

## CHAPTER TEN

# 10

### A LOOK BACK

Chapter 9 focused on forecasting and pro forma analysis of financial statements. We showed the importance of forecasting for security valuation.

### A LOOK AT THIS CHAPTER

This chapter begins with additional tools for assessing short-term liquidity. We explain liquidity and describe analysis tools capturing different aspects of it. Attention is directed at accounting-based ratios, turnover, and operating activity measures of liquidity. This chapter also focuses on capital structure and its implications for solvency. We analyze the importance of financial leverage and its effects on risk and return. We also describe book values and earnings coverage measures and their interpretation.

### A LOOK AHEAD

Chapter 11 emphasizes earnings-based analysis and equity valuation. Our earnings-based analysis focuses on assessing earning power. Discussion of equity valuation focuses on issues in estimating company values and forecasting earnings.

## CREDIT ANALYSIS

### ANALYSIS OBJECTIVES

- Explain the importance of liquidity, and describe working capital measures of liquidity and their components.
- Interpret the current ratio and cash-based measures of liquidity.
- Analyze operating cycle and turnover measures of liquidity and their interpretation.
- Illustrate what-if analysis for evaluating changes in company conditions and policies.
- Describe capital structure and its relation to solvency.
- Explain financial leverage and its implications for company performance and analysis.
- Analyze adjustments to accounting book values to assess capital structure.
- Describe analysis tools for evaluating and interpreting capital structure composition and for assessing solvency.
- Analyze asset composition and coverage for solvency analysis.
- Explain earnings-coverage analysis and its relevance in evaluating solvency.
- Describe capital structure risk and return and its relevance to financial statement analysis.
- Interpret ratings of organizations' debt obligations (Appendix 10A).
- Describe prediction models of financial distress (Appendix 10B).

## Is GM a Credit Risk?

NEW YORK—During economic booms, leverage can help companies make the most of their money. But if growth evaporates, the once-manageable debt becomes a drag on earnings.

General Motors (GM) provides an example. Declining market share, coupled with higher payments on borrowed funds, pensions and health care, resulted in the 2005 downgrade of GM bonds to junk status. The effect on GM is higher interest costs and reduced borrowing sources; many investment funds are prohibited from owning bonds that are below “investment grade.”

More generally, credit-rating agencies aggressively slashed corporate credit ratings as the economy slowed in the early 2000s. Downgrades soared to record levels, raising corporate borrowing costs.

Ratings agencies have today ratcheted up their oversight. “We’ve accelerated and heightened our credit-review process,” says the executive managing director of Standard & Poor’s. S&P is spending more time looking over company accounts and broadening its review to include customers and competitors. Ratings agencies are also paying more attention to equity and

**Ratings agencies have today ratcheted up their oversight**

corporate bond prices as early warning signs of company trouble.

How much debt is too much? A good place to start is to look at capital, which is usually measured as long-term debt plus shareholders’

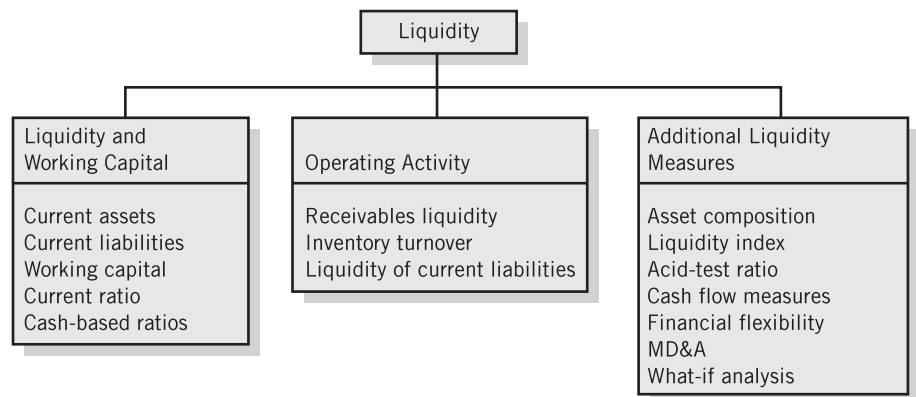
equity. As a rule of thumb, debt is preferably less than 50% of capital. But this rule must be adjusted to benchmark companies against their competitors. For example, in cyclical industries such as paper and chemicals, where revenues can swing wildly, the less debt the better.

For GM, Fitch Ratings offered the following comment relating to its downgrade of GM’s credit rating, “GM’s difficulties are augmented by its high and inflexible cost structure, unrelenting price competition, continued industry expansion and overcapacity, and increasing raw material and legacy costs. In addition, this has occurred amidst a relatively favorable economic growth environment.” This chapter examines such ratings in the more general context of credit analysis.



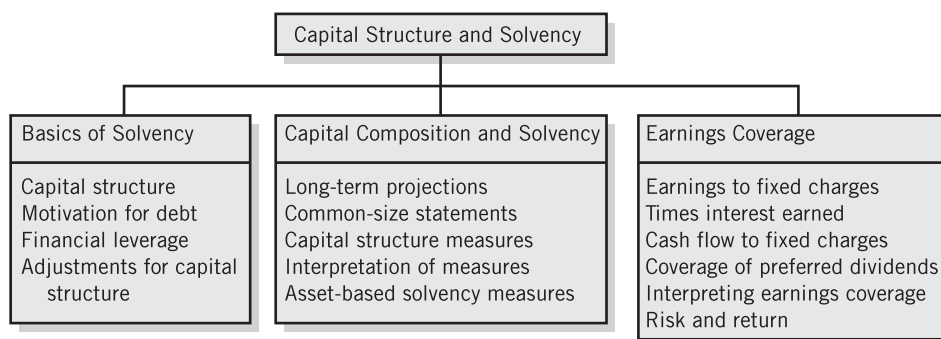
## PREVIEW OF CHAPTER 10

**Liquidity** refers to the availability of company resources to meet short-term cash requirements. A company’s short-term liquidity risk is affected by the timing of cash inflows and outflows along with its prospects for future performance. Analysis of liquidity is aimed at companies’ operating activities, their ability to generate profits from sale of products and services, and working capital requirements and measures. Section 1 of this chapter describes several financial statement analysis tools used



to assess liquidity risk. We begin with a discussion of the importance of liquidity and its link to working capital. We explain and interpret useful ratios of both working capital and a company's operating cycle for assessing liquidity. We also discuss potential adjustments to these analysis tools and the underlying financial statement numbers. What-if analysis of changes in a company's conditions or strategies concludes this section.

**Solvency** refers to a company's long-run financial viability and its ability to cover long-term obligations. All business activities of a company—financing, investing, and operating—affect a company's solvency. One of the most important components of solvency analysis is the composition of a company's capital structure. **Capital structure** refers to a company's sources of financing and its economic attributes. Section 2 of this chapter describes capital structure and explains its importance to solvency analysis. Since solvency depends on success in operating activities, we examine earnings and the ability of earnings to *cover* important and necessary company expenditures. We describe



various tools of solvency analysis, including leverage measures, analytical accounting adjustments, capital structure analysis, and earnings-coverage measures. We demonstrate these analysis tools with data from financial statements. We also discuss the relation between risk and return inherent in a company's capital structure and its implications for financial statement analysis.

## SECTION 1: LIQUIDITY

Section 1 focuses on liquidity. We consider solvency and capital structure in Section 2.

### .....LIQUIDITY AND WORKING CAPITAL

**Liquidity** is the ability to convert assets into cash or to obtain cash to meet short-term obligations. *Short term* is conventionally viewed as a period up to one year, though it is identified with the normal operating cycle of a company (the time period encompassing the buying-producing-selling-collecting cycle).

The importance of liquidity is best seen by considering repercussions stemming from a company's inability to meet short-term obligations. Liquidity is a matter of degree. Lack of liquidity prevents a company from taking advantage of favorable discounts or profitable opportunities. More extreme liquidity problems reflect a company's inability to cover current obligations. This can lead to forced sale of investments and other assets at reduced prices and, in its most severe form, to insolvency and bankruptcy.

For a company's shareholders, a lack of liquidity can foretell a loss of owner control or loss of capital investment. When a company's owners possess unlimited liability (proprietorships and certain partnerships), a lack of liquidity endangers their personal assets. To creditors of a company, a lack of liquidity can yield delays in collecting interest and principal payments or the loss of amounts due them. A company's customers and suppliers of products and services are also affected by short-term liquidity problems. Implications include a company's inability to execute contracts and damage to important customer and supplier relationships.

These scenarios highlight why measures of liquidity are of great importance in our analysis of a company. If a company fails to meet its current obligations, its continued existence is doubtful. Viewed in this light, all other measures of analysis are of secondary importance. While accounting measurements assume indefinite existence of the company, our analysis must always assess the validity of this assumption using liquidity and solvency measures.

Working capital is a widely used measure of liquidity. **Working capital** is defined as the excess of current assets over current liabilities. It is important as a measure of liquid assets that provide a safety cushion to creditors. It is also important in measuring the liquid reserve available to meet contingencies and the uncertainties surrounding a company's balance of cash inflows and outflows.

## Current Assets and Liabilities

**Current assets** are cash and other assets reasonably expected to be (1) realized in cash or (2) sold or consumed within one year (or the normal operating cycle of the company if greater than one year). Balance sheet accounts typically included as current assets are cash, marketable securities maturing within the next fiscal year, accounts receivable, inventories, and prepaid expenses. **Current liabilities** are obligations expected to be satisfied within a relatively short period of time, usually one year. Current liabilities typically include accounts payable, notes payable, short-term bank loans, taxes payable, accrued expenses, and the current portion of long-term debt.

Our analysis must assess whether all current obligations with a reasonably high probability of eventual payment are reported in current liabilities. Their exclusion from current liabilities handicaps analysis of working capital. Three common concerns are:

1. Contingent liabilities associated with loan guarantees. We need to assess the likelihood of this contingency materializing when we compute working capital.
2. Future minimum rental payments under noncancelable operating lease agreements.
3. Contracts for construction or acquisition of long-term assets often call for substantial progress payments. These obligations for payments are reported in the footnotes as "commitments" and *not* as liabilities in the balance sheet. When computing working capital, our analysis should often include these commitments.

We also should recognize that current deferred tax assets (debits) are no more current assets than current deferred tax liabilities (credits) are current liabilities. Current deferred tax assets do not always represent expected cash inflows in the form of tax refunds. These assets usually serve to reduce future income tax expense. An exception is the case of net operating loss carrybacks. Similarly, current deferred tax liabilities do not always represent future cash outflows. Examples are temporary differences

of a recurring nature (such as depreciation) that do not necessarily result in payment of taxes because their reversing differences are offset by equal or larger originating differences.

## Working Capital Measure of Liquidity

Loan agreements and bond indentures often contain stipulations for maintenance of minimum working capital levels. Financial analysts assess the magnitude of working capital for investment decisions and recommendations. Government agencies compute aggregates of companies' working capital for regulatory and policy actions. And published financial statements distinguish between current and noncurrent assets and liabilities in response to these and other user needs.

Yet the amount of working capital is more relevant to users' decisions when related to other key financial variables like sales or total assets. It is of limited value for direct comparative purposes and for assessing the adequacy of working capital. This is seen in Illustration 10.1.

### ILLUSTRATION 10.1



The following two companies have an equal amount of working capital. Yet, a quick comparison of the relation of current assets to current liabilities indicates Company A's working capital position is superior to Company B's.

	Company A	Company B
Current assets.....	\$300,000	\$1,200,000
Current liabilities .....	(100,000)	(1,000,000)
Working capital .....	\$200,000	\$ 200,000

## Current Ratio Measure of Liquidity

The previous illustration highlights the need to consider *relative* working capital. That is, a \$200,000 working capital excess yields a different conclusion for a company with \$300,000 in current assets than one with \$1,200,000 in current assets. A common relative measure in practice is the current ratio. The **current ratio** is defined as:

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

In Illustration 10.1, the current ratio is 3:1 (\$300,000/\$100,000) for Company A and 1.2:1 (\$1,200,000/\$1,000,000) for Company B. This ratio reveals a different picture for companies A and B. The ability to differentiate between companies on the basis of liquidity helps account for the widespread use of the current ratio.

### Relevance of the Current Ratio

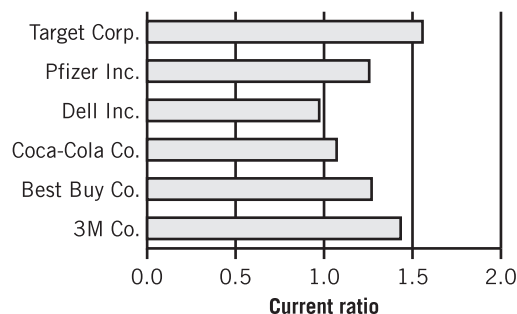
Reasons for the current ratio's widespread use as a measure of liquidity include its ability to measure:

- **Current liability coverage.** The higher the amount (multiple) of current assets to current liabilities, the greater assurance we have that current liabilities will be paid.

- **Buffer against losses.** The larger the buffer, the lower the risk. The current ratio shows the margin of safety available to cover shrinkage in noncash current asset values when ultimately disposing of or liquidating them.
- **Reserve of liquid funds.** The current ratio is relevant as a measure of the margin of safety against uncertainties and random shocks to a company's cash flows. Uncertainties and shocks, such as strikes and extraordinary losses, can temporarily and unexpectedly impair cash flows.

While the current ratio is a relevant and useful measure of liquidity and short-term solvency, it is subject to certain limitations we must be aware of. Consequently, before we describe the usefulness of the current ratio for our analysis, we discuss its limitations.

**Current Ratios for Selected Companies**



### **Limitations of the Current Ratio**

A first step in critically evaluating the current ratio as a tool for liquidity and short-term solvency analysis is for us to examine both its numerator and denominator. If we define *liquidity* as the ability to meet cash outflows with adequate cash inflows, including an allowance for unexpected decreases in inflows or increases in outflows, then it is appropriate for us to ask: Does the current ratio capture these important factors of liquidity? Specifically, does the current ratio:

- Measure and predict the pattern of future cash inflows and outflows?
- Measure the adequacy of future cash inflows to outflows?

The answer to both these questions is generally no. The current ratio is a static measure of resources available at a point in time to meet current obligations. The current reservoir of cash resources does not have a logical or causal relation to its future cash inflows. Yet future cash inflows are the greatest indicator of liquidity. These cash inflows depend on factors excluded from the ratio, including sales, cash expenditures, profits, and changes in business conditions. To clarify these limitations, we need to examine more closely the individual components of the current ratio.

### **Numerator of the Current Ratio**

We discuss each individual component of current assets and its implications for analysis using the current ratio.

**Cash and Cash Equivalents.** Cash held by a well-managed company is primarily of a precautionary reserve intended to guard against short-term cash imbalances. For example, sales can decline more rapidly than cash outlays for purchases and expenses in a business downturn, requiring availability of excess cash. Since cash is a nonearning asset and cash equivalents are usually low-yielding securities, a company aims to minimize its investment in these assets. The cash balance has little relation to the existing level of business activity and is unlikely to convey predictive implications. Further, many companies rely on cash substitutes in the form of open lines of credit not entering into the computation of the current ratio.

**Marketable Securities.** Cash in excess of the precautionary reserve is often spent on investment securities with returns exceeding those for cash equivalents. These investments

are reasonably viewed as available to discharge current liabilities. Since investment securities are reported at their fair values (see Chapter 4), much of the guesswork from estimating their net realizable value is removed. Our analysis must recognize that the further removed the balance sheet date is from our analysis date, the greater likelihood for unrecorded changes in these investments' fair values.

**Accounts Receivable.** A major determinant of accounts receivable is sales. The relation of accounts receivable to sales is governed by credit policies and collection methods. Changes in receivables correspond to changes in sales, though not necessarily on a directly proportional basis. Our analysis of accounts receivable as a source of cash must recognize, except in liquidation, the revolving nature of this asset. That is, the collection of one account is succeeded by a new extension of credit. Accordingly, the level of receivables is not a measure of future net cash inflows.

**Inventories.** Like receivables, the major determinant of inventories is sales or expected sales—not the level of current liabilities. Since sales are a function of demand and supply, methods of inventory management (such as economic order quantities, safety stock levels, and reorder points) maintain inventory increments varying not in proportion to demand but by lesser amounts. The relation of inventories to sales is underscored by the observation that sales initiate the conversion of inventories to cash. Determination of future cash inflows from the sale of inventories depends on the profit margin that can be realized since inventories are reported at the lower of cost or market. The current ratio does not recognize sales level or profit margin, yet both are important determinants of future cash inflows.

**Prepaid Expenses.** Prepaid expenses are expenditures for future benefits. Since these benefits are typically received within a year of the company's operating cycle, they preserve the outlay of current funds. Prepaid expenses are usually small relative to other current assets. However, our analysis must be aware of the tendency of companies with weak current positions to include deferred charges and other items of dubious liquidity in prepaid expenses. We should exclude such items from our computation of working capital and the current ratio.

### ***Denominator of the Current Ratio***

Current liabilities are the focus of the current ratio. They are a source of cash in the same way receivables and inventories use cash. Current liabilities are primarily determined by sales, and a company's ability to meet them when due is the object of working capital measures. For example, since purchases giving rise to accounts payable are a function of sales, payables vary with sales. As long as sales remain constant or are rising, the payment of current liabilities is a refunding activity. In this case the components of the current ratio provide little, if any, recognition to this activity or to its effects on future cash flows. Also, current liabilities entering into the computation of the current ratio do not include prospective cash outlays—examples are certain commitments under construction contracts, loans, leases, and pensions.

## **Using the Current Ratio for Analysis**

From our discussion of the current ratio, we can draw at least three conclusions.

1. Liquidity depends to a large extent on *prospective* cash flows and to a lesser extent on the level of cash and cash equivalents.

2. No direct relation exists between balances of working capital accounts and likely patterns of future cash flows.
3. Managerial policies regarding receivables and inventories are directed primarily at efficient and profitable asset utilization and secondarily at liquidity.

These conclusions do not bode well for the current ratio as an analysis tool and we might question why it enjoys widespread use in analysis. Reasons for using the current ratio include its understandability, its simplicity in computation, and its data availability. Its use also derives from the creditor's (especially banker's) propensity toward viewing credit situations as conditions of last resort. They ask themselves: What if there were a complete stoppage of cash inflows? Would current assets meet current liabilities? This extreme analysis is not always a useful way of assessing liquidity. Two other points are also pertinent. First, our analysis of short-term liquidity and solvency must recognize the relative superiority of cash flow projections and pro forma financial statements versus the current ratio. These analyses require information not readily available in financial statements, including product demand estimation (see Chapter 9). Second, if our analysis uses the current ratio as a static measure of the ability of current assets to satisfy current liabilities, we must recognize this is a different concept of liquidity from the one described above. In our context, liquidity is the readiness and speed that current assets are convertible to cash and the extent this conversion yields shrinkage in current asset values.

It is not our intent to reject the current ratio as an analysis tool. But it is important for us to know its relevant use. Moreover, there is no "adjustment" to rectify its limitations. Consequently, to what use can we apply the current ratio? The relevant use of the current ratio is only to measure the ability of current assets to discharge current liabilities. In addition, we can consider the excess of current assets, if any, as a liquid surplus available to meet imbalances in the flow of funds and other contingencies. These two applications are applied with our awareness that the ratio assumes company liquidation. This is in contrast to the usual going-concern situation where current assets are of a revolving nature (such as new receivables replacing collected receivables) and current liabilities are of a refunding nature (such as new payables covering payables due).

Provided we apply the current ratio in the manner described, there are two elements that we must evaluate and measure before the current ratio can usefully form a basis of analysis:

1. Quality of both current assets and current liabilities.
2. Turnover rate of both current assets and current liabilities—that is, the time necessary for converting receivables and inventories into cash and for paying current liabilities.

Several adjustments, ratios, and other analysis tools are available to make these evaluations and enhance our use of the current ratio (see subsequent pages). The remainder of this section describes relevant applications of the current ratio in practice.

### ***Comparative Analysis***

Analyzing the trend in the current ratio is often enlightening. Changes in the current ratio over time, however, must be interpreted with caution. Changes in this ratio do not necessarily imply changes in liquidity or operating performance. For example, during a recession a company might continue to pay current liabilities while inventory and receivables accumulate, yielding an increase in the current ratio. Conversely, in a successful period, increases in taxes payable can lower the current ratio. Company expansion



often accompanying operating success can create larger working capital requirements. This “prosperity squeeze” in liquidity decreases the current ratio and is the result of company expansion unaccompanied by an increase in working capital—see Illustration 10.2.

**ILLUSTRATION 10.2**

Technology Resources, Inc., experiences a doubling of current assets and a quadrupling of current liabilities with *no change* in its working capital. This yielded a prosperity squeeze evidenced by a 50% decline in the current ratio.

	Year 1	Year 2
Current assets .....	\$300,000	\$600,000
Current liabilities .....	(100,000)	(400,000)
Working capital .....	<u>\$200,000</u>	<u>\$200,000</u>
Current ratio .....	3:1	1.5:1

**Ratio Management**

Our analysis must look for “management” of the current ratio, also known as *window dressing*. Toward the close of a period, management will occasionally press the collection of receivables, reduce inventory below normal levels, and delay normal purchases. Proceeds from these activities are then used to pay off current liabilities. The effect of these activities is to increase the current ratio—see Illustration 10.3.

**ILLUSTRATION 10.3**

Technology Resources, Inc., increases its current ratio by making an earlier-than-normal payoff of \$50,000 of current liabilities:

	Before Payoff	After Payoff
Current assets .....	\$ 200,000	\$150,000
Current liabilities .....	(100,000)	(50,000)
Working capital .....	<u>\$ 100,000</u>	<u>\$100,000</u>
Current ratio .....	2:1	3:1

Our analysis should also go beyond annual measures and use interim measures of the current ratio. Interim analysis makes it more difficult for management to window dress and allows us to gauge seasonal effects on the ratio. For example, a strong current ratio in December can be misleading if a company experiences a credit squeeze at its seasonal peak in July.

**Rule of Thumb Analysis**

A frequently applied rule of thumb is if the current ratio is 2:1 or better, then a company is financially sound, while a ratio below 2:1 suggests increasing liquidity risks. The 2:1 norm implies there are \$2 of current assets available for every \$1 of current liabilities or, alternatively viewed, the value of current assets can in liquidation shrink by as much as 50% and still cover current liabilities. A current ratio much higher than 2:1, while implying superior coverage of current liabilities, can signal inefficient use of resources and

a reduced rate of return. Our evaluation of the current ratio with any rule of thumb is of dubious value for two reasons:

1. Quality of current assets and the composition of current liabilities are more important in evaluating the current ratio (for example, two companies with identical current ratios can present substantially different risks due to variations in the quality of working capital components).
2. Working capital requirements vary with industry conditions and the length of a company's net trade cycle.

### Net Trade Cycle Analysis

A company's working capital requirements are affected by its desired inventory investment and the relation between credit terms from suppliers and those extended to customers. These considerations determine a company's **net trade cycle**. Computation of a company's net trade cycle is described in Illustration 10.4

Selected financial information from Technology Resources for the end of Year 1 is reproduced below:

Sales for Year 1 .....	\$360,000
Receivables .....	40,000
Inventories* .....	50,000
Accounts payable† .....	20,000
Cost of goods sold (including depreciation of \$30,000) .....	320,000

\*Beginning inventory is \$100,000.

†These relate to purchases included in cost of goods sold.

We estimate Technology Resources' purchases per day as:

Ending inventory .....	\$ 50,000
Cost of goods sold .....	<u>320,000</u>
	370,000
Less: Beginning inventory .....	(100,000)
Cost of goods purchased and manufactured .....	270,000
Less: Depreciation in cost of goods sold .....	(30,000)
Purchases .....	<u>\$240,000</u>

$$\text{Purchases per day} = \$240,000 \div 360 = \$666.67$$

Then, the net trade cycle for Technology Resources is computed as (in days):

$$\begin{aligned} \text{Accounts receivable} &= \frac{\$40,000}{\$360,000 \div 360} = 40.00 \text{ days} \\ \text{Inventories} &= \frac{\$50,000}{\$320,000 \div 360} = \frac{56.24}{96.24} \text{ days} \\ \text{Less: Accounts payable} &= \frac{\$20,000}{\$240,000 \div 360} = 30.00 \text{ days} \\ \text{Net trade cycle (days)} &= \underline{\underline{66.24}} \text{ days} \end{aligned}$$

#### ILLUSTRATION 10.4



The numerator and denominator in Illustration 10.4 are adjusted on a consistent basis. Specifically, accounts receivable reported in sales dollars are divided by sales per day, inventories reported at cost are divided by cost of goods sold per day, and accounts payable reported in dollars of purchases are divided by purchases per day. Consequently, while the day measures are expressed on different bases, our estimation of the net trade cycle is on a consistent basis. This analysis shows Technology Resources has 40 days of sales tied up in receivables, maintains 56 days of goods available in inventory, and receives only 30 days of purchases as credit from its suppliers. The longer the net trade cycle, the larger is the working capital requirement. Reduction in the number of days' sales in receivables or cost of sales in inventories lowers working capital requirements. An increase in the number of days' purchases as credit received from suppliers lowers working capital needed. Working capital requirements are determined by industry conditions and practices. Comparisons using industry current ratios, and analysis of working capital requirements using net trade cycle measures, are useful in analysis of the adequacy of a company's working capital.

#### **ANALYSIS VIEWPOINT**

#### **. . . YOU ARE THE BANKER**

International Machines Corporation (IMC) calls on you for a short-term one-year \$2 million loan to finance expansion in the United Kingdom. As part of your loan analysis of IMC you compute a 4:1 current ratio on current assets of nearly \$1.6 million. Analysis of industry competitors yields a 1.9:1 average current ratio. What is your decision on IMC's loan application using this limited information? Would your decision change if IMC's application is for a 10-year loan?

## **Cash-Based Ratio Measures of Liquidity**

Cash and cash equivalents are the most liquid of current assets. In this section, we examine cash-based ratio measures of liquidity.

### ***Cash to Current Assets Ratio***

The ratio of "near-cash" assets to the total of current assets is one measure of the degree of current asset liquidity. This measure, known as the **cash to current assets ratio**, is computed as:

$$\frac{\text{Cash} + \text{Cash equivalents} + \text{Marketable securities}}{\text{Current assets}}$$

The larger this ratio, the more liquid are current assets.

### ***Cash to Current Liabilities Ratio***

Another ratio measuring cash adequacy is the **cash to current liabilities ratio**. It is computed as:

$$\frac{\text{Cash} + \text{Cash equivalents} + \text{Marketable securities}}{\text{Current liabilities}}$$

This ratio measures the cash available to pay current obligations. This is a severe test ignoring the refunding nature of current assets and current liabilities. It supplements the cash to current assets ratio in measuring cash availability from a different perspective. To view this ratio as an extension of the quick ratio (see later analysis in this chapter) is, except in extreme cases, a too severe test of short-term liquidity. Still the importance of

cash as the ultimate form of liquidity should not be underestimated. The record of business failures provides many examples of insolvent companies with sizable noncash assets (both current and noncurrent) and an inability to pay liabilities or to operate.

## ..... OPERATING ACTIVITY ANALYSIS OF LIQUIDITY

Operating activity measures of liquidity are important in credit analysis. This section considers three operating activity measures based on accounts receivable, inventory, and current liabilities.

### Accounts Receivable Liquidity Measures

For most companies selling on credit, accounts and notes receivable are an important part of working capital. In assessing liquidity, including the quality of working capital and the current ratio, it is necessary to measure the quality and liquidity of receivables. Both quality and liquidity of accounts receivable are affected by their turnover rate. *Quality* refers to the likelihood of collection without loss. A measure of this likelihood is the proportion of receivables within terms of payment set by the company. Experience shows that the longer receivables are outstanding beyond their due date, the lower is the likelihood of collection. Their turnover rate is an indicator of the age of receivables. This indicator is especially useful when compared with an expected turnover rate computed using the permitted credit terms. *Liquidity* refers to the speed in converting accounts receivable to cash. The receivables turnover rate is a measure of this speed.

### Accounts Receivable Turnover

The **accounts receivable turnover** ratio is computed as:

$$\frac{\text{Net sales on credit}}{\text{Average accounts receivable}}$$

Notes receivable from normal sales should be included when computing accounts receivable turnover. We should also include only credit sales when computing this ratio because cash sales do not create receivables. Since financial statements rarely separately disclose cash and credit sales, our analysis often must compute this ratio using total net sales (that is, assuming cash sales are insignificant). If cash sales are not insignificant, then this ratio is less useful. However, if the proportion of cash sales to total sales is relatively stable, then year-to-year comparisons of changes in the receivables turnover ratio are reliable. The most direct way for us to determine *average* accounts receivable is to add beginning and ending accounts receivable for the period and divide by two. Using monthly or quarterly figures yields more accurate estimates. The more that sales fluctuate, the more likely this ratio is distorted. The receivables turnover ratio indicates how often, on average, receivables revolve—that is, are received and collected during the year. Illustration 10.5 provides an example.

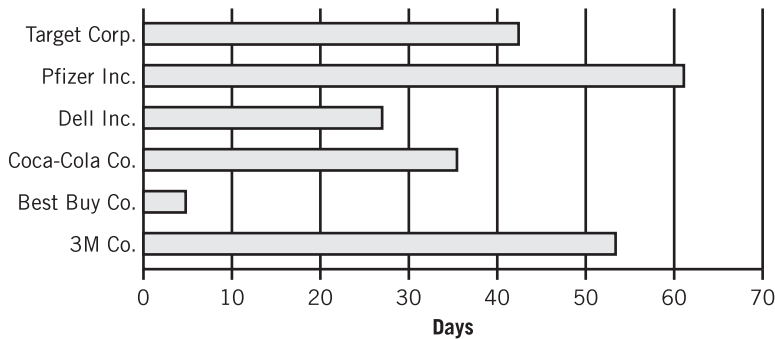
Consumer Electronics reports sales of \$1,200,000, beginning receivables of \$150,000, and year-end receivables of \$250,000. Its accounts receivable turnover ratio is computed as:

$$\frac{\$1,200,000}{(\$150,000 + \$250,000) \div 2} = \frac{\$1,200,000}{\$200,000} = 6$$

### ILLUSTRATION 10.5



### Days' Sales in Receivables for Selected Industries



### Days' Sales in Receivables

While the accounts receivable turnover ratio measures the speed of collections and is useful for comparison purposes, it is not directly comparable to the terms of trade a company extends to its customers. This latter comparison is made by converting the turnover ratio into days of sales tied up in receivables. The **days' sales in receivables** measures the number of days it takes, on average, to collect accounts receivable based

on the year-end balance in accounts receivable. It is computed by dividing accounts receivable by average daily sales as follows:

$$\text{Days' sales in receivables} = \text{Accounts receivable} \div \frac{\text{Sales}}{360}$$

Using data from Consumer Electronics, the computation follows:<sup>1</sup>

$$\frac{\text{Accounts receivable}}{\text{Average daily sales}} = \frac{\$250,000}{(\$1,200,000/360)} = \frac{\$250,000}{\$3,333} = 75 \text{ days}$$

### Interpretation of Receivables Liquidity Measures

Accounts receivable turnover rates and collection periods are usefully compared with industry averages or with the credit terms given by the company. When the collection period is compared with the terms of sale allowed by the company, we can assess the extent of customers paying on time. For example, if usual credit terms of sale are 40 days, then an average collection period of 75 days reflects one or more of the following conditions:

- Poor collection efforts.
- Delays in customer payments.
- Customers in financial distress.

The first condition demands corrective managerial action, while the other two reflect on both the quality and liquidity of accounts receivable and demand judicious managerial action. An initial step is to determine whether accounts receivable are representative of company sales activity. For example, receivables may be sold to SPEs and, if the SPEs are properly structured, the receivables are removed from the books. Intermittent sales of accounts receivable may, therefore, distort the ratio computations. It is not

<sup>1</sup> An alternative measure, the **receivables collection period**, measures the number of days it takes, on average, to collect accounts receivable based on the *average* balance in accounts receivable. It is computed by dividing the accounts receivable turnover ratio into 360 days (an approximate number of days in a year):

$$\text{Collection period} = \frac{360}{\text{Accounts receivable turnover}}$$

Using the figures from Consumer Electronics in Illustration 10.5, the receivables collection period is:

$$\frac{360}{6} = 60 \text{ days}$$

uncommon for companies to continue to service the accounts for the SPE. In this case the total amount of serviced receivables is provided in the footnotes. These can be added to those reported on the balance sheet to arrive at total outstanding receivables. The turnover ratios are then computed using total outstanding receivables.

Another complication relates to whether the receivable turnover ratios are computed based on gross or net accounts receivable. If the latter, the resulting computations are affected by the company's degree of conservatism in estimating uncollectible accounts. It is generally preferable to compute turnover ratios based on gross receivables to avoid this problem.

Certain trend analyses also merit our study. The trend in collection period over time is important in helping assess the quality and liquidity of receivables. Another trend to watch is the relation between the provision for doubtful accounts and gross accounts receivable, computed as:

$$\frac{\text{Provision for doubtful accounts}}{\text{Gross accounts receivable}}$$

Increases in this ratio over time suggest a decline in the collectibility of receivables. Conversely, decreases in this ratio suggest improved collectibility or the need to reevaluate the adequacy of the doubtful accounts provision. Overall, accounts receivable liquidity measures are important in our analysis. They are also important as measures of asset utilization, a subject we address in Chapter 8.

## Inventory Turnover Measures

Inventories often constitute a substantial proportion of current assets. The reasons for this often have little to do with a company's need to maintain adequate liquid funds. Inventories are investments made for purposes of obtaining a return through sales to customers. In most companies, a certain level of inventory must be kept. If inventory is inadequate, sales volume declines below an attainable level. Conversely, excessive inventories expose a company to storage costs, insurance, taxes, obsolescence, and physical deterioration. Excessive inventories also tie up funds that can be used more profitably elsewhere. Due to risks in holding inventories, and given that inventories are further removed from cash than receivables are, they are normally considered the least liquid current asset. Our evaluation of short-term liquidity and working capital, which involves inventories, must include an evaluation of the quality and liquidity of inventories. Measures of inventory turnover are excellent tools for this analysis.

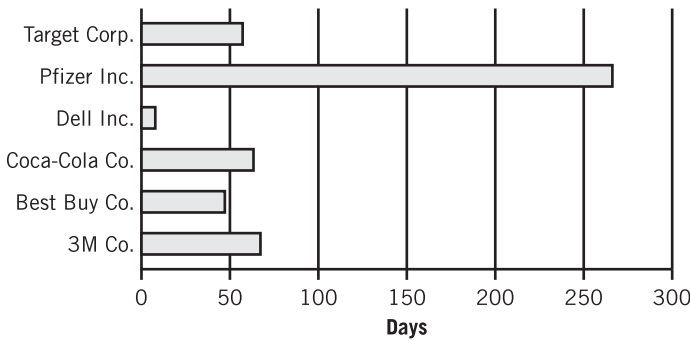
### *Inventory Turnover*

The **inventory turnover ratio** measures the average rate of speed at which inventories move through and out of a company. Inventory turnover is computed as:

$$\frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

Consistency requires we use cost of goods sold in the numerator because, like inventories, it is reported at cost. Sales, in contrast, includes a profit margin. Average inventory is computed by adding the beginning and ending inventory balances, and dividing by two. This averaging computation can be refined by averaging quarterly or monthly inventory figures. When we are interested in evaluating the *level* of inventory at a specific date, such as year-end, we compute the inventory turnover ratio using the inventory balance at that date in the denominator.

### Days' Sales in Inventory for Selected Companies



### Days' Sales in Inventory

Another measure of inventory turnover useful in assessing a company's purchasing and production policy is the number of **days' sales in inventory**, computed as:<sup>2</sup>

$$\text{Inventories} \div \frac{\text{Cost of goods sold}}{360}$$

This ratio tells us the number of days required to sell *ending* inventory assuming a given rate of sales. Illustration 10.6 provides an example.

**ILLUSTRATION 10.6** Selected financial information from Macon Resources for Year 8 is reproduced below:



Sales .....	\$1,800,000
Cost of goods sold .....	1,200,000
Beginning inventory .....	200,000
Ending inventory .....	400,000

$$\text{Days' sales in inventory} = \frac{\$400,000}{\$1,200,000/360} = 120 \text{ days}$$

### Interpreting Inventory Turnover

The current ratio views current asset components as sources of funds to potentially pay off current liabilities. Viewed similarly, inventory turnover ratios offer measures of both the quality and liquidity of the inventory component of current assets. *Quality of inventory* refers to a company's ability to use and dispose of inventory. We should recognize, however, that a continuing company does not use inventory for paying current liabilities since any serious reduction in normal inventory levels likely cuts into sales volume.

When inventory turnover decreases over time, or is less than the industry norm, it suggests slow-moving inventory items attributed to obsolescence, weak demand, or nonsalability. These conditions question the feasibility of a company recovering inventory costs. We need further analysis in this case to see if decreasing inventory turnover is due to inventory buildup in anticipation of sales increases, contractual commitments, increasing prices, work stoppages, inventory shortages, or other legitimate reason. We also must be aware of inventory management (such as just-in-time systems) aimed at keeping inventory levels low by integrating ordering, producing, selling, and distributing. Effective inventory management increases inventory turnover.

<sup>2</sup> An alternative measure, the **days to sell inventory ratio**, is computed as:

$$\frac{360}{\text{Inventory turnover}}$$

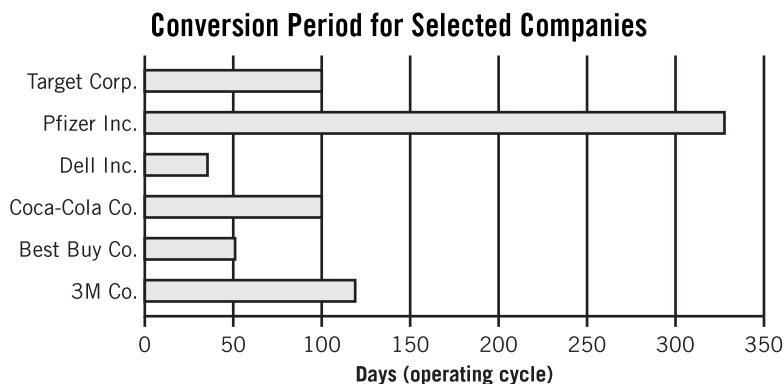
This ratio tells us the number of days a company takes in selling *average* inventory for that year. Using the figures from Illustration 10.6, the days to sell inventory ratio is computed as:

$$\text{Inventory turnover ratio} = \frac{\$1,200,000}{(\$200,000 + \$400,000) \div 2} = 4$$

$$\text{Days to sell inventory ratio} = \frac{360}{4} = 90 \text{ days}$$

Another useful inventory liquidity measure is its **conversion period** or **operating cycle**. This measure combines the collection period of receivables with the days to sell inventories to obtain the time interval to convert inventories to cash. Using results computed from our two independent illustrations above, we would compute the conversion period as:

Days' sales in receivables.....	75
Days' sales in inventories .....	<u>120</u>
Conversion period .....	<u>195</u>



This implies it takes 195 days for a company to both sell its inventory and to collect the receivables, based on current levels of receivables and inventories.<sup>3</sup>

In evaluating inventory turnover, our analysis must be alert to the influence of alternative accounting principles for valuing the ratio's components. Our discussion of accounting for inventory in Chapter 4 is relevant here. Use of the LIFO method of inventory valuation can seriously impair the usefulness of both turnover and current ratios. For example, inventory valuation affects both the numerator and denominator of the current ratio—the latter through its effect on taxes payable. Information is often available in the financial statements enabling us to adjust unrealistically low LIFO inventory values in times of rising prices, making these values useful for inclusion in turnover and current ratios. Notice that even if two companies use the LIFO method for inventory valuation, their inventory-based ratios are likely *not* comparable because their LIFO inventory pools (bases) are almost certainly acquired in different years with different price levels. We also must remember that companies using a “natural year” may have at year-end an atypically low inventory level. This can increase a turnover ratio to an abnormally high level.

#### **ANALYSIS VIEWPOINT**

#### **. . . YOU ARE THE CONSULTANT**

King Entertainment, Inc., engages your services as a management consultant. One of your tasks is to streamline costs of inventory. After studying prior performance and inventory reports, you propose to strategically reduce inventories through improved inventory management. Your proposal expects the current inventory turnover of 20 will increase to 25. Money not invested in inventory can be used to decrease current liabilities—the costs of holding current liabilities average 10% per year. What is your estimate of cost savings if predicted sales are \$150 million and predicted cost of sales is \$100 million?

<sup>3</sup> Alternative computations commonly in use are (a) *Days to sell inventory + Collection period*, as described in footnotes 1 and 2, and (b) *Days' sales in receivables (days to sell inventory) + Days' sales in inventory (collection period) – Average payment period (days' purchases in accounts payable)*. This latter computation recognizes that a portion of working capital is provided by a company's suppliers (the average payment period and day's purchases in accounts payable are discussed in the section Days' Purchases in Accounts Payable).



## Liquidity of Current Liabilities

Current liabilities are important in computing both working capital and the current ratio for two related reasons:

1. Current liabilities are used in determining whether the excess of current assets over current liabilities affords a sufficient margin of safety.
2. Current liabilities are deducted from current assets in arriving at working capital.

In using working capital and the current ratio, the point of view is one of liquidation and *not* of continuing operations. This is because in normal operations current liabilities are not paid off but are of a refunding nature. Provided sales remain stable, both purchases and current liabilities should remain steady. Increasing sales usually yield increasing current liabilities.

### *Quality of Current Liabilities*

The quality of current liabilities is important in analysis of working capital and the current ratio. Not all current liabilities represent equally urgent or forceful payment demands. At one extreme, we find liabilities for various taxes that must be paid promptly regardless of current financial pressures. Collection powers of federal, state, and local government authorities are formidable. At the other extreme are current liabilities to suppliers with whom a company has a long-standing relationship and who depend on and value its business. Postponement and renegotiation of these liabilities in times of financial pressures are both possible and common.

The quality of current liabilities must be judged on their degree of urgency in payment. We should recognize if fund inflows from current revenues are viewed as available for paying current liabilities, then labor and similar expenses requiring prompt payment have a first call on revenues. Trade payables and other liabilities are paid only after these outlays are met. We examined this aspect of funds flow in the prior chapter.

Our analysis also must be aware of unrecorded liabilities having a claim on current funds. Examples are purchase commitments and certain postretirement and lease obligations. When long-term loan acceleration clauses exist, a failure to meet current installments can render the entire debt due and payable.

### *Days' Purchases in Accounts Payable*

A measure of the extent to which companies "lean on the trade" is the **average payable days outstanding**. This measure is computed as:<sup>4</sup>

$$\text{Average payable days outstanding} = \frac{\text{Accounts payable}}{\text{Cost of goods sold} \div 360}$$

The average payable days outstanding provides an indication of the average time the company takes in paying its obligations to suppliers. The longer the payment period, the greater the use of suppliers' capital.

A related measure is **accounts payable turnover**. It is computed as: Cost of goods sold  $\div$  Average accounts payable. This ratio indicates the speed at which a company pays for purchases on account.

<sup>4</sup> Purchases can be substituted for cost of goods sold in this formula, and can be estimated as:  
Purchases = Cost of goods sold + Ending inventory – Beginning inventory.

## ..... ADDITIONAL LIQUIDITY MEASURES

### Current Assets Composition

The composition of current assets is an indicator of working capital liquidity. Use of common-size percentage comparisons facilitates our evaluation of comparative liquidity, regardless of the dollar amounts. Consider Illustration 10.7 as a case example.

Texas Electric's current assets along with their common-size percentages are reproduced below for Years 1 and 2:

#### ILLUSTRATION 10.7

Current assets	Year 1		Year 2	
Cash .....	\$ 30,000	30%	\$ 20,000	20%
Accounts receivable .....	40,000	40	30,000	30
Inventories .....	30,000	30	50,000	50
Total current assets .....	<u>\$100,000</u>	<u>100%</u>	<u>\$100,000</u>	<u>100%</u>

An analysis of Texas Electric's common-size percentages reveals a marked deterioration in current asset liquidity in Year 2 relative to Year 1. This is evidenced by a 10% decline for both cash and accounts receivable.

### Acid-Test (Quick) Ratio

A more stringent test of liquidity uses the **acid-test (quick) ratio**. This ratio includes those assets most quickly convertible to cash and is computed as:

$$\frac{\text{Cash} + \text{Cash equivalents} + \text{Marketable securities} + \text{Accounts receivable}}{\text{Current liabilities}}$$

Inventories are often the least liquid of current assets and are not included in the acid-test ratio. Another reason for excluding inventories is that their valuation typically involves more managerial discretion than required for other current assets. Yet we must remember that inventories for some companies are more liquid than slow-paying receivables. Our analysis must assess the merits of excluding inventories in evaluating liquidity. The interpretation of the acid-test ratio is similar to that of the current ratio.

### Cash Flow Measures

The static nature of the current ratio and its inability (as a measure of liquidity) to recognize the importance of cash flows in meeting maturing obligations has led to a search for a dynamic measure of liquidity. Since liabilities are paid with cash, a comparison of operating cash flow to current liabilities is important. A ratio comparing operating cash flow to current liabilities overcomes the static nature of the current ratio since its numerator reflects a flow variable. This **cash flow ratio** is computed as:

$$\frac{\text{Operating cash flow}}{\text{Current liabilities}}$$

The cash flow ratio computation for Campbell Soup in Year 11 is (data taken from financial statements reproduced in Appendix A):

$$\frac{\$805.2}{\$1,278} = 0.63$$

## Financial Flexibility

There are important *qualitative* considerations bearing on short-term liquidity. These are usefully characterized as depending on the financial flexibility of a company. **Financial flexibility** is the ability of a company to take steps to counter unexpected interruptions in the flow of funds. It can mean the ability to borrow from various sources, to raise equity capital, to sell and redeploy assets, or to adjust the level and direction of operations to meet changing circumstances. A company's capacity to borrow depends on several factors and is subject to change. It depends on profitability, stability, size, industry position, asset composition, and capital structure. It also depends on credit market conditions and trends. A company's capacity to borrow is important as a source of cash and in turning over short-term debt. Prearranged financing or open lines of credit are reliable sources of cash. Additional factors bearing on an assessment of a company's financial flexibility are (1) ratings of its commercial paper, bonds, and preferred stock, (2) any restrictions on its sale of assets, (3) the extent expenses are discretionary, and (4) ability to respond quickly to changing conditions (such as strikes, demand shifts, and breaks in supply sources).

## Management's Discussion and Analysis

As we discussed in Chapter 1, the Securities and Exchange Commission requires companies to include in their annual reports an expanded management discussion and analysis of financial condition and results of operations (MD&A). The financial condition section requires a discussion of liquidity—including known trends, demands, commitments, or uncertainties likely to impact the company's ability to generate adequate cash. If a material deficiency in liquidity is identified, management must discuss the course of action it has taken or proposes to take to remedy the deficiency. Internal and external sources of liquidity and any material unused sources of liquid assets must be identified and described. Our analysis benefits from management's discussion and analysis. For example, Dell includes a useful discussion titled Liquidity, Capital Commitments, and Contractual Cash Obligations in its MD&A section (see Appendix A).

## What-If Analysis

**What-if analysis** is a useful technique to trace through the effects of changes in conditions or policies on the resources of a company. What-if analysis is illustrated in this section using the following selected financial data from Consolidated Technologies, Inc., at December 31, Year 1:

Cash .....	\$ 70,000
Accounts receivable .....	150,000
Inventory .....	65,000
Fixed assets .....	200,000
Accumulated depreciation .....	43,000
Accounts payable .....	130,000
Notes payable .....	35,000
Accrued tax liability .....	18,000
Capital stock .....	200,000

The following additional information is reported for the year ended December 31, Year 1:

Sales.....	\$750,000
Cost of sales.....	520,000
Purchases.....	350,000
Depreciation .....	25,000
Net income.....	20,000

Consolidated Technologies anticipates 10% growth in sales for Year 2. All revenue and expense items are expected to increase by 10%, except for depreciation, which remains the same. All expenses are paid in cash as they are incurred, and Year 2 ending inventory is projected at \$150,000. By the end of Year 2, Consolidated Technologies expects to have notes payable of \$50,000 and a zero balance in accrued taxes. The company maintains a minimum cash balance of \$50,000 as a managerial policy.

**Case 10.1** Consolidated Technologies is considering a change in credit policy where ending accounts receivable reflect 90 days of sales. What impact does this change have on the company's cash balance? Will this change affect the company's need to borrow? Our analysis of this what-if situation is as follows:

<b>CONSOLIDATED TECHNOLOGIES</b>			
Cash Forecast			
For Year Ended December 31, Year 2			
Cash, January 1, Year 2.....			\$ 70,000
Cash collections			
Accounts receivable, January 1, Year 2.....	\$150,000		
Sales.....	<u>825,000</u>		
Total potential cash collections .....	975,000		
Less: Accounts receivable, December 31, Year 2.....	<u>(206,250)<sup>(a)</sup></u>	768,750	
Total cash available.....			838,750
Cash disbursements			
Accounts payable, January 1, Year 2.....	\$130,000		
Purchases.....	<u>657,000<sup>(b)</sup></u>		
Total potential cash disbursements.....	787,000		
Accounts payable, December 31, Year 2 .....	<u>(244,000)<sup>(c)</sup></u>	543,000	
Notes payable, January 1, Year 2 .....	35,000		
Notes payable, December 31, Year 2.....	<u>(50,000)</u>	(15,000)	
Accrued taxes .....	18,000		
Cash expenses <sup>(d)</sup> .....	<u>203,500</u>	749,500	
Cash, December 31, Year 2 .....			89,250
Cash balance desired.....			<u>50,000</u>
Cash excess .....			<u>\$ 39,250</u>

*(continued)*

(concluded)

Explanations:

(a)  $\$825,000 \times \frac{90}{360} = \$206,250.$

(b) Year 2 cost of sales\*:  $\$520,000 \times 1.1 = \$572,000$

Ending inventory (given)	150,000
Goods available for sale	\$722,000
Beginning inventory	(65,000)
Purchases	\$657,000

\* Excluding depreciation.

(c)  $\text{Purchases} \times \frac{\text{Beg. accounts payable}}{\text{Year 1 purchases}} = \$657,000 \times \frac{\$130,000}{\$350,000} = \underline{\underline{\$244,000}}$

(d) Gross profit ( $\$825,000 - \$572,000$ )

	\$253,000
Less: Net income	\$24,500*
Depreciation	25,000
Other cash expenses	(49,500)
	\$203,500

\* 110% of \$20,000 (Year 1 income) + 10% of \$25,000 (Year 1 depreciation).

Alternatively,  $\$185,000 \times 1.10 = \$203,500$ , where \$185,000 is last year's other cash expenses.

This change in credit policy would yield an excess in cash and no required borrowing.

**Case 10.2** What if Consolidated Technologies worked to achieve an *average* accounts receivable turnover of 4.0 (instead of using *ending* receivables as in the previous case)? What impact does this change have on the company's cash balance? Our analysis of this what-if situation follows:

Excess cash balance as computed above .....	\$39,250
Change from <i>ending</i> to <i>average</i> accounts receivable (A. R.) turnover increases year-end accounts receivable to:	
Average A. R. = $\frac{\$825,000}{4} = \$206,250$	
Ending A. R. = $[\$206,250 \times 2] - \$150,000 = \$262,500^a$	
Less: Accounts receivable balance from Case 10.1	(206,250)
Cash to be borrowed .....	56,250 (cash decrease)
	\$17,000 (cash deficit)

<sup>a</sup> Average A. R. =  $\frac{\text{Sales}}{\text{Average A. R. turnover}}$ ; Ending A. R. =  $[(\text{Average A. R.}) \times 2] - \text{Beginning A. R.}$

Consolidated Technologies would be required to borrow funds to achieve expected performance under the conditions specified.

**Case 10.3** What if, in addition to the conditions prevailing in Case 10.2, the company's suppliers require payment within 60 days? What is the effect of this payment requirement on the cash balance? Our analysis of this case is as follows:

Cash required to borrow (from Case 10.2) .....	\$ 17,000
Ending accounts payable (from Case 10.1) .....	\$244,000
Ending accounts payable under 60-day payment:	
Purchases $\times \frac{60}{360} = \$657,000 \times \frac{60}{360}$ .....	(109,500)
Additional disbursements required .....	134,500
Cash to be borrowed .....	\$151,500

This more demanding payment schedule from suppliers would place additional borrowing requirements on Consolidated Technologies.

## SECTION 2: CAPITAL STRUCTURE AND SOLVENCY

### .....BASICS OF SOLVENCY

Analyzing solvency of a company is markedly different from analyzing liquidity. In liquidity analysis, the time horizon is sufficiently short for reasonably accurate forecasts of cash flows. Long-term forecasts are less reliable and, consequently, analysis of solvency uses less precise but more encompassing analytical measures.

Analysis of solvency involves several key elements. Analysis of capital structure is one of these. *Capital structure* refers to the sources of financing for a company. Financing can range from relatively permanent equity capital to more risky or temporary short-term financing sources. Once a company obtains financing, it subsequently invests it in various assets. Assets represent secondary sources of security for lenders and range from loans secured by specific assets to assets available as general security for unsecured creditors. These and other factors yield different risks associated with different assets and financing sources.

Another key element of long-term solvency is *earnings* (or *earning power*)—implying the recurring ability to generate cash from operations. Earnings-based measures are important and reliable indicators of financial strength. Earnings is the most desirable and reliable source of cash for long-term payment of interest and debt principal. As a measure of cash inflows from operations, earnings is crucial to covering long-term interest and other fixed charges. A stable earnings stream is an important measure of a company's ability to borrow in times of cash shortage. It is also a measure of the likelihood of a company's rebounding from conditions of financial distress.

Lenders guard themselves against company insolvency and financial distress by including loan covenants in the lending agreements. Loan covenants set conditions of *default*, often based on accounting measures, at a level to allow the lender the opportunity to collect on the loan before severe financial distress. Covenants are often designed to (1) emphasize key measures of financial strength like the current ratio and debt to equity ratio, (2) prohibit the issuance of additional debt, or (3) ensure against disbursement of company resources through excessive dividends or acquisitions. Covenants cannot assure lenders against operating losses—invariably the source of financial distress. Covenants and protective provisions also cannot substitute for our alertness and monitoring of a company's results of operations and financial condition. The enormous amount of both public and private debt financing has led to some standardized approaches to its analysis and evaluation. While this chapter explains many of these approaches, Appendix 10A discusses the analysis of debt securities by rating agencies, and Appendix 10B describes the use of ratios as predictors of financial distress.

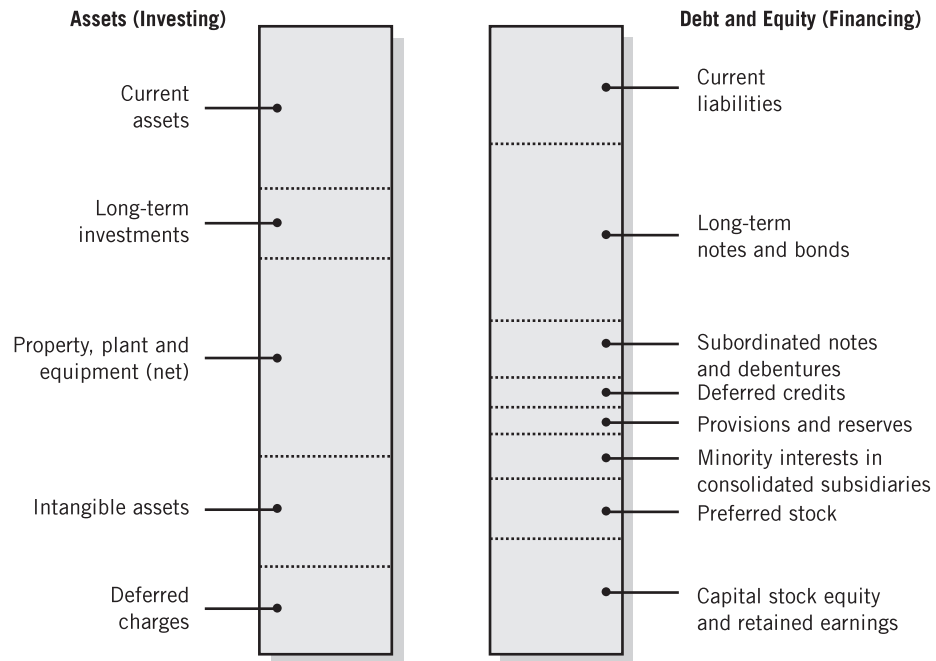
### Importance of Capital Structure

Capital structure is the equity and debt financing of a company. It is often measured in terms of the relative magnitude of the various financing sources. A company's financial stability and risk of insolvency depend on its financing sources and the types and amounts of various assets it owns. Exhibit 10.1 portrays a typical company's asset distribution and its financing sources. This exhibit highlights the potential variety in the investing and financing items that constitute a company—depicted within the accounting framework of assets equal liabilities plus equity.



#### DEBT LIMIT

Each year, about 40% of small-business owners seek a loan. Banks reject about one-quarter of them.

**Exhibit 10.1****A Typical Company's Asset Distribution and Capital Structure****Characteristics of Debt and Equity**

The importance of analyzing capital structure derives from several perspectives, not the least is the difference between debt and equity. **Equity** refers to the *risk capital* of a company. Characteristics of equity capital include its uncertain or unspecified return and its lack of any repayment pattern. Equity capital contributes to a company's stability and solvency. It is usually characterized by a degree of permanence, persistence in times of adversity, and a lack of any mandatory dividend requirement. A company can confidently invest equity financing in long-term assets and expose them to business risks without threat of recall.

Unlike equity capital, both short-term and long-term **debt** capital must be repaid. The longer the debt repayment period and the less demanding its repayment provisions, the easier it is for a company to service debt capital. Still, debt must be repaid at specified times regardless of a company's financial condition, and so too must periodic interest on most debt. Failure to pay principal and interest typically results in legal proceedings where common shareholders can lose control of the company and all or part of their investment. When the proportion of debt in the total capital structure of a company is larger, the higher are the resulting fixed charges and repayment commitments. The likelihood of a company's inability to pay interest and principal when due and potential losses for creditors also increases.

For investors in common stock, debt reflects a risk of loss of the investment, balanced by the potential of profits from financial leverage. **Financial leverage** is the use of debt to increase earnings. Leverage magnifies both managerial success (income) and failure (losses). Excessive debt limits management's initiative and flexibility for pursuing profitable opportunities. For creditors, increased equity capital is preferred as protection

against losses from adversities. Lowering equity capital as a proportionate share of a company’s financing decreases creditors’ protection against loss and consequently increases credit risk. Our analysis task is to measure the degree of risk resulting from a company’s capital structure. The remainder of this section looks at the motivation for debt capital and measuring its effects.

## Motivation for Debt Capital

From a shareholder’s perspective, debt is a preferred external financing source for at least two reasons:

1. Interest on most debt is fixed and, provided interest cost is less than the return on net operating assets, the excess return is to the benefit of equity investors.
2. Interest is a tax-deductible expense whereas dividends are not.

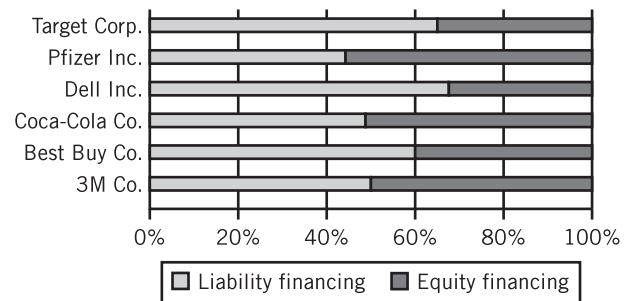
We discuss each of these factors in this section due to their importance for debt financing and risk analysis.

### Concept of Financial Leverage

Companies typically carry both debt and equity financing. Creditors are generally unwilling to provide financing without protection provided by equity financing. Financial leverage refers to the amount of debt financing in a company’s capital structure. Companies with financial leverage are said to be **trading on the equity**. This indicates a company is using equity capital as a borrowing base in a desire to reap excess returns.

Exhibit 10.2 illustrates trading on the equity. This exhibit computes the returns achieved for two companies referred to as Risky, Inc., and Safety, Inc.

Liability and Equity Financing for Selected Companies



Trading on the Equity—Returns for Different Earnings Levels (\$ millions)

Exhibit 10.2

	FINANCING SOURCES			Operating Income before Taxes	10% Debt Interest	Taxes (40%)	Net Income	NOPAT [operating income × (1 – 40%)]	RETURN ON	
	Assets	Debt	Equity						Net Operating Assets (RNOA) <sup>*</sup>	Equity <sup>†</sup> (ROE)
<b>Year 1</b>										
Risky, Inc. ....	\$1,000	\$400	\$ 600	\$200	\$40	\$64	\$ 96	\$120	12%	16%
Safety, Inc. ....	1,000	0	1,000	200	0	80	120	120	12	12
<b>Year 2</b>										
Risky, Inc. ....	1,000	400	600	100	40	24	36	60	6	6
Safety, Inc. ....	1,000	0	1,000	100	0	40	60	60	6	6
<b>Year 3</b>										
Risky, Inc. ....	1,000	400	600	50	40	4	6	30	3	1
Safety, Inc. ....	1,000	0	1,000	50	0	20	30	30	3	3

<sup>\*</sup>Return on net operating assets = NOPAT/Net Operating Assets.

<sup>†</sup>Return on equity = Net income/Shareholders’ equity.



These two companies have identical net operating assets and operating income. Risky, Inc., derives 40% of its financing from debt while Safety, Inc., is debt-free, or *unlevered*. For Year 1, when the average return on net operating assets is 12%, the return on stockholders' equity of Risky, Inc., is 16%. This higher return to stockholders is due to the excess return on net operating assets over the *after-tax* cost of debt (12% versus 6%, the latter computed as  $10\% [1 - 0.40]$ ). Safety, Inc.'s return on equity always equals the return on assets since there is no debt. For Year 2, the return on assets of Risky, Inc., equals the after-tax cost of debt and, consequently, the effects of leverage are neutralized. For Year 3, leverage is shown to be a double-edged sword. Specifically, when the return on net operating assets is *less* than the after-tax cost of debt, Risky, Inc.'s return on equity is lower than the return on equity for debt-free Safety, Inc. To generalize from this example: (1) a levered company is *successfully* trading on the equity when return on assets exceeds the after-tax cost of debt, (2) a levered company is *unsuccessfully* trading on the equity when return on net operating assets is less than the after-tax cost of debt, and (3) effects of leveraging are magnified in both good *and* bad years.

### ***Tax Deductibility of Interest***

One reason for the advantageous position of debt is the *tax deductibility of interest*. We illustrate this tax advantage by extending the case in Exhibit 10.2. Let us reexamine the two companies' results (\$ millions) for Year 2:

Year 2	Risky, Inc.	Safety, Inc.
Income before interest and taxes .....	\$100	\$100
Interest (10% of \$400).....	(40)	0
Income before taxes .....	60	100
Taxes (40%).....	(24)	(40)
Net income.....	36	60
Add back interest paid to bondholder.....	40	0
Total return to security holders (debt and equity).....	<u>\$ 76</u>	<u>\$ 60</u>

Recall the leverage effects are neutral in Year 2. Still, notice that even when the return on net operating assets equals the after-tax cost of debt, the total amount available for distribution to debt and equity holders of Risky, Inc., is \$16 higher than the amount available for the equity holders of Safety, Inc. This is due to the lower tax liability for Risky, Inc. We must remember the value of tax deductibility of interest depends on having sufficient income. To generalize from this example: (1) interest is tax deductible while cash dividends to equity holders are not, (2) because interest is tax deductible the income available to security holders can be much larger, and (3) nonpayment of interest can yield bankruptcy whereas nonpayment of dividends does not.

### ***Other Effects of Leverage***

Beyond the advantages from excess return to financial leverage and the tax deductibility of interest, a long-term debt position can yield other benefits to equity holders. For example, a growth company can avoid earnings per share dilution through issuance of debt. In addition, if interest rates are increasing, a leveraged company paying a fixed lower interest rate is more profitable than its nonleveraged competitor. However, the reverse is also true. Finally, in times of inflation, monetary liabilities (like most debt capital) yield price-level gains.

**ANALYSIS VIEWPOINT****. . . YOU ARE THE ENTREPRENEUR**

You are the entrepreneur and sole shareholder of a small, start-up restaurant. Your business is unlevered and doing well. The most recent year's return on assets is 9% on assets of \$200,000 (the tax rate is 40%). You are considering expanding your business but need to take on debt to finance expansion. What is your criterion in deciding whether to expand by adding debt?

## Adjustments for Capital Structure Analysis

Measurement and disclosure of liability (debt) and equity accounts in financial statements are governed by the application of accepted accounting principles. We discussed principles governing measurement and disclosure of liability and equity accounts in Chapter 3. Our analysis must remember these principles when analyzing capital structure and its implications for solvency.

### *Adjustments to Book Values of Liabilities*

The relation between liabilities and equity capital, the two major sources of a company's financing, is an important factor in assessing long-term solvency. An understanding of this relation is therefore essential in our analysis. There exist liabilities not fully reflected in balance sheets and there are financing-related items whose accounting classification as debt or equity must not be blindly accepted in our analysis. Our identification and classification of these items depend on a thorough understanding of their economic substance and the conditions to which they are subject. The discussion in this section supplements the important analytical considerations in Chapter 3.

**Deferred Income Taxes.** An important question is whether we treat deferred taxes as a liability, as equity, or as part debt and part equity. Our answer depends on the nature of the deferral, past experience of the account (such as its growth pattern), and the likelihood of future reversals. In reaching our decision, we must recognize that, under normal circumstances, deferred taxes reverse and become payable when a company's size declines. To the extent future reversals are a remote possibility, as conceivable with timing differences from accelerated depreciation, deferred taxes should be viewed like long-term financing and treated like equity. However, if the likelihood of a drawing down of deferred taxes in the foreseeable future is high, then deferred taxes (or part of them) should be treated like long-term liabilities.

**Operating Leases.** Current accounting practice requires that most financing long-term noncancelable leases be shown as debt. Yet companies have certain opportunities to structure leases in ways to avoid reporting them as debt. Operating leases should be recognized on the balance sheet for analytical purposes, increasing both fixed assets and liabilities as discussed in Chapter 3.

**Off-Balance-Sheet Financing.** In determining the debt for a company, our analysis must be aware that some managers attempt to understate debt, often with new and sometimes complex means. We discuss several means for doing this in Chapter 3, including sales of receivables, off-balance-sheet financing arrangements utilizing special purpose entities (SPEs), and equity method investments. Our critical reading of notes and management comments, along with inquiries to management, can often shed light on the existence of unrecorded liabilities.

**Contingent Liabilities.** Contingencies such as product guarantees and warranties represent obligations to offer future services or goods that are classified as liabilities. Typically, reserves created by charges to income are also considered liabilities. Our analysis must make a judgment regarding the likelihood of commitments or contingencies becoming actual liabilities and then treat these items accordingly. For example, guarantees of indebtedness of subsidiaries or others that are likely to become liabilities should be treated as liabilities.

**Minority Interests.** Minority interests in consolidated financial statements represent the book value of ownership interests of minority shareholders of subsidiaries in the consolidated group. These are *not* liabilities similar to debt because they have neither mandatory dividend payment nor principal repayment requirements. Capital structure measurements concentrate on the mandatory payment aspects of liabilities. From this point of view, minority interests are more like outsiders' claims to a portion of equity or an offset representing their proportionate ownership of assets.

**Convertible Debt.** Convertible debt is usually reported among liabilities (or as an item separate from both debt and equity listings). If conversion terms imply this debt will be converted into common stock, then it can be classified as equity for purposes of capital structure analysis.

**Preferred Stock.** Most preferred stock requires no obligation for payment of dividends or repayment of principal. These characteristics are similar to those of equity. However, as we discussed in Chapter 3, preferred stock with mandatory redemption requirements is similar to debt and should be considered as debt in our analysis.

#### **ANALYSIS VIEWPOINT**

#### **. . . YOU ARE THE ANALYST**

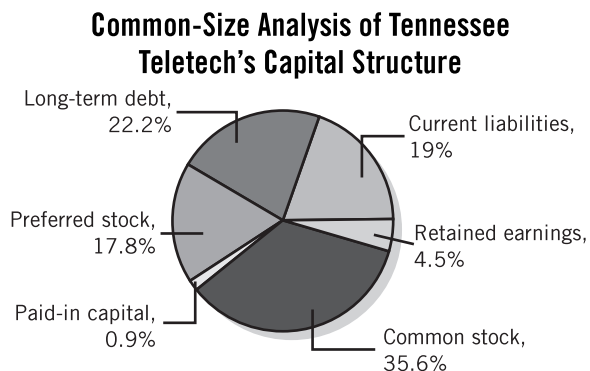
You are an analyst for a securities firm. Your supervisor asks you to assess the relative risk of two potential *preferred equity* investments. Your analysis indicates these two companies are identical in all aspects of both returns and risks with the exception of their financing composition. The first company is financed 20% by debt, 20% from preferred equity, and 60% from common equity. The second is financed 30% by debt, 10% from preferred equity, and 60% from common equity. Which company presents the greater preferred equity risk?

## **.....CAPITAL STRUCTURE COMPOSITION AND SOLVENCY**

The fundamental risk with a leveraged capital structure is the risk of inadequate cash under conditions of adversity. Debt involves a commitment to pay fixed charges in the form of interest and principal repayments. While certain fixed charges can be postponed in times of cash shortages, the fixed charges related to debt cannot be postponed without adverse repercussions to a company's shareholders and creditors. This section discusses several measures commonly used to estimate the degree of financial leverage and to evaluate the risk of insolvency.

## Common-Size Statements in Solvency Analysis

A common measure of financial risk for a company is its capital structure composition. **Composition analysis** is performed by constructing a **common-size statement** of the liabilities and equity section of the balance sheet. Exhibit 10.3 illustrates a common-size analysis for Tennessee Teletech, Inc. An advantage of common-size analysis of capital structure is in revealing the relative magnitude of financing sources for a company. We see Tennessee Teletech is primarily financed from common (35.6%) and preferred (17.8%) stock and liabilities (41.2%)—and a small amount of earnings is retained in the company (4.5%). Common-size analysis also lends itself to direct comparisons across different companies. A variation of common-size analysis is to perform the analysis using ratios. Another variation focuses only on long-term financing sources, excluding current liabilities.



**Tennessee Teletech's Capital Structure: Common-Size Analysis**

**Exhibit 10.3**

Current liabilities .....	\$ 428,000	19.0%
Long-term debt .....	500,000	22.2
Equity capital		
Preferred stock .....	400,000	17.8
Common stock .....	800,000	35.6
Paid-in capital .....	20,000	0.9
Retained earnings .....	102,000	4.5
Total equity capital .....	1,322,000	58.8
Total liabilities and equity .....	\$2,250,000	100.0%

## Capital Structure Measures for Solvency Analysis

**Capital structure ratios** are another means of solvency analysis. Ratio measures of capital structure relate components of capital structure to each other or their total. In this section we describe the most common of these ratios. We must take care to understand the meaning and computation of any measure or ratio before applying it.

### **Total Debt to Total Capital**

A comprehensive ratio is available to measure the relation between total debt (Current debt + Long-term debt + Other liabilities as determined by analysis such as deferred taxes and redeemable preferred) and total capital [Total debt + Stockholders' equity (including preferred)]. The **total debt to total capital ratio** (also called **total debt ratio**) is expressed as

$$\frac{\text{Total debt}}{\text{Total capital}}$$

Recall that total capital equals, by definition, total assets. The total debt to total capital ratio for Year 11 of Campbell Soup (financial statements are in Appendix A) is computed as:

$$\frac{\$1,278^{(a)} + \$772.6^{(b)} + \$305.0^{(c)}}{\$1,793.4^{(d)} + \$2,355.6^{(e)}} = \frac{\$2,355.6}{\$4,149.0} = 0.57$$

<sup>(a)</sup> Current liabilities

<sup>(b)</sup> Long-term debt

<sup>(c)</sup> Other liabilities

<sup>(d)</sup> Total shareholders' equity

<sup>(e)</sup> Total debt (numerator)

This measure is often expressed in ratio form, such as 0.57, or described as debt constituting 57% of Campbell Soup's capital structure.

### ***Total Debt to Equity Capital***

Another measure of the relation of debt to capital sources is the ratio of total debt (as defined above) to *equity* capital. The **total debt to equity capital ratio** is defined as:

$$\frac{\text{Total debt}}{\text{Shareholders' equity}}$$

The total debt to equity capital ratio for Year 11 of Campbell Soup is computed as:

$$\frac{\$2,355.6}{\$1,793.4} = 1.31$$

This ratio implies that Campbell Soup's total debt is 1.31 times its equity capital. Alternatively stated, Campbell Soup's credit financing equals 1.31 for every \$1 of equity financing.

### ***Long-Term Debt to Equity Capital***

The **long-term debt to equity capital ratio** measures the relation of long-term debt (usually defined as all noncurrent liabilities) to equity capital. A ratio in excess of 1:1 indicates greater long-term debt financing compared to equity capital. This ratio is commonly referred to as the debt to equity ratio and it is computed as:

$$\frac{\text{Long-term debt}}{\text{Shareholders' equity}}$$

For Year 11 of Campbell Soup, the long-term debt to equity ratio equals:

$$\frac{\$2,355.6^{(a)} - \$1,278^{(b)}}{\$1,793.4^{(c)}} = 0.60$$

<sup>(a)</sup> Total debt

<sup>(b)</sup> Total current liabilities

<sup>(c)</sup> Shareholders' equity

## Short-Term Debt to Total Debt

The ratio of debt maturing in the short term relative to total debt is an important indicator of the short-run cash and financing needs of a company. Short-term debt, as opposed to long-term debt or sinking fund requirements, is an indicator of enterprise reliance on short-term (primarily bank) financing. Short-term debt is usually subject to frequent changes in interest rates.

## Interpretation of Capital Structure Measures

Common-size and ratio analyses of capital structure are primarily measures of the *risk* of a company's capital structure. The higher the proportion of debt, the larger the fixed charges of interest and debt repayment, and the greater the likelihood of insolvency during periods of earnings decline or hardship. Capital structure measures serve as *screening devices*. For example, when the ratio of debt to equity capital is relatively small (10% or less), there is no apparent concern with this aspect of a company's financial condition—our analysis is probably better directed elsewhere. Should our analysis reveal debt is a significant part of capitalization, then further analysis is necessary. Extended analysis should focus on several different aspects of a company's financial condition, results of operations, and future prospects.

Analysis of short-term liquidity is always important because before we assess long-term solvency we want to be satisfied about the near-term financial survival of the company. We described various analyses of short-term liquidity already in this chapter. Loan and bond indenture covenants requiring maintenance of minimum working capital levels attest to the importance of current liquidity in ensuring a company's long-term solvency. Additional analytical tests of importance include the examination of debt maturities (as to amount and timing), interest costs, and risk-bearing factors. The latter factors include a company's earnings stability or persistence, industry performance, and composition of assets.



### DEFAULT

A study indicated that fewer than 1% of companies that carry the "A" rating have defaulted on their debt. This compares to 35% of companies with the "B" rating that have defaulted.

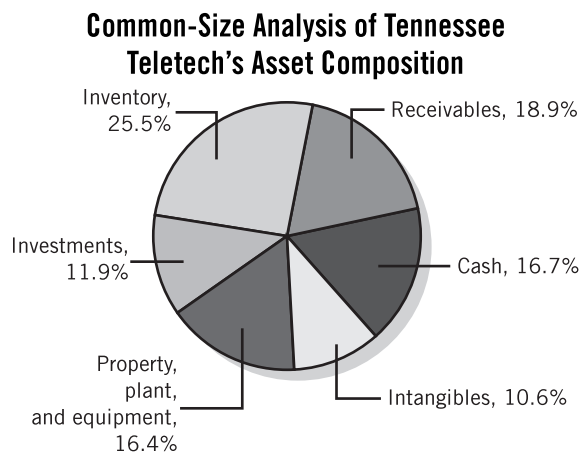
## Asset-Based Measures of Solvency

This section describes two categories of asset-based analyses of a company's solvency.

### Asset Composition in Solvency Analysis

The assets a company employs in its operating activities determine to some extent the sources of financing. For example, fixed and other long-term assets are typically not financed with short-term loans. These long-term assets are usually financed with equity capital. Debt capital is also a common source of long-term asset financing, especially in industries like utilities where revenue sources are stable.

**Asset composition analysis** is an important tool in assessing the risk exposure of a company's capital structure. Asset composition is typically evaluated using common-size statements of asset balances. Exhibit 10.4 shows a common-size analysis of Tennessee Teletech's assets (its liabilities and equity are analyzed in Exhibit 10.3). Judging by the distribution of assets and the



**Exhibit 10.4****Tennessee Teletech's Asset Composition: Common-Size Analysis**

Current assets		
Cash .....	\$ 376,000	16.7%
Accounts receivable (net).....	425,000	18.9
Merchandise inventory .....	574,000	25.5
Total current assets.....	1,375,000	61.1
Investments.....	268,000	11.9
Property, plant, and equipment (net).....	368,000	16.4
Intangibles .....	239,000	10.6
Total assets.....	<u>\$2,250,000</u>	<u>100.0%</u>

related capital structure, it appears that since a relatively high proportion of assets is current (61%), a 41% total liabilities position is not excessive. Further analysis and measurements might alter or reinforce this preliminary interpretation.

## .....EARNINGS COVERAGE

Our discussion of capital structure measures recognizes their usefulness as screening devices. They are a valuable means of deciding whether risk inherent in a company's capital structure requires further analysis. One limitation of capital structure measures is their inability to focus on availability of cash flows to service a company's debt. As debt is repaid, capital structure measures typically *improve* whereas annual cash requirements for paying interest or sinking funds remain *fixed* or *increase* (examples of the latter include level payment debt with balloon repayment provisions or zero coupon bonds). This limitation highlights the important role of a company's **earnings coverage**, or *earning power*, as the source of interest and principal repayments. While highly profitable companies can in the short term face liquidity problems because of asset composition, we must remember that long-term earnings are the major source of liquidity, solvency, and borrowing capacity.

### Relation of Earnings to Fixed Charges

The relation of earnings to fixed charges is part of **earnings coverage analysis**. Earnings coverage measures focus on the relation between debt-related fixed charges and a company's earnings available to meet these charges. These measures are important factors in debt ratings (see Appendix 10A). Bond indentures often specify minimum levels of earnings coverage for additional issuance of debt. Securities and Exchange Commission regulations require that the ratio of *earnings to fixed charges* be disclosed in the prospectus of all debt securities registered. The typical measure of the **earnings to fixed charges ratio** is:

$$\frac{\text{Earnings available for fixed charges}}{\text{Fixed charges}}$$

The concept underlying this measure is straightforward. Yet application of this measure is complicated by what is included in both "earnings available for fixed charges" and "fixed charges."

## ***Computing Earnings Available for Fixed Charges***

We previously discussed differences between income determined using accrual accounting and cash from operations (see Chapters 2, 6, and 7). For example, certain revenue items like undistributed subsidiary earnings and sales on extended credit terms do not generate immediate cash inflows (although a parent can determine dividends for controlled subsidiaries). Similarly, certain expenses like depreciation, amortization, depletion, and deferred tax charges do not require cash outflows. These distinctions are important since fixed debt charges are paid out of cash, not earnings. Our analysis must recognize that unadjusted net income is not necessarily a good measure of cash available for fixed charges. Using earnings as an approximation of cash from operations is sometimes appropriate while in others it can misstate the amount available for servicing fixed charges. Our approach to this problem lies not with generalizations but in careful analysis of noncash revenue and expense items that make up income. For example, in analyzing depreciation as a noncash expense, we must remember the long-run necessity of a company's replacing plant and equipment.

The income level used in computing earnings coverage ratios deserves attention. We must consider the question: What level of income is most representative of the amount actually available in future periods for paying debt-related fixed charges? Average earnings from continuing operations that span the business cycle and are adjusted for likely future changes are probably a good approximation of the average cash available from future operations to pay fixed charges. If one objective of an earnings coverage ratio is to measure a creditor's maximum exposure to risk, an appropriate earnings figure is one that occurs at the low point of the company's business cycle.

## ***Computing Fixed Charges***

The second major component in the earnings to fixed charges ratio is fixed charges. In this section we examine the fixed charges typically included in the computation. Analysis of fixed charges requires us to consider several important components.

**Interest Incurred.** Interest incurred is the most direct and obvious fixed charge arising from debt. We can approximate the amount of interest incurred by referring to the mandatory disclosure of *interest paid* in the statement of cash flows. Interest incurred differs from the reported interest paid due to reasons that include (1) changes in interest payable, (2) interest capitalized being netted, and (3) discount and premium amortization. In the absence of information, interest paid is a good approximation of interest incurred.

**Interest Implicit in Lease Obligations.** We discussed accounting recognition of leases as financing devices in Chapter 3. When a lease is capitalized, the interest portion of the lease payment is included in interest expense on the income statement, while most of the balance is usually considered repayment of the principal obligation. A question arises when our analysis discovers certain leases that should be capitalized but are not. This question goes beyond the accounting question of whether capitalization is appropriate or not. We must remember a long-term lease represents a fixed obligation that must be given recognition in computing the earnings to fixed charges ratio.

**Preferred Stock Dividend Requirements of Majority-Owned Subsidiaries.** These are viewed as fixed charges because they have priority over the distribution of earnings to the parent. Items that would be or are eliminated in consolidation should not be viewed



as fixed charges. We must remember that all fixed charges not tax deductible must be tax adjusted. This is done by increasing them by an amount equal to the income tax required to yield an after-tax income sufficient to cover these fixed charges. The preferred stock dividend requirements of majority-owned subsidiaries are an example of a non-tax-deductible fixed charge. We make an adjustment to compute the “gross” amount:

$$\frac{\text{Preferred stock dividend requirements}}{1 - \text{Effective tax rate}}$$

**Principal Repayment Requirements.** Principal repayment obligations are from a cash outflow perspective as onerous as interest obligations. In the case of rental payments, a company’s obligations to pay principal and interest must be met simultaneously. Several reasons are advanced as to why requirements for principal repayments are not given recognition in earnings to fixed charges ratio calculations, including:

- The earnings to fixed charges ratio is based on income. It assumes if the ratio is at a satisfactory level, a company can refinance obligations when they become due or mature. Accordingly, they need not be met by funds from earnings.
- If a company has an acceptable debt to equity ratio it should be able to reborrow amounts equal to principal repayments.
- Inclusion can result in double counting. For example, funds recovered by depreciation provide for debt repayment. If earnings reflect a deduction for depreciation, then fixed charges should not include principal repayments. There is some merit to this argument if debt is used to acquire depreciable fixed assets and if there is some correspondence between the pattern of depreciation and principal repayments. We must recognize that depreciation is recovered typically only from profitable or at least break-even operations. Therefore, this argument’s validity is subject to these conditions. We must also recognize the definition of *earnings* in the earnings to fixed charges ratio emphasizes cash from operations as that available to cover fixed charges. Using this concept eliminates the double-counting problem since noncash charges like depreciation would be added back to net income in computing earnings coverage.
- A problem with including debt repayment requirements in fixed charges is that not all debt agreements provide for sinking funds or similar repayment obligations. Any arbitrary allocation of indebtedness across periods would be unrealistic and ignore differences in pressures on cash resources from actual debt repayments across periods. In the long run, maturities and balloon payments must all be met. One solution rests with our careful analysis of debt repayment requirements. This analysis serves as the basis in judging the effect of these requirements for long-term solvency. To assume debt can be refinanced, rolled over, or otherwise paid from current operations is risky. Rather, we must recognize debt repayment requirements and their timing in analysis of long-term solvency. Including sinking fund or other early repayment requirements in fixed charges is a way of recognizing these obligations. Another way is applying debt repayment requirements over a period of 5 to 10 years into the future and relating these to after-tax funds expected to be available from operations.

**Guarantees to Pay Fixed Charges.** Guarantees to pay fixed charges of unconsolidated subsidiaries or of unaffiliated persons (entities) should be added to fixed charges if the requirement to honor the guarantee appears imminent.

**Other Fixed Charges.** While interest payments and principal repayment requirements are the fixed charges most directly related to the incurrence of debt, there is no reason to restrict our analysis of long-term solvency to these charges or commitments. A thorough analysis of fixed charges should include all long-term rental payment obligations<sup>5</sup> (not only the interest portion), and especially those rentals that must be met under non-cancelable leases. The reason short-term leases can be excluded from consideration in fixed charges is they represent obligations of limited duration, usually less than three years. Consequently, these leases can be discontinued in a period of financial distress. Our analysis must evaluate how essential these leased items are to the continued operation of the company. Additional charges not directly related to debt, but considered long-term commitments of a fixed nature, are long-term noncancelable purchase contracts in excess of normal requirements.

### Computing Earnings to Fixed Charges

The conventional formula, and one adopted by the SEC, for computing the earnings to fixed charges ratio is:

$$\frac{\begin{array}{l} (a) \text{ Pretax income from continuing operations } \textit{plus} (b) \text{ Interest expense } \textit{plus} \\ (c) \text{ Amortization of debt expense and discount or premium } \textit{plus} (d) \text{ Interest portion of} \\ \text{operating rental expenses } \textit{plus} (e) \text{ Tax-adjusted preferred stock dividend requirements of} \\ \text{majority-owned subsidiaries } \textit{plus} (f) \text{ Amount of previously capitalized interest amortized in} \\ \text{the period } \textit{minus} (g) \text{ Undistributed income of less than 50\%-owned subsidiaries or affiliates} \end{array}}{\begin{array}{l} (h) \text{ Total interest incurred } \textit{plus} (c) \text{ Amortization of debt expense and discount or premium} \\ \textit{plus} (d) \text{ Interest portion of operating rental expenses } \textit{plus} (e) \text{ Tax-adjusted preferred stock} \\ \text{dividend requirements of majority-owned subsidiaries} \end{array}}$$

Individual components in this ratio are labeled *a–h* and are further explained here:

- a.* Pretax income before discontinued operations, extraordinary items, and cumulative effects of accounting changes.
- b.* Interest incurred less interest capitalized.
- c.* Usually included in interest expense.
- d.* Financing leases are capitalized so the interest implicit in these is already included in interest expense. However, the interest portion of long-term operating leases is included on the assumption many long-term operating leases narrowly miss the capital lease criteria, but have many characteristics of a financing transaction.
- e.* Excludes all items eliminated in consolidation. The dividend amount is increased to pretax earnings required to pay for it.<sup>6</sup>
- f.* Applies to nonutility companies. This amount is not often disclosed.
- g.* Minority interest in income of majority-owned subsidiaries having fixed charges can be included in income.
- h.* Included whether expensed or capitalized.

<sup>5</sup> Capitalized long-term leases affect income by the interest charge implicit in them and by the amortization of the property right. To consider the “principal” component of these leases as fixed charges (after income is reduced by amortization of the property right) can yield double counting.

<sup>6</sup> Computed as (Preferred stock dividend requirements)/(1 – Income tax rate). The income tax rate is computed as Actual income tax provision/Income before income taxes, extraordinary items, and cumulative effect of accounting changes.

For ease of presentation, two items (provisions) are left out of the ratio above, but they should be reflected in the ratio when they exist:

1. Losses of majority-owned subsidiaries should be considered in *full* when computing earnings.
2. Losses on investments in less than 50%-owned subsidiaries accounted for by the equity method should not be included in earnings *unless* the company guarantees subsidiaries' debts.

Finally, the SEC requires that if the earnings to fixed charges ratio is less than 1.0, the amount of earnings insufficient to cover fixed charges should be reported.

### ***Illustration of Earnings to Fixed Charges Ratio***

This section illustrates actual computation of the earnings to fixed charges ratio. Our first case focuses on CompuTech Corp., whose income statement is reproduced in Exhibit 10.5 along with selected notes. Using this information for CompuTech (\$ thousands) we compute the earnings to fixed charges ratio as (letter references are to the ratio definition):

$$\frac{\$2,200 (a) + \$700 (b \text{ and } c) + \$300 (d) + \$80 (f) - \$600 (g) + \$200^*}{\$840 (h) + \$60 (c) + \$300 (d)} = 2.40$$

\* *Note:* The SEC permits inclusion in income of the minority interest in the income of majority-owned subsidiaries having fixed charges. This amount is added to reverse a similar deduction from income.

### ***Pro Forma Computation of Earnings to Fixed Charges***

In situations where fixed charges not yet incurred are recognized in computing the earnings to fixed charges ratio (such as interest costs under a prospective debt issuance), it is acceptable to estimate offsetting benefits expected from these future cash inflows and include them in pro forma earnings. Benefits derived from prospective debt can be measured in several ways, including interest savings from a planned refunding activity, income from short-term investments where proceeds can be invested, or other reasonable estimates of future benefits. When the effect of a prospective refinancing plan changes the ratio by 10% or more, the SEC usually requires a pro forma computation of the ratio reflecting changes to be effected under the plan.

## **Times Interest Earned Analysis**

Another earnings coverage measure is the **times interest earned ratio**. This ratio considers interest as the only fixed charge needing earnings coverage:

$$\frac{\text{Income} + \text{Tax expense} + \text{Interest expense}}{\text{Interest expense}}$$

The numerator in this ratio is sometimes referred to as earnings before interest and taxes, or EBIT, and then the ratio is referred to as EBIT/I. The times interest earned ratio is a simplified measure. It ignores most adjustments to both the numerator and denominator that we discussed with the earnings to fixed charges ratio. While its computation is simple, it is potentially misleading and not as effective an analysis tool as the earnings to fixed charges ratio.

**Exhibit 10.5****COMPUTECH CORPORATION**

## Income Statement

Net sales.....		\$13,400,000
Income of less than 50%-owned affiliates (all undistributed) .....		600,000
Total revenue.....		<u>14,000,000</u>
Cost of goods sold .....	\$7,400,000	
Selling, general, and administrative expenses .....	1,900,000	
Depreciation (excluded from above costs) <sup>1</sup> .....	800,000	
Interest expense, net <sup>2</sup> .....	700,000	
Rental expense <sup>3</sup> .....	800,000	
Share of minority interests in consolidated income <sup>4</sup> .....	200,000	(11,800,000)
Income before taxes .....		<u>2,200,000</u>
Income taxes		
Current.....	800,000	
Deferred .....	<u>300,000</u>	(1,100,000)
Income before extraordinary item .....		1,100,000
Extraordinary gain (net of \$67,000 tax) .....		<u>200,000</u>
Net income.....		<u>\$ 1,300,000</u>
Dividends		
On common stock .....	\$ 200,000	
On preferred stock .....	<u>400,000</u>	(600,000)
Earnings retained for the year .....		<u>\$ 700,000</u>

*Selected notes to financial statements:*

<sup>1</sup> Depreciation includes amortization of previously capitalized interest of \$80,000.

<sup>2</sup> Interest expense consists of:

Interest incurred (except items below).....	\$740,000
Amortization of bond discount .....	60,000
Interest portion of capitalized leases .....	100,000
Interest capitalized .....	<u>(200,000)</u>
Interest expense.....	\$700,000

<sup>3</sup> Interest implicit in noncapitalized leases amounts to \$300,000.

<sup>4</sup> These subsidiaries have fixed charges.

*Additional information (for the income statement period):*

Increase in accounts receivable.....	\$310,000
Increase in inventories.....	180,000
Increase in accounts payable .....	140,000
Decrease in accrued taxes .....	20,000

## Relation of Cash Flow to Fixed Charges

Companies must pay fixed charges in cash while net income includes earned revenues and incurred expenses that do not necessarily generate or require immediate cash. This section describes a cash-based measure of fixed-charges coverage to address this limitation.

### *Cash Flow to Fixed Charges Ratio*

The **cash flow to fixed charges ratio** is computed using *cash from operations* rather than earnings in the numerator of the earnings to fixed charges ratio. Cash from operations is reported in the statement of cash flows. The cash flow to fixed charges ratio is defined as:

$$\frac{\text{Pretax operating cash flow} + \text{Adjustments (b) through (g) defined on page 559}}{\text{Fixed charges}}$$

Using financial data of CompuTech from Exhibit 10.5 we can compute pretax cash from operations for this ratio as:

Pretax income.....	\$2,200,000
Add (deduct) adjustments to cash basis	
Depreciation.....	800,000
Deferred income taxes (already added back) .....	—
Amortization of bond discount .....	60,000
Share of minority interest in income .....	200,000
Undistributed income of affiliates .....	(600,000)
Increase in receivables .....	(310,000)
Increase in inventories.....	(180,000)
Increase in accounts payable.....	140,000
Decrease in accrued tax.....	(20,000)
Pretax cash from operations.....	<u>\$2,290,000</u>

Fixed charges needing to be added back to pretax cash from operations are:

Pretax cash from operations .....	\$2,290,000
Interest expensed (less bond discount added back above) .....	640,000
Interest portion of operating rental expense .....	300,000
Amount of previously capitalized interest amortized during period* .....	—
Total numerator.....	<u>\$3,230,000</u>

\* Assume included in depreciation (already added back).

The numerator does not reflect a deduction of \$600,000 (undistributed income of affiliates) because it, being a noncash source, is already deducted in arriving at pretax cash from operations. Also the “share of minority interests in consolidated income” is already added back in arriving at pretax cash from operations. Fixed charges for the ratio’s denominator are:

Interest incurred .....	\$ 900,000
Interest portion of operating rentals .....	300,000
Fixed charges.....	<u>\$1,200,000</u>

CompuTech's cash flow to fixed charges ratio is computed as:

$$\frac{\$3,230,000}{\$1,200,000} = 2.69$$

## Permanence of Cash from Operations

The relation of a company's cash flows from operations to fixed charges is important to an analysis of long-term solvency. Because of this relation's importance, we assess the "permanence" of operating cash flows. We typically do this in evaluating the components constituting operating cash flows. For example, the depreciation add-back to net income is more permanent than net income because recovery of depreciation from sales precedes receipt of any income. For all businesses, selling prices must (in the long run) reflect the cost of plant and equipment used in production. The depreciation add-back assumes cash flow benefits from recovery of depreciation are available to service debt. This assumption is true only in the short run. In the long run, this cash recovery must be dedicated to replacing plant and equipment. An exception can occur with add-backs of items like amortization of goodwill that are not necessarily replaced or depleted. Permanence of changes in the operating working capital (operating current assets less operating current liabilities) component of operating cash flows is often difficult to assess. Operating working capital is linked more with sales than with pretax income and therefore is often more stable than operating cash flows.

## Earnings Coverage of Preferred Dividends

Our analysis of preferred stock often benefits from measuring the earnings coverage of preferred dividends. This analysis is similar to our analysis of how earnings cover debt-related fixed charges. The SEC requires disclosure of the ratio of combined fixed charges and preferred dividends in the prospectus of all preferred stock offerings. Computing the earnings coverage of preferred dividends must include in fixed charges all expenditures taking precedence over preferred dividends. Since preferred dividends are not tax deductible, after-tax income must be used to cover them. Accordingly, the **earnings coverage of preferred dividends ratio** is computed as:

$$\frac{\text{Pretax income} + \text{Adjustments (b) through (g) defined on page 559}}{\text{Fixed charges} + \left( \frac{\text{Preferred dividends}}{1 - \text{Tax rate}} \right)}$$

Using the financial data from CompuTech Corp. in Exhibit 10.5, we can compute its earnings coverage of preferred dividends ratio. This is identical to using CompuTech's ratio of earnings to fixed charges (computed earlier) and adding the tax-adjusted preferred dividend requirement. Computation of the earnings coverage to preferred dividends ratio is (\$ thousands):

$$\frac{\$2,200 (a) + \$700 (b \text{ and } c) + \$300 (d) + \$80 (f) - \$600 (g) + \$200^*}{\$840 (h) + \$60 (c) + \$300 (d) + \left( \frac{\$400^\dagger}{1 - 0.50} \right)} = 1.44$$

*Note:* Letters refer to components in the earnings to fixed charges ratio (see page 559).

\* Minority interest in income of majority-owned subsidiaries (see prior discussion).

† Tax-adjusted preferred dividend requirement.

If there are two or more preferred issues outstanding, the coverage ratio is usually computed for each issue by omitting dividend requirements of junior issues and including all prior fixed charges and senior issues of preferred dividends.

## Interpreting Earnings Coverage Measures

Earnings coverage measures provide us insight into the ability of a company to meet its fixed charges out of current earnings. There exists a high correlation between earnings coverage measures and the default rate on debt—that is, the higher the coverage, the lower the default rate. A study of creditor experience with debt revealed the following default and yield rates for debt classified according to times interest earned ratios:

Times Interest Earned	Default Rate	Promised Yield	Realized Yield	Loss Rate
3.0 and over.....	2.1%	4.0%	4.9%	-0.9%
2.0-2.9.....	4.0	4.3	5.1	-0.8
1.5-1.9.....	17.9	4.7	5.0	-0.3
1.0-1.4.....	34.1	6.8	6.4	0.4
Under 1.0.....	35.0	6.2	6.0	0.2

Our attention on earnings coverage measures is sensible since creditors place considerable reliance on the ability of a company to meet its obligations and continue operating. An increased yield rate on debt seldom compensates creditors for the risk of losing principal. If the likelihood of a company meeting its obligations through continuing operations is not high, creditors' risk is substantial.

### ***Importance of Earnings Variability and Persistence for Earnings Coverage***

An important factor in evaluating earnings coverage measures is the behavior of earnings and cash flows across time. The more stable the earnings pattern of a company or industry, the lower is the acceptable earnings coverage measure. For example, a utility experiences little in the way of economic downturns or upswings and therefore we accept a lower earnings coverage ratio. In contrast, cyclical companies like machinery manufacturers can experience both sharp declines and increases in performance. This uncertainty leads us to impose a higher earnings coverage ratio on these companies. Both *earnings variability* and *earnings persistence* are common measures of this uncertainty across time. Our analysis can use one or both of these measures in determining the accepted standard for earnings coverage. Earnings persistence often is measured as the (auto) correlation of earnings across time.

### ***Importance of Measurements and Assumptions for Earnings Coverage***

Determining an acceptable level for earnings coverage depends on the method of computing an earnings coverage measure. We described several earnings coverage measures in this chapter. Many of these measures assume different definitions of *earnings* and *fixed charges*. We expect lower levels for earnings coverage measures employing the most

demanding and stringent definitions. Both the SEC and our computation of the earnings to fixed charges coverage ratio use earnings *before* discontinued operations, extraordinary items, and cumulative effects of accounting changes. While excluding these three items yields a less variable earnings stream, it also excludes important components that are part of a company's business activities. Accordingly, we suggest these components be included in computing the *average* coverage ratio over several years. The acceptable level also varies with the measure of earnings—for example, earnings measured as the average, worst, best, or median performance. The quality of earnings is another important factor. We should not compute earnings coverage ratios using shortcuts or purposefully conservative means. For example, using after-tax income in computing coverage ratios where fixed charges are tax deductible is incorrect and uses conservatism improperly. Our acceptable level of coverage must ultimately reflect our willingness and ability to incur risk (relative to our expected return). Appendix 10A refers to acceptable levels of coverage ratios used by rating agencies in analyzing debt securities.

## Capital Structure Risk and Return

It is useful for us to consider recent developments in financial innovations for assessing the risk inherent in a company's capital structure. A company can increase risks (and potential returns) of equity holders by increasing leverage. For example, a *leveraged buyout* uses debt to take a company private by buying out equity holders. The acquirors rely on future cash flows to service the increased debt and on anticipated asset sales to reduce debt. Another potential benefit of leverage is the tax deductibility of interest while dividends paid to equity holders are not tax deductible. Still, substitution of debt for equity yields a riskier capital structure. This is why bonds used to finance certain leveraged buyouts are called *junk bonds*. A junk bond, unlike its high-quality counterpart, is part of a high-risk capital structure where its interest payments are minimally covered by earnings. Economic adversities rapidly jeopardize interest payments and principal of junk bonds. Junk bonds possess the risk of equity more so than the safety of debt.

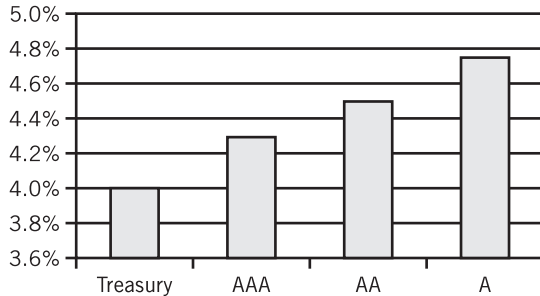
Financial experience continually reminds us of those who forget the relation between risk and return. It is no surprise that highly speculative financial periods spawn risky securities. Our surprise is the refusal by some to appreciate the adjective *junk* when applied to bonds. Similarly, zero coupon bonds defer all payment of interest to maturity and offer several advantages over standard debt issues. However, when issued by companies with less than outstanding credit credentials, the risk with zero coupon bonds is substantially higher than with standard debt—due to the uncertainty of receiving interest and principal many years into the future. Another financial innovation called *payment in kind (PIK) securities* pay interest by issuing additional debt. The assumption is a debtor, possibly too weak to pay interest currently, will subsequently be successful enough to pay it later. While innovations in financing companies' business activities continue, and novel terms are coined, our analysis must focus on substance over form. The basic truth about the relation between risk and return in a capital structure remains.

Factors contributing to risk and our available tools of analysis discussed in this and preceding chapters point to our need for thorough and sound financial analysis. Relying on credit ratings or others' rankings is a delegation of our analysis and evaluation responsibilities. It is risky for us to place partial or exclusive reliance on these sources of analysis. No matter how reputable, these sources *cannot* capture our unique risk and return expectations.



## .....APPENDIX 10A RATING DEBT

### 10-Year Treasury and Corporate Bond Yields



A comprehensive and complex system for rating debt securities is established in the world economy. Ratings are available from several highly regarded investment research firms: Moody's, Standard & Poor's (S&P), Duff and Phelps, and Fitch Ratings. Many financial institutions also develop their own in-house ratings.

### BOND CREDIT RATINGS

The bond credit rating is a composite expression of judgment about the *creditworthiness* of the bond issuer and the quality of the specific security being rated. A rating measures credit risk where *credit risk* is the probability of developments unfavorable to the interests of creditors. This judgment of creditworthiness is expressed in a series of symbols reflecting degrees of credit risk. Specifically, the top four rating grades from Standard & Poor's are:

- AAA** Bonds rated AAA are highest-grade obligations. They possess the highest degree of protection as to principal and interest. Marketwise, they move with interest rates and provide maximum safety.
- AA** Bonds rated AA also qualify as high-grade obligations and in the majority of instances differ little from AAA issues. Here, too, prices move with the long-term money market.
- A** Bonds rated A are regarded as upper-medium grade. They have considerable investment strength but are not free from adverse effects of changes in economic and trade conditions. Interest and principal are regarded as safe. They predominantly reflect money rates in their price behavior, and to some extent economic conditions.
- BBB** Bonds rated BBB, or medium-grade category, are borderline between sound obligations and those where the speculative element begins to predominate. These bonds have adequate asset coverage and normally are protected by satisfactory earnings. Their susceptibility to changing conditions, particularly economic downturns, necessitates constant monitoring. Marketwise, these bonds are more responsive to business and trade conditions than to interest rates. This grade is the lowest that typically qualifies for commercial bank investment.

#### BOND QUALITY RATINGS

Rating Grades	Standard & Poor's	Moody's
Highest grade	AAA	Aaa
High grade	AA	Aa
Upper medium	A	A
Lower medium	BBB	Baa
Marginally speculative	BB	Ba
Highly speculative	B	B, Caa
Default	D	Ca, C

There is a lower selection of ratings, including **BB**, lower-medium grade to marginally speculative; **B**, very speculative; and **D**, bonds in default.

A major reason why debt securities are widely rated while equity securities are not is because there is far greater uniformity of approach and homogeneity of analytical measures in analyzing creditworthiness than in analyzing future market performance of equity securities. This wider agreement on what is being measured in credit risk analysis has resulted in acceptance of and reliance on published credit ratings for several purposes.

Criteria determining a specific rating are never precisely defined. They involve both *quantitative* (ratio and comparative analyses) and *qualitative* (market position and management quality) factors. Major rating agencies refuse to disclose their precise mix of factors determining ratings (which is usually a committee decision). They wish to avoid arguments about the validity of qualitative factors in ratings. These rating agencies use the analysis techniques discussed throughout this book. The following description of factors determining ratings is based on published sources and from discussions with officials of rating agencies.

## RATING COMPANY BONDS

In rating an industrial bond issue, the rating agency focuses on the issuing company's asset protection, financial resources, earning power, management, and specific provisions of the debt. Also important are company size, market share, industry position, cyclical influences, and general economic conditions.

*Asset protection* refers to the extent a company's debt is covered by its assets. One measure is net tangible assets to long-term debt. One rating agency uses a rule of thumb where a bond needs a net tangible asset to long-term debt value of 5:1 for a AAA rating; 4:1 for a AA rating; 3 to 3.5:1 for an A rating; and 2.5:1 for a BBB rating. Concern with undervalued assets, especially with companies in the natural resources or real estate industries, leads to adjustments to these rating levels. Another rule of thumb suggests the long-term debt to total capital ratio be under 25% for a AAA, near 30% for a AA, near 35% for an A, and near 40% for a BBB rating. Additional factors entering rating agencies' consideration of asset protection include book value; composition of working capital; the quality and age of property, plant, and equipment; off-balance-sheet financing; and unrecorded liabilities.

*Financial resources* refer to liquid resources like cash and working capital accounts. Analysis measures include the collection period of receivables and inventory turnover. Their values are assessed relative to industry and absolute standards. Raters also analyze the issuer's use of both short-term and long-term debt, and their mix.

*Future earning power*, and the issuer's cash-generating ability, is an important factor in rating debt securities because the level and quality of future earnings determine a company's ability to meet its obligations, especially those of a long-term nature. Earning power is usually a more reliable source of protection than assets. One common measure of protection due to earning power is the earnings to fixed charges coverage ratio. A rule of thumb suggests an acceptable earnings to fixed charges ratio is 5:1 to 7:1 for a AAA rating, over 4:1 for a AA rating, over 3:1 for an A rating, and over 2:1 for a BBB rating. Another measure of debt servicing potential is cash flow from operations to long-term debt. A rule of thumb suggests this ratio be over 65% for a AAA, 45 to 60% for a AA, 35 to 45% for an A, and 25 to 30% for a BBB rating.

*Management's* abilities, foresight, philosophy, knowledge, experience, and integrity are important considerations in rating debt. Through interviews, site visits, and other analyses, the raters probe management's goals, strategies, plans, and tactics in areas like research and development, product promotion, product planning, and acquisitions.

*Debt provisions* are usually written in the bond indenture. Raters analyze the specific provisions in the indenture designed to protect interests of bondholders under a variety of conditions. These include analysis of stipulations (if any) for future debt issuances, security provisions like mortgaging, sinking funds, redemption provisions, and restrictive covenants.



### IS DEBT TOO HIGH?

To get a sense for whether a company has too much debt, compare its debt level with the average for companies with different ratings. The following table gives ratios (code: [1] is the long-term debt to equity ratio and [2] is the total debt to equity ratio) for different credit ratings:

	[1]	[2]
AAA	4.4%	4.5%
AA	23.0	34.1
A	33.3	42.9
BBB	41.5	47.9
BB	56.4	59.8
B	73.6	76.0

## LIMITATIONS IN THE RATINGS GAME

Debt ratings are useful to a large proportion of debt issuances. Yet we must understand the inherent limitations of the standardized procedures of rating agencies. As with equity security analysis, our analysis can improve on these ratings. Debt issuances reflect a wide range of characteristics. Consequently, they present us with opportunities to identify differences within rating classes and assess their favorable or unfavorable impact within their ratings class. Also, there is evidence that rating changes lag the market. This lag effect presents us with additional opportunities to identify important changes prior to their being reported by rating agencies.

## .....APPENDIX 10B PREDICTING FINANCIAL DISTRESS

A common use of financial statement analysis is identifying areas needing further investigation and analysis. One of these applications is **predicting financial distress**. Research has made substantial advances in suggesting various ratios as predictors of distress. This research is valuable in providing additional tools for analyzing long-term solvency. Models of financial distress, commonly referred to as **bankruptcy prediction models**, examine the trend and behavior of selected ratios. Characteristics of these ratios are used in identifying the likelihood of future financial distress. Models presume that evidence of distress appears in financial ratios and that we can detect it sufficiently early for us to take actions to either avoid risk of loss or to capitalize on this information.

### ALTMAN Z-SCORE

Probably the most well-known model of financial distress is **Altman's Z-score**. Altman's Z-score uses multiple ratios to generate a predictor of distress.<sup>7</sup> Altman's Z-score uses a statistical technique (multiple discriminant analysis) to produce a predictor that is a linear function of several explanatory variables. This predictor classifies or predicts the likelihood of bankruptcy or nonbankruptcy. Five financial ratios are included in the Z-score:  $X_1$  = Working capital/Total assets,  $X_2$  = Retained earnings/Total assets,  $X_3$  = Earnings before interest and taxes/Total assets,  $X_4$  = Shareholders' equity/Total liabilities, and  $X_5$  = Sales/Total assets. We can view  $X_1$ ,  $X_2$ ,  $X_3$ ,  $X_4$ , and  $X_5$  as reflecting (1) liquidity, (2) age of firm and cumulative profitability, (3) profitability, (4) financial structure, and (5) capital turnover rate, respectively. The Altman Z-score is computed as:

$$Z = 0.717 X_1 + 0.847 X_2 + 3.107 X_3 + 0.420 X_4 + 0.998 X_5$$

A Z-score of less than 1.20 suggests a high probability of bankruptcy, while Z-scores above 2.90 imply a low probability of bankruptcy. Scores between 1.20 and 2.90 are in the gray or ambiguous area.<sup>8</sup>

<sup>7</sup> See E. Altman, "Financial Ratios, Discriminant Analysis, and the Prediction of Corporate Bankruptcy," *Journal of Finance* 22 (September 1968), pp. 589–609. Also see J. Begley, J. Ming, and S. Watts, "Bankruptcy Classification Errors in the 1980s: An Empirical Analysis of Altman's and Ohlson's Models," *Review of Accounting Studies* (1997).

<sup>8</sup> The model shown here is from Altman, *Corporate Financial Distress* (New York: John Wiley, 1983), pp. 120–124. This model is more generalizable than his earlier 1968 model which can only be applied to publicly traded companies. The earlier model is:  $Z = 1.2 X_1 + 1.4 X_2 + 3.3 X_3 + 0.6 X_4 + 1.0 X_5$ . But  $X_4$  in the earlier model requires the market value of preferred and common equity be available. The new model can be applied to *both* publicly traded and nonpublicly traded companies with no measurable effect on prediction performance. Use of the earlier model is fine provided it is only applied to publicly traded companies.

## DISTRESS MODELS AND FINANCIAL STATEMENT ANALYSIS

Research efforts identify a useful role for ratios in predicting financial distress. However, we must *not* blindly apply this or any other model without informed and critical analysis of a company's fundamentals. There is no evidence to suggest computation of a *Z*-score is a better means of analyzing long-term solvency than is the integrated use of the analysis tools described in this book. Rather, we assert the use of ratios as predictors of distress is best in complementing our rigorous analysis of financial statements. Evidence does suggest the *Z*-score is a useful screening, monitoring, and attention-directing device.

### GUIDANCE ANSWERS TO ANALYSIS VIEWPOINTS

#### BANKER

Your decision on IMC's one-year loan application is positive for at least two reasons. First, your analysis of IMC's short-term liquidity is reassuring. IMC's current ratio of 4:1 suggests a considerable margin of safety in its ability to meet short-term obligations. Second, IMC's current assets of \$1.6 million and current ratio of 4:1 implies current liabilities of \$400,000 and a working capital excess of \$1.2 million. This working capital excess totals 60 percent of the loan amount. The evidence supports approval of IMC's loan application. However, if IMC's application is for a 10-year loan, our decision is less optimistic. While the current ratio and working capital suggest a good safety margin, there are indications of inefficiency in operations. First, a 4:1 current ratio is in most cases too excessive and characteristic of inefficient asset use. Second, IMC's current ratio is more than double that of its competitors. Our decision regarding a long-term loan is likely positive, *but* substantially less optimistic than a short-term loan.

#### CONSULTANT

Cost savings are assumed to derive from paying off current liabilities with money not invested in inventory. Accordingly, cost savings equal (Inventory reduction  $\times$  10%). Under the old system, inventory equaled \$5 million. This is obtained using the inventory turnover ratio:  $20 = \$100 \text{ million} / \text{Average inventory}$ . With the new system, inventory equals \$4 million; computed

using the new inventory turnover:  $25 = \$100 \text{ million} / \text{Average inventory}$ . The cost savings are \$100,000—computed from  $(\$5 \text{ million} - \$4 \text{ million}) \times 10\%$ .

#### ENTREPRENEUR

The main criterion in your analysis is to compare the restaurant's return on assets to the after-tax cost of debt. If your restaurant can continue to earn 9% on assets, then the *after-tax* cost of debt must be less than 9% for you to successfully trade on the equity. Since the tax rate is 40%, you could successfully trade on the equity by adding new debt with an interest rate of 15% or less  $[9\% (1 - 0.40)]$ . The lower the interest rate is from 15%, the more successful is your trading on the equity. You must recognize that taking on debt increases the riskiness of your business (due to the risk of unsuccessfully trading on the equity). This is because if your restaurant's earnings decline to where return on assets falls below the after-tax cost of debt, then return on equity declines even further. Accordingly, your assessment of earnings stability, or *persistence*, is a crucial part of the decision to add debt.

#### ANALYST

The preferred equity risk is greater for the second company. For the first company, senior securities (to preferred equity) constitute 20% of financing. However, for the second company, senior securities constitute 30% of financing. In a situation of bankruptcy, 30% of

residual value must be paid to debtors prior to payments to preferred equity holders. In addition, financial leverage for the second company is potentially greater, although precise assessment of leverage risk depends on the features of preferred stock (features such as fixed return, cumulative, nonparticipating, redeemable, and nonvoting make preferred stock more like debt).

## QUESTIONS

- 10-1. Why is liquidity important in analysis of financial statements? Explain its importance from the viewpoint of more than one type of user.
- 10-2. Working capital equals current assets less current liabilities. Identify and describe factors impairing the usefulness of working capital as an analysis measure.
- 10-3. Are fixed assets potentially includable in current assets? Explain. If your answer is yes, describe situations where inclusion is possible.
- 10-4. Certain installment receivables are not collectible within one year. Why are these receivables sometimes included in current assets?
- 10-5. Are all inventories included in current assets? Why or why not?
- 10-6. What is the justification for including prepaid expenses in current assets?
- 10-7. Assume a company under analysis has few current liabilities but substantial long-term liabilities. Notes to the financial statements report the company has a "revolving loan agreement" with a bank. Is this disclosure relevant to your analysis?
- 10-8. Certain industries are subject to peculiar financing and operating conditions calling for special consideration in drawing distinctions between *current* and *noncurrent*. How should analysis recognize this in evaluating short-term liquidity?
- 10-9. Your analysis of two companies reveals identical levels of working capital. Are you confident in concluding their liquidity positions are equivalent?
- 10-10. What is the current ratio? What does the current ratio measure? What are reasons for using the current ratio for analysis?
- 10-11. Since cash generally does not yield a return, why does a company hold cash?
- 10-12. Is there a relation between level of inventories and sales? Are inventories a function of sales? If there is a relation between inventories and sales, is it proportional?
- 10-13. What are management's objectives in determining a company's investment in inventories and receivables?
- 10-14. What are the limitations of the current ratio as a measure of liquidity?
- 10-15. What is the appropriate use of the current ratio as a measure of liquidity?
- 10-16. What are cash-based ratios of liquidity? What do they measure?
- 10-17. How can we measure "quality" of current assets?
- 10-18. What does accounts receivable turnover measure?
- 10-19. What is the days' sales in receivables? What does it measure?
- 10-20. Assume a company's days' sales in receivables is 60 days in comparison to 40 days for the prior period. Identify at least three possible reasons for this change.
- 10-21. What are the repercussions to a company of (a) overinvestment and (b) underinvestment in inventories?
- 10-22. What problems are expected in an analysis of a company using the LIFO inventory method when costs are increasing? What effects do price changes have on the (a) inventory turnover ratio and (b) current ratio?
- 10-23. Why is the composition of current liabilities relevant to our analysis of the quality of the current ratio?
- 10-24. A seemingly successful company can have a poor current ratio. Identify possible reasons for this result.

- 10–25. What is window-dressing of current assets and liabilities? How can we recognize whether financial statements are window-dressed?
- 10–26. What is the rule of thumb governing the expected level of the current ratio? What risks are there in using this rule of thumb for analysis?
- 10–27. Describe the importance of sales in assessing a company's current financial condition and the liquidity of its current assets.
- 10–28. Identify important qualitative considerations in the analysis of a company's liquidity. What SEC disclosures help our analysis in this area?
- 10–29. What is the importance of what-if analysis on the effects of changes in conditions or policies for a company's cash resources?
- 10–30. Identify several key elements in the evaluation of solvency.
- 10–31. Why is analysis of a company's capital structure important?
- 10–32. What is meant by *financial leverage*? Identify one or more cases where leverage is advantageous.
- 10–33. Dynamic Electronics, Inc., a successful and high-growth company, consistently experiences a favorable difference between the rate of return on its assets and the interest rate paid on borrowed funds. Explain why this company should not increase its debt to the 90% level of total capitalization and thereby minimize any need for equity financing.  
(CFA Adapted)
- 10–34. How should we treat deferred income taxes in an analysis of capital structure?
- 10–35. In analysis of capital structure, how should lease obligations not capitalized be treated? Under what conditions should they be considered equivalent to debt?
- 10–36. What is off-balance-sheet financing? Provide one or more examples.
- 10–37. What are liabilities for pensions? What factors should our analysis of a company's pension obligations take into consideration?
- 10–38. When is information on unconsolidated subsidiaries important to solvency analysis?
- 10–39. Would you classify the items below as equity or liabilities? State your reason(s) and any assumptions.
- |  |                      |
|--|----------------------|
| a. Minority interest in consolidated financial statements. | d. Convertible debt. |
| b. Appropriated retained earnings.                         | e. Preferred stock.  |
| c. Guarantee for product performance on sale.              |                      |
- 10–40. a. Why might an analysis of financial statements need to adjust the book value of assets?  
b. Give three examples of the need for possible adjustments to book value.
- 10–41. In evaluating solvency, why are long-term projections necessary in addition to a short-term analysis? What are some limitations of long-term projections?
- 10–42. What is the difference between common-size analysis and capital structure ratio analysis? Explain how capital structure ratio analysis is useful to financial statement analysis.
- 10–43. Equity capital on the balance sheet is reported using historical cost accounting and at times differs considerably from market value. How should our analysis allow for this, if at all, in analyzing capital structure?
- 10–44. Why is the evaluation of asset composition useful for capital structure analysis?
- 10–45. What does the earnings to fixed charges ratio measure? What does this ratio add to the other tools of credit analysis?
- 10–46. In computing the earnings to fixed charges ratio, what broad categories of items are included in fixed charges? What tax adjustments must be considered for these items?
- 10–47. A company you are analyzing has a purchase commitment of raw materials under a noncancelable contract that is substantial in amount. Under what conditions do you include this purchase commitment in computing fixed charges?
- 10–48. Is net income a reliable measure of cash available to meet fixed charges?
- 10–49. Company B is a wholly owned subsidiary of Company A. Company A is also Company B's principal customer. As a potential lender to Company B, what particular facets of this relationship concern you most? What safeguards, if any, do you require in any loan contract?

- 10–50. Comment on the assertion: “*Debt is a supplement to, not a substitute for, equity financing.*”
- 10–51. A company in need of additional equity financing sells convertible debt. This action postpones equity dilution and the company ultimately sells its shares at an effectively higher price. What are the advantages and disadvantages of this action?
- 10–52. *a.* What is the reason for restrictive covenants in long-term debt indentures?  
*b.* What is the reason for provisions regarding:  
 (1) Maintenance of minimum working capital (or current ratio)?  
 (2) Maintenance of minimum shareholders’ equity?  
 (3) Restrictions on dividend payments?  
 (4) Power of creditors to elect a majority of the board of directors of the debtor company in the event of default under terms of the loan agreement?
- 10–53. Why are debt securities regularly rated while equity securities are not?
- 10–54. What factors do rating agencies emphasize in rating an industrial bond? Describe these factors.
- 10–55. Can an analysis of financial statements improve on published bond ratings? Explain.
- 10–56. What is the reason(s) why companies hire bond rating agencies to rate their debt?

## EXERCISES

### EXERCISE 10–1

*Interpreting Effects of Transactions on Liquidity Measures*

The Lux Company experiences the following unrelated events and transactions during Year 1. The company’s existing current ratio is 2:1 and its quick ratio is 1.2:1.

1. Lux wrote off \$5,000 of accounts receivable as uncollectible.
2. A bank notifies Lux that a customer’s check for \$411 is returned marked insufficient funds. The customer is bankrupt.
3. The owners of Lux Company make an additional cash investment of \$7,500.
4. Inventory costing \$600 is judged obsolete when a physical inventory is taken.
5. Lux declares a \$5,000 cash dividend to be paid during the first week of the next reporting period.
6. Lux purchases long-term investments for \$10,000.
7. Accounts payable of \$9,000 are paid.
8. Lux borrows \$1,200 from a bank and gives a 90-day, 6% promissory note in exchange.
9. Lux sells a vacant lot for \$20,000 that had been used in its operations.
10. A three-year insurance policy is purchased for \$1,500.

*Required:*

Separately evaluate the immediate effect of each transaction on the company’s:

- a.* Current ratio
- b.* Quick (acid-test) ratio
- c.* Working capital

### EXERCISE 10–2

*Interpreting Effects of Transactions on Liquidity Measures*

Interpret the effect of the following six *independent* events and transactions for the:

- a.* Accounts receivable turnover (currently equals 3.0).
- b.* Days’ sales in receivables.
- c.* Inventory turnover (currently equals 3.0).

The three columns to the right of each event and transaction are identified as (*a*), (*b*), and (*c*) corresponding to the three liquidity measures. For each event and transaction indicate the effect as an increase (I); decrease (D); or no effect (NE).

Events and Transactions	(a)	(b)	(c)
1. Beginning inventory understatement of \$500 is corrected this period.	_____	_____	_____
2. Sales on account are underreported by \$10,000.	_____	_____	_____
3. \$10,000 of accounts receivable are written off by a charge to the allowance for doubtful accounts.	_____	_____	_____
4. \$10,000 of accounts receivable are written off by a charge to bad debts expense (direct method).	_____	_____	_____
5. Under the lower-of-cost-or-market method, inventory is reduced to market by \$1,000.	_____	_____	_____
6. Beginning inventory overstatement of \$500 is corrected this period.	_____	_____	_____

Interpret the effect of the following six *independent* events and transactions for the:

- Accounts receivable turnover (equals 4.0 prior to the event).
- Days' sales in receivables.
- Inventory turnover (equals 4.0 prior to the event).

The three columns to the right of each event and transaction are identified as (a), (b), and (c) corresponding to the three liquidity measures. For each event and transaction indicate the effect as an increase (I); decrease (D); or no effect (NE).

Events and Transactions	(a)	(b)	(c)
1. \$5,000 of accounts receivable are written off by a charge to allowance for doubtful accounts.	_____	_____	_____
2. Beginning inventory understatement of \$1,000 is corrected this period.	_____	_____	_____
3. Under the lower-of-cost-or-market method, inventory is reduced to market by \$2,000.	_____	_____	_____
4. Obsolete inventory of \$3,000 is identified and written off.	_____	_____	_____
5. Beginning inventory overstatement of \$2,000 is corrected this period.	_____	_____	_____
6. Sales on account are overstated by \$10,000 and corrected this period.	_____	_____	_____

The management of a corporation wishes to improve the appearance of its current financial position as reflected in the current and quick ratios.

*Required:*

- Describe four ways in which management can window-dress the financial statements to accomplish this objective.
- For each technique you identify in (a), describe the procedures, if any, you can use in your analysis to detect the window-dressing.

(CFA Adapted)

### EXERCISE 10-3

*Interpreting Effects of Transactions on Liquidity Measures*

### EXERCISE 10-4

*Identifying Window-Dressing*



**EXERCISE 10-5**

*Determining the Effect of Transactions on Solvency Ratios*

Financial data (\$ thousands) for Wisconsin Wilderness, Inc., are reproduced below:

Short-term liabilities .....	\$ 500
Long-term liabilities .....	800
Equity capital .....	1,200
Cash from operations .....	300
Pretax income .....	200
Interest expense .....	40

Indicate the effect that each of the Wisconsin Wilderness transactions and events (1 through 10) on the next page has on each of the four ratios below. (Each transaction or event is independent of others—consider only the immediate effect.) Use I for increase, D for decrease, and NE for no effect.

- a. Total debt to equity.
- b. Long-term debt to equity.
- c. Earnings to fixed charges (exceeds 1.0 before transactions and events).
- d. Cash flow to fixed charges (exceeds 1.0 before transactions and events).

	<b>a</b>	<b>b</b>	<b>c</b>	<b>d</b>
1. Increase in tax rate.				
2. Retire bonds—paid in cash.				
3. Issue bonds to finance expansion.				
4. Issue preferred stock to finance expansion.				
5. Depreciation expense increases.				
6. Collect accounts receivable.				
7. Refinance debt resulting in higher interest cost.				
8. Capitalize higher proportion of interest expense.				
9. Convert convertible debt into common stock.				
10. Acquire inventory on credit.				

**EXERCISE 10-6**

*What-If Analysis of Capital Structure (multiple choice)*

The following information is relevant for Questions 1 and 2:  
Austin Corporation's Year 8 financial statement notes include the following information:

- a. Austin recently entered into operating leases with total future payments of \$40 million that equal a discounted present value of \$20 million.
- b. Long-term assets include held-to-maturity debt securities carried at their amortized cost of \$10 million. Fair market value of these securities is \$12 million.
- c. Austin guarantees a \$5 million bond issue, due in Year 13. The bonds are issued by Healey, a nonconsolidated 30%-owned affiliate.

After analysis, you decide to adjust Austin's balance sheet for each of the above three items.

- 1. Among the effects of these adjustments for the times interest earned coverage ratio is (choose one of the following):
  - a. Lease capitalization increases this ratio.
  - b. Lease capitalization decreases this ratio.
  - c. Recognizing the debt guarantee decreases this ratio.
  - d. Held-to-maturity debt securities adjustment increases this ratio.

2. Among the effects of these adjustments for the long-term debt to equity ratio is (choose one of the following):
- Only the held-to-maturity debt securities adjustment decreases this ratio.
  - Only lease capitalization decreases this ratio.
  - All three adjustments decrease this ratio.
  - All three adjustments increase this ratio.
3. What is the effect of a cash dividend payment on the following ratios (all else equal)?

Times Interest Earned	Long-Term Debt to Equity
a. Increase	Increase
b. No effect	Increase
c. No effect	No effect
d. Decrease	Decrease

4. What is the effect of selling inventory for profit on the following ratios (all else equal)?

Times Interest Earned	Long-Term Debt to Equity
a. Increase	Increase
b. Increase	Decrease
c. Decrease	Increase
d. Decrease	Decrease

5. The existence of uncapitalized operating leases is to (choose one of the following):
- Overstate the earnings to fixed charges coverage ratio.
  - Overstate fixed charges.
  - Overstate working capital.
  - Understate the long-term debt to equity ratio.

(CFA Adapted)

## PROBLEMS

Refer to the financial statements of **Campbell Soup Company** in Appendix A.

### Campbell Soup Company

#### PROBLEM 10-1

*Analyzing Measures of Short-Term Liquidity*

*Required:*

- Compute the following liquidity measures for Year 10:
  - Current ratio.
  - Acid-test ratio.
  - Accounts receivable turnover (accounts receivable balance at end of Year 9 is \$564.1).
  - Inventory turnover (inventory balance at end of Year 9 is \$816.0).
  - Days' sales in receivables.
  - Days' sales in inventory.
  - Conversion period (operating cycle).
  - Cash and cash equivalents to current assets.
  - Cash and cash equivalents to current liabilities.
  - Days' purchases in accounts payable.
  - Net trade cycle.
  - Cash flow ratio.
- Assess Campbell's liquidity position using results from (a).
- For Year 10, compute ratios 1, 4, 5, 6, and 7 using inventories valued on a FIFO basis (FIFO inventory at the end of Year 9 is \$904).
- What are the limitations of the current ratio as a measure of liquidity?
- How can analysis and use of other related measures (other than the current ratio) enhance the evaluation of liquidity?

Check  
 (a) 7. 105.54  
 10. 46.36  
 11. 59.18

**PROBLEM 10-2***What-If Analysis of  
Cash Requirements*

Selected financial data of Future Technologies, Inc., at December 31, Year 1, are shown below:

Cash.....	\$ 42,000	Accounts payable.....	\$ 78,000
Accounts receivable.....	90,000	Notes payable.....	21,000
Inventory.....	39,000	Accrued taxes.....	10,800
Fixed assets.....	120,000	Capital stock.....	120,000
Accumulated depreciation.....	25,800	Retained earnings.....	35,400

The following additional information is available for the year ended December 31, Year 1:

Sales .....	\$450,000	Depreciation.....	\$15,000
Cost of goods sold (excluding depreciation).....	312,000	Net income.....	12,000
Purchases.....	210,000		

For Year 2, Future Technologies anticipates a 5% sales growth. To counterbalance this lower than expected growth rate, the company implements cost-cutting strategies to reduce cost of goods sold by 2% from the Year 1 level. All other expenses are expected to increase by 5%. Expected net income for Year 2 is \$20,000. Ending Year 2 inventory is estimated at \$90,000 and there is no expected balance in accrued taxes. The company requires \$175,000 to buy new equipment in Year 2. The minimum desired cash balance is \$30,000. The company offers a discount of 2% of sales if payment is received in 10 days. It is expected that 10% of sales take advantage of this discount, while the remaining 90% are collected (on average) in 60 days.

*Required:*

Prepare a what-if analysis of cash needs (cash forecast) for Year 2. Will Future Technologies need to borrow money?

**CHECK**Predicted borrowing,  
\$103,232**PROBLEM 10-3***What-If Analysis of  
Changes in Credit Policy*

Shown below are selected financial accounts of RAM Corp. as of December 31, Year 1:

Cash.....	\$ 80,000	Accounts payable.....	\$130,000
Accounts receivable.....	150,000	Notes payable.....	35,000
Inventory.....	65,000	Accrued taxes.....	20,000
Fixed assets.....	200,000	Capital stock.....	200,000
Accumulated depreciation.....	45,000		

The following additional information is available for Year 1:

Sales .....	\$800,000	Depreciation.....	\$25,000
Cost of sales (excludes depreciation).....	520,000	Net income.....	20,000
Purchases.....	350,000		

RAM Corp. anticipates growth of 10% in sales for the coming year. All corresponding revenue and expense items are expected to increase by 10%, except for depreciation, which remains the same. All expenses are paid in cash as incurred during the year. Year 2 ending inventory is predicted at \$150,000. By the end of Year 2, the company expects a notes payable balance of \$50,000 and no accrued taxes. The company maintains a minimum cash balance of \$50,000 as a managerial policy.

*Required:*Consider each of the following circumstances separately and independently of each other and focus only on changes described. (*Hint:* Prepare an analysis of cash needs (cash forecast) for Year 2, and then calculate the effect of each of these three separate alternative scenarios.)

- a. RAM is considering changing its credit policy. This change implies ending accounts receivable would represent 90 days of sales. What is the impact of this policy change on RAM's current cash position? Will the company be required to borrow?
- b. RAM is considering a change to a 120-day collection period based on ending accounts receivable. What is the effect(s) of this change on its cash position?
- c. Suppliers are considering changing their policy of extending credit to RAM to require payment on purchases within 60 days; there would be no change in RAM's collection period. What is the effect(s) of this change on its cash position?

**CHECK**

- (a) Cash excess, \$33,500
- (c) Cash needed, \$46,000

Reproduced below are selected financial data at the end of Year 5 and *forecasts* for the end of Year 6 for Top Corporation:

**PROBLEM 10-4**

*What-If Analysis of Cash Demands*

Account	Year 5	Year 6 (Forecast)	Account	Year 5	Year 6 (Forecast)
Cash .....	\$ 35,000	?	Accounts payable .....	\$ 65,000	\$122,000
Accounts receivable.....	75,000	?	Notes payable .....	17,500	15,000
Inventory.....	32,000	\$ 75,000	Accrued taxes .....	9,000	0
Fixed assets.....	100,000	100,000	Capital stock .....	100,000	100,000
Accumulated depreciation.....	21,500	25,000			

Additional forecast estimates for Year 6:

Sales.....	\$412,500	Net income.....	\$10,000
Cost of sales.....	70% of sales forecast	Days' sales in receivables.....	90 days

*Required:*

Assuming all expenses are paid in cash when incurred and that cost of sales is exclusive of depreciation, forecast the ending cash balance for Year 6. If Top Corp. wishes to maintain a minimum cash balance of \$50,000, must it borrow?

**CHECK**

Cash needed, \$27,125

You are an investment analyst at Valley Insurance. Robert Jollie, a CFA and your superior, recently asked you to prepare a report on Gant Corporation's liquidity. Gant is a manufacturer of heavy equipment for the agricultural, forestry, and mining industries. Most of its plant capacity is located in the United States and a majority of its sales are international. Gant's investment bankers are offering Valley Insurance a participation in a private placement debenture issue. Beyond the traditional ratio analysis, your memo to Jollie stresses the following:

**PROBLEM 10-5**

*Qualitative Assessment of Liquidity*

1. Gant's current ratio is 2:1.
2. During the prior fiscal year, Gant's working capital increased substantially.
3. While Gant's earnings are below record levels, rigorous cost controls yield an acceptable level of profitability and provide a basis for continued liquidity.

After reviewing your memo, Jollie dismisses it as “totally inadequate”—not because it did not include a quantitative analysis of financial ratios, but because it did not effectively address liquidity. Jollie writes:

Liquidity is a cash issue, and liquidity analysis is a process of evaluating the risk of whether a company can pay its debts as they come due. The vagaries and inconsistencies of working capital definitions do not adequately address this issue. Working capital analysis simply accounts for the change in a company’s working capital position and adds little to an assessment of liquidity.

*Required:*

- a. Identify five key information items directly reflecting on Gant’s liquidity that you should attempt to derive from this company’s financial statements and management interviews.
- b. Identify five *qualitative* financial and economic assessments specific to Gant and its industry that you should consider in further analyzing Gant’s liquidity.

(CFA Adapted)

### PROBLEM 10–6

*Interpreting Measures of Short-Term Liquidity*

As lending officer for Prudent Bank you are analyzing the financial statements of ZETA Corporation (see Case CC–2 in the Comprehensive Case Chapter for data) as part of ZETA’s loan application. Your superior requests you evaluate ZETA’s liquidity using the two-year financial information available. The following additional information is acquired (in \$ thousands): Inventory at January 1, Year 5, \$32,000.

*Required:*

- a. Compute the following measures for both Years 5 and 6:
  - (1) Current ratio.
  - (2) Days’ sales in receivables.
  - (3) Inventory turnover.
  - (4) Days’ sales in inventory.
  - (5) Days’ purchases in accounts payable (assume all cost of sales items are purchased).
  - (6) Cash flow ratio.
- b. Comment on any significant year-to-year changes identified from the analysis in (a).

#### CHECK

- (5) Year 5, 79
- Year 6, 76

### PROBLEM 10–7

*Calculating Solvency Ratios*

Refer to the financial statements of **Campbell Soup Company** in Appendix A.

*Required:*

- a. Compute the following measures for Year 10. (Assume 50% of deferred income taxes will reverse in the foreseeable future—the remainder should be considered equity.)
  - (1) Total debt to equity.
  - (2) Total debt to total assets.
  - (3) Long-term liabilities to equity.
  - (4) Total equity to total liabilities.
  - (5) Fixed assets to equity.
  - (6) Short-term liabilities to total debt.
  - (7) Earnings to fixed charges.
  - (8) Cash flow to fixed charges.
  - (9) Working capital to total debt.
- b. Under the heading “Balance Sheets” in its Management’s Discussion and Analysis section, Campbell refers to the ratio of total debt to capitalization (33.7%). Verify Campbell’s computation for Year 10.

#### CHECK

- (1) 1.21
- (7) 2.14
- (8) 5.27

The income statement of Kimberly Corporation for the year ended December 31, Year 1, is reproduced below:

**PROBLEM 10–8**

*Computing and  
Analyzing Earnings  
Coverage Ratios*

<b>KIMBERLY CORPORATION</b>	
Consolidated Income Statement (\$ thousands)	
For Year Ended December 31, Year 1	
Sales.....	\$14,000
Undistributed income of less than 50%-owned affiliates .....	300
Total revenue.....	14,300
Cost of goods sold.....	\$6,000
Selling and administrative expenses.....	2,000
Depreciation.....	600
Rental expense.....	500
Share of minority interest in consolidated income.....	200
Interest expense.....	400
	(9,700)
Income before taxes .....	4,600
Income taxes	
Current .....	900
Deferred .....	400
	(1,300)
Net income .....	<u>\$ 3,300</u>
Less dividends.....	
Common stock.....	300
Preferred stock.....	400
	(700)
Earnings retained for the year.....	<u>\$ 2,600</u>

*Additional Information:*

1. The following changes occurred in current assets and current liabilities for Year 1:

<u>Current accounts</u>	<u>Increase (decrease)</u>	<u>Current accounts</u>	<u>Increase (decrease)</u>
Accounts receivable.....	\$900	Notes payable to bank .....	\$(200)
Inventories.....	(800)	Accounts payable .....	700
Dividend payable.....	(100)		

2. The effective tax rate is 40%.

3. Shares of minority interests in consolidated income do not have fixed charges.

4. Interest expense includes:

Interest incurred (except items below).....	\$600
Amortization of bond premium.....	(300)
Interest on capitalized leases .....	140
Interest incurred .....	440
Less interest capitalized .....	(40)
Interest expense.....	<u>\$400</u>

5. Amortization of previously capitalized interest (included in depreciation) is \$60.  
 6. Interest implicit in operating lease rental payment (included in rental expense) is \$120.

Required:

**CHECK**

- (1) 8.71  
 (2) 11.11

- a. Compute the following earnings coverage ratios:  
 (1) Earnings to fixed charges.  
 (2) Cash flow to fixed charges.  
 (3) Earnings coverage of preferred dividends.  
 b. Analyze and interpret the earnings coverage ratios in (a).

**PROBLEM 10–9**

*Computing and  
 Analyzing Earnings  
 Coverage Ratios*

The income statement of Lot Corp. for the year ended December 31, Year 1, follows:

<b>LOT CORPORATION</b>	
Income Statement (\$ thousands)	
For Year Ended December 31, Year 1	
Sales .....	\$27,400
Undistributed income of less than 50%-owned affiliates .....	<u>400</u>
Total revenue .....	27,800
Less: Cost of goods sold .....	<u>(14,000)</u>
Gross profit .....	13,800
Selling and administrative expenses .....	\$3,600
Depreciation <sup>(a)</sup> .....	1,200
Rental expense <sup>(b)</sup> .....	1,400
Share of minority interest in consolidated income <sup>(c)</sup> .....	600
Interest expense <sup>(d)</sup> .....	<u>1,200</u>
Income before taxes .....	5,800
Income taxes	
Current .....	2,000
Deferred .....	<u>1,000</u>
	<u>(3,000)</u>
Net income .....	<u>\$ 2,800</u>
Dividends	
Preferred stock .....	400
Common stock .....	<u>1,000</u>
	<u>(1,400)</u>
Earnings retained for the year .....	<u>\$ 1,400</u>

<sup>(a)</sup> Represents depreciation excluded from all other expense categories and includes \$100 amortization of previously capitalized interest.

<sup>(b)</sup> Includes \$400 of interest implicit in operating lease rental payments that should be considered as having financing characteristics.

<sup>(c)</sup> These subsidiaries have fixed charges.

<sup>(d)</sup> Interest expense includes:

Interest incurred (except items below) .....	\$ 880
Amortization of bond discount .....	100
Interest portion of capitalized leases .....	340
Interest capitalized .....	<u>(120)</u>
	<u>\$1,200</u>

*Additional Information:*

1. The following changes occurred in current assets and liabilities for Year 1:

Current accounts	Increase (decrease)	Current accounts	Increase (decrease)
Accounts receivable.....	\$(1,600)	Notes payable .....	\$ (400)
Inventories.....	2,000	Accounts payable.....	2,000
Dividend payable.....	240		

2. Tax rate is 40%.

*Required:*

a. Compute the following earnings coverage ratios:

- (1) Earnings to fixed charges.
- (2) Cash flow to fixed charges.
- (3) Earnings coverage of preferred dividends.

**CHECK**

- (1) 4.48
- (2) 6.04

b. Analyze and interpret the earnings coverage ratios in (a).

Your supervisor is considering purchasing the bonds and preferred shares of ARC Corp. She furnishes you the following ARC income statement and expresses concern about the coverage of fixed charges.

**PROBLEM 10–10**  
*Analyzing Coverage Ratios*

<b>ARC CORPORATION</b>	
Consolidated Income Statement	
For Year Ended December 31, Year 5	
Sales.....	\$27,400
Income of less than 50%-owned affiliates (note 1) .....	800
Total revenue.....	28,200
Cost of goods sold.....	(14,000)
Gross profit.....	14,200
Selling and administrative expenses .....	\$3,600
Depreciation (note 2) .....	1,200
Rental expenses (note 3).....	1,400
Share of minority interests in consolidated income (note 4) .....	600
Interest expense (note 5).....	1,200
Income before income taxes.....	(8,000)
	6,200
Income taxes	
Current .....	\$2,000
Deferred.....	1,000
	\$ (3,000)
Net income .....	<u>\$ 3,200</u>
Dividends	
Preferred stock.....	400
Common stock.....	1,000
	(1,400)
Increase in retained earnings.....	<u>\$ 1,800</u>

*(continued)*



**PROBLEM 10–10**  
*(concluded)*

Notes:

1. For the income from affiliates, \$600 is undistributed.
2. Includes \$80 amortization of previously capitalized interest.
3. Includes \$400 of interest implicit in operating lease rental payments.
4. These subsidiaries do not have fixed charges.
5. Interest expense includes:

Interest incurred (except items below) .....	\$ 880
Amortization of bond discount.....	100
Interest portion of capitalized leases .....	340
Interest capitalized .....	<u>(120)</u>
	\$1,200

6. The following changes occurred in current year balance sheet accounts:

Accounts receivable .....	\$(600)
Inventories .....	160
Payables and accrued expenses.....	120
Dividends payable.....	<u>(80)</u>
Current portion of long-term debt .....	<u>(100)</u>

7. Tax rate is 40 percent.

Required:

- a. Compute the following earnings coverage ratios:
  - (1) Earnings to fixed charges.
  - (2) Cash flow to fixed charges.
  - (3) Earnings coverage of preferred dividends.
- b. Analyze and interpret the earnings coverage ratios in (a).

**PROBLEM 10–11**

*Calculating Financial Ratios on Debt and Equity Securities*

Refer to the following financial data of Fox Industries Ltd.:

<b>FOX INDUSTRIES LIMITED</b>					
Condensed Income Statement (\$ thousands)					
	<b>FISCAL YEAR ENDED</b>				
	<b>Year 7</b>	<b>Year 6</b>	<b>Year 5</b>	<b>Year 4</b>	<b>Year 3</b>
Earnings before depreciation, interest on long-term debt, and taxes .....	\$8,750	\$8,250	\$8,000	\$7,750	\$7,250
Less: Depreciation.....	<u>(4,000)</u>	<u>(3,750)</u>	<u>(3,500)</u>	<u>(3,500)</u>	<u>(3,250)</u>
Earnings before interest on long-term debt and taxes .....	\$4,750	\$4,500	\$4,500	\$4,250	\$4,000

<b>FOX INDUSTRIES LIMITED</b>	
Capitalization at December 31, Year 7 (\$ thousands)	
Long-term debt	
First mortgage bonds	
5.00% serial bonds due Year 8 to Year 10 .....	\$ 7,500
6.00% sinking fund bonds due Year 15 (note 1).....	17,500
Debentures	
6.50% sinking fund debentures due Year 16 (note 1).....	<u>10,000</u>
Total long-term debt .....	\$35,000

*(continued)*

**PROBLEM 10–11**  
*(concluded)*

Capital stock	
\$1.10 cumulative redeemable preferred, stated value	
\$5.00 per share (redeemable at \$20.00 share).....	\$ 1,500
400,000 Class A shares, no-par value (note 2) .....	14,000
1,000,000 common shares, no par value.....	<u>6,000</u>
Total capital stock .....	21,500
Paid-in capital.....	7,000
Retained earnings.....	<u>18,500</u>
Total long-term debt and equity.....	<u>\$82,000</u>

*Notes:*

1. Combined annual sinking fund payments are \$500.
2. Subject to the rights of the preferred shares, the Class A shares are entitled to fixed cumulative dividends at the rate of \$2.50 per share per annum, and are convertible at the holder's option, at any time, into common shares on the basis of two common shares for one Class A share.

*Required:*

- a. Compute the (1) earnings coverage ratio for Year 7, and (2) average earnings coverage ratio for the five-year period Year 3 through Year 7 (inclusive), separately on the first mortgage bonds and on the sinking fund debentures at the end of Year 7.
- b. Compute the long-term debt to equity ratio as of December 31, Year 7, and identify the proportion of equity represented by shares senior to common shares.
- c. Assuming a 50% income tax rate, calculate the (1) earnings coverage ratio for Year 7, and (2) average earnings coverage ratio for the five-year period Year 3 through Year 7 (inclusive), on the \$1.10 cumulative redeemable preferred shares at the end of Year 7.
- d. Assuming a 50% income tax rate and full conversion of the Class A shares, calculate earnings per common share for the end of Year 7.

**CHECK**

- (c) 1. 1.7
2. 1.6
- (d) \$0.56

(CFA Adapted)

TOPP Company is planning to invest \$20,000,000 in an expansion program expected to increase income before interest and taxes by \$4,000,000. TOPP currently is earning \$5 per share on 2,000,000 shares of common stock outstanding. TOPP's capital structure prior to the investment is:

Total debt .....	\$20,000,000
Shareholders' equity.....	<u>50,000,000</u>
Total capitalization.....	<u>\$70,000,000</u>

Expansion can be financed by the sale of 400,000 shares at \$50 each or by issuing long-term debt at 6%. TOPP's most recent income statement follows:

Sales .....	\$100,000,000
Variable costs.....	\$60,000,000
Fixed costs.....	<u>20,000,000</u>
Total costs .....	<u>(80,000,000)</u>
Income before interest and taxes .....	20,000,000
Interest expense (6% rate).....	<u>(1,000,000)</u>
Income before taxes .....	19,000,000
Income taxes (40% rate).....	<u>(7,600,000)</u>
Net income .....	<u>\$ 11,400,000</u>

**PROBLEM 10–12**

*Analyzing Alternative  
Financing Strategies*

Required:

**CHECK**

(a) 1. \$6.54

- a. Assuming TOPP maintains its current income level and achieves the expected income from expansion, what will be TOPP's earnings per share:  
 (1) If expansion is financed by debt?                      (2) If expansion is financed by equity?
- b. At what level of income before interest and taxes will earnings per share be equal under both alternatives?

**PROBLEM 10-13**

*Analytical Adjustment  
of the Debt to  
Capitalization Ratio*

You are a senior portfolio manager with Reilly Investment Management reviewing the biweekly printout of equity value screens prepared by a brokerage firm. One of the screens used to identify companies is a "low long-term debt/total long-term capital ratio." The printout indicates this ratio for Lubbock Corporation is 23.9%. Your reaction is that Lubbock might be a potential takeover target and you proceed to analyze Lubbock's balance sheet reproduced below:

**LUBBOCK CORPORATION**

Condensed Balance Sheet, (\$ millions)

December 31, Year 7

**Assets**

Cash and equivalents .....	\$ 100
Receivables .....	350
Marketable securities .....	150
Inventory .....	800
Other current assets .....	400
Total current assets .....	1,800
Plant and equipment, net .....	1,800
Total assets .....	<u>\$3,600</u>

**Liabilities and Equity**

Note payable .....	\$ 125
Accounts payable .....	175
Taxes payable .....	150
Other current liabilities .....	75
Total current liabilities .....	525
Long-term debt .....	675
Deferred taxes (noncurrent) .....	175
Other noncurrent liabilities .....	75
Minority interest .....	100
Common stock .....	400
Retained earnings .....	1,650
Total liabilities and equity .....	<u>\$3,600</u>

Further analysis of Lubbock's financial statements reveals the following notes:

1. A subsidiary, Lubbock Property Corp., holds, as joint venture partner, a 50% interest in its head office building in Chicago, and 10 regional shopping centers in the United States. The parent company has guaranteed the indebtedness of these properties, which total \$250,000,000 at December 31, Year 7.
2. The LIFO cost basis was used in the valuation of inventories at December 31, Year 7. If the FIFO method of inventory was used in place of LIFO, inventories would have exceeded reported amounts by \$200,000,000.

3. The company leases most of its facilities under long-term contracts. These leases are categorized as operating leases for accounting purposes. Future minimum rental payments as of December 31, Year 7 are: \$90,000,000 per year for Year 8 through Year 27. These leases carry an implicit interest rate factor of 10%, which translates to a present value of approximately \$750,000,000.

*Required:*

- Explain how the information in each note is used to adjust items on Lubbock's balance sheet.
- Calculate an adjusted *long-term debt to total long-term capitalization* ratio applying the proposed adjustments from (a). Ignore potential income tax effects.
- As a potential investor, you consider other accounting factors in evaluating Lubbock's balance sheet including:
  - Valuation of marketable securities.
  - Treatment of deferred taxes.

Discuss how each of these accounting factors can impact Lubbock's *long-term debt to total long-term capitalization* ratio.

(CFA Adapted)

You are analyzing the bonds of ZETA Company (see Case CC-2 in the Comprehensive Case Chapter for data) as a potential long-term investment. As part of your decision-making process, you compute various ratios for Years 5 and 6. Additional data and information to be considered only for purposes of this problem follow (\$ thousands):

1. Interest consists of:

	Year 6	Year 5
Interest incurred (except items below).....	\$ 9,200	\$5,000
Amortization of bond discount.....	2,500	2,000
Interest portion of capitalized leases.....	80	—
Interest capitalized.....	(1,780)	(1,000)
	<u>\$10,000</u>	<u>\$6,000</u>

- Depreciation includes amortization of previously capitalized interest of \$1,200 for Year 6 and \$1,000 for Year 5.
- Interest portion of operating rental expense considered a fixed charge: \$20 in Year 6 and \$16 in Year 5.
- The associated company is less than 50% owned.
- Deferred taxes constitute a long-term liability.
- Present value of noncapitalized financing leases is \$200 for both years.
- Excess of the projected pension benefit obligation over the accumulated pension benefit obligation is \$2,800 for both years.
- End of Year 4 total assets and equity capital are \$94,500 and \$42,000, respectively.
- Average market price per share of ZETA's common stock is \$40 and \$45 for Year 6 and Year 5, respectively.

*Required:*

- Compute the following analytical measures for both Year 6 and Year 5:
  - Total debt to total assets.
  - Total debt to equity.
  - Long-term debt to equity.
  - Earnings to fixed charges.
  - Cash flow to fixed charges.
- Analyze and interpret both the level and year-to-year trend in these measures.

**CHECK**

	<u>Year 6</u>
(4)	2.61
(5)	2.25

As a new employee of Clayton Asset Management, you are assigned to evaluate the credit quality of BRT Corp. bonds. Clayton holds the bonds in its high-yield bond portfolio. The following information is provided to assist in the analysis.

- BRT Corporation is a rapidly growing company in the broadcast industry. It has grown primarily through a series of aggressive acquisitions.

**PROBLEM 10-15**

*Analysis of  
Creditworthiness with  
Merger Activity*

2. Early in Year 6, BRT announced it was acquiring a competitor in a hostile takeover that would double its assets but also increase debt. The credit rating of BRT debt fell from BBB to BB. The acquisition reduced the financial flexibility of BRT but increased its presence in the broadcasting industry.
3. In the middle of Year 7, BRT announced it is merging with another large entertainment company. The merger will alter BRT's capital structure and also make it the leader in the broadcast industry. The Year 6 acquisition combined with this merger will increase the total assets of BRT by a factor of four. A large portion of the total assets are intangible, representing franchise and distribution rights.
4. While the outlook for the broadcasting industry remains strong, large telecommunication companies attempting to enter the broadcasting industry are keeping competitive pressures high. Laws and regulations also promote the competitiveness of the environment, but initial start-up costs make it difficult for new companies to enter the industry. Large capital expenditures are required to maintain and improve existing systems as well as to expand current business.
5. For your analysis, you are provided with the financial data shown here:

**BRT CORPORATION**

Balance Sheet Data (in millions)

At December 31

	Year 3	Year 4	Year 5	Year 6	Projected Year 7
Current assets .....	\$ 654	\$ 718	\$2,686	\$ 2,241	\$ 5,255
Fixed assets, net .....	391	379	554	1,567	2,583
Other assets (intangibles) .....	<u>2,982</u>	<u>3,090</u>	<u>3,176</u>	<u>8,946</u>	<u>20,435</u>
Total assets.....	\$4,027	\$4,187	\$6,416	\$12,754	\$28,273
Current liabilities.....	\$ 799	\$ 876	\$ 966	\$ 1,476	\$ 3,731
Long-term debt .....	2,537	2,321	2,378	7,142	15,701
Other liabilities .....	326	292	354	976	349
Total equity .....	<u>365</u>	<u>698</u>	<u>2,718</u>	<u>3,160</u>	<u>8,492</u>
Total liabilities and equity.....	\$4,027	\$4,187	\$6,416	\$12,754	\$28,273

**BRT CORPORATION**

Income Statement Data

(In Millions Except per Share Data)

For Year Ended December 31

	Year 3	Year 4	Year 5	Year 6	Projected Year 7
Net sales.....	\$1,600	\$1,712	\$2,005	\$4,103	\$9,436
Operating expenses .....	<u>(1,376)</u>	<u>(1,400)</u>	<u>(1,620)</u>	<u>(3,683)</u>	<u>(8,603)</u>
Operating income .....	224	312	385	420	833
Interest expense.....	(296)	(299)	(155)	(270)	(825)
Income taxes.....	<u>(20)</u>	<u>(42)</u>	<u>(130)</u>	<u>(131)</u>	<u>(4)</u>
Net income.....	<u>\$ (92)</u>	<u>\$ (29)</u>	<u>\$ 100</u>	<u>\$ 19</u>	<u>\$ 4</u>
Earnings per share .....	\$ (0.86)	\$ (0.24)	\$ 0.83	\$ 0.09	\$ 0.01
Average price per share .....	\$26.30	\$34.10	\$44.90	\$40.10	\$40.80
Average shares outstanding .....	107	120	121	198	359

**BRT CORPORATION**

## Selected Ratios

	Year 3	Year 4	Year 5	Year 6	Projected Year 7
Operating income to sales .....	14.0%	18.2%	19.2%	10.2%	*
Sales to total assets .....	0.39	0.41	0.31	0.32	0.33
Earnings before interest and taxes to total assets .....	5.5%	7.4%	6.0%	3.3%	*
Times interest earned .....	0.76	1.04	2.48	1.55	*
Long-term debt to total assets .....	63.0%	55.4%	37.0%	55.9%	*

**CLAYTON ASSET MANAGEMENT**

## Credit Rating Standards

## AVERAGE RATIOS BY RATING CATEGORY

Financial Ratios	AA	A	BBB	BB	B	CCC	CC
Operating income to sales (%) .....	16.2	13.4	12.1	10.3	8.5	6.4	5.2
Sales to total assets .....	2.50	2.00	1.50	1.00	0.75	0.50	0.25
Earnings before interest and taxes to total assets .....	15.0%	10.0%	8.0%	6.0%	4.0%	3.0%	2.0%
Times interest earned .....	5.54	3.62	2.29	1.56	1.04	0.79	0.75
Long-term debt to total assets .....	19.5%	30.4%	40.2%	51.8%	71.8%	81.0%	85.4%
<b>Bond Credit Spread Information</b>							
Current yield spread in basis points over 10-year Treasuries .....	45	55	85	155	225	275	350

*Required:*

- Calculate the following ratios using the projected Year 7 financial information:
  - Operating income to sales.
  - Earnings before interest and taxes to total assets.
  - Times interest earned.
  - Long-term debt to total assets.
- Discuss the effect of the Year 7 merger on the creditworthiness of BRT through an analysis of each of the ratios in (a).
- BRT Corporation 10-year bonds are currently rated BB and are trading at a yield to maturity of 7.70%. The current 10-year Treasury note is yielding 6.15%. Based on your work in (a) and (b), the background information, and information on Selected Ratios and Credit Rating Standards, state and justify whether Clayton should hold or sell the BRT Corporation bonds in its portfolio. Include qualitative factors in your discussion.

(CFA adapted)

Assume you are a fixed-income analyst at an investment management firm. You are following the developments at two companies, Sturdy Machines and Patriot Manufacturing, which are both U.S.-based industrial companies that sell their products worldwide. Both companies operate in cyclical industries. Sturdy Machines' profits have suffered from a rising dollar and a slump in its business. The company has said that major cuts in its operating expenses are likely to be necessary if it is to make a profit next year. On the other hand, Patriot Manufacturing has

**PROBLEM 10-16**

*Comparative Credit  
Analysis of Companies*

been able to maintain its profitability and enhance its balance sheet. Selected data for both companies follow:

Ratio	Year 5	Year 6	Year 7
<b>Sturdy Machines</b>			
Cash flow/total debt (%).....	37.3	31.0	33.0
Total debt/capital (%).....	38.2	40.1	41.3
Pretax interest coverage (times).....	4.2	2.3	1.1
<b>Patriot Manufacturing</b>			
Cash flow/total debt (%).....	34.6	38.0	43.1
Total debt/capital (%).....	40.0	37.3	34.9
Pretax interest coverage (times).....	2.7	4.5	6.1

You are monitoring the bonds of these companies for possible purchase. You notice that a rating agency recently downgraded the senior debt of Sturdy Machines from AA to A and upgraded the senior debt of Patriot Manufacturing from AA to AAA. You received the following yield quotes from a broker:

- Sturdy Machines 7.50% due June 1, 2008, quoted at 7.10%.
- Patriot Manufacturing 7.50% due June 1, 2008, quoted at 7.10%.

*Required:*

Recommend which of the above bonds you should buy. Justify your choice with reference to at least two ratios and two qualitative factors from the information provided.

(CFA adapted)

## CASES

### CASE 10-1

*Preparing and*

*Interpreting Cash Flow*

*Forecasts*

Fax Corporation's income statement and balance sheet for the year ended December 31, Year 1, are reproduced below:

<b>FAX CORPORATION</b>	
Income Statement	
For Year Ended December 31, Year 1	
Net sales.....	\$960,000
Cost of goods sold (excluding depreciation) .....	(550,000)
Gross profit.....	410,000
Depreciation expense.....	\$ 30,000
Selling and administrative expenses .....	<u>160,000</u> (190,000)
Income before taxes.....	220,000
Income taxes (state and federal) .....	(105,600)
Net income.....	<u>\$114,400</u>

**FAX CORPORATION**

## Balance Sheet

December 31, Year 1

**Assets**

## Current assets

Cash.....	\$ 30,000	
Marketable securities.....	5,500	
Accounts receivable.....	52,000	
Inventory.....	<u>112,500</u>	
Total current assets.....		\$200,000

Plant and equipment.....	630,000	
Less: Accumulated depreciation.....	<u>(130,000)</u>	<u>500,000</u>
Total assets.....		<u>\$700,000</u>

**Liabilities and Equity**

## Current liabilities

Accounts payable.....	\$ 60,000	
Notes payable.....	<u>50,000</u>	
Total current liabilities.....		\$110,000

Long-term debt.....		150,000
---------------------	--	---------

## Equity

Capital stock.....	250,000	
Retained earnings.....	<u>190,000</u>	<u>440,000</u>

Total liabilities and equity.....		<u>\$700,000</u>
-----------------------------------	--	------------------

**Additional Information:**

- Purchases in Year 1 are \$480,000.
- In Year 2, management expects 15% sales growth and a 10% increase in all expenses except for depreciation, which increases by 5%.
- Management expects an inventory turnover ratio of 5.5 for Year 2.
- A receivable collection period of 90 days, based on *year-end* accounts receivable, is planned for Year 2.
- Year 2 income taxes, at the same rate of pretax income for Year 1, will be paid in cash.
- Notes payable at the end of Year 2 will be \$30,000.
- Long-term debt of \$25,000 will be paid in Year 2.
- FAX desires a minimum cash balance of \$20,000 in Year 2.
- The ratio of accounts payable to purchases for Year 2 is the same as in Year 1.
- All selling and administrative expenses will be paid in cash in Year 2.
- Marketable securities and equity accounts at the end of Year 2 are the same as in Year 1.

**Required:**

- Prepare a statement of forecasted cash inflows and outflows (what-if analysis) for the year ended December 31, Year 2.
- Will FAX Corporation have to borrow money in Year 2?

**CHECK**Forecast cash needed,  
\$55,920



**CASE 10-2**

*Preparing and  
Interpreting Cash Flow  
Forecasts*

Kopp Corporation's income statement and balance sheet for the year ending December 31, Year 1, are reproduced below:

**KOPP CORPORATION**

## Income Statement

For Year Ended December 31, Year 1

Net sales .....		\$ 960,000
Cost of goods sold .....		<u>(550,000)</u>
Gross profit.....		410,000
Depreciation expense.....	\$ 30,000	
Selling and administrative expenses.....	<u>160,000</u>	<u>(190,000)</u>
Income before taxes.....		220,000
Income taxes (48%) .....		<u>(105,600)</u>
Net income .....		<u><u>\$ 114,400</u></u>

**KOPP CORPORATION**

## Balance Sheet

December 31, Year 1

**Assets**

## Current assets

Cash.....	\$ 30,000	
Marketable securities.....	5,500	
Accounts receivable .....	52,500	
Inventory .....	<u>112,000</u>	
Total current assets.....		\$200,000
Plant and equipment.....	630,000	
Less: Accumulated depreciation.....	<u>(130,000)</u>	<u>500,000</u>
Total assets .....		<u><u>\$700,000</u></u>

**Liabilities and Equity**

## Current liabilities

Accounts payable.....	\$ 60,000	
Notes payable.....	<u>50,000</u>	
Total current liabilities.....		\$110,000
Long-term debt.....		150,000

## Equity

Capital stock.....	250,000	
Retained earnings.....	<u>190,000</u>	<u>440,000</u>
Total liabilities and equity .....		<u><u>\$700,000</u></u>

**Additional Information:**

1. Purchases in Year 1 are \$450,000.
2. In Year 2, management expects 15% sales growth and a 10% increase in all expenses except for depreciation, which increases by 5%.
3. Inventory turnover for Year 1 is 5.0, and management expects an inventory turnover ratio of 6.0 for Year 2.
4. A receivable collection period of 90 days, based on *year-end* accounts receivable, is planned for Year 2.
5. Year 2 income taxes, at the same rate on pretax income in Year 1, will be paid in cash.
6. Notes payable of \$20,000 will be paid in Year 2.
7. Long-term debt of \$25,000 will be repaid in Year 2.
8. Kopp desires a minimum cash balance of \$20,000 in Year 2.
9. The ratio of accounts payable to purchases will remain the same in Year 2 as in Year 1.

**Required:**

- a. Prepare a statement of forecasted cash inflows and outflows (what-if analysis) for the year ending December 31, Year 2.
- b. Will Kopp Corporation have to borrow money in Year 2?

**CHECK**

Forecasted cash need,  
\$35,898

Ian Manufacturing Company was organized five years ago and manufactures toys. Its most recent three years' balance sheets and income statements are reproduced below:

**CASE 10-3**

*Making a  
Lending Decision*

**IAN MANUFACTURING COMPANY**

## Balance Sheets

June 30, Year 5, Year 4, and Year 3

	Year 5	Year 4	Year 3
<b>Assets</b>			
Cash .....	\$ 12,000	\$ 15,000	\$ 16,000
Accounts receivable, net .....	183,000	80,000	60,000
Inventory .....	142,000	97,000	52,000
Other current assets .....	5,000	6,000	4,000
Plant and equipment, net .....	160,000	110,000	70,000
Total assets .....	<u>\$502,000</u>	<u>\$308,000</u>	<u>\$202,000</u>
<b>Liabilities and Equity</b>			
Accounts payable .....	\$147,800	\$ 50,400	\$ 22,000
Federal income tax payable .....	30,000	14,400	28,000
Long-term liabilities .....	120,000	73,000	22,400
Common stock, \$5 par value .....	110,000	110,000	80,000
Retained earnings .....	94,200	60,200	49,600
Total liabilities and equity .....	<u>\$502,000</u>	<u>\$308,000</u>	<u>\$202,000</u>

**IAN MANUFACTURING COMPANY**

## Condensed Income Statements

For Years Ended June 30, Year 5, Year 4, Year 3

	Year 5	Year 4	Year 3
Net sales .....	<b>\$1,684,000</b>	\$1,250,000	\$1,050,000
Cost of goods sold .....	<b>(927,000)</b>	(810,000)	(512,000)
Gross profit .....	<b>757,000</b>	440,000	538,000
Marketing and administrative costs.....	<b>(670,000)</b>	(396,700)	(467,760)
Operating income.....	<b>87,000</b>	43,300	70,240
Interest cost .....	<b>(12,000)</b>	(7,300)	(2,240)
Income before income tax.....	<b>75,000</b>	36,000	68,000
Income tax.....	<b>(30,000)</b>	(14,400)	(28,000)
Net income .....	<b>\$ 45,000</b>	<b>\$ 21,600</b>	<b>\$ 40,000</b>

A reconciliation of retained earnings for years ended June 30, Year 4, and Year 5, follows:

**IAN MANUFACTURING COMPANY**

## Statement of Retained Earnings

For Years Ended June 30, Year 5 and Year 4

	Year 5	Year 4
Balance, beginning .....	<b>\$ 60,200</b>	\$49,600
Add: Net income .....	<b>45,000</b>	21,600
Subtotal .....	<b>105,200</b>	71,200
Deduct: Dividends paid .....	<b>(11,000)</b>	(11,000)
Balance, ending .....	<b>\$ 94,200</b>	<b>\$60,200</b>

**Additional Information:**

1. All sales are on account.
2. Long-term liabilities are owed to the company's bank.
3. Terms of sale are net 30 days.

**Required:**

- a. Compute the following measures for both Years 4 and 5:
  - (1) Working capital.
  - (2) Current ratio.
  - (3) Acid-test ratio.
  - (4) Accounts receivable turnover.
  - (5) Collection period of receivables.
  - (6) Inventory turnover.
  - (7) Days to sell inventory.
  - (8) Debt-to-equity ratio.
  - (9) Times interest earned.

**CHECK**

- (a) (5) Year 5, 28.10
- (8) Year 5, 1.46

- b. Using Year 3 as the base year, compute an index-number trend series for:
- (1) Sales.
  - (2) Cost of goods sold.
  - (3) Gross profit.
  - (4) Marketing and administrative costs.
  - (5) Net income.
- c. Based on your analysis in (a) and (b), prepare a one-page report yielding a recommendation on whether to grant a loan to Ian Manufacturing. Support your recommendation with relevant analysis.

**Altria Group**, formerly known as Philip Morris Companies, is a major manufacturer and distributor of consumer products. It has a history of steady growth in sales, earnings, and cash flows. In recent years Altria has diversified with acquisitions of Miller Brewing and General Foods. In Year 8, Altria acted to further diversify by announcing an unsolicited cash tender offer for all the 124 million outstanding shares of Kraft at \$90 per share. After negotiation, Kraft accepts a \$106 per share all-cash offer from Altria. Assume you are an analyst with Investment Services, and that soon after the cash tender offer you are requested by your supervisor to review the potential acquisition of Kraft and assess its impact on Altria's credit standing. You assemble various information using the following projected Year 8 and Year 9 financial data:

**Altria Group Inc.****CASE 10-4<sup>A</sup>**

*Determining  
Bond Rating*

<b>ALTRIA GROUP, INC.</b>					
Projected Financial Data (\$ millions)					
	Year 8 Estimate Excluding Kraft	YEAR 9 ESTIMATE			
		Before Kraft	Kraft Only	Adjustments	Consolidated
<b>Selected Income Statement Data</b>					
<b>Sales</b>					
Domestic tobacco.....	\$ 8,300	\$ 8,930			\$ 8,930
International tobacco.....	8,000	8,800			8,800
General Foods .....	10,750	11,600			11,600
Kraft.....			\$11,610		11,610
Beer .....	3,400	3,750			3,750
Total sales.....	30,450	33,080	11,610		44,690
<b>Operating income</b>					
Domestic tobacco.....	\$ 3,080	\$ 3,520		\$ 35	\$ 3,555
International tobacco.....	800	940			940
General Foods .....	810	870			870
Kraft.....			\$ 1,050	50	1,100
Beer .....	190	205			205
Other.....	105	125			125
Goodwill amortization .....	(110)	(110)		(295)	(405)
Total operating income.....	4,875	5,550	1,050	(210)	6,390
Percent of sales .....	16.0%	16.8%	9.0%		14.3%
Interest expense .....	(575)	(500)	(75)	(1,025)	(1,600)
Corporate expense.....	(200)	(225)	(100)	(40)	(365)
Other expense.....	(5)	(5)			(5)

(continued)

**CASE 10-4<sup>A</sup>**  
(concluded)

	Year 8 Estimate Excluding Kraft	YEAR 9 ESTIMATE			
		Before Kraft	Kraft Only	Adjustments	Consolidated
Pretax income.....	4,095	4,820	875	(1,275)	4,420
Percent of sales.....	13.4%	14.6%	7.5%		9.9%
Income taxes.....	(1,740)	(2,000)	(349)	493	(1,856)
Tax rate.....	42.5%	41.5%	40.0%		42.0%
Net income.....	<u>\$ 2,355</u>	<u>\$ 2,820</u>	<u>\$ 526</u>	<u>\$ (782)</u>	<u>\$ 2,564</u>
<b>Selected Year-End Balance Sheet Data</b>					
Short-term debt.....	\$ 1,125	\$ 1,100	\$ 683		\$ 1,783
Long-term debt.....	4,757	3,883	895	\$11,000	15,778
Stockholders' equity.....	8,141	9,931	2,150	(2,406)	9,675
<b>Other Selected Financial Data</b>					
Depreciation and amortization.....	720	750	190	295	1,235
Deferred taxes.....	100	100	10	280	390
Equity in undistributed earnings of unconsolidated subsidiaries.....	110	125			125

*Required:*

- You arrange a visit with Altria management. Given the information you have assembled above, identify and discuss five major industry considerations you should pursue when questioning management.
- Additional information is collected showing median ratio values along with their bond rating category for three financial ratios. Using this information reported in the excerpt below along with the projections above:
  - Calculate these same three ratios for Altria for Year 9 using:
    - Amounts *before* accounting for the Kraft acquisition.
    - Consolidated amounts *after* the Kraft acquisition.
  - Discuss and interpret the two sets of ratios from 1 compared to the median values for each bond rating category. Determine and support your recommendation on a rating category for Altria *after* the Kraft acquisition.

**CHECK**

- (1b) 3 ratios:  
3.76, .619, .231

(CFA Adapted)

**Additional Information:**

**MEDIAN RATIO VALUES ACCORDING TO BOND RATING CATEGORIES**

Ratio	AAA	AA	A	BBB	BB	B	CCC
Pretax interest coverage.....	14.10	9.67	5.40	3.63	2.25	1.58	(0.42)
Long-term debt as a percent of L-T Debt + Equity.....	11.5%	18.7%	28.3%	34.3%	48.4%	57.2%	73.2%
Cash flow* as a percent of total debt.....	111.8%	86.0%	50.9%	34.2%	22.8%	14.1%	6.2%

\*For the purpose of calculating this ratio, Standard & Poor's defines cash flow as net income plus depreciation, amortization, and deferred taxes, less equity in undistributed earnings of unconsolidated subsidiaries.

Source: Standard & Poor's.

Assume you are an analyst at a brokerage firm. One of the companies you follow is ABEX Chemicals, Inc., which is rapidly growing into a major producer of petrochemicals (principally polyethylene). You are uneasy about competitors in the petrochemical business, their aggressive expansion, and the possibility of a recession in the next year or two. In response, you compile a summary of relevant industry statistics. Your analysis suggests prices of petrochemicals produced by ABEX will likely decline over the next 12 to 18 months. Primarily for this reason, you consider ABEX's credit standing as risky. You also note that ABEX common stock recently declined from \$15 to \$9 per share. Because of this price decline and subsequent instability, you further extend your credit analysis of ABEX. You focus on the external environment, company fundamentals, and stock price behavior. A description of your findings follows:

**External environment.** While uncertainty about the economy persists, you conclude the key issue for the petrochemical industry is not demand but overcapacity. As revealed in Exhibit I, polyethylene production is expected to remain flat in Year 10 and capacity to increase, causing operating rates to fall. The result is increased competition and lower product prices. In the long run you expect use of polyethylene to grow 4% per annum and prices to rise 5% per annum, beginning in Year 12.

**Company fundamentals.** ABEX's operating income depends primarily on two businesses: pipeline distribution of natural gas (gas transmission) and petrochemical production. The gas transmission business is declining due to lower gas production and price constraints, but your outlook is for modest increases in volume and transmission rates. Your summary of key statistics for pipeline operations is included in Exhibit I. The more unpredictable component of ABEX's operating income is the petrochemical operation. Operating income from petrochemicals are sensitive to selling price, production costs, and volume of polyethylene sales. A key to estimating operating income is estimation of future prices and costs, and ABEX's market share. ABEX's management is confident their lower cost structure makes them price competitive and permits a higher capacity operating rate than their competitors. Exhibit I includes a summary of key statistics for polyethylene operations.

**CASE 10-5***Comprehensive Analysis  
of Creditworthiness***Exhibit I****TOTAL U.S. POLYETHYLENE CAPACITY, PRODUCTION, AND PRICES**

	Year 5	Year 6	Year 7	Year 8	Year 9	Projected Year 10	Projected Year 11	Compound Annual Growth
Total production (lbs. millions).....	15,600	16,100	17,600	18,900	19,700	19,700	19,800	
Growth rate.....	7.6%	3.2%	9.3%	7.4%	4.2%	0.0%	0.5%	4.1%
Total capacity (lbs. millions).....	17,600	17,700	18,600	20,100	21,200	23,400	24,300	
Growth rate.....	2.9%	0.6%	5.1%	8.1%	5.5%	10.4%	3.8%	5.5%
Capacity operating rate.....	88.6%	91.0%	94.6%	94.0%	92.9%	84.2%	81.5%	
Average price per pound.....	\$ 0.41	\$0.37	\$0.36	\$0.51	\$0.52	\$0.47	\$0.57	
Percent change.....	-9.8%	-10.8%	-2.7%	24.4%	2.0%	-9.6%	21.3%	5.6%

*(continued)*

**Exhibit I**  
(concluded)



**ABEX CHEMICALS, INC.**

Selected Key Statistics

	Year 5	Year 6	Year 7	Year 8	Year 9	Projected Year 10
<b>Polyethylene operations</b>						
Production (lbs. millions) .....	1,840	1,975	2,870	4,835	5,000	4,950
Approximate capacity (lbs. millions) .....	1,900	2,100	2,950	5,000	5,500	5,500
Capacity operating rate.....	97%	94%	97%	97%	91%	90%
Average price received .....	\$0.411	\$0.367	\$0.356	\$0.511	\$0.515	\$0.470
Average cost/pound produced .....	\$0.338	\$0.307	\$0.285	\$0.350	\$0.394	\$0.370
<b>Pipeline transportation operations</b>						
\$/1,000 cubic feet (price).....	\$0.286	\$0.253	\$0.248	\$0.221	\$0.192	\$0.187
Gas transported (trillion cubic feet) .....	4.64	4.88	4.67	5.00	5.85	6.29
Operating profit margin .....	25.6%	27.2%	27.3%	25.9%	26.8%	27.0%

**Stock price evaluation.** Some investors value companies using discounted cash flows, but you are increasingly emphasizing the quality of cash flow, earning power, yield, book value, and earnings components. You also assemble financial statements and key financial ratios for ABEX (see Exhibits II–IV).

*Required:*

Your firm's fixed income portfolio manager asks you to further extend your investigation of ABEX. The manager wants your assessment of whether the credit quality (risk) of ABEX's debt has changed during the most recent three years—Year 7 through Year 9. You decide to analyze key financial ratios for ABEX, focusing on areas of (1) asset protection, (2) liquidity, and (3) earning power.

- Identify *five ratios* from Exhibit IV relevant to at least one of these three areas of analysis. Discuss and interpret both levels and trends in these five key ratios from Year 7 through Year 9.
- Compare and analyze the pipeline and petrochemical divisions using three *qualitative* measures relevant to ABEX's credit quality for the period Year 7 through Year 9.
- Using your analysis from (a) and (b), discuss whether ABEX's credit quality has changed from Year 7 through Year 9.

(CFA Adapted)

## Exhibit II



<b>ABEX CHEMICALS, INC.</b>					
Consolidated Income Statements (\$ millions)					
	Year 5	Year 6	Year 7	Year 8	Year 9
<b>Revenues</b>					
Petrochemicals.....	\$ 757	\$ 725	\$ 1,021	\$ 2,472	\$ 2,575
Pipelines .....	1,328	1,235	1,156	1,106	1,123
Total revenues .....	2,085	1,960	2,177	3,578	3,698
<b>Operating costs*</b>					
Petrochemicals.....	(622)	(607)	(818)	(1,691)	(1,970)
Pipelines .....	(988)	(899)	(840)	(820)	(822)
Total operating costs .....	(1,610)	(1,506)	(1,658)	(2,511)	(2,792)
<b>Operating income</b>					
Petrochemicals.....	135	118	203	781	605
Pipelines .....	340	336	316	286	301
Total operating income.....	475	454	519	1,067	906
<b>Interest on long-term debt</b>					
Petrochemicals.....	(60)	(84)	(78)	(211)	(266)
Pipelines .....	(169)	(166)	(166)	(172)	(178)
Total interest expense.....	(229)	(250)	(244)	(383)	(444)
Administrative expenses .....	(22)	(24)	(23)	(28)	(40)
Rental expenses.....	(15)	(17)	(17)	(20)	(22)
Income from investments .....	25	8	4	7	4
Income before taxes .....	234	171	239	643	404
<b>Income taxes</b>					
Current .....	(78)	(30)	(45)	(40)	(44)
Deferred .....	(23)	(35)	(67)	(201)	(136)
Total taxes .....	(101)	(65)	(112)	(241)	(180)
Net income.....	133	106	127	402	224
Preferred dividends.....	(77)	(74)	(26)	(17)	(17)
Net available for common .....	<u>\$ 56</u>	<u>\$ 32</u>	<u>\$ 101</u>	<u>\$ 385</u>	<u>\$ 207</u>
Average shares outstanding <sup>†</sup> (millions).....	128	135	185	231	253
Basic earnings per common share.....	\$0.44	\$0.24	\$0.54	\$1.67	\$0.82
Common dividends per share .....	0.40	0.40	0.40	0.40	0.50
Cash flow per common share.....	2.52	2.44	2.26	3.85	2.85

\*Operating costs include costs of goods sold and depreciation, where depreciation equals (\$ millions):

Petrochemicals.....	\$ 48	\$ 60	\$ 62	\$135	\$233
Pipelines.....	96	95	97	98	102
Total depreciation.....	<u>\$144</u>	<u>\$155</u>	<u>\$159</u>	<u>\$233</u>	<u>\$335</u>

<sup>†</sup>Year 10 estimate is 305 million shares outstanding.



**Exhibit III**

**ABEX CHEMICALS, INC.**  
Consolidated Balance Sheets (\$ millions)

	Year 5	Year 6	Year 7	Year 8	Year 9
<b>Assets</b>					
Current assets					
Cash and short-term investments.....	\$ 45	\$ 48	\$ 74	\$ 102	\$ 133
Accounts receivable .....	279	300	414	868	923
Inventories .....	125	121	128	501	535
Total current assets.....	449	469	616	1,471	1,591
Investments and other assets.....	631	380	167	252	400
Goodwill.....	35	90	105	330	560
Property, plant, and equipment (net)					
Petrochemicals.....	1,184	1,245	1,323	2,670	3,275
Pipelines .....	2,282	2,484	2,547	2,540	2,530
Total assets .....	<u>\$4,581</u>	<u>\$4,668</u>	<u>\$4,758</u>	<u>\$7,263</u>	<u>\$8,356</u>
<b>Liabilities and Shareholders' Equity</b>					
Current liabilities					
Bank indebtedness.....	\$ 226	\$ 77	\$ 72	\$ 215	\$ 245
Accounts payable and accrued liabilities.....	333	312	377	768	787
Current portion of long-term debt .....	99	70	76	86	136
Other current payables.....	35	33	32	34	54
Total current liabilities .....	693	492	557	1,103	1,222
Long-term debt					
Petrochemicals.....	553	743	721	2,017	2,176
Pipelines .....	1,686	1,648	1,638	1,702	1,725
Advances—gas contracts .....	115	135	186	290	210
Deferred income taxes .....	125	160	227	428	564
Total liabilities .....	3,172	3,178	3,329	5,540	5,897
Preferred stock.....	861	826	329	216	216
Common stock and retained earnings .....	548	664	1,100	1,507	2,243
Total shareholders' equity.....	1,409	1,490	1,429	1,723	2,459
Total liabilities and shareholders' equity .....	<u>\$4,581</u>	<u>\$4,668</u>	<u>\$4,758</u>	<u>\$7,263</u>	<u>\$8,356</u>
Average shares outstanding (millions)* .....	128	135	185	231	253

\*Year 10 estimate is 305 million shares outstanding.

**Exhibit IV****ABEX CHEMICALS, INC.**

## Selected Financial Ratios

	Year 5	Year 6	Year 7	Year 8	Year 9
Petrochemicals operating margin.....	17.8%	16.3%	19.9%	31.6%	23.5%
Pipeline operating margin.....	25.6%	27.2%	27.3%	25.9%	26.8%
Return on assets (EBIT/total assets).....	10.1%	9.0%	10.2%	14.1%	10.2%
Pretax profit margin.....	11.2%	8.7%	11.0%	18.0%	10.9%
Tax rate.....	43.2%	38.0%	46.9%	37.5%	44.4%
Petrochemicals asset turnover					
(sales/fixed assets).....	0.64	0.58	0.77	0.93	0.79
Pipelines asset turnover (sales/fixed assets).....	0.58	0.50	0.45	0.44	0.44
Turnover (sales/total assets).....	0.46	0.42	0.46	0.49	0.44
Debt to common equity.....	4.30	3.80	2.31	2.66	1.83
Net tangible assets to long-term debt.....	58.4%	55.4%	52.0%	34.7%	46.2%
Long-term debt to total capitalization.....	62.6%	62.9%	64.0%	70.0%	62.6%
Total assets to total shareholders' equity.....	3.25	3.13	3.33	4.22	3.40
Pretax interest coverage.....	1.63	1.46	1.80	2.54	1.84
Operating cash flow to long-term debt.....	20.2%	18.0%	20.4%	26.6%	22.1%
Collection period.....	48 days	55 days	68 days	87 days	90 days
Inventory turnover.....	11.0	11.0	12.0	7.2	4.7
Short-term debt to total debt.....	12.1%	5.5%	5.8%	7.5%	9.3%
Petrochemicals average cost of long-term debt.....	10.9%	11.3%	10.8%	10.5%	12.2%
Pipeline average cost of long-term debt.....	10.0%	10.1%	10.1%	10.1%	10.3%
Average cost of preferreds.....	8.9%	9.0%	7.9%	7.9%	7.9%