THE STATEMENT OF CASH FLOWS

We've made the point that income as reported in the income statement does not equal cash in the pocket of the business or its owner. Accounting income includes things like depreciation, which is one of several artificial devices designed to make the income statement a representation of the long-run condition of the enterprise. Businesses, however, are run with cold, hard cash on a day-to-day basis. Therefore, another statement is needed to give users information detailing the actual movement of cash in and out of the company. That document is the **statement of cash flows**. It shows a reader where the firm's money came from and what it was spent on during the period covered.

Terminology

A more formal name for the statement of cash flows is the statement of changes in financial position, but people rarely use that awkward title. It comes from the fact that the balance sheet can be called the statement of financial position, and technically the cash statement analyzes changes in the balance sheet. Common usage involves the words "cash flow" or "funds flow." Sources and uses or sources and applications of cash or funds are also ways of referring to what we will call the statement of cash flows.

Cash statements report inflows and outflows of money. Inflows are usually represented by positive numbers while outflows are negative. Negative numbers are shown in parentheses.

Where the Statement of Cash Flows Comes From

The income statement and balance sheet emerge directly from closing the books. The statement of cash flows does not; it is constructed from the other two statements after they're produced.

HOW THE STATEMENT OF CASH FLOWS WORKS—PRELIMINARY EXAMPLES

The best way to gain an understanding of the role of cash in financial statements is to appreciate how the statement of cash flows is put together from the balance sheet and



income statement. The pages that follow will develop a working knowledge of the principles as well as the calculations involved.

It takes two balance sheets and an income statement to build a statement of cash flows for an accounting period. The income statement is from the period and the balance sheets are as of its beginning and end. (A beginning balance sheet is the ending balance sheet of the previous period.)

The cash statement analyzes where money has come from and gone to by doing two things. First, it takes net income for the period and adjusts it for some of the items that make it different from the everyday concept of income as cash in one's pocket. Second, it takes the two consecutive balance sheets and analyzes the *changes* in everything the company has and everything it owes to determine how those changes have affected the cash balance.

Applying these ideas can be a little difficult if we jump right into a business example. It helps to first consider personal examples involving familiar assets and liabilities. We'll begin with two such illustrations.

Buying a Car on Credit

Suppose Joe Jones has after-tax income of \$50,000 and spends \$40,000 on normal living expenses during a year. Also assume that at the beginning of the year he had a bank balance of \$10,000 and no other assets or liabilities. Further assume that during the year he bought a new car costing \$30,000, financing \$25,000 at the bank with a car loan. At the end of the year he has \$15,000 in the bank.

The statement of cash flows lays out these transactions in a way that highlights where the cash comes from and goes to. The "where from" and "where to" are commonly called *sources* and *uses of cash*, respectively. The statement goes on to demonstrate that the beginning balance in the bank plus the net cash flow equals the ending balance in the bank.

The idea is illustrated conceptually as follows.

Cash income	\$ 50,000	
Cash used on living expenses	<u>(40,000)</u>	
Net source of cash from income		\$10,000
Source of cash from loan		25,000
Use of cash to buy auto		<u>(30,000)</u>
Net inflow/(outflow) of cash		\$ 5,000
Beginning cash balance		\$10,000
Net cash flow		<u>5,000</u>
Ending cash balance		\$15,000

In this example the net source of cash from income is analogous to a business's net income adjusted for noncash items. This item is an important *source* of cash for Joe.

Joe *used* \$30,000 to buy an automobile. In other words, he *increased his assets* by \$30,000. In general, any time assets are increased, cash is used. Joe also *received* \$25,000 from the bank when he took out the loan, which is a liability. In other words, he realized a *source* of cash of \$25,000 by *increasing his liabilities*. In general, any increase in liabilities results in a source or inflow of cash.

It's important to keep the car and the loan separate in your mind. In our personal lives we tend to think of going into a car dealer with a down payment and coming out with a car and loan payments all in one transaction. To understand the statement of cash flows, you have to keep the asset (the car) and the liability (the loan) separate.

When he bought the car Joe didn't just spend \$5,000. He spent \$30,000 and borrowed \$25,000 at the same time.

Adding Joe's sources (income and loan) and uses (car purchase) together we get his net cash flow. Assuming all his money is in the bank, the beginning balance plus the net cash flow has to equal the ending balance. If it doesn't, something is wrong with the record keeping or accounting.

Here's a slightly more complicated illustration.

Buying and Selling Cars

Suppose at the beginning of a year Sally Smith has an expensive car with a current market value of \$20,000 and a \$14,000 loan outstanding on it. At the same time her bank balance is \$6,000. During the year she has after-tax income of \$60,000 but spends \$62,000 on living expenses. In an effort to economize, she sells her big car for \$20,000 and buys a small economy model for \$9,000 in cash (no loan). When she sells the old car she pays off the \$14,000 loan on it. At the end of the year her bank balance is \$1,000. Sally's cash flows look something like this.

Cash income	\$60,000	
Cash used on living expenses	<u>(62,000)</u>	
Net source of cash from income ²		\$(2,000)
Source of cash from selling old car	\$20,000	
Use of cash to buy new car	<u>(9,000)</u>	
Net source from car investments		11,000
Use of cash to pay off old car financing		<u>(14,000)</u>
Net inflow/(outflow) of cash		\$(5,000)
Beginning cash balance		\$6,000
Net cash flow		<u>(5,000)</u>
Ending cash balance		\$1,000

In this case, Sally *reduced her assets* by selling the old car for \$20,000. That sale was a *source* of cash. In general, when assets are reduced, the reduction is a source of cash. She also bought a new car, which was obviously an increase in her assets and a use of cash.

Sally paid off her car loan using cash. In doing so she *reduced a liability*. In general, a liability reduction is a use of cash.

Notice that Sally's net source of cash from income less expenses was negative simply because she spent more than she made this year. That added to the fact that she spent more than she gained on the cars and loan together means she has a net negative cash flow for the year. She accomplished that by pulling down her bank balance. If she didn't have any money in the bank, she could still have done it by borrowing. Then we would have shown an additional source due to an increase in a liability, the loan.

These examples help to illustrate the ideas involved in cash flow because we're all familiar with automobiles as assets and loans as liabilities. Basically, cash flows stem from either income or changes in assets and liabilities.

2. Because income is usually positive and a source of cash, a loss is conventionally shown as a negative source rather than as a use.

BUSINESS CASH FLOWS

In a business, income is represented by adjusting net income from the income statement for noncash items like depreciation. Assets and liabilities are conveniently listed on balance sheets as of the beginning and end of the year, so changes in each account can be calculated easily.

However, in a business context changes in balance sheet amounts get a little confusing when assets include things like accounts receivable and liabilities include items like accounts payable and accruals. It's not as easy to see that an increase in receivables is a use of cash as it is to understand that you need cash to buy a car. A decrease in accruals is also more difficult to fathom as a use of cash than is paying off a loan.

Cash Flow Rules

In practice we don't have to worry about thinking through how cash flows in and out of every account. Four simple rules illustrated in the preceding examples can be applied to any business's financial statements. All we need to do to analyze cash is to keep those rules in mind. The rules are that changes in balance sheet accounts result in sources and uses of cash as follows.

Asset increase = Use

Asset decrease = Source

Liability increase = Source

Liability decrease = Use

Standard Presentation

A business's statement of cash flows is organized to show cash flows from three different kinds of activities: operating, investing, and financing.

Operating activities have to do with running the business on a day-to-day basis.

Investing activities occur when the firm buys (invests in) or sells things such as fixed assets that enable it to do business. Investing activities also include long-term purchases and sales of financial assets.³

Financing activities occur when the company borrows money, pays off loans, sells stock, or pays dividends. They have to do with raising money and servicing the obligations that come along with it.

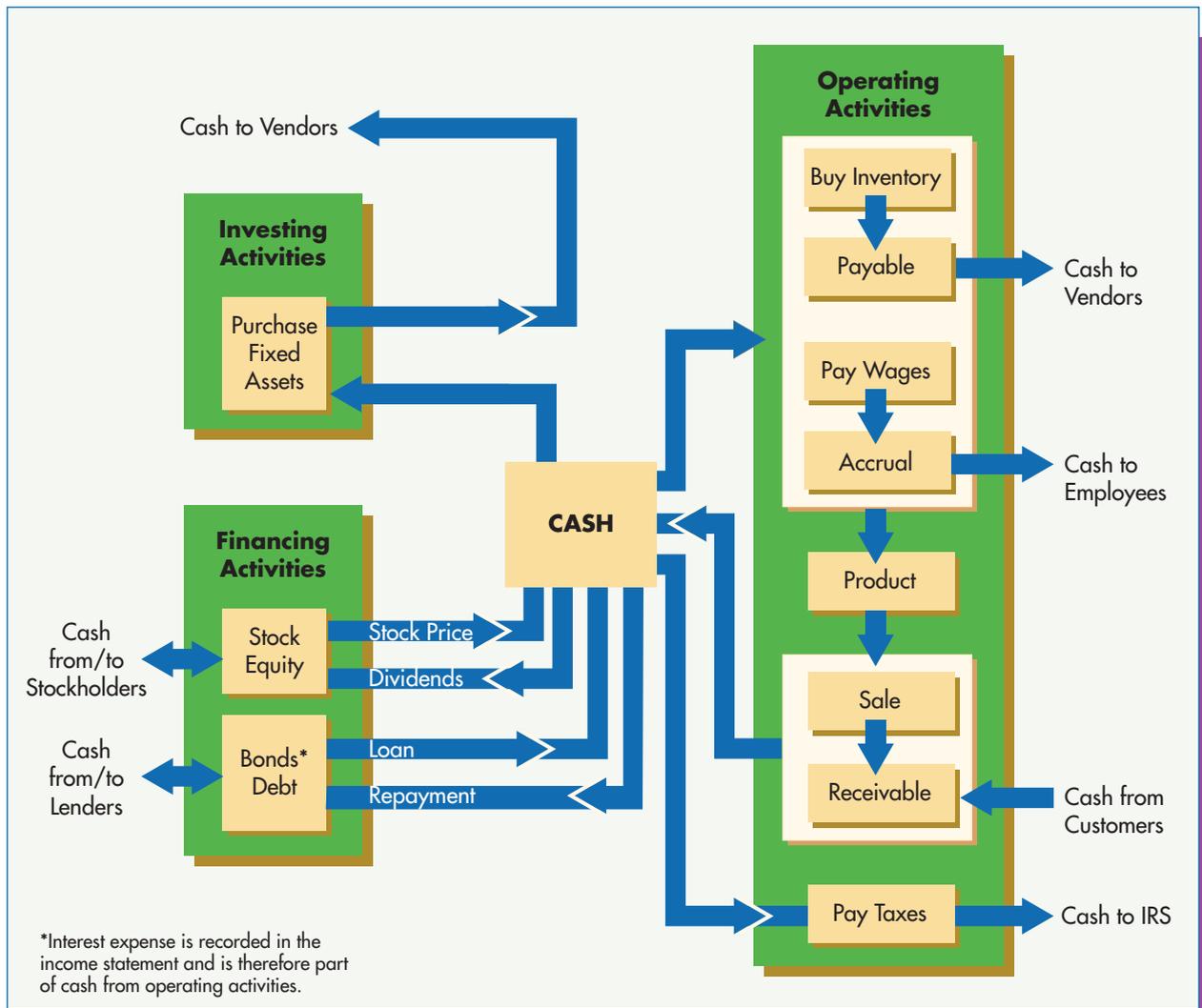
Graphic Portrayals

Before tackling a numerical example, let's fix these ideas in mind by looking at two graphic representations of cash flow in a business.

Figure 3.2 shows how cash flows in and out of a company. Notice that operating activities have to do with the normal course of business and the current accounts of the balance sheet. Investing activities generally have to do with buying long-lived assets, either real or financial. Financing activities are concerned with debt and equity.

3. The term "invest" generally means buying something that is expected to return more than its cost in the future. When individuals say "invest" they usually mean buying a financial asset. However, we sometimes use the term with physical things (investing in a house) or even intangibles (investing in an education). When we talk about investment by companies we generally mean buying the equipment used in doing business such as machinery, vehicles, and real estate.

The **statement of cash flows** presents **operating, investing, and financing** activities separately.

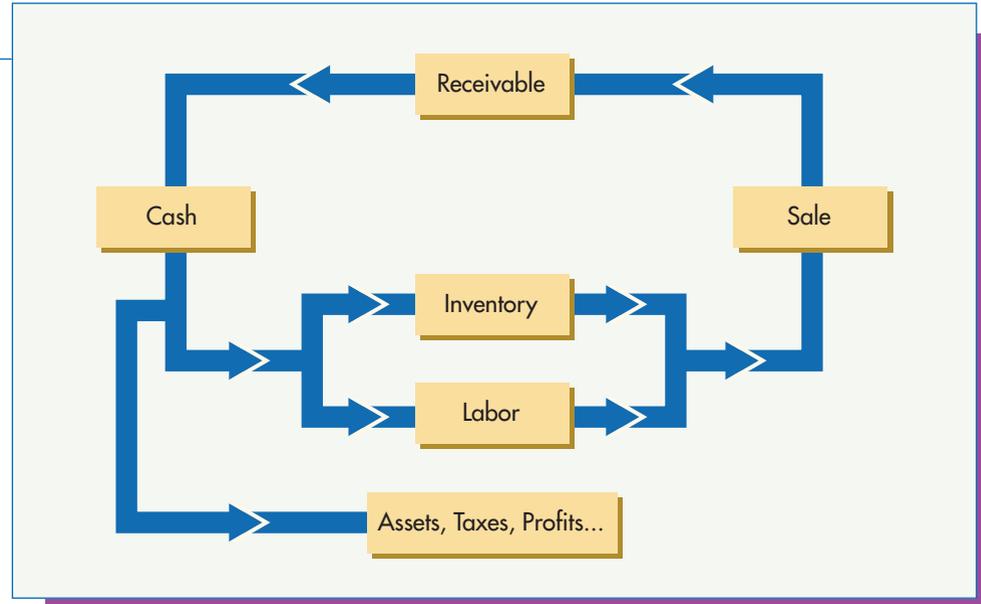
Figure 3.2 Business Cash Flows


Product is **converted** into cash, which is transformed into more product, creating the **cash conversion cycle**.

Figure 3.3 is usually called the *cash conversion cycle*, but the term *racetrack diagram* is a little more colorful and tends to fix it in mind better. Starting at the bottom of the track, a business uses cash to purchase inventory and labor to produce a product. That product is sold, resulting in a receivable. When the receivable is collected, the firm once again has cash in hand that it uses to buy more inventory and labor to produce more product and so on.

In a sense the company is running around a racetrack, converting cash to product and product to cash. You can think of the firm continually doing this equipped with some level of assets.

Given a level of assets, the firm goes around the track faster by making more sales in the period. Clearly the faster it can go around, the better off it is as long as

Figure 3.3**The Cash Conversion Cycle—The Racetrack Diagram**

it doesn't damage something else by going too fast. In other words, it's important to get a lot of sales per dollar of assets employed in the business. That's one of several measures of success.

However, a firm that just runs around the track putting all its money back into inventory wouldn't be doing its owners much good. A successful business has to pull something out each time around to buy new assets for growth and to replace old ones that wear out, to pay taxes, and for profit. Clearly, the larger the slice that can be taken out of cash flow each time around the track, the better off the firm is. This idea is simply profitability and is shown in the lower part of the figure.

Summarizing, the diagram illustrates that a business has to do two things for success: sell a lot for its level of assets and sell at a reasonable profit margin given its costs and expenses.

Notice that the two things work against each other. The business can always sell more if it charges less, but then it will have less profit. Conversely, a higher price yields more profit but lower sales. We'll come back to this idea toward the end of the chapter.

CONSTRUCTING THE STATEMENT OF CASH FLOWS

Now we can look at putting together a statement of cash flows for a business. The best way to do that is to work through a numerical example.

The Belfry Company's Cash Flows

Constructing a business cash flow statement requires balance sheets at the beginning and end of the period under consideration and an income statement for that period.

Consider the following statements for the hypothetical Belfry Company in which the balance sheets are arranged vertically.

Belfry Company Balance Sheet For the period ended 12/31/x2			Belfry Company Income Statement For the period ended 12/31/x2	
ASSETS			Sales	\$10,000
	12/31/X1	12/31/X2	COGS	<u>6,000</u>
Cash	\$1,000	\$ 1,400	Gross margin	\$ 4,000
Accounts receivable	3,000	2,900	Expense	\$ 1,600
Inventory	<u>2,000</u>	<u>3,200</u>	Depreciation	<u>500</u>
CURRENT ASSETS	\$6,000	\$ 7,500	EBIT	\$ 1,900
Fixed assets			Interest	<u>400</u>
Gross	\$4,000	\$ 6,000	EBT	\$ 1,500
Accumulated deprec.	<u>(1,000)</u>	<u>(1,500)</u>	Tax	<u>500</u>
Net	\$3,000	\$ 4,500	Net income	\$ 1,000
TOTAL ASSETS	\$9,000	\$12,000		
LIABILITIES				
Accounts payable	\$1,500	\$ 2,100		
Accruals	<u>500</u>	<u>400</u>		
CURRENT LIABILITIES	\$2,000	\$ 2,500		
Long-terms debt	\$5,000	\$ 6,200		
Equity	<u>2,000</u>	<u>3,300</u>		
TOTAL CAPITAL	\$ 7,000	\$ 9,500		
TOTAL LIABILITIES AND EQUITY	\$9,000	\$12,000		

In addition to the information on these statements, we'll assume the company sold stock for \$800 during the year and paid a \$500 dividend.

Notice that we've shown depreciation separately in the income statement for convenience. Most presentations don't do that. We'll develop the statement of cash flows for Belfry one activity at a time.

Operating Activities

Operating activities are the things a company does on a day-to-day basis to conduct its business. Typically they include buying inventory, producing and selling product, paying expenses and taxes, and collecting on credit sales. The focus of these activities is the production of net income, so we start the cash statement with that figure.

However, net income includes items that don't represent cash flows in the current period. Our next step is therefore to adjust those out. The result is called *operating income*.

In Belfry's case, the only adjustment necessary to calculate operating income is to add back depreciation, which was subtracted in the calculation of net income.

Net income	\$1,000
Depreciation	<u>500</u>
Operating income	\$1,500

Operating activities involve the **income statement** and **current** balance sheet accounts.

Next we recognize that the money from operating transactions runs through the current balance sheet accounts. Therefore changes in those accounts are part of operating cash flow. We analyze the balances *other than cash* and classify the changes as sources or uses of cash according to the cash flow rules. The cash account is handled separately later.

In Belfry’s case, accounts receivable decreased from \$3,000 to \$2,900, providing a \$100 source of cash because according to the second rule an asset decrease is a source. Similarly, inventory increased from \$2,000 to \$3,200 for a use of \$1,200 according to the first rule.

Apply the third and fourth rules to the changes in accounts payable and accruals to get the following sources and uses.

Account	Source/(Use)
Receivables	\$ 100
Inventory	(1,200)
Payables	600
Accruals	<u>(100)</u>
	\$ (600)

The sum of the current account changes and operating income is cash from operating activities. The typical presentation is illustrated for Belfry as follows.

Net income	\$1,000
Depreciation	500
Net changes in current accounts	<u>(600)</u>
Cash from operating activities	\$ 900

Investing Activities

Cash from investing activities is simple in this example. The only entry comes from an increase in Belfry’s fixed assets of \$2,000. This is reflected by the increase in gross fixed assets from \$4,000 to \$6,000, which is a use of cash according to the first rule.

Notice that we use the gross fixed assets account for this calculation rather than the net. That’s because the net figure includes a reduction for accumulated depreciation, the change in which is the other side of the entry that put depreciation on the income statement. That depreciation is already included in the cash flow statement in the operating section, and we don’t want to repeat it here.

Hence, cash from investing activities is

Purchase of fixed assets (\$2,000)

Financing Activities

There are three financing activities in this example. The first is an increase in long-term debt, a source according to the third rule. The company appears to have taken out another loan. The second is a sale of stock, and the third a dividend payment. The sale of stock results in an increase in equity, a liability,⁴ and is a source according

4. Equity is a “liability” of the company to its owners. We treat it as a liability with respect to the cash flow rules.

Investing activities typically include purchasing **fixed assets**.

Financing activities deal with the **capital accounts, long-term debt** and **equity**.

to the third rule. The dividend payment is clearly a use of money. It reduces equity and is therefore a use according to the fourth rule.

Cash from financing activities is calculated as follows.

Increase in long-term debt	\$1,200
Sale of stock	800
Dividend paid	<u>(500)</u>
Cash from financing activities	\$1,500

The Equity and Cash Accounts

Notice that we haven't calculated the change in equity and classified it as a source or a use of cash. That's because the procedure breaks that change into three parts and includes them individually. Let's lay the pieces out. The change in equity is the sum of net income and the sale of new stock less the dividend paid. These are as follows for Belfry.

Net income	\$1,000
Stock sale	800
Dividend	<u>(500)</u>
Total change in equity	\$1,300

The stock sale and the dividend are included under financing activities, while the addition of net income to equity shows up under operating activities.

Also notice that we haven't done anything with the cash account. It's been omitted because the cash flow total of the three activities we've presented so far must equal the change in the cash account. That's shown as a reconciliation at the end of the statement.

In Belfry's case the sum of operating, investing, and financing activities is a positive \$400, so we have the following reconciliation.

Beginning cash balance	\$1,000
Net cash flow	<u>400</u>
Ending cash balance	\$1,400

The entire statement of cash flows for Belfry is shown on page 79.

To summarize, the statement of cash flows takes information from the income statement and balance sheet and displays it in a manner that highlights the movement of cash. No new information is created; what is already there is simply rearranged in a way that's more usable in the day-to-day running of the business.

Conclusions

In this case, examination of the statement of cash flows leads to some concern about the Belfry Company. The firm is quite profitable, earning 10% on sales, but still had to borrow substantially during the year. Clearly the fixed asset purchase had something to do with the additional funds required. One must ask whether that expenditure was entirely necessary. Another concern is the sudden increase in inventory. Does it mean that some of the existing inventory isn't good? If so, this could portend a big loss.

You should always keep in mind the fact that it's cash that really counts in business, not net income.

Belfry Company
Statement of Cash Flows
For the period ended 12/31/x2

CASH FROM OPERATING ACTIVITIES	
Net income	\$ 1,000
Depreciation	500
Net changes in current accounts	(600)
Cash from operating activities	<u>\$ 900</u>
CASH FROM INVESTING ACTIVITIES	
Purchase of fixed assets	\$(2,000)
CASH FROM FINANCING ACTIVITIES	
Increase in long-term debt	\$ 1,200
Sale of stock	800
Dividend paid	(500)
Cash from financing activities	<u>\$ 1,500</u>
NET CASH FLOW	\$ 400
Beginning cash balance	\$ 1,000
Net cash flow	<u>400</u>
Ending cash balance	\$ 1,400

To drive that point home, let's ask another question about Belfry. Notice that during the year it had to borrow an additional \$1,200 from the bank. Would a bank have been likely to extend that additional credit?

In fact, a bank might have been reluctant to advance more money to this company. Notice that the firm's capital (long-term debt plus equity) is in the neighborhood of 70% debt. We'll see later that such a high proportion of debt is beyond the comfort level of most lenders. The bank could have refused further advances, putting the company in a cash bind. If that had caused Belfry to fail to make its payroll, the company could have been out of business overnight.

Yet Belfry is earning great profits in terms of net income, 10% of sales. Take the lesson to heart: A firm can go broke profitably. Small businesses do it all the time, and it happens to big companies with surprising frequency.

FREE CASH FLOWS

Free cash flow refers to whether a firm generates cash beyond its own needs. Under normal conditions, most firms generate positive cash flows from operating activities, but some of those funds have to be used to maintain a long-run competitive position. The largest such nonoperating cash requirement is typically replacing worn-out fixed assets.

Free cash flow is defined as net cash flow less such requirements. It is essentially the cash available for distribution to common stockholders. If free cash flow is negative, the firm must either borrow or raise more equity capital to be viable in the long run.

The free cash flow concept is especially important when one company acquires another. The acquiring firm needs to know whether its new business will need cash infusions after the acquisition or will generate funds that can be used elsewhere.

from the **CFO**

A firm that manages cash poorly can **go out of business** while making an **accounting profit**.

Cash generated **beyond reinvestment** needs is **free cash flow**.

Financial ratios are formed from sets of financial statement figures. Ratios **highlight** different aspects of **performance**.

For a business, **liquidity** refers to its **ability to pay its bills** in the short run.

RATIO ANALYSIS

People who make judgments about businesses by reading financial statements have developed some relatively standard methods with which they analyze information. The general technique is known as **ratio analysis**. Its use is virtually universal among financial professionals. It is therefore important that you be familiar with the basic technique and a few of the more commonly used ratios.

Ratio analysis involves taking sets of numbers out of the financial statements and forming ratios with them. The numbers are chosen so that each ratio has a particular meaning to the operation of the business.

An example will make the idea clear. There's a ratio that gives a quick indication of whether the company will have the means to pay its bills during the next year. It's called the **current ratio** and is based on the definitions of current assets and current liabilities.

Recall from Chapter 2 that the money coming into a firm from normal operations passes through current assets. Similarly, outgoing money normally passes through current liabilities. Further, the definition of "current" is that cash will be generated or required within a year.

It's clear that to remain solvent, a company must have at least as much money coming in as it has going out. This fact suggests that comparing the sizes of current assets and current liabilities at a point in time will give an indication of whether operating cash flows will be positive or negative in the near future. The current ratio does just that. It's formed by dividing current assets by current liabilities, and must exceed 1.0 or the firm can expect to run short of cash within the next year.⁵ The current ratio measures **liquidity**, which in this context refers to the company's ability to pay its bills in the short run.

Numerous ratios have been devised, each having a special significance like the current ratio. We'll cover several of the most commonly used ratios in the remainder of this chapter.

COMPARISONS

Ratios by themselves have some value, but not nearly as much as they have when they're compared with other similar figures. For example, a current ratio of 1.8 in a particular business might seem all right by itself, but it could cause concern if competing firms have current ratios in excess of 3.0. In such a case we would suspect that some characteristic of the business requires great liquidity, and the firm we are analyzing doesn't have it.

Ratio analysis is usually conducted in the context of one or more of three comparisons. Comparisons are made with respect to history, the competition, and budget.

History

Comparison with history means looking at a ratio next to the same figure calculated for the same organization in one or more immediately preceding accounting periods. The idea is to look for trends. If a firm's current ratio is seen to be decreasing steadily over a number of periods, the analyst would ask why.

5. The current ratio generally needs to be quite a bit greater than 1.0. If future inflows and outflows are just equal, timing problems can be expected if the outflows come first.

The Competition

The performance of other companies in the same field is always a good yardstick for evaluating a firm's performance. If a particular measure is substantially off what others are doing, it's a good idea to find out why. Industry average data are often available through trade associations, government publications, banking publications, and the publications of investment analysts.

Budget

Most businesses of any size develop financial plans for the future. We'll study business planning in Chapter 4. For now it's enough to understand that a plan involves a projected set of financial statements from which ratios can be developed. When financial performance is being evaluated, what the organization really did is always compared with what management said it would do in their plan (budget) for the period. Comparing planned and actual ratios highlights where management needs to put its attention in running the business.

Ratios are typically compared with similar figures from **history**, the **competition**, and **budget**.

COMMON SIZE STATEMENTS

The first step in a financial analysis is usually the calculation of a set of ratios known as **common size statements**. The common size income statement is the most frequently used. The idea can best be understood with an example.

Suppose we're interested in comparing the financial performance of two companies in the same line of business that are substantially different in size. For example, consider the income statements of Alpha and Beta.

A **common size income statement** presents each line item as a **percent of revenue**.

	Alpha	Beta
Sales revenue	\$2,187,460	\$150,845
Cost of sales	<u>1,203,103</u>	<u>72,406</u>
Gross margin	\$ 984,357	\$ 78,439
Expenses	<u>505,303</u>	<u>39,974</u>
EBIT	\$ 479,054	\$ 38,465
Interest	<u>131,248</u>	<u>15,386</u>
EBT	\$ 347,806	\$ 23,079
Tax	<u>118,254</u>	<u>3,462</u>
Net income	\$ 229,552	\$ 19,617

It's hard to tell which company is doing a better job of controlling costs and expenses by looking at the dollar figures because Alpha is so much larger than Beta.

The comparison is made much easier by creating a *common size* statement for each company to abstract away from absolute dollars and state things in relative terms. A common size income statement is formed by stating each line as a percentage of revenue. The percentages are usually stated to the first decimal place and displayed next to the dollar figures. Let's look at the comparison of Alpha and Beta with the aid of common size statements.

	Alpha		Beta	
	\$	%	\$	%
Sales revenue	\$2,187,460	100.0	\$150,845	100.0
Cost of sales	<u>1,203,103</u>	<u>55.0</u>	<u>72,406</u>	<u>48.0</u>
Gross margin	\$ 984,357	45.0	\$ 78,439	52.0
Expenses	<u>505,303</u>	<u>23.1</u>	<u>39,974</u>	<u>26.5</u>
EBIT	\$ 479,054	21.9	\$ 38,465	25.5
Interest	<u>131,248</u>	<u>6.0</u>	<u>15,386</u>	<u>10.2</u>
EBT	\$ 347,806	15.9	\$ 23,079	15.3
Tax	<u>118,254</u>	<u>5.4</u>	<u>3,462</u>	<u>2.3</u>
Net income	\$ 229,552	10.5	\$ 19,617	13.0

Each percentage figure below sales is a ratio of that line's dollars to revenue dollars. The ratio of cost of sales (or cost of goods sold) to sales revenue is generally called the *cost ratio*, while expenses as a percentage of revenue can be called the *expense ratio*. Net income as a percentage of sales has a name of its own, *return on sales*, and is one of the ratios we'll look at later.

Comparing the two columns of ratios in our example, we can immediately see significant differences in the way the two companies are operating. Alpha's cost is 55% of revenues while Beta's is only 48%. This is unusual because one would expect the larger company to have economies of scale in production that would make it more efficient than the smaller firm.

Several explanations are possible. Alpha might have some production problems, Beta might be particularly good at what it does, or there may be a difference in what they're making. In the last situation Alpha might be producing a simple bottom-of-the-line product that sells at a minimal markup while Beta might be making a fancy customized version of the same thing that's marked up much higher.

The point is that the common size analysis leads us to ask the right questions. It doesn't give us the answers, but it gets our investigation of problems started in the right direction.

Common size analysis is particularly useful in comparing a firm's performance with its own history. Unfavorable trends in cost or expense ratios from this year to last and the year before are signals to management that should never be overlooked or taken lightly.

A set of common size statements is generally the first thing an analyst prepares when starting a project.

Common size balance sheets can also be constructed that state everything as a percentage of total assets. They can be useful in determining whether a firm has relatively too much money tied up in inventory or receivables, or whether it uses more equipment than it should.

RATIOS

In the following pages we'll present some of the more commonly used ratios of financial analysis. Each ratio is designed to illuminate some aspect of how the business is doing. In each case we'll illustrate how the ratio is calculated, discuss the rationale behind its use, and explain what it's telling the analyst.

Remember that ratios are most meaningful when used in comparisons. For that reason it's difficult to make a generalization about what a good or an acceptable value is for any particular figure. For example, one of the ratios we'll be talking about

from the **CFO**

measures how effectively the firm uses inventory. With respect to that ratio, a good number for a manufacturing company would be terrible for a retailer.

After we've discussed each ratio, we'll calculate its value for the Belfry Company, using the financial statement shown on page 76.

A Note on Average versus Ending Values

Notice that we have a beginning and an ending balance sheet for the Belfry Company, which brings up a computational question. When a ratio calls for a balance sheet figure, should we use the beginning, the ending, or an average value?

The answer depends on what the ratio is measuring. If it pertains to a position or status at the end of the year, ending values are appropriate. On the other hand, if the ratio measures an activity that goes on during the entire period, average balance sheet figures better reflect performance. Beginning values alone are never appropriate.

The difference between average and ending values isn't very important if the company is relatively stable and account balances aren't changing much. However, it can be significant if the firm is growing or shrinking rapidly.

Sophisticated analysts always use average balances where appropriate. However, in order to keep the computations in our illustrations and problems simple, we will consistently use ending balances. You should just be aware that the issue exists.

Categories of Ratios

Ratios can be categorized according to the kinds of issues they address. The ones we'll discuss fit into five classifications: liquidity, asset management, debt management, profitability, and market value.

Liquidity ratios indicate the firm's ability to pay its bills in the short run. *Asset management* ratios show how the company uses its resources to generate revenue and profit and to avoid cost. *Debt management* ratios show how effectively the firm uses other people's money and whether it's using too much borrowed money. *Profitability* ratios give us several measures by which to assess the success of the whole venture in making money. *Market value* ratios give an indication of how investors feel about the company's financial future.

Ratios fall into five categories: **liquidity**, **asset management**, **debt management**, **profitability**, and **market value**.

LIQUIDITY RATIOS

Liquidity ratios are of particular concern to lenders and suppliers who provide products and services to the firm on credit. They want to be sure the company has the ability to pay its debts.

The Current Ratio

The current ratio is the primary measure of a company's liquidity—that is, its ability to meet its financial obligations in the near future. The calculation is

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

The reasoning behind the ratio was discussed earlier as an example. If everything coming in the near future is a current asset today, and everything to be paid out in the near future is a current liability today, then current assets should be substantially above current liabilities to ensure solvency. That means the current ratio has to exceed 1.0. In general, a figure greater than 1.5 or 2.0 is required for comfort.

Liquidity ratios measure the ability to meet short-term **financial obligations**.

Having said that, we should point out two anomalies that occur with respect to this ratio. If you look at the balance sheets of large, sophisticated companies that are doing well, you'll often see current ratios in the neighborhood of 1.0. Does this mean these firms are in danger of insolvency?

The answer is generally no in spite of the low current ratio. The reason is that the firms are being managed very well. Holding current assets like receivables and inventory ties up money that could be used elsewhere. Hence, firms try to operate with as few current assets as possible. Companies which do that well can have relatively low current ratios if they have a line of credit with a bank to cover temporary cash shortages.

It's also important to be aware that a high current ratio can be misleading. Inventories and receivables can be overstated, meaning some items in those accounts are valueless and will never turn into cash. If those items remain on the balance sheet, they can result in an inflated current assets figure and a falsely comforting current ratio.

Belfry's current ratio is

$$\text{current ratio} = \frac{\$7,500}{\$2,500} = 3.0$$

The current ratio is a pure number and is generally not referred to in units of any kind.

The Quick Ratio or Acid Test

The **quick ratio** is conceptually similar to the current ratio. The calculation is

$$\text{quick ratio} = \frac{\text{current assets} - \text{inventory}}{\text{current liabilities}}$$

The liquidity measure provided by the current ratio depends on the conversion of inventory to cash in a reasonable time. However, as we described in Chapter 2, inventory is particularly subject to valuation problems and is often overstated. Inventory also takes more time to convert to cash than other current items.

As a result of these problems, analysts look for a liquidity measure that does not depend on inventory. The quick ratio simply takes it out of current assets in the calculation. The quick ratio is also called the *acid test*, which implies a particularly tough, discerning test.

Current assets sometimes contain minor items such as prepaid expenses that never become cash; they, too, should be subtracted when calculating the quick ratio. In Belfry's case we have

$$\text{quick ratio} = \frac{\$7,500 - \$3,200}{\$2,500} = 1.7$$

Like the current ratio, the quick ratio isn't stated in any particular units.

ASSET MANAGEMENT RATIOS

Asset management ratios address the fundamental efficiency with which a company is run. They help an analyst understand the firm's basic competitiveness.

The Average Collection Period (ACP)

The **average collection period (ACP)** represents the average number of days the firm takes to collect its receivables. That is, how long does it take to get paid on credit

from the **CFO**

The **ACP** measures the time it takes to **collect** on credit sales.

sales? The ACP is also known as the DSO for *days sales outstanding*, or the receivables cycle. The ACP is stated in *days* and is calculated as follows.

$$\text{ACP} = \frac{\text{accounts receivable}}{\text{average daily sales}}$$

where average daily sales is sales/360. Multiplying the numerator and denominator by 360 gives a more convenient formulation.

$$\text{ACP} = \frac{\text{accounts receivable}}{\text{sales}} \times 360$$

It is common practice to use a 360-day year made up of twelve 30-day months in these calculations.⁶

Clearly, the longer a firm takes to collect its money the worse off it is. Although there are significant exceptions, most credit business is done on terms of 30 days. Frequently a discount is offered for faster payment on the order of 10 days.

Customers often stretch credit terms by paying a few days late, and sellers, who are anxious to keep their business, don't complain over minor delays. That means it's not unusual to see ACPs of 35 to 45 days in the normal course of business in some industries. However, if the ACP exceeds the company's terms of sale by more than 50%, there are probably serious credit problems.

Collection problems have several important implications. The most apparent is that the firm may be granting credit to customers that lack either the ability or the intent to pay. Another possibility, however, is that customers are finding something wrong with the company's product. Customer dissatisfaction frequently results in a reluctance to pay the bill.

The proper interpretation of a high ACP is very important. Although the ACP represents an average collection period, a high figure doesn't usually mean that the average customer is paying excessively slowly. It may imply that while most receivables are being collected fairly promptly, a few are very old, as much as six months or a year. These are unlikely ever to be realized in cash.

Remember from our discussion in Chapter 2 that management is sometimes reluctant to write off questionable receivables because doing so reduces profit. The result of that tendency is an overstated receivables account, which means that the firm's balance sheet is worth less than it purports to be.

Old receivables should be written off without delay or at least reserved through an addition to the allowance for doubtful accounts.

The value of the receivables balance net of the allowance for doubtful accounts should be used in the calculation. For Belfry we have the following ACP.

$$\text{ACP} = \frac{\$2,900}{\$10,000} \times 360 = 104.4 \text{ days}$$

This is not a good result. Belfry clearly has a problem collecting money from at least some of its credit customers.

The Inventory Turnover

The **inventory turnover ratio** is an attempt to measure whether the firm has excess funds tied up in inventory. The ratio is calculated as follows.

$$\text{inventory turnover} = \frac{\text{cost of goods sold}}{\text{inventory}}$$

6. The 360-day year is common, but so is the use of a 365-day year. We'll use both conventions from time to time.

Inventory turnover gives an indication of the **quality** of inventory as well as **how well it is managed**.

from the **CFO**

Holding inventory costs money. Inventory costs include interest, storage, insurance, and taxes. In addition, the more inventory a company holds, the more it has at risk of spoiling and becoming obsolete. The inventory turnover measures how many times a year the firm uses up an average stock of goods. A higher turnover is better in that it implies doing business with less tied up in inventory.

A low turnover figure can mean some old inventory is on the books that isn't being used. What is being used may be turning over adequately, but some material can just be dead weight. Such old stock should be disposed of for whatever can be gotten for it.

Operating with too little inventory can create problems too. Excessively low inventory levels cause stockouts—running out of raw material in the factory or not having the product a customer wants on hand. The result is work stoppages and lost sales. There is definitely a right amount of inventory somewhere between too much and too little. The inventory turnover ratio helps to find it.

An alternate formulation of the inventory turnover ratio involves using sales in the numerator rather than cost of goods sold. In practice the cost of goods sold formulation is preferred because cost and inventory are comparable numbers, whereas sales includes expenses and profit. Either formulation can be used if comparisons are made consistently.

Belfry's inventory turnover using cost of goods sold is

$$\text{inventory turnover (based on COGS)} = \frac{\$6,000}{\$3,200} = 1.9$$

The alternative formulation with sales in the numerator is

$$\text{inventory turnover (based on Sales)} = \frac{\$10,000}{\$3,200} = 3.1$$

Inventory turnover is a pure number, but it's usually stated in units of "turns" or "times," which are written as "×."

Notice that in this example the results would be considerably different if an average inventory balance was used in the denominator. That's because inventory changed a lot during the year.

Fixed Asset Turnover and Total Asset Turnover

Fixed and total asset turnovers measure the relationship of the firm's assets to a year's sales.

$$\text{fixed asset turnover} = \frac{\text{sales}}{\text{fixed assets}}$$

$$\text{total asset turnover} = \frac{\text{sales}}{\text{total assets}}$$

A business can be thought of as using its assets in conjunction with the skills of its employees to generate revenue and profit. These ratios show the relationship between assets and sales. In general, a company that generates more sales with a given level of assets does better than a firm that generates fewer sales with the same assets.

The two ratios allow us to focus on either fixed or total assets. The total assets ratio tends to be more widely used. The ratio using fixed assets is appropriate in industries where significant equipment is required to do business.

These ratios are long-term measures of performance, which are of primary interest to equity investors and stock market analysts. Both asset values are stated net of accumulated depreciation. For the Belfry Company we have the following ratios.

$$\text{fixed asset turnover} = \frac{\$10,000}{\$4,500} = 2.2$$

$$\text{total asset turnover} = \frac{\$10,000}{\$12,000} = .83$$

The units here are generally stated as “times,” sometimes with the symbol “×.” For example, Belfry’s fixed asset turnover might be written as $2.2 \times$ for “2.2 times.”

DEBT MANAGEMENT RATIOS

Debt management deals with how the firm uses other people’s money to its own advantage. By “other people’s money” we mean borrowing as well as trade credit and other liabilities. In financial analysis, we’re primarily concerned that a company doesn’t use so much of these funds that it assumes excessive risk. This is an important point. The problem with using other people’s money is that it requires future cash outflows for interest and/or repayment. If a firm’s operations don’t supply enough cash for those payments, it can get in big trouble.

Terminology

The term *debt* in ratio analysis requires a little amplification. Some authorities use the word to mean any source of money other than equity. Applied to our examples that definition means *debt* is the sum of long-term debt and current liabilities. Others prefer to restrict the idea of *debt* to interest-bearing obligations, which are generally long-term borrowings.

Theorists tend to prefer the first interpretation. They like to add current liabilities and long-term debt to arrive at a *total debt* figure for use in ratio analysis. Businesspeople, however, are more likely to limit the definition of debt to long-term, interest-bearing borrowing. Clearly this can lead to some confusion.

In this book, we’ll simply be careful to say exactly what we mean. We’ll call *total debt* the sum of current liabilities and long-term debt. Long-term debt will mean just that, and we’ll take the word *debt* by itself to mean formal borrowing regardless of term. Where common usage is different we’ll explain.

The Debt Ratio

The **debt ratio** uses the total debt concept and measures the relationship between total debt and equity in supporting the firm’s assets. That is, it tells us how much of the firm’s assets are supported by other people’s money.

$$\text{debt ratio} = \frac{\text{long-term debt} + \text{current liabilities}}{\text{total assets}}$$

A high debt ratio is viewed as risky by investors, especially lenders. Debt management ratios are generally stated as percentages.

Belfry’s debt ratio is

$$\text{debt ratio} = \frac{\$6,200 + \$2,500}{\$12,000} = 72.5\%$$

Debt to Equity Ratio

The **debt to equity ratio** generally uses just long-term debt and is stated somewhat differently than other ratios.

$$\text{debt to equity ratio} = \text{long-term debt} : \text{equity}$$

This ratio is a measure of the mix of debt and equity within the firm's total capital. It is an important measure of risk, because a high level of debt can burden the income statement with excessive interest. This makes the firm's profitability fragile in recessionary times. Interest is known as a **fixed financial charge**, and must be paid regardless of whether or not revenues and profits are healthy. Hence in a business downturn, large interest charges can throw a company into a loss position quickly. The riskiness associated with debt and interest is called **financial risk**.

This ratio is unusual in that it is commonly stated as a proportion rather than as a decimal or a percentage. For example, if capital of \$100 includes debt of \$33.33, conventional terminology would describe the debt to equity ratio as "one-third—two-thirds," or "33/67." If capital is two-thirds debt, we would say the ratio is "2 to 1 debt to equity."

For Belfry we have

$$\text{debt to equity} = \$6,200 : \$3,300$$

This would be stated as 1.9 : 1 (1.9 to 1) because $\$6,200/\$3,300 = 1.9$.

Times Interest Earned (TIE)

TIE gets at the idea of burdening the income statement with interest more directly. It measures the number of times interest can be paid out of earnings before interest and taxes (EBIT).

$$\text{TIE} = \frac{\text{EBIT}}{\text{interest}}$$

TIE is called a *coverage ratio*. For example, if EBIT is \$100 and interest is \$10, so TIE is 10, we would say that interest is covered 10 times. Clearly, the more times earnings cover existing interest, the safer it is to lend the firm more money.

For the Belfry Company we have

$$\text{TIE} = \frac{\$1,900}{\$400} = 4.8$$

The appropriate unit is times.

Cash Coverage

There's an obvious problem with the TIE ratio. Interest is a cash payment, but EBIT is not exactly a source of cash. Rather, it's an income statement subtotal that may be considerably different from cash flow. In other words, more or less cash than EBIT may be available in any given year to pay interest. The problem can be partially solved by recognizing that the biggest difference between EBIT and a comparable cash figure is depreciation. It is subtracted as part of cost and expense in the calculation of EBIT.

A better approximation of coverage is available if we form another ratio with depreciation added to EBIT in the numerator. This ratio is called *cash coverage*.

$$\text{cash coverage} = \frac{\text{EBIT} + \text{depreciation}}{\text{interest}}$$

Fixed financial charges like interest increase a firm's **financial risk**.

A high level of **interest coverage** implies safety.

Belfry's cash coverage is

$$\text{cash coverage} = \frac{\$1,900 + \$500}{\$400} = 6.0$$

Fixed Charge Coverage

The TIE and cash coverage ratios recognize interest as a *fixed* financing charge. The term “fixed” implies that interest must be paid regardless of business conditions, unlike dividends, which may be reduced if earnings are poor.

In recent years leasing has supplemented debt as a means of acquiring assets. Instead of borrowing to buy equipment, businesses lease the same equipment and make lease instead of interest payments. We'll discuss leasing in Chapter 7.

However, if a company's leased equipment is necessary to stay in business, or if the leases are contractually noncancelable, the payments become fixed charges in the sense that they have to be paid regardless of conditions, just like interest.

We can adjust the TIE ratio to recognize this additional fixed charge. Because lease payments have been subtracted along with other costs and expenses to come to EBIT, they must be added back in the numerator to arrive at a cash figure available to pay all fixed charges. The same amounts must also be added to the denominator as fixed charges equivalent to interest. The resulting ratio is known as *fixed charge coverage*.

$$\text{fixed charge coverage} = \frac{\text{EBIT} + \text{lease payments}}{\text{interest} + \text{lease payments}}$$

Other fixed charges can be added to the numerator and denominator when appropriate.

We'll assume that the Belfry Company has \$700 of lease payments within its cost and expense figures. Its fixed charge coverage is then

$$\text{fixed charge coverage} = \frac{\$1,900 + \$700}{\$400 + \$700} = 2.4$$

Debt management ratios are important to both creditors and stockholders. Creditors want to make sure funds are available to pay interest and principal, and are therefore particularly interested in short-run coverage ratios. Stockholders are concerned about the impact of excessive debt and interest on long-term profitability.

PROFITABILITY RATIOS

The most fundamental measure of a business's success is profit. Without profit there are no dividends, and without dividends or the expectation of them, no one will invest in stock.

Lenders don't like profitless companies either. Firms that are losing money or barely breaking even are perilously close to not being able to repay their loans.

Profitability ratios give us relative measures of the firm's money-making success. That is, they gauge profits per dollar of sales made, assets employed, or equity invested. They're generally stated as percentages.

Return on Sales (ROS)

Return on sales is also called the *profit margin* or *net profit margin*. It is simply net income as a percentage of sales.

$$\text{ROS} = \frac{\text{net income}}{\text{sales}}$$

Lease payments are **fixed** financial charges similar to interest.

ROS measures control of the income statement: **revenue, cost** and **expense**.

Notice that this ratio is the bottom line of the common size income statement. It is a fundamental indication of the overall profitability of the business. It gives insight into management's ability to control the income statement items of revenue, cost, and expense.

Belfry's ROS is

$$\text{ROS} = \frac{\$1,000}{\$10,000} = 10\%$$

Return on Assets (ROA)

A business uses assets and the skills of its people to earn a profit. ROA quantifies the success of that effort with respect to assets by stating net income as a percentage of total assets.

$$\text{ROA} = \frac{\text{net income}}{\text{total assets}}$$

ROA measures the overall ability of the firm to utilize the assets in which it has invested to earn a profit.

Belfry's ROA is

$$\text{ROA} = \frac{\$1,000}{\$12,000} = 8.3\%$$

Return on Equity (ROE)

ROE is the most fundamental profitability ratio. It states net income as a percentage of equity.

$$\text{ROE} = \frac{\text{net income}}{\text{equity}}$$

ROE measures the firm's ability to earn a return on the owners' invested capital. It takes the ROA concept one step further by factoring in the effect of borrowed money. If the firm has substantial debt, ROE tends to be higher than ROA in good times and lower in bad times. If there is little or no debt, ROE and ROA are close to the same. We'll talk about the effect of borrowed money, called *leverage*, in detail in Chapter 14. For Belfry we have

$$\text{ROE} = \frac{\$1,000}{\$3,300} = 30.3\%$$

MARKET VALUE RATIOS

The ratios we've discussed so far all pertain to the internal management of the firm. As such they are all more or less under the control of management. Another set of ratios compares certain financial statement figures to the value the stock market places on the firm. These ratios are less controllable by management because the perceptions and attitudes of the investing public are imposed on the actions of the company in arriving at market value. Management can influence those perceptions and attitudes, but it doesn't control them.

The market value of a company is reflected in the price of its stock. Multiplying the per-share price by the number of shares outstanding leads to a value for the company as a whole. However, it is common practice to think in terms of per-share values.

ROA adds the effectiveness of **asset management** to ROS.

ROE adds the effect of **borrowing** to ROA.

The **P/E ratio** is an indication of the value the **stock market** places on a company.

Price/Earnings Ratio

This ratio compares the market price of the stock to the **earnings per share** calculated from the latest income statement. Earnings per share is simply net income divided by the number of shares of common stock outstanding. It is usually abbreviated as **EPS**, while the price/earnings ratio is referred to as the **P/E ratio**.

$$\text{P/E ratio} = \frac{\text{stock price}}{\text{EPS}}$$

The P/E ratio is very important in the stock market. Notice that it tells us how much investors are willing to pay for a dollar of the firm's earnings. For example, if a company's P/E is 10 and earnings per share are \$4.50, the stock is selling for \$45. Stock market people would say, "The company is selling for 10 times earnings."

Different companies carry different P/Es. Clearly, the higher the P/E the better, because a dollar of earnings translates into more shareholder wealth at higher P/Es. The most significant factor leading to a high P/E ratio is a high expected level of growth by the company.

P/Es must be used with caution. A firm that is losing money doesn't have a meaningful P/E. Further, if profits are very small but the stock has some value, the P/E can be enormous. That isn't meaningful either.

To calculate market value ratios for the Belfry Company, we need the number of shares outstanding and the price of the stock. For the sake of illustration we'll assume that there are 300 shares valued at a price of \$38 per share. Earnings per share is then

$$\text{EPS} = \$1,000/300 = \$3.33$$

and the P/E ratio is

$$\text{P/E} = \frac{\$38}{\$3.33} = 11.4$$

Market to Book Value Ratio

A company's **book value** is the total value of the equity on its balance sheet. That's equal to the value of assets less liabilities to outsiders. Notice that it may be more or less than the amount the firm could actually realize by selling everything and paying off its debts.

A healthy company is usually expected to have a market value in excess of its book value. This is sometimes known as the **going concern value** of the firm. The idea is that the combination of assets and people that creates an enterprise will generate future earnings that are worth more than the assets alone are worth today.

The market to book value ratio gets at this idea of excess value. Like P/E, it is generally thought of in per-share terms. Market value per share is just the price of the stock, and book value per share is total equity divided by the number of shares outstanding. The calculation is

$$\text{market to book value ratio} = \frac{\text{stock price}}{\text{book value per share}}$$

The market to book value ratio is a broad indicator of what the market thinks of a particular stock. A value below 1.0 indicates grave concern about the company's future. Such a firm is said to be selling *below book*.

A firm's P/E is primarily a function of its **expected growth**.

http://

Go to SmallBizFinance for ratio analysis calculators at

<http://www.bankrate.com/brm/news/biz/bizcalcs/ratiocalcs.asp>

to perform a ratio analysis on our hypothetical Belfry Company.

Speculative investors sometimes like to gamble on stocks whose market to book value ratio is below 1.0. Situations arise in which a stock's price is depressed because the market has overreacted to bad news about a fundamentally sound company. In such a case the firm's stock price sometimes rebounds quickly, and an investment at the depressed level can be very profitable. Some investors use the market to book value ratio to identify situations in which this *might* be the case.

Belfry's book value per share is its equity divided by the number of shares outstanding.

$$\text{book value per share} = \$3,300/300 = \$11$$

The market to book value ratio is then

$$\text{market to book value ratio} = \frac{\$38}{\$11} = 3.5$$

Table 3.1 summarizes all of the foregoing ratios.

DU PONT EQUATIONS

Each of the ratios we've been talking about measures a particular aspect of running a company. However, the ratio measures aren't entirely independent, and performance on one is sometimes tied to performance on others.

Two insightful relationships between ratios are captured in the **Du Pont equations**.⁷ The first is developed by writing the definition of ROA and multiplying by sales/sales (= 1, so the multiplication doesn't change the value of the expression).

$$\text{ROA} = \frac{\text{net income}}{\text{total assets}} \times \frac{\text{sales}}{\text{sales}}$$

Now reverse the order of the denominators to get

$$\text{ROA} = \frac{\text{net income}}{\text{sales}} \times \frac{\text{sales}}{\text{total assets}}$$

Notice that we've formed two ratios, the product of which is ROA. But we've seen the new ratios before; they're return on sales and total asset turnover. Hence the Du Pont equation is

$$\text{ROA} = \text{ROS} \times \text{total asset turnover.}$$

The relationship is an important result. ROA is a fundamental measure of performance, indicating how well a company uses its assets to generate profits. But it is the product of two more elementary measures. The first, ROS, measures how well a firm keeps some of its sales dollars in profit. The second, total asset turnover, measures the company's ability to generate sales with the assets it has.

The Du Pont equation tells us that to run a business well, as measured by ROA, we have to manage costs and expenses well and generate a lot of sales per dollar of assets. This lesson should sound familiar. It's the same message we got from the racetrack diagram (cash conversion cycle on p. 75) earlier in this chapter.

The **Du Pont equations** express relationships between ratios that give **insights** into successful operation.

7. So called because they were developed at the Du Pont corporation.

Table 3.1

Financial Ratios

Liquidity Ratios

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

$$\text{quick ratio} = \frac{\text{current assets} - \text{inventory}}{\text{current liabilities}}$$

*Asset Management Ratios**

$$\text{ACP} = \frac{\text{accounts receivable}}{\text{average daily sales}} = \frac{\text{accounts receivable}}{\text{sales}} \times 360$$

$$\text{inventory turnover} = \frac{\text{cost of goods sold}}{\text{inventory}}$$

$$\text{fixed asset turnover} = \frac{\text{sales}}{\text{fixed assets}}$$

$$\text{total asset turnover} = \frac{\text{sales}}{\text{total assets}}$$

Debt Management Ratios

$$\text{debt ratio} = \frac{\text{long-term debt} + \text{current liabilities}}{\text{total assets}}$$

$$\text{debt to equity ratio} = \text{long-term debt} : \text{equity}$$

$$\text{TIE} = \frac{\text{EBIT}}{\text{interest}}$$

$$\text{cash coverage} = \frac{\text{EBIT} + \text{depreciation}}{\text{interest}}$$

$$\text{fixed charge coverage} = \frac{\text{EBIT} + \text{lease payments}}{\text{interest} + \text{lease payments}}$$

Profitability Ratios

$$\text{ROS} = \frac{\text{net income}}{\text{sales}}$$

$$\text{ROA}^* = \frac{\text{net income}}{\text{total assets}}$$

$$\text{ROE}^* = \frac{\text{net income}}{\text{equity}}$$

Market Value Ratios

$$\text{P/E ratio} = \frac{\text{stock price}}{\text{EPS}}$$

$$\text{market to book value ratio} = \frac{\text{stock price}}{\text{book value per share}}$$

*Average balance sheet values may be appropriate.



PRACTICAL FINANCE

Concepts in Financial Analysis: MVA and EVA®

In recent years the related ideas of **market value added (MVA)** and **economic value added (EVA®)** have become popular as gauges of business success. The concept behind both measures is the creation of shareholder wealth. We'll consider MVA first.

There are two ways to think about the value of a firm's equity. The *market* value of equity is just stock price times the number of shares outstanding. At the same time the equity *contributed* by shareholders is reflected in the equity accounts on the company's books (including retained earnings). If market value is greater than book value, some *additional* value has been created by the company acting as an ongoing business. This extra is MVA. It's the cumulative amount management has made for the stockholders over and above dividends since the inception of the firm.

Notice that MVA can be negative if the stock is selling below its book value. Conceptually MVA is similar to the market to book value ratio we discussed earlier. You should be able to see that a negative MVA is equivalent to a market to book ratio of less than 1.0.

The more exciting idea is EVA, economic value added. In theory it is the amount by which the firm increases or decreases MVA in the current year.

Before defining EVA precisely, it's important to notice something about traditional net income. When we calculate net income we subtract interest from revenues along with other costs and expenses. You can think of interest as the cost the company pays for the use of its debt capital. We do not, however, subtract a payment to stockholders for the use of equity capital.

That means financial analysis based on net income (EAT) recognizes the cost of debt (interest) but implicitly treats equity as a free source of capital. This presents a problem because equity capital does have a cost, basically the return demanded by stockholders on their investments. Ignoring the cost of equity makes performance seem better than it is. For example, a company with a small positive net income is profitable in an accounting sense but may be an economic failure because it doesn't provide an adequate return to stockholders on their equity investments.

A better measure of overall performance than accounting net income would be produced if we modified the income statement to subtract the cost of both debt and equity capital instead of just the interest cost of debt. This is exactly what EVA does using a concept called the **cost of capital**. We'll study the cost of capital a great deal in a later chapter. For now it's enough to

The *extended Du Pont equation* takes the idea one step further by expressing return on equity (ROE) in terms of other ratios. We'll develop that by writing the definition of ROE and multiplying by sales/sales and by total assets/total assets.

$$\text{ROE} = \frac{\text{net income}}{\text{equity}} \times \frac{\text{sales}}{\text{sales}} \times \frac{\text{total assets}}{\text{total assets}}$$

Now rearrange the denominators to get

$$\text{ROE} = \frac{\text{net income}}{\text{sales}} \times \frac{\text{sales}}{\text{total assets}} \times \frac{\text{total assets}}{\text{equity}}$$

understand that it's a single, average "interest rate" that reflects the rate of return the business pays to the suppliers of its capital, both debt and equity. That rate, stated on an after-tax basis, is the "cost" of the capital funds the firm uses.

EVA is defined as follows.

$$\text{EVA} = \text{EBIT} (1 - T) - (\text{debt} + \text{equity})(\text{cost of capital \%})$$

where T is the tax rate.

The first term on the right is EBIT adjusted to an after-tax basis by multiplying by $(1 - T)$. This figure is what the firm's after-tax earnings would be if there were no charges for the use of capital, either debt or equity.

The second term on the right subtracts a charge for the use of capital. Debt + equity is total capital, so the cost of capital percentage times that sum is the dollar amount the firm pays for the use of all of its capital. This term is like the traditional interest charge in the income statement except that it's expanded to include a payment for equity. It's an after-tax figure, because the cost of capital percentage is stated after tax.

Hence, EVA is after-tax earnings less an after-tax charge for all capital. But the charge for capital is simply the minimum amount stockholders and bondholders demand for investing their money. They could make that amount by putting it in any number of alternate investments. Hence, if EVA is positive, the firm is exceeding its investors' expectations. That is, a positive EVA is an extra, an additional contribution to shareholders' wealth made during the year.

This is a very important idea. If EVA is zero, the firm is just earning what investors expect and demand, nothing more and nothing less. That's *adequate* performance. On the other hand, if EVA is positive, management is performing above expectations and contributing some additional value to stockholders. A negative EVA, of course, means the firm is losing ground, making a negative contribution to shareholder wealth.

EVA began to gain popularity about fifteen years ago and is one of the hottest ideas in financial management today. More firms seem to be using it with each passing year. Several attribute major gains in market value to a management focus on EVA rather than traditional net income. The EVA and MVA concepts were developed by Stern Stewart & Co., a financial consulting firm. Stern Stewart maintains that its clients who use EVA—including Best Buy (consumer electronics), Guidant (medical products), and Noble Drilling (energy)—outperform their peers in the stock market.

Source: <http://www.eva.com>

The last term is called the *equity multiplier*. We'll explain it in a minute, but first notice that the ROE expression is the same as the ROA expression with the last term added.

$$\begin{aligned} \text{ROE} &= \text{ROS} \times \text{total asset turnover} \times \text{equity multiplier} \\ \text{ROE} &= \text{ROA} \times \text{equity multiplier} \end{aligned}$$

The equity multiplier has to do with the idea of leverage, using borrowed money instead of your own to work for you. Hence, the extended Du Pont equation says that to measure performance in terms of ROE, we add the concept of leverage to performance in terms of ROA.

To understand the equity multiplier, consider the right side of the balance sheet. It lists all of the places where the firm's money comes from: equity, debt, and other liabilities.⁸ These add to total assets because both sides of the balance sheet sum to that figure. Debt and other liabilities are other people's money, while equity is the firm's own money (its owners'). The equity multiplier is related to the proportion to which the firm is financed by other people's money as opposed to owners' money.

For example, suppose a firm has total assets of \$100 and equity of \$25. That means three quarters of its assets are financed by debt and/or liabilities (\$75) and one quarter (\$25) is supported by equity. The equity multiplier is $(\$100/\$25=)$ 4, and the extended Du Pont equation says that the firm's ROE will be four times its ROA because of the use of other people's money.

That's very good if the business is making a profit and ROA is a positive number. For example, if ROA is 5%, ROE would be a healthy 20%. However, if times get tough, using other people's money is generally bad news. Suppose the business starts to lose money and ROA is -5% . Unfortunately, the multiplier still works the same way, and ROE will be -20% , a pretty dismal figure.

The extended Du Pont equation says something very important about running a business. The operation of the business itself is reflected in ROA. This means managing customers, people, costs, expenses, and equipment. But that result, good or bad, can be *multiplied* by borrowing. In other words, the way you *finance* a business can greatly exaggerate the results of nuts and bolts operations.

Write out the Du Pont equations for Belfry to verify the relationships.

USING THE DU PONT EQUATIONS

Comparing the Du Pont equations between a company and an industry average can give some insights into how a firm is doing in relation to its competitors. For example, suppose we have the following data for Samson Inc. and its industry.

	ROA = ROS × Total Asset Turnover		
Samson Inc.	12%	6%	2×
Industry	15%	5%	3×

If Samson is trying to figure out why its ROA is below average, this display focuses attention in the right direction. It says that management of the income statement items, like cost and expense, is a little better than average, but the use of assets to generate sales, as measured by total asset turnover, is very poor in comparison to the competition.

The turnover problem is probably in one or both of two areas. Perhaps the company has unnecessary or ineffective assets, such as overstated inventory or inefficient machinery. Or maybe its promotional activities are not on target, so sales are lower than they should be. The job is now to find out what's going on and fix the problem.

SOURCES OF COMPARATIVE INFORMATION

The best competitive information for ratio analysis is generally an industry average. These averages are available in several places.

The Du Pont equations can be used to **isolate problems**.

8. In our Belfry example other liabilities are simply current liabilities, but that's not always the case.

http://

Visit these sites:
D&B at
<http://www.dnb.com>
and Value Line at
<http://www.valueline.com>

Dun and Bradstreet (D&B) is a credit rating service. Vendors use D&B reports to make decisions about whether or not to sell to customers on credit.

D&B maintains credit files on most businesses in the United States. The files include financial information and comments on a firm's past payment history as reported by other firms that have done business with it. D&B subscribers can order reports on specific companies to help in making the credit decision.

D&B has summarized its data to provide industry average ratios for about 800 lines of business. The information is published in *Industry Norms and Key Business Ratios*.

The Risk Management Association is an association of bank lending officers. It publishes summarized ratio information on 250 industries in *Statement Studies*.

The U.S. Commerce Department publishes the *Quarterly Financial Report*, which contains summarized ratio information for a large number of industries. Government reports on industry are usually organized by the Standard Industrial Classification (SIC) Code that provides a systematic segregation and cataloging of industrial activity.

Value Line and similar investment advisory services provide industry profiles as well as reports on individual companies.

LIMITATIONS AND WEAKNESSES OF RATIO ANALYSIS

Although ratio analysis is a powerful tool, it has some significant shortcomings. Analysts have to be careful not to apply the techniques blindly to any set of statements they come across. Here are a few of the more significant problems.

Diversified companies, large firms with consolidated operations, create what is probably the biggest analysis problem. Such companies often have divisions operating in significantly different industries. The financial information they publish *consolidates* the results of those different operations into one set of statements. Because the interpretation of ratios is highly dependent on industry norms, this mixing of results from different businesses can greatly reduce the informative value of analysis.

Financial reporting standards set by the accounting profession for diversified businesses require the disclosure of some *segment information*, but it is generally of limited scope and use.

Window dressing refers to practices at year end that make balance sheets look better than they otherwise would through improvements that don't last. Here's a simple example. Imagine a firm with a current ratio that's too low whose business is fundamentally sound so it can borrow long term. Suppose this company takes out a long-term loan a few days before the end of the year, holds the proceeds in cash, a current asset, over year end, and repays the loan a few days later. It thus increases year-end current assets with no impact on current liabilities, thereby improving the reported current ratio.

Accounting principles allow a great deal of latitude in reporting. That means similar companies might report the same thing differently, making their financial results artificially dissimilar. Depreciation is a good example. The choice between accelerated and straight line depreciation is up to the firm, but the difference can double reported depreciation in a given period. That in turn can make a big percentage difference in net income between two essentially identical firms.

Inflation often distorts financial statements. Real estate purchased years ago, for example, will be carried on the balance sheet at its original cost. Yet it may be worth many times that amount in today's market. During periods of rapid inflation, inventory, cost of goods sold, and depreciation can badly distort true results.

The *interpretation* of ratios isn't always clear. Recall our discussion of the current ratio and inventory turnover.

The most important thing to remember with respect to these issues is that *ratio analysis doesn't give answers; it helps you ask the right questions*.

Ratio analysis is **not an exact science** and requires judgment and **experienced interpretation**.

QUESTIONS

1. List the main user groups of financial information. What are the reasons for their interest?
2. Where do analysts get financial information about companies? What are their concerns about the information?
3. Financial analysts are generally optimists who believe what they're told. Right or wrong? Explain.
4. If a company's cash account increases from the beginning to the end of the year, there's more cash on hand so that must be a source of cash. Yet the cash account is an asset, and the first cash flow rule says that an asset increase is a use of cash. Explain this apparent conflict.
5. Why don't we calculate the difference in the equity account between the beginning and end of the year and consider that difference as a source or use of cash? Why do we similarly exclude the cash account?
6. What are free cash flows? Who is likely to be most interested in them? Why?
7. Outline the thinking behind ratio analysis in brief, general terms (a few lines; don't go into each ratio individually).
8. Financial ratios don't do you much good by themselves. Explain.
9. What is the reasoning behind using the current ratio as a measure of liquidity?
10. Why do we need the quick ratio when we have the current ratio?
11. A company's terms are net 30 and the ACP is 35 days. Is that cause for alarm? Why or why not?
12. Discuss the different definitions of debt in ratio analysis.
13. Why do people view having too much debt as risky? If you were interested in determining whether a company had too much debt, what measure would you use? Why? How much debt do you think would generally be considered too much?
14. It can be argued that the TIE ratio doesn't make much sense. Why? How would you change the measure to be more meaningful? (*Hint*: Think in terms of cash flows.)
15. Can managers affect market value ratios?
16. Can a competent financial analyst always correctly assess a firm's financial health from publicly available information? Explain.

BUSINESS ANALYSIS

1. The present format for the statement of cash flows is organized according to operating activities, investing activities, and financing activities. That format has only been in use since the late 1980s. The previous format first listed all sources and then all uses of cash, giving a subtotal for each. Cash flow was then the difference between the two subtotals. What advantages or disadvantages do you see of the current format in relation to the old one? Which would you prefer if you had a choice?

2. A company has been growing rapidly for the last three years. It was profitable before the growth spurt started. Although this year's revenues are almost three times those of three years ago, the firm is now losing money. What's the first thing you would do to try to pinpoint where the problem(s) may be?
3. The term "liquidity" is used in several ways. What does it mean in the context of an asset or liability, such as those on the balance sheet? What does it mean when applied to an operating company? What does the similar term "liquidate" mean when applied to a company?
4. The industry average inventory turnover ratio is 7 and your company's is 15. This could be good or bad news. Explain each possibility. How would you find out whether it is bad news?
5. You invested \$10,000 in the stock of HiFly Inc. two years ago. Since then the stock has done very well more than doubling in value. You tried to analyze HiFly's financial statements twice in the last two year, but were confused by several of the detailed notes to those statements. You haven't worried about it though, because the statements show a steady growth in revenue and earnings along with an unqualified opinion by the firm's auditors that they were prepared using generally accepted accounting principles (GAAP). While checking the status of your investments in *The Wall Street Journal* this morning you were shocked to see that HiFly's price had declined by 30% since you last checked it a week ago. What may have happened?

PROBLEMS

1. The Waterford Wax Company had the following current account activity last year.

	Beginning	Ending		Beginning	Ending
Cash	\$ 160	\$ 333	Accounts payable	\$722	\$2,084
Accounts receivable	1,875	3,810	Accruals	<u>217</u>	<u>456</u>
Inventory	<u>438</u>	<u>2,676</u>			
Current assets	\$2,473	\$6,819	Current liabilities	\$939	\$2,540

- a. Calculate and display the current account detail required for the Cash from Operating Activities section of the statement of cash flows.
 - b. If you also knew that Waterford's revenues had risen by 20% last year, would you be concerned about the firm's financial health? Why? (Words only.)
2. Timberline Inc. had the following current accounts last year. (\$000)

	Beginning	Ending		Beginning	Ending
Cash	\$ 175	\$ 238	Accounts payable	\$205	\$182
Accounts receivable	1,456	2,207	Accruals	<u>95</u>	<u>83</u>
Inventory	<u>943</u>	<u>786</u>			
Current assets	\$2,574	\$3,231	Current liabilities	\$300	\$265

In addition, the company had sales revenues of \$9,453,000 and costs and expenses (including interest and tax) of \$7,580,000. Depreciation of \$1,462,000 is included in the cost and expense figures.

Construct a statement showing Timberline's Cash from Operating Activities section, including a detail of changes in balance sheet accounts.

3. Fred Klein started his own business recently. He began by depositing \$5,000 of his own money (equity) in a business account. Once he'd done that his balance sheet was as follows.

Assets		Liabilities and Equity	
Cash	\$5,000	Equity	\$5,000
Total	\$5,000	Total	\$5,000

During the next month, his first month of business, he completed the following transactions. (All payments were made with checks out of the bank account.)

- Purchased \$2,500 worth of inventory, paying \$1,500 down and owing the vendor the remainder.
 - Used \$500 of the inventory in making product.
 - Paid employees' wages of \$1,100 on the last day of the month.
 - Sold all the product made in the first month on credit for \$3,000.
 - Paid rent of \$1,200.
- a. Construct a balance sheet for Fred's business at the end of its first month. (*Hint:* Fred's business has only current assets, current liabilities, and an equity account. Calculate the ending balance in each of the current accounts from the information given. The ending equity account balance will be the difference between the current assets and liabilities at month end.)
- b. Construct Fred's income statement. (*Hint:* Fred's revenue is the credit sale. His costs/expenses consist of the inventory used in product sold plus the things other than inventory for which he wrote checks. Ignore taxes.)
- c. Construct Fred's statement of cash flows for the month. (*Hint:* Fred's beginning balance sheet has only two accounts, cash and equity, each with a \$5,000 balance. All other accounts open with zero balances.)
- d. Is Fred's business profitable in an accounting sense? In a cash flow sense? (Words only.)
- e. Can the business fail while making a profit? How might that happen in the next month or so? (Words only.)
4. The Blandings Home Construction Company purchased a new crane for \$350,000 this year. It sold the old crane for \$80,000. At the time it had a net book value of \$20,000. Assume any profit on the sale of old equipment is taxed at 25%. These were the only transactions that affected investing activities this year. Construct the Cash Flow from Investing Activities section of the statement of cash flows to concisely convey the maximum information to readers of the company's financial statements.

5. Lansing Inc., a profitable food products manufacturer, has undertaken a major expansion that will be financed by new debt and equity issues as well as earnings. During the last year the company borrowed \$5 million for a term of 30 years to finance a new building to house the expanded operations. It also sold 60,000 shares of \$4 par value stock at \$51 per share to pay for new equipment. It also paid off short-term loans that support inventory and receivables totaling \$700,000 as they came due and took out new short-term debt for the same purpose of \$850,000, which was outstanding at year end. Lansing also made a scheduled payment of \$500,000 on an old long-term loan with which it had acquired production equipment several years ago. The payment included interest of \$425,000. Finally the firm paid dividends of \$2.50 per share on 700,000 shares of outstanding common stock. Calculate and display the Cash from Financing Activities section of Lansing's statement of cash flows.
6. Fitch Inc.'s financial statements are as follows:

Fitch Inc.			Fitch Inc.	
Balance Sheet			Income Statement	
For the period ended 12/31/x1			For the period ended	
(\$000)			12/31/x1 (\$000)	
ASSETS			Sales	\$40,506
	12/31/X0	12/31/X1	COGS	14,177
Cash	\$ 2,165	\$ 2,647	Gross margin	\$26,329
Accounts receivable	4,832	5,614	Expense	19,487
Inventory	3,217	2,843	EBIT	\$ 6,842
CURRENT ASSETS	\$10,214	\$ 11,104	Interest	180
Fixed assets			EBT	\$ 6,662
Gross	\$35,183	\$39,456	Tax	2,265
Accumulated deprec.	(22,640)	(24,852)	Net income	\$ 4,397
Net	\$12,543	\$14,604		
Total assets	\$22,757	\$25,708		
LIABILITIES				
Accounts payable	\$ 1,642	\$ 1,420		
Accruals	438	1,228		
CURRENT LIABILITIES	\$ 2,080	\$ 2,648		
Long-term debt	\$ 1,823	\$ 409		
Equity	18,854	22,651		
TOTAL CAPITAL	\$20,677	\$23,060		
TOTAL LIABILITIES				
AND EQUITY	\$22,757	\$25,708		

Fitch also sold stock for \$2.5 million and paid dividends of \$3.1 million. No fixed assets were retired during the year. (*Hint:* That implies fixed asset purchases

and depreciation are the only changes in the gross fixed assets and accumulated depreciation accounts.)

Construct Fitch's statement of cash flows for 20X1.

7. Axtel Company has the following financial statements.

Axtel Company Balance Sheet			Axtel Company Income Statement	
For the period ended 12/31/x1			For the period ended 12/31/x1	
(\$000)			(\$000)	
ASSETS			Sales	\$36,227
	12/31/X0	12/31/X1	COGS	19,925
Cash	\$ 3,514	\$ 2,875	Gross margin	16,302
Accounts receivable	6,742	5,583	Expense	10,868
Inventory	2,573	3,220	EBIT	\$ 5,434
CURRENT ASSETS	\$12,829	\$11,678	Interest	713
Fixed assets			EBT	\$ 4,721
Gross	\$22,478	\$24,360	Tax	1,605
Accumulated deprec.	(12,147)	(13,313)	Net income	\$ 3,116
Net	\$10,331	\$11,047		
Total assets	\$23,160	\$22,725		
LIABILITIES				
Accounts payable	\$ 1,556	\$ 1,702		
Accruals	268	408		
CURRENT LIABILITIES	\$ 1,824	\$ 2,110		
Long-term debt	\$ 7,112	\$ 6,002		
Equity	14,224	14,613		
TOTAL CAPITAL	\$21,336	\$20,615		
TOTAL LIABILITIES				
AND EQUITY	\$23,160	\$22,725		

In addition, Axtel *retired* stock for \$1,000,000 and paid a dividend of \$1,727,000. Depreciation for the year was \$1,166,000. Construct a statement of cash flows for Axtel for 20X1. (*Hint*: Retiring stock means buying it back from shareholders. Assume the purchase was made at book value, and treat it like a negative sale of stock.)

8. Calculate all of the ratios discussed in the chapter for Axtel Company of the preceding problem. Assume Axtel had leasing costs of \$7,267 in 20X1 and had 1,268,000 shares of stock outstanding valued at \$28.75 per share at year end.
9. The Seymour Corp. attempted to increase sales rapidly in 20X1 by offering a new, low-cost product line designed to appeal to credit customers in relatively poor

financial condition. The company sold no new stock during the year but paid dividends of \$3,000,000. Depreciation for the year was \$7,851,000, and no fixed assets were retired or sold. The firm had the following financial statements for 20X1.

Seymour Corp. Balance Sheet			Seymour Corp. Income Statement	
For the period ended 12/31/x1			For the period ended 12/31/x1	
(\$000)			(\$000)	
ASSETS			Revenue	\$88,765
	12/31/X0	12/31/X1	COGS	39,506
Cash	\$ 2,745	\$ 1,071	Gross margin	\$49,259
Receivables	19,842	24,691	Expenses	\$34,568
Inventory	10,045	15,621	EBIT	14,691
CURRENT ASSETS	\$32,632	\$41,383	Interest	4,312
Fixed assets			EBT	\$10,379
Gross	\$80,128	\$97,432	Tax	4,152
Accum. deprec.	(60,225)	(68,076)	EAT	\$ 6,227
Net	\$ 19,903	\$29,356		
Total assets	\$52,535	\$70,739		
LIABILITIES AND EQUITY				
Accts payable	\$ 3,114	\$ 6,307		
Accruals	768	914		
CURRENT LIABILITIES	\$ 3,882	\$ 7,221		
Long-term debt	\$36,490	\$48,128		
Equity	12,163	15,390		
TOTAL CAPITAL	\$48,653	\$63,518		
TOTAL LIABILITY				
AND EQUITY	\$52,535	\$70,739		

- Without preparing a statement of cash flows, examine the changes in each balance sheet account and summarize in rough terms where Seymour got its cash and what it spent the money on. Include the sum of net income and depreciation as a source of cash.
- Construct a statement of cash flows for Seymour Corp. How does the information available from the statement compare with the results of your analysis in part a?
- Does it look like Seymour may be headed for financial trouble? Explain the possible implications of the new product and credit strategy on individual accounts. (*Hint:* Consider the implications of two extreme scenarios; the new product is doing very well or very poorly.)

10. Slattery Industries reported the following financial information for 20X2:

Revenues	\$10.0 million
Costs & expenses (excluding depreciation)	8.0
Depreciation	0.5
Taxes	0.6
Net income	0.9
Fixed assets (gross)	10.0
Working capital	4.0

The firm expects revenues costs, expenses (excluding depreciation), and working capital to grow at 10% per year for the next three years. It also expects to invest \$2 million per year in fixed assets which includes replacing worn out equipment and purchasing enough new equipment to support the projected growth and maintain a competitive position. Assume depreciation is 5% of the gross fixed asset account, the tax rate is 40%, and that Slattery has no debt and therefore pays no interest.

- Make a rough projection of cash flows for 20X3, 20X4, and 20X5 assuming no new debt or equity is raised. Simply compute an income statement in each year, add depreciation, and subtract increases in working capital and fixed asset purchases.
 - Are your projections free cash flows?
 - What do your projections imply for Slattery's owners/managers?
 - How would you evaluate Slattery's ability to achieve this level of growth (as measured by the increase in fixed assets)?
11. Linden Corp. has a 10% market share in its industry. Below are income statements (\$millions) for Linden and for the industry.

	Linden	Industry
Sales	\$6,000	\$64,000
Cost of goods sold	<u>3,200</u>	<u>33,650</u>
Gross margin	\$2,800	\$30,350
Expenses:		
Sales and marketing	\$ 430	\$ 3,850
Engineering	225	2,650
Finance and administration	<u>650</u>	<u>4,560</u>
Total expenses	\$1,305	\$ 11,060
EBIT	\$1,495	\$ 19,290
Interest expense	<u>230</u>	<u>4,500</u>
EBT	\$1,265	\$ 14,790
Tax	<u>500</u>	<u>5,620</u>
Net income	\$ 765	\$ 9,170

- Develop common sized income statements for Linden and the industry as a whole.
- What areas should management focus on to improve performance, and what kind of issues should be examined or looked for in each area?

12. Norton Industries recorded total cost of goods sold for 20X2 of \$6.5 million. Norton had the following inventory balances for the months indicated (end of period balances):

	In Millions		In Millions
December 20X1	\$1.20	July 20X2	\$1.81
January 20X2	1.65	August 20X2	1.78
February 20X2	1.70	September 20X2	1.26
March 20X2	1.38	October 20X2	1.61
April 20X2	1.66	November 20X2	1.63
May 20X2	1.93	December 20X2	1.19
June 20X2	1.41		

- a. Compute inventory turnover for Norton using the following methods to calculate the inventory figure:
1. End of year
 2. Average of the beginning and end of year
 3. Average of the ends of quarters (use the five quarter ends)
 4. Average of the ends of months (use the 13 month ends)
- b. Which method provides the most accurate picture of Norton's inventory management? Why?
- c. Which method do you think Norton is currently using? Why?
13. Partridge Inc. sells about \$45 million a year on credit. Good credit and collections performance in the industry result in a 35-day ACP.
- a. What is the maximum receivables balance Partridge can tolerate and still receive a good rating with respect to credit and collections?
 - b. If Partridge is now collecting an average receivable in 40 days, by how much will it have to lower the receivables balance to achieve a good rating?
14. Epsom Co. manufactures furniture and sells about \$40 million a year at a gross margin of 45%.
- a. What is the maximum inventory level the firm can carry to maintain an inventory turnover (based on COGS) of 8.0?
 - b. If the inventory contains \$1.2 million of obsolete and damaged goods that don't turn over at all, how fast would the active inventory have to turn over to achieve an overall turnover rate of 8.0?
15. The Nelson Sheetmetal Company has current assets of \$2.5 million and current liabilities of \$1.0 million. The firm is in need of additional inventory and has an opportunity to borrow money on a short-term note with which it can buy the needed material. However, a previous financing agreement prohibits the company from operating with a current ratio below 1.8. What is the maximum amount of inventory Nelson can obtain in this manner? (*Hint*: The note and the inventory are both current items of equal size on the balance sheet.)
16. Sweet Tooth Cookies, Inc. has the following ratios.

$$\text{ROE} = 15\%$$

$$\text{Total Asset turnover} = 1.2$$

$$\text{ROS} = 10\%$$

What percentage of its assets are financed by equity?

17. The Paragon Company has sales of \$2,000 with a cost ratio of 60%, current ratio of 1.5, inventory turnover ratio (based on cost) of 3.0, and average collection period (ACP) of 45 days. Complete the following current section of the firm's balance sheet.

Cash	\$ _____	Accounts payable	\$ _____
Accounts receivable	_____	Accruals	_____ 60
Inventory	_____		
Current assets	\$ _____	Current liabilities	\$ 750

18. You are given the following selected financial information for The Blatz Corporation.

Income Statement		Balance Sheet	
COGS	\$750	Cash	\$250
Net income	\$160	Net fixed assets	\$850

Ratios

ROS	10%
Current ratio	2.3
Inventory turnover	6.0×
ACP	45 days
Debt ratio	49.12%

Calculate accounts receivable, inventory, current assets, current liabilities, debt, equity, ROA, and ROE.

19. Companies often use ratios as a basis for planning. The technique is to assume the business being planned will achieve targeted levels of certain ratios and then calculate the financial statement amounts that will result in those ratios. The process always starts with a dollar assumption about sales revenue. Forecast the balance sheet for Lambert Co. using the following projected information (\$000). Round all projections to the nearest thousand dollars.

Sales	\$10,000
Cash	\$500
Accruals	\$50
Gross margin	45%
ACP	42 days
Inventory turns	7.0×
Total asset turnover	1.25×
Current ratio	2.0
Debt : equity	1 : 3

ASSETS		LIABILITIES	
Cash	_____	Accounts payable	_____
Accounts receivable	_____	Accruals	_____
Inventory	_____	Current liabilities	_____
Current assets	_____	Debt	_____
Net fixed assets	_____	Equity	_____
Total assets	_____	Total liabilities & equity	_____

20. Tribke Enterprises collected the following data from its financial reports for 20X3:

Stock price	\$18.37
Inventory balance	\$300,000
Expenses (excluding OGS)	\$1,120,000
Shares outstanding	290,000
Average issue price of shares	\$5.00
Gross margin %	40%
Interest rate	8%
TIE ratio	8
Inventory turnover	12×
Current ratio	1.5
Quick ratio	.75
Fixed asset turnover	1.5

Complete the following abbreviated financial statements, and calculate per share ratios indicated. (*Hint: Start by subtracting the formula for the quick ratio from that for the current ratio and equating that to the numerical difference.*)

INCOME STATEMENT

Revenue	_____
COGS	_____
GM	_____
Expense	_____
EBIT	_____
Interest	_____
EBT	_____
Tax	_____
EAT	_____

BALANCE SHEET

Current assets	_____	Current liabilities	_____
Fixed assets	_____	Long-term debt	_____
		Equity:	
		Paid-in capital*	_____
		Retained earnings	_____
		Total equity	_____
Total assets	_____	Total liabilities & equity	_____

*Paid-in Capital = Common Stock + Paid-in Excess

RATIOS

Book value per share	_____	Market value per share	_____
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21. (Refer to the INSIGHTS box on pages 94–95 before attempting this problem. Notice that the calculations called for here do not involve cost of capital.) William Edwards, Inc. (WEI) had one million shares of common stock outstanding on 12/31/20X0. The stock had been sold for an average of \$8.00 per share and had a market price of \$13.25 per share on that date. WEI also had a balance of

\$5.0 million in its retained earnings account on that date. The following projection has been made for WEI's next five years of operations:

Year	Net Income	Dividends/Share	Shares Issued	Average Issue Price	Stock Price 12/31
20X1	\$700,000	\$.20	None	NA	\$13.75
20X2	840,000	.22	50,000	\$14.00	14.25
20X3	750,000	.24	100,000	13.50	13.80
20X4	900,000	.26	50,000	14.50	15.00
20X5	860,000	.28	None	NA	15.40

Compute the MVA as of 12/31/X0, and compute EVA[®], the change in MVA, as a result of each subsequent year's activity. (Assume that all shares issued during any given year received the dividends declared that year.) Comment on management's projected performance over the five-year period. What would you do if you represented a majority of the stockholders? Would the result have been different before MVA/EVA analysis?

22. Prahm & Associates had EBIT of \$5M last year. The firm carried an average debt of \$15M during the year on which it paid 8% interest. The company paid no dividends and sold no new stock. At the beginning of the year it had equity of \$17M. The tax rate is 40%, and Prahm's cost of capital is 11%. Calculate Prahm's EVA[®] during the year, and comment on that performance relative to ROE. Make your calculations using average balances in the capital accounts.
23. The Hardigree Hamburger chain is a closely held corporation with 400,000 shares of common stock outstanding. The owners would like to take the company public by issuing another 600,000 shares and selling them to the general public in an initial public offering (IPO). (IPOs are discussed in Chapter 5.). Benson's Burgers is a similar chain that operates in another part of the country. Its stock is publicly traded at a price earnings (P/E) ratio of 25. Hardigree had net income of \$2,500,000 in 2006.
- How much is Hardigree likely to raise with its public offering?
 - What will the public offering imply about the wealth of the current owners?
24. **Comprehensive Problem.** The Protek Company is a large manufacturer and distributor of electronic components. Because of some successful new products marketed to manufacturers of personal computers, the firm has recently undergone a period of explosive growth, more than doubling its revenues during the last two years. However, the growth has been accompanied by a marked decline in profitability and a precipitous drop in the company's stock price.

You are a financial consultant who has been retained to analyze the company's performance and find out what's going wrong. Your investigative plan involves conducting a series of in-depth interviews with management and doing some independent research on the industry. However, before starting, you want to focus your thinking to be sure you can ask the right questions. You'll begin by analyzing the firm's financial statements over the last three years, which are shown below.

The following additional information is provided with the financial statements. Depreciation for 20X1, 20X2, and 20X3 was \$200, \$250, and \$275 million,

Protek Company Income Statements
For the periods ended 12/31
(\$000,000)

	<u>20X1</u>	<u>20X2</u>	<u>20X3</u>
Sales	\$1,578	\$2,106	\$3,265
COGS	<u>631</u>	<u>906</u>	<u>1,502</u>
Gross margin	\$ 947	\$1,200	\$1,763
Expenses			
Marketing	\$ 316	\$ 495	\$ 882
R&D	158	211	327
Administration	<u>126</u>	<u>179</u>	<u>294</u>
Total expenses	\$ 600	\$ 885	\$1,503
EBIT	\$ 347	\$ 315	\$ 260
Interest	<u>63</u>	<u>95</u>	<u>143</u>
EBT	\$ 284	\$ 220	\$ 117
Tax	<u>97</u>	<u>75</u>	<u>40</u>
EAT	\$ 187	\$ 145	\$ 77

Protek Company Balance Sheets
For the periods ended 12/31
(\$000,000)

	<u>20X1</u>	<u>20X2</u>	<u>20X3</u>
ASSETS			
Cash	\$ 30	\$ 40	\$ 62
Accounts receivable	175	351	590
Inventory	<u>90</u>	<u>151</u>	<u>300</u>
Current assets	\$ 295	\$ 542	\$ 952
Fixed assets			
Gross	\$1,565	\$2,373	\$2,718
Accumulated depreciation	<u>(610)</u>	<u>(860)</u>	<u>(1,135)</u>
Net	\$ 955	\$1,513	\$1,583
Total assets	\$1,250	\$2,055	\$2,535
LIABILITIES			
Accounts payable	\$ 56	\$ 81	\$ 134
Accruals	<u>15</u>	<u>20</u>	<u>30</u>
Current liabilities	\$ 71	\$ 101	\$ 164
Capital			
Long-term debt	\$ 630	\$1,260	\$1,600
Equity	<u>549</u>	<u>694</u>	<u>771</u>
Total liabilities & equity	\$1,250	\$2,055	\$2,535

respectively. No stock was sold or repurchased, and, like many fast-growing companies, Protek paid no dividends. Assume the tax rate is a flat 34%, and the firm pays 10% interest on its debt.

- Construct common size income statements for 20X1, 20X2, and 20X3. Analyze the trend in each line. What appears to be happening? (*Hints:* Think in terms of both dollars and percentages. As the company grows, the absolute dollars of cost and expense spending go up. What does it mean if the percentage of revenue represented by the expenditure increases as well? How much of an increase in spending do you think a department could manage efficiently? Could pricing of Protek's products have any effect?)
- Construct statements of cash flows for 20X2 and 20X3. Where is the company's money going to and coming from? Make a comment about its free cash flows during the period. Is it likely to have positive or negative free cash flows in the future?
- Calculate the indicated ratios for all three years. Analyze trends in each ratio and compare each with the industry average. What can you infer from this information? Make specific statements about liquidity, asset management, especially receivables and inventories, debt management, and profitability. Do not simply say that ratios are higher or lower than the average or that they are going up or down. Think about what might be going on in the company and propose reasons why the ratios are acting as they are. Use only ending balance sheet figures to calculate your ratios. Do certain specific problems tend to affect more than one ratio? Which ones?

	Industry Average	20X1	20X2	20X3
Current ratio	4.5			
Quick ratio	3.2			
ACP	42 days			
Inventory turnover	7.5×			
Fixed asset turnover	1.6×			
Total asset turnover	1.2×			
Debt ratio	53%			
Debt : equity	1 : 1			
TIE	4.5			
ROS	9.0%			
ROA	10.8%			
ROE	22.8%			
Equity multiplier	2.1			

- Construct both Du Pont equations for Protek and the industry. What, if anything, do they tell us?
- One hundred million shares of stock have been outstanding for the entire period. The price of Protek stock in 20X1, 20X2, and 20X3 was \$39.27, \$26.10, and \$11.55, respectively. Calculate the firm's earnings per share (EPS) and its price/earnings ratio (P/E). What's happening to the P/E? To what things are investors likely to be reacting? How would a slowdown in personal computer sales affect your reasoning?
- Would you recommend Protek stock as an investment? Why might it be a very bad investment in the near future? Why might it be a very good one?

INTERNET PROBLEM

25. Learning about different companies is an important part of the financial manager's job. Go to <http://www.annualreports.com>, and search for the latest annual report for Merck & co., the pharmaceuticals manufacturer.
- At the Merck site, click on pdf annualreport. Scroll down a short way and read the Chairman's Report. Was it a good year for the company? Why?
 - Check out the company's income statement. By what percent did its sales change from the prior year?
 - What do you think contributed to this change? Read what management has to say by going to the sections in the report where management analyzes the company's financial condition.

COMPUTER PROBLEMS

26. At the close of 20X3, the financial statements of Northern Manufacturing were as follows.

Northern Manufacturing Balance Sheet For the period ended 12/31/x3 (\$000)			Northern Manufacturing Income Statement For the period ended 12/31/x3 (\$000)	
ASSETS			Sales	\$22,560
	12/31/X1	12/31/X2	COGS	<u>11,506</u>
Cash	\$ 500	\$ 200	Gross margin	\$ 11,054
Accounts receivable	6,250	7,300	Expense	5,332
Inventory	<u>5,180</u>	<u>6,470</u>	Depreciation	<u>700</u>
CURRENT ASSETS	\$ 11,930	\$ 13,970	EBIT	\$ 5,022
Fixed assets			Interest	<u>1,180</u>
Gross	\$ 7,500	\$ 9,000	EBT	\$ 3,842
Accumulated deprec.	<u>(2,400)</u>	<u>(3,100)</u>	Tax	<u>1,537</u>
Net	\$ 5,100	\$ 5,900	Net income	\$ 2,305
TOTAL ASSETS	\$ 17,030	\$ 19,870		
LIABILITIES				
Accounts payable	\$ 1,860	\$ 2,210		
Accruals	<u>850</u>	<u>220</u>		
CURRENT LIABILITIES	\$ 2,710	\$ 2,430		
Long-term debt	\$ 11,320	\$ 12,335		
Equity	<u>3,000</u>	<u>5,105</u>		
TOTAL CAPITAL	\$ 14,320	\$ 17,440		
TOTAL LIABILITIES AND EQUITY	\$ 17,030	\$ 19,870		

In addition, Northern paid dividends of \$1.2 million and sold new stock valued at \$1.0 million in 20X3. Use the CASHFLO program to produce Northern's statement of cash flows for 20X3.

27. Comparative historical financial statements for Northern Manufacturing of the preceding problem are as follows.

Northern Manufacturing
Income Statements
For the years ended
(\$ooo)

	12/31/X1	12/31/X2	12/31/X3
Sales	\$17,850	\$20,510	\$22,560
COGS	<u>9,100</u>	<u>10,665</u>	<u>11,506</u>
Gross margin	\$ 8,750	\$ 9,845	\$ 11,054
Expense	5,180	5,702	5,332
Depreciation	<u>600</u>	<u>650</u>	<u>700</u>
EBIT	\$ 2,970	\$ 3,493	\$ 5,022
Interest	<u>800</u>	<u>910</u>	<u>1,180</u>
EBT	\$ 2,170	\$ 2,583	\$ 3,842
Tax	<u>868</u>	<u>1,033</u>	<u>1,537</u>
Net income	\$ 1,302	\$ 1,550	\$ 2,305
Dividends paid	\$ 650	\$ 750	\$ 1,200
Stock sold	0	0	1,000
Lease payments	\$ 500	\$ 700	\$ 800

Northern Manufacturing
Balance Sheets
For the years ended
(\$ooo)

ASSETS	12/31/X0	12/31/X1	12/31/X2	12/31/X3
Cash	\$ 955	\$ 980	\$ 500	\$ 200
Accounts receivable	3,103	3,570	6,250	7,300
Inventory	<u>2,890</u>	<u>3,033</u>	<u>5,180</u>	<u>6,470</u>
CURRENT ASSETS	\$ 6,948	\$ 7,583	\$11,930	\$13,970
Fixed assets				
Gross	\$ 5,800	\$ 6,650	\$ 7,500	\$ 9,000
Accumulated deprec.	<u>(1,150)</u>	<u>(1,750)</u>	<u>(2,400)</u>	<u>(3,100)</u>
Net	\$ 4,650	\$ 4,900	\$ 5,100	\$ 5,900
TOTAL ASSETS	\$11,598	\$12,483	\$17,030	\$19,870

LIABILITIES

Accounts payable	\$ 1,860	\$ 1,650	\$ 1,860	\$ 2,210
Accruals	385	742	850	220
CURRENT LIABILITIES	\$ 2,245	\$ 2,392	\$ 2,710	\$ 2,430
Long-term debt	\$ 7,805	\$ 7,891	\$ 11,320	\$ 12,335
Equity	1,548	2,200	3,000	5,105
TOTAL CAPITAL	\$ 9,353	\$ 10,091	\$ 14,320	\$ 17,440
TOTAL LIABILITIES & EQUITY	\$ 11,598	\$ 12,483	\$ 17,030	\$ 19,870
Number of shares		300,000	300,000	315,000
Stock price		\$ 78.12	\$ 70.00	\$ 65.88

- Use the ANALYS program to prepare common size statements and a set of financial ratios for each of the last three years.
- Analyze the results of ANALYS for Northern Manufacturing. The firm has been quite successful in terms of revenue and profit growth so far. Do the ratios reveal any disturbing trends that might indicate future problems?

DEVELOPING SOFTWARE

28. Write a program to generate a statement of cash flows yourself. It isn't as hard as you might think.

First set up the income statement and two balance sheets on the spreadsheet just as they appear in Problem 26. Let the amounts in individual accounts such as Cash, A/R, Revenue, COGS, Interest, and Tax be input items, and let the program calculate all the totals and subtotals such as Current Assets, Total Assets, Gross Margin, and Net Income.

Next take a different area of the spreadsheet and set up the changes in the current accounts and the statement of cash flows shown below.

Take all of the items shown in lowercase xxx's from the statements in the first part of your spreadsheet. Some will be single items like net income and depreciation, but most will be differences between beginning and ending balances like the increase or decrease in long-term debt or the change in receivables. Finally, program the spreadsheet to add up the subtotals where the uppercase XXX's appear and display the reconciliation.

The trickiest part is keeping the signs straight in your subtractions for sources and uses.

Once you have your program written, test it with the inputs to the CASHFLO program and see if you get the same results.

29. Write your own analysis program to calculate a common size income statement and the ratios introduced in this chapter. To keep the exercise reasonably simple, just provide for one year of ratios and one common size statement.

Construct an input area in your spreadsheet in the form of an income statement and a balance sheet. Input the accounts and have the program calculate all totals and subtotals. Define your common size income statement alongside the input income statement by dividing each input line item by revenue. Define your ratios in another area drawing the numerators and denominators from the input statements.

Test your program using the 20X3 statements for Northern Manufacturing from Problem 27. Compare your results with those of the ANALYS program.

Northern Manufacturing
Summary of Changes to Current Accounts
For the year ended 12/31/x3
(\$000)

ACCOUNT	SOURCE/(USE)
Receivables	\$ xxx
Inventory	xxx
Payables	xxx
Accruals	<u>xxx</u>
	\$XXX

Northern Manufacturing
Statement of Cash Flows
For the year ended 12/31/x3
(\$000)

CASH FROM OPERATING ACTIVITIES	
Net income	\$ x,xxx
Depreciation	xxx
Net changes in current accounts	<u>xxx</u>
Cash from operating activities	\$ XXX
CASH FROM INVESTING ACTIVITIES	
Purchase of fixed assets	\$ (x,xxx)
CASH FROM FINANCING ACTIVITIES	
Increase (Decrease) in long-term debt	\$ x,xxx
Sale of stock	xxx
Dividend paid	<u>(xxx)</u>
Cash from financing activities	\$ X,XXX
NET CASH FLOW	\$XXX
RECONCILIATION	
Beginning cash balance	\$ x,xxx
Net cash flow	<u>XXX</u>
Ending cash balance	\$ X,XXX

THOMSON ONE Business School Edition

In this chapter we'll use Thomson ONE to do some financial analysis of the companies we overviewed in Chapter 1. Go to the text Web site at <http://lasher.swlearning.com>, select your book and click on the Thomson ONE button. Enter Thomson ONE—Business School Edition using the username and password you created when you registered the serial number on your access card. Select a problem for this chapter, and you'll see an expanded version that includes instructions on how to navigate within the Thomson ONE system, as well as some additional explanation of the presentation format.

30. Take a piece of paper and set up a simple five-column chart. Write the following ratios in the left-most column.

PFM Ratio Name	Thomson ONE ratio name
Current ratio	Current Ratio
ACP	Receivables Days Sales
Total asset turnover	Sales/Total Assets
Return on Sales	Net Income/Sales
Return on Assets	Net Income/Total Assets
Return on Equity	Net Income/Equity
Times interest earned	Times interest earned
P/E Ratio	P/E

Now label the other four columns for the four companies we looked at in Chapter 1: General Motors, Harley-Davidson, Starbucks, and Microsoft.

- For each company go to the Thomson ONE page displaying three or more years of history for annual values of a broad range of financial ratios. Examine the trend in each of the ratios we've listed and note its performance on your chart. Is performance improving, declining, stable, or is there something strange going on?
- Make another chart and write down the most recent ratios for each company and compare them between companies.

Typically ratios within industries or types of industries are similar if companies are performing similarly. For example, companies in heavy manufacturing tend to have high levels of fixed assets (also called property, plant and equipment), while companies producing services or intellectual products and retailers tend to have fewer fixed assets. That generally makes the total asset turnover figure lower for manufacturers like GM and Harley than for firms like Starbucks or Microsoft.

Do your ratios show the similarities we've just described? If not, go to the Thomson ONE page displaying the financial statements themselves and look at dollar line items to see if you can find an explanation. Analyze each ratio.

- How would you rank the four firms in terms of financial performance? Look at ROS, ROA, ROE, and P/E. What economic or market factors might account for big differences in P/E?
 - Compare GM and Harley. They both make motor vehicles. Why is their financial performance so different? (*Hint*: Think in terms of market and economic factors that make the numbers what they are.)
31. Analyze the performance of each of the four companies we've been working with against its competition. This is called a peer analysis in Thomson ONE. The system will show you a variety of ratios arrayed against their average value among a group of competitors. It will also show the performance of individual competitors on the same ratios.
- First note who the competitors are. Does the selection of competitors make sense to you? How is each of our companies doing against its competition? Conduct a thorough analysis. Don't just say better or worse on particular ratios. Try to think of reasons why.