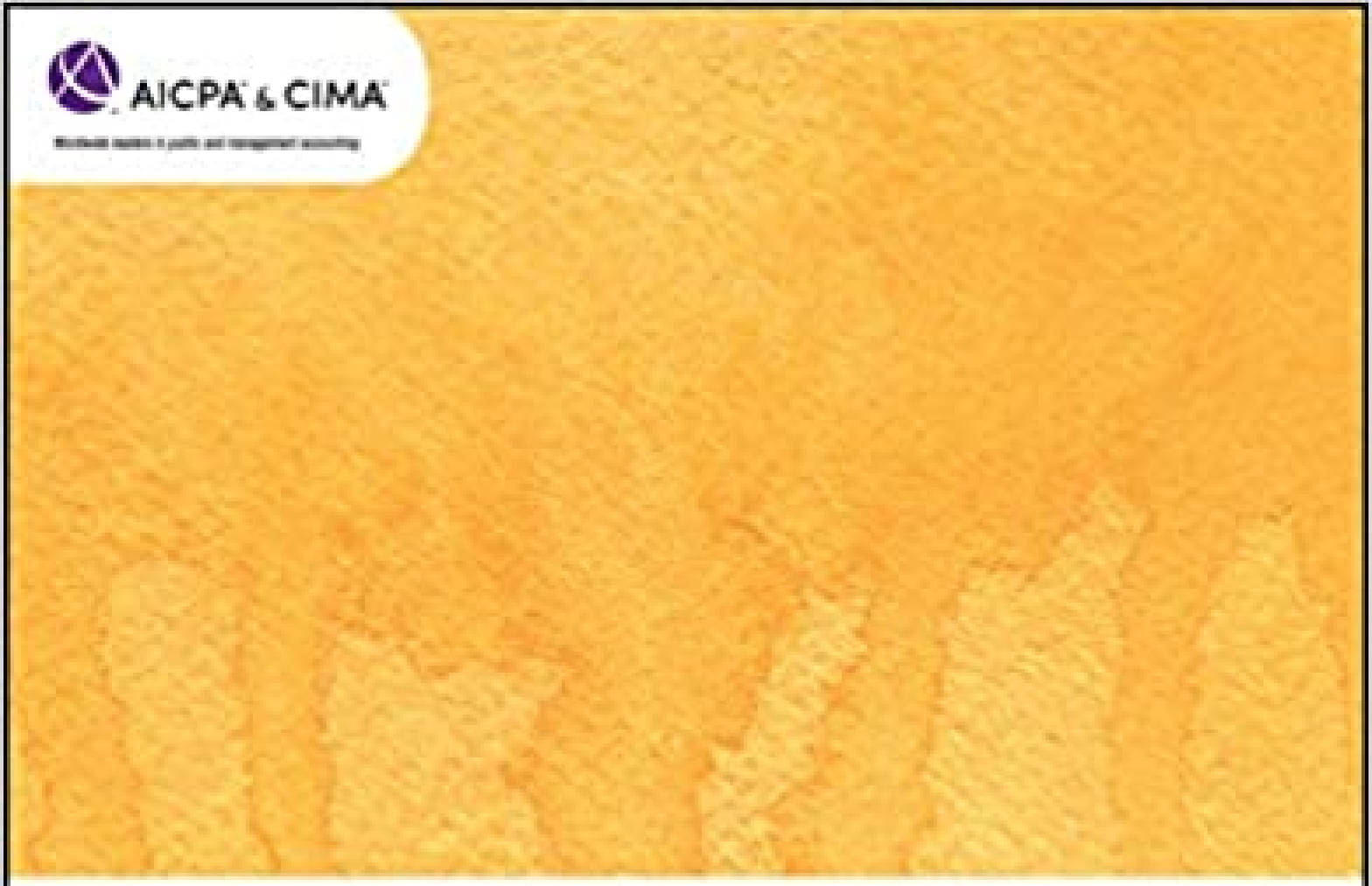

Financial Statement Analysis

Basis for Management Advice

WALLACE DAVIDSON III

WILEY

FINANCIAL STATEMENT ANALYSIS: BASIS FOR MANAGEMENT ADVICE

BY WALLACE DAVIDSON, PHD

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Chapter 1

Company Valuation

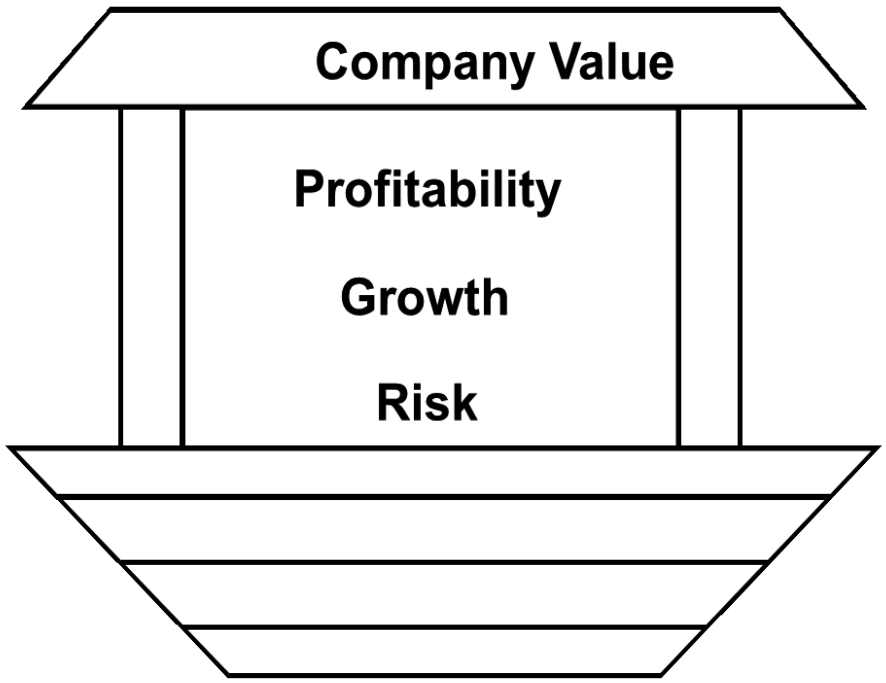
Learning objectives

- Identify how an analyst places a value on a company.
- Recognize who uses company valuations.

Introduction

This section shows the correct method for determining the value of a company using the constant growth dividend capitalization model. Explanations are presented of (1) the variables defined in the model and (2) the valuation techniques and who uses them.

Why use a valuation technique?



Financial information is an important determinant of company value. We need to know how the financial statements affect company value.

- How does increased profitability affect company value?
  - Profitability is positively related to company value. That is, as a company becomes more profitable its value increases.
- How does increased growth affect company value?
  - Growth is defined as the company's increasing ability to produce cash flows or profits. Growth is positively related to company value.
- How does increased risk affect company value? Liquidity risk? Financial risk?
  - All types of risk reduce company value. Liquidity and financial risk can be measured from financial statements. As they increase, company value declines.
  - A valuation technique is particularly important for small- and medium-sized companies. Large-company values are found in the security markets. Smaller companies do not have this luxury.

    The value of a company is determined largely by its ability to earn a profit. We want to know how the interpretation of the company's financial statements affects the value of the company. The value of a company is, after all, a reflection of the owner's wealth.

Knowledge check

1. An increase in profitability will cause company value to

    a. Increase.
    b. Decrease.
    c. Not change.
    d. Either increase or decrease.

2. An increase in the growth rate will cause company value to

    a. Increase.
    b. Decrease.
    c. Either increase or decrease.
    d. Not change.

3. As risk increases, the value of a company will

    a. Increase.
    b. Decrease.
    c. Either increase or decrease.
    d. Not change.

Who uses valuation techniques?

Owners

The *owner* of a company needs to know the company's value if he or she (1) is expecting to sell the company, or (2) is determining borrowing capacity.

Potential owners

The *potential owner* of a company must understand the concept of company value to determine how much to pay for the company.

Bankers

A *banker* must understand company value when determining a company's borrowing capacity or collateral value.

Security analysts

For large companies, *security analysts* spend considerable time with valuation techniques. This is not important for our purposes. We want to understand how financial statement information affects company value.

Our purpose in examining valuation is to give us a gauge by which we can determine the effect of the ratios on the company's value.

Wells Fargo "dividend capitalization" model

The value of a company's equity is the present value of cash flows (dividends) that can be taken out of the company. Value is affected by the company's cash earnings, the expected growth rate of cash earnings and the company's risk. Cash earnings and growth are positively related to company value, whereas risk is negatively related to company value.

Value of a company's equity = $\frac{FCF_1}{1+R} + \frac{FCF_2}{(1+R)^2} + \frac{FCF_3}{(1+R)^3} + \ldots$

Mathematically this expression can be reduced to

Value = $\frac{FCF_1}{R-G}$

FCF = Funds that can be withdrawn from the business are called "free cash flow"

R = Risk adjusted rate of return

G = Expected growth rate

In the numerator, the expression FCF represents the company's free cash flow. Free cash flow is the cash left over after all necessary investments have been made and expenses paid. Whenever we examine a ratio or other financial data that relates to a company's earning power, valuation can be referred to. Specifically, if a company's earning power increases (FCF goes up), then the value of the company will go up.

In the denominator, the expression R represents a company's cost of equity capital. As a company's risk increases, its cost of equity increases. It is important to note that if a company's risk is increasing (liquidity or financial risk), then its value is declining. As R rises, the company's equity value declines.

R is the rate of return required by equity holders. Because equity is riskier than debt to investors, R is greater than a company's cost of debt. In large companies, it has been estimated that R is roughly three percent greater than the company's cost of debt.

The second term in the denominator, G, represents the company's ability to grow in terms of earning power. As G rises, the value of the company will rise.

Knowledge Check

4. Assuming that a company's free cash flow is $125,000, its cost of capital is 12 percent and its expected growth rate is 2 percent, what would be our estimate for the company's value?

    a. $1,250,000.
    b. $750,000.
    c. $1,041,666.
    d. It is impossible to provide an estimate from these figures.

5. Assuming that a company's cost of capital increased from 12 percent to 14 percent while its expected growth rate remained at 2 percent and its free cash flow remained at $125,000, what would the value of the company be now?

    a. $750,000.
    b. $1,041,667.
    c. The value of the company would not change if its cost of capital increased.
    d. It is impossible to estimate from these figures.

Dividend computation for privately-held corporation

What is the dividend capacity of a privately held company? This example will clarify the issue. Suppose that the owner of a company (C-corporation) pays a $150,000 salary to himself or herself for a job that he or she could hire an outside manager to do for $50,000. The owner's added salary is $100,000. This practice eliminates the double taxation of dividends.

Example	
Dividend paid	$75,000
Owner's salary	150,000
Equivalent manager's salary	50,000

The added salary of $100,000 was tax deductible as a salary, but it would not be tax deductible as a dividend. At a 50 percent tax rate, it would be worth only $50,000 as a dividend.

Real dividend computation	
Dividend paid	$75,000
Adjustment for salary	50,000*
Free cash flow	$125,000
* $100,000 (1 - .5) with an assumed 50% tax rate	

Therefore, free cash flow represents the earning power of the company in terms of cash flows that the owner(s) may withdraw from the company. If a decision is made that increases the company's cash flows, then the company's value is increased. If a decision is made that increases the company's risk, then the value is decreased. Financial statement analysis is used to measure both the risk and return of the company.

Note also that in valuing a business one should look for other inefficiencies that may reduce FCF and the value of the business.

Illustrative problem

Using the data in the example, estimate this company's value if it has a cost of capital of 12 percent and an expected growth rate of 2 percent.

Knowledge check

6. _____ cash flow is the cash flow after all necessary investments have been made and expenses paid.

    a. Free.
    b. Total.
    c. Positive.
    d. Negative.

How would you respond?

You are the CFO of a medium sized publicly traded company. The CEO and 25 percent owner of the company wants to sell her shares in the company and retire. She is thinking about engaging in a new risky venture that has the chance of dramatically increasing reported income. She hopes that this would increase the stock price. She has asked your opinion.

How would you respond? Things to consider...

- What would the increased risk do to the stock price?
- Because the project is risky, what are the chances of success?
- Does it improve cash flow if successful?
- Are there any legal issues to consider?

Review questions

1. Why should you use a particular valuation technique?

2. Who uses valuation techniques? Explain why each group of interested parties uses a valuation technique.

3. Which specific valuation technique should you use? Why?

4. Write out the equation for the constant growth dividend capitalization model. Define each variable and explain why each variable is used in the model.

5. Define the term free cash flow as it is used in a valuation model. Why is it used in this way?

6. When we speak of a growth ratio in a valuation model, of which growth rate are we speaking? Why?

Chapter 2

Ratio Analysis: The Effect Ratios

Learning objectives

- Identify which ratios are effect ratios.
- Distinguish what each of these ratios measures.
- Calculate each ratio.

Introduction

The effect ratios are used to determine the extent of a company's problems. Liquidity, leverage, and profitability measures are included.

The purpose of this chapter is to introduce you to the effect ratios. These ratios do not show the reason for a change; they only show that a change has occurred. The ratios show the magnitude of a change but do not record the reason for that change. The chapter does show how a change in any of the causal ratios can change each of the effect ratios. The nine effect ratios are the current ratio, inventory to working capital, receivables to working capital, net sales to working capital, debt to net worth, debt to assets, short-term debt to net worth, times interest earned, and return on equity.

Effect ratios

Liquidity measures

- Current ratio
- Quick ratio
- Defensive interval
- Cash conversion cycle
- Inventory/working capital
- Receivables/working capital
- Net sales/working capital
- Operating cash flow to current liabilities

Leverage measures

- Debt to net worth
- Debt to assets
- Tangible debt ratios
- Short-term debt to net worth
- Times interest earned
- Cash times interest earned
- Fixed charge coverage

Knowledge check

1. Which ratio is not a liquidity measure?

    a. Current ratio.
    b. Defensive interval.
    c. Times interest earned.
    d. All of the above are liquidity measures.

Profitability measures

- Return on Equity – Net Income/Net Worth

Three areas of concern are measured by financial statement characteristics. *Liquidity* is the measurement of how well the firm can meet its obligations in the short run. The second area is leverage. *Leverage* ratios measure the firm's debt usage and how well it can afford its debt. The third area is profitability. *Profitability* ratios are a measure of how profitable a firm is relative to its size.

Liquidity

The concept of liquidity can be easily explained as the ease with which a company can pay its bills. Companies that do not struggle to pay bills have adequate liquidity. Companies can have excessive liquidity since liquid assets tend to earn a low rate of return. Excessive liquidity can hurt profitability.

Four different aspects to liquidity are quantity, timing, quality, and early warning. The quantity of liquidity measures how much liquidity the company carries relative to its size. Timing aspects of liquidity measure how long the liquidity will last. Quality of liquidity is concerned with the makeup of the liquidity. Finally, there is an early warning ratio that measure liquidity in rapidly growing companies.

Liquidity category	Ratios
Quantity of liquidity	Current ratio
	Quick ratio
Timing of liquidity	Defensive interval
	Cash conversion cycle
Quality of liquidity	Inventory/working capital
	Receivable/working capital
Early warning	Net sales/working capital
	Operating cash flow to current liabilities

Quantity of liquidity measures

Two ratios that measure the quantity of liquidity are the current ratio and the quick ratio.

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

The current ratio is a measure of the quantity of liquidity. Therefore, this ratio only tells you how much liquidity you have. It does not let you know the make-up of the liquidity. A company can have a “sound” current ratio and still have a liquidity problem if its current assets, for example, are composed largely of inventory that cannot be sold or receivables that cannot be collected.

Knowledge check

2. Select the statement that is most true.

    a. A company with a good "solid" current ratio has no liquidity problems.
    b. The current ratio measures the quantity of liquidity, so even a company with a good solid current ratio might have liquidity problems.
    c. Both answers a. and b. are false.
    d. Both answers a. and b. are true.

Do not be overly concerned with the 2-to-1 standard (unless your banker uses this standard in loan covenants).

$$\text{Quick Ratio} = \frac{\text{Quick Assets}}{\text{Quick Liabilites}}$$

The quick ratio is also a measure of the quantity of liquidity. We compute this ratio by dividing quick assets by current liabilities. Quick assets are those assets that can be converted to cash without additional sales. They include cash, marketable securities, and accounts receivables. The quick ratio measures the liquidity of the company assuming that no additional sales of inventory can be made. This ratio increases in importance as inventory's proportion of total assets is large, when inventory becomes obsolete or spoils quickly, and in any circumstances in which the real value of the inventory is questionable.

Knowledge check

3. Suppose that a company's current ratio remained stable from last year to this year. However its quick ratio decreased. What likely happened to cause this difference?

    a. Inventory increased.
    b. Inventory decreased.
    c. Receivables increased.
    d. Cash increased or decreased.

When we compare the trend in the current ratio to the trend in the quick ratio, we can garner some additional information.

Illustrative problem

Suppose that a company's current ratio was 2.5 last year and decreased to 2.0 this year. Last year's quick ratio was 1.0 and stayed constant this year. What does this trend suggest?

Timing of liquidity measures

There are two measures of the timing of liquidity. They are the defensive interval and the cash conversion cycle.

$$\text{Defensive Interval} = \frac{\text{Quick Assets}}{\text{Daily Cash Operating Expenses}}$$

The defensive interval measures the length of time a company can continue to operate on its liquid assets without any new sales. To compute this ratio, divide quick assets by daily cash operating expenses. Daily cash operating expenses include all expenses listed above operating income on the income statement except for noncash items such as depreciation and amortization. It focuses on the need for liquidity. A longer defensive interval implies greater liquidity. This ratio, however, ignores the possibility of future cash inflows.

$$\text{Cash Conversion Cycle} = 365\left[\frac{\text{inventory}}{\text{cost of good sold}}\right] + 365\left[\frac{\text{receivables}}{\text{sales}}\right] - 365\left[\frac{\text{accounts payables} + \text{accruals}}{\text{daily cash operating expenses}}\right]$$

The cash conversion cycle measures the amount of time it takes from the start of the company's process when the company first begins disbursing cash until the company collects cash from its customers. A long cash conversion cycle implies that it is taking a long time to convert the company's product into cash. The cash conversion cycle is the sum of the inventory conversion period and the receivables conversion period less the payables deferral period. To improve its cash conversion, a company could reduce inventory conversion time, reduce receivables conversion time, or increase payables deferral time.

Inventory to working capital

Working capital is the margin of protection a company provides for the payment of current obligations. It is measured in terms of "quantity" by the current ratio. This ratio, inventory to working capital, is a measure of the *quality* of working capital. It measures the dependency of the company's working capital on inventory.

Working capital can be defined as current assets, less current liabilities. Generally, if a firm has positive working capital, its liquid assets exceed its near term liabilities. In this ratio one may use current assets in the denominator when net working capital is negative.

Historically, inventory problems have caused a lot of firms to go under. When this ratio becomes large, then the firm becomes more susceptible to problems caused by inventory that will not sell.

For example, both of these companies operate in the same industry. Company A is below average, and B is way above average.

	Company	
	A	B
Cash	$2,000	$10,000
Accounts receivable	16,000	40,000
Inventory	10,000	60,000
Total	28,000	110,000
Current liabilities	10,000	80,000
Working capital	$18,000	$30,000
Inventory to working capital	56%	200%
Industry average	60%	60%

Suppose that their inventory values are cut by one-half. Company A would lose $5,000 but would still have $13,000 of working capital. The current ratio would drop from 2.8 to 2.3.

Company B would lose $30,000 and have no working capital. Its current ratio would be 1. Clearly, company B is more vulnerable to problems caused by inventory troubles. Unless the receivables and other current assets were in excellent shape, an inventory problem could put company B out of business.

Knowledge check

4. When a company's inventory to working capital ratio increases, we can argue that the _____ of liquidity has decreased.

    a. Quantity.
    b. Timing.
    c. Quality.
    d. Dollar amount.

Accounts receivables to working capital ratio

This ratio is a measure of working capital quality; that is the extent of the company's reliance on receivables for its working capital. When this ratio becomes large, the *quality* of the company's liquidity is said to be poor.

This is a very important ratio for small firms. They generally do not subscribe to credit reporting or credit interchange services. Often these small firms do not have anyone special to handle their receivables. A build-up of receivables can be a signal of collection problems.

	Company	
	H	J
Cash	$1,000	$5,000
Trade receivables	6,000	50,000
Inventory	7,000	30,000
Total current assets	14,000	85,000
Total current liabilities	4,000	55,000
Working capital	$10,000	$30,000
Trade receivables to working capital	60.0%	166.7%
Industry average	75.0%	75.0%

If these companies lost all of their receivables to default, company H would still have positive working capital. Hence this company has some ability to withstand such a problem.

Company J is in serious straits. Receivables are greater than working capital by $20,000, leaving a very low margin for error. If customers slowed down their payments, Company J would be in a bind.

Suppose that company J's collection period increased by 50 percent. Receivables would rise by 50 percent to $75,000. If this rise were financed by current liabilities (which would rise to $80,000), working capital would remain at $30,000, but the current ratio would drop to 1.375 from 1.545. Receivables to working capital would rise to 250 percent.

The trade receivables to working capital ratio is generally not reported in industry sources. We can construct this ratio from other data provided by the ratio services. We will construct an industry ratio from Robert Morris and Dun and Bradstreet data.

Knowledge check

5. If a company's ratio of receivables to working capital increases, we argue that the company's quality of liquidity has

    a. Increased.
    b. Decreased.
    c. Not changed.
    d. Receivables to working capital has no impact on the quality or quantity of liquidity.

Net sales to working capital (working capital turnover)

	Company	
	V	W
Current assets	$25,000	$25,000
Current liabilities	24,000	11,000
Working capital	1,000	14,000
Sales	$150,000	$150,000
Sales to working capital	150 times	10.7 times
Industry average	10 times	10.0 times

This ratio indicates the demands made upon working capital in support of the sales volume. The higher the sales in comparison to working capital, the greater the strain a company encounters in satisfying creditors while meeting payroll and taxes.

This ratio is particularly useful when a company is experiencing rapid sales growth. It may signal a working capital problem before the other liquidity ratios do.

In the example, firm V has insufficient working capital to support its sales, and would be more susceptible to an external shock.

Knowledge check

6. The liquidity measure that is particularly useful in periods of rapid sales growth is

    a. Current ratio.
    b. Net sales to working capital.
    c. Quick ratio.
    d. Debt to assets ratio.

Operating cash flow to current liabilities

$$\text{Operating cash flow to current liabilities} = \frac{\text{Cash flow from operations}}{\text{Average current liabilities}}$$

This ratio measures the extent that cash flow from the company's operations covers the company's current liabilities (averaged over the time period). A larger ratio implies greater liquidity. Some companies with regular and predictable cash flow find that if this ratio is sufficient, that they can get by with smaller amounts of current assets (such as a lower current ratio).

Debt ratios

$$\text{Debt to Asset Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}}$$

$$\text{Debt to Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Net Worth}}$$

The debt to asset ratio and the debt to equity ratio are measures of the same thing. An analyst need only compute one or the other. Both ratios are measures of financial risk. When a firm's debt ratios increase, its financial risk increases. In fact, these ratios are generally one of the major determinants of a company's eligibility for a "new" loan and a determinant of borrowing rates. With these ratios it is particularly important to know what limits our lenders have placed on us. This limit becomes our debt capacity. Furthermore, it is useful to monitor industry averages to be sure that we do not deviate from the norm.

These two ratios are perfectly redundant. They measure the same thing but use a different scale, so if you know one ratio, you can compute the other.

Illustrative problem

If a company has a debt to asset ratio of 40 percent, what is its debt to equity ratio?

Tangible debt ratios

$$\text{Tangible Debt to Asset Ratio} = \frac{\text{Total Debt}}{\text{Total Tangible Assets}}$$

$$\text{Tangible Debt to Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Net Worth} - \text{Intangible Assets}}$$

Tangible debt ratios are often used by lenders. They are particularly useful when the market value of the intangible assets is questionable. Lenders want the debt ratios based upon assets that they can actually sell or receive value.

Knowledge check

7. Lenders often examine tangible debt ratios. If a company has a material amount of intangible assets, its tangible debt to asset ratio will be _____ its ordinary debt ratio.

    a. Larger than.
    b. Smaller than.
    c. The same as.
    d. Unrelated to.

Current liabilities to net worth

Small businesses must often rely upon short-term financing. This ratio is a measure of the extent to which the small firm uses short-term financing rather than net worth.

Short-term debt, when used as “permanent” financing, can increase a company’s risks beyond the risks of long-term debt. The increased risks include rollover risks and interest rate risks.

A company with a low current liability to net worth ratio is generally free from creditor demands. If this ratio is high, the management must spend excessive amounts of time dealing with creditors. This excessive time robs the company of initiative.

	D	F
Company ratio	40%	145%
Industry ratio	75%	75%

In the example, Company D and F are in the same industry and have ratios of 40 percent and 145 percent, respectively. Company D has ample coverage to permit prompt payment. Creditors will have few restrictions. Company F is nearly twice the industry average. This company has excessive short-term borrowing. Generally this company would have very severe restrictions from its creditors: restricted current ratio, salaries, and operations.

Rollover risk is the chance that a firm cannot renew a loan. Short-term debt usage increases this risk because rollover occurs more frequently. Short-term debt has more volatile interest rates than long term debt and the rate must be renegotiated more often. This reduces the predictability of interest costs and increases risk.

Knowledge check

8. The type of debt with the greatest “rollover” risk is

    a. Short-term debt.
    b. Long-term debt.
    c. Bonds.
    d. Mortgages on fixed assets.

9. Select the statement that is most true.

    a. Short-term debt can be used as permanent financing, but must be continually renegotiated. This increases the company’s “rollover risk.”
    b. When short-term debt that is used as permanent financing, the predictability of interest expense over the long run has been reduced and the faces higher interest rate risk.
    c. Both of the previous answers are true.
    d. Both of the previous answers are false.

Times interest earned

$$\text{Times Interest Earned} = \frac{\text{Earning before Interest and Taxes}}{\text{Interest Expense}}$$

This ratio is a measure of the firm's ability to pay its long-term debt obligations. If this ratio is adequate, then there is little danger of default. Companies with a large and stable times interest earned ratio have no trouble when it is time to "roll over" their debt.

Since causal ratios directly influence profit and debt usage, the times interest earned ratio is directly related to and affected by all of the ratios. A manager must be able to look beyond this ratio.

Since this ratio is a measure of risk, its influence on value should be apparent.

$$\text{Cash Times Interest Earned} = \frac{\text{Cash flow from Operations before Interest and Taxes}}{\text{Cash Interest Payments}}$$

This ratio measures the same thing as the times interest earned; however it bases the computation on cash flow. Here, we are measuring how many times cash flow covers cash interest payments. Lenders often use the cash flow approach.

$$\text{Fixed Charge Coverage} = \frac{\text{Earning before Interest, Taxes, and Lease Payments}}{\text{Interest Expense} + \text{Lease Payments}}$$

This ratio measures the number of times that earnings cover all financial obligations. The denominator can also include preferred stock dividends (Preferred Stock Dividend/1 – Tax Rate) on a before-tax basis, as well as sinking fund payments (Sinking Fund Payment/1 – Tax Rate).

Knowledge check

10. The primary difference in the interpretation of the times interest earned ratio and fixed charge coverage ratio is

    a. The fixed chargre coverage ratio recognizes that there may be other financial obligations besides interest payments.
    b. The fixed charge coverage ratio is not appropriate for companies that use leasing as a form of financing.
    c. There is no real difference in the ratios.
    d. Fixed charge coverage measures liquidity and times interest earned measures the ability to afford debt.

Net profit to net worth (return on equity)

This ratio is a measure of the return on the equity investment in the firm. If this ratio is too low, then profits are insufficient. If this ratio is excessively high, then the firm is using too much debt and too little equity.

	Company	
	A	B
Net sales	$2,000,000	$2,000,000
Net profit	20,000	100,000
Net worth	80,000	1,000,000
Net profit to net sales	1%	5%
Industry average	3.3%	3.3%
Net profit to net worth (ROE)	25%	10%
Industry average	8.8%	8.8%

Both companies have above average return on equity (ROE). Company A has a substandard profit margin. This suggests that A is deficient in net worth (uses too much debt). Its sales are too high given its net worth, so it will be an overtrader. Company B, on the other hand, has an above average profit margin and ROE ratios. Company B is a profitable company even though its ROE is below that of company A.

This ratio can be affected by all of the causal ratios since each of the causal ratios can affect the use of debt and profitability.

Knowledge check

11. The ratio that measures the amount of time a company could survive without new sales is

    a. The defensive interval.
    b. Return on equity.
    c. Net sales to working capital.
    d. Debt to assets ratio.

Effect ratio summary

1. Current ratio – if small, indicates inadequate liquidity
2. Quick ratio – if small, indicates inadequate liquidity
3. Defensive interval – if small, implies the company could not survive very long in a financial crisis
4. Inventory to working capital – if large, indicates poor quality of liquidity
5. Receivables to working capital – if large, indicates poor quality of liquidity
6. Net sales to working capital – if large, indicates inadequate liquidity to support sales
7. Debt to net worth – if large, indicates increased financial risk
8. Debt to assets – if large, indicates increased financial risk
9. Tangible debt ratio – measures debt usage proportionate to tangible assets
10. Short-term debt to net worth – if large, implies extremely high-risk situation
11. Times interest earned – if small, indicates insufficient financial solvency or high financial risk. May also be computed as a cash flow ratio.
12. Fixed charge coverage – measures how many times earnings cover all financial obligations
13. Return on equity – the key profitability ratio is a measure of the return on owners' investment in the firm

Review questions

1. Of what is the current ratio a measure? Why is the current ratio an effect ratio? Why is it not a causal ratio?

2. How can an increase in a firm's collection period affect the current liabilities to net worth ratio?

3. Why is the debt to assets ratio so important?

4. How does the fixed charge coverage ratio differ from the times interest earned ratio?

5. What information does the inventory to working capital ratio give?

6. What does the trade receivables to working capital ratio tell you? How can the collection period affect this ratio?

7. Show how you calculate the net profit to net worth ratio. What is the most common, but potentially most dangerous, way to increase this ratio?

8. What role does the net sales to fixed assets ratio play in calculating the return on fixed assets? How could an increase in the fixed assets to net worth ratio affect this ratio?

9. Why is the net sales to working capital ratio an effect ratio and not a causal ratio?

Chapter 3

Analysis of Profitability Using the DuPont Analysis

Learning objective

- Identify what a DuPont analysis is.

Introduction

The purpose of this section is to discuss how the DuPont system enables one to examine a firm's financial statements to determine what, if anything, is causing its return on investment or return on equity to fall short of expectations. This is accomplished by breaking these returns into three component parts: profit margin, asset turnover, and return on assets. Only when that area of weakness is identified can management take appropriate steps towards improvement.

DuPont system

$$ROE = \frac{\text{Net Income}}{\text{Equity}}$$

$$ROE = \frac{\text{Net Income}}{?} \times \frac{?}{\text{Equity}}$$

$$ROE = \frac{\text{Net Income}}{\text{Total Assets}} \times \frac{\text{Total Assets}}{\text{Equity}}$$

The DuPont System allows us to examine a company's financial statements and see where its profitability problems (if any) come from. The return on equity is broken down into the return on assets [net income/total assets] and into the equity multiples [total assets/total equity]. The product of the equity multiples and the return on assets is the return on equity.

Knowledge check

1. The DuPont system is a way of breaking down the return on equity into its component parts. One can find the return on equity is by multiplying the Return on Assets (ROA)times
   a. The equity multiplier.
   b. Debt to asset ratio.
   c. Asset turnover.
   d. Three.

This part of the breakdown shows that debt usage, as measured by the equity multiplier, can "lever up" the ROE. The more debt a company has, the larger its equity multiplier will be. The equity multiplier is perfectly redundant with the debt to asset ratio. That is, they measure the same thing but use a different scale of measurement. The equity multiplier is "1" for an equity only firm. As leverage increases, the equity multiplier decreases. For example, a company with a debt to asset ratio of 50 percent would have an equity multiplier of 2.

If a firm's ROA is 10 percent, an increase in debt usage that causes the equity multiplier to rise from 2 to 3 will cause the ROE to rise from 20 percent to 30 percent. The reverse is also true. When a company is losing money, the equity multiplier "levers down" the ROE.

Knowledge check

2. If a company has an ROA of 15 percent and an equity multiplier of two times, its ROE would be

    a. 7.5 percent.
    b. 15 percent.
    c. 30 percent.
    d. We cannot solve this problem with the limited information provided.

3. If the company in the previous question increased its debt usage, its equity multiplier would increase. Suppose its equity multiplier increased to three times. What would happen to the ROE?

    a. Decrease down to 5 percent
    b. Increase to 45 percent.
    c. Increase to 22.5 percent.
    d. Increase to 18 percent.

DuPont system

The DuPont system allows us to further dissect the ratios. We can split the numerator and denominator of the ROA and place sales (revenue) in it.

$$\text{ROA} = \frac{\text{Net Income}}{\text{Total Assets}}$$

$$\text{ROA} = \frac{\text{Net Income}}{?} \times \frac{?}{\text{Total Assets}}$$

$$\text{ROA} = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Total Assets}}$$

We now can see that the ROA is the product of the profit margin [net income/sales] and the asset turnover [sales/total assets]. Today, some people refer to the asset turnover as the asset utilization ratio. It is the same ratio with a different name.

The profit margin shows the number of pennies of profit from each dollar of revenue. When sales are stable or increasing, the profit margin determines the company's ability to control costs. So a declining profit margin generally signals a cost control problem. Of course, one could conceivably increase a profit margin by increasing prices. However, price increases may be unrealistic in a competitive environment.

The asset turnover ratio shows how well the company is using its asset base to produce sales. A low asset turnover implies insufficient sales or excessive assets, while a large turnover suggests that assets are being sufficiently used to produce sales.

From this breakdown we can see that a low ROA (or ROE) can be caused by inadequate cost control or inadequate sales.

Knowledge check

4. The second step in the DuPont analysis is to divide the ROA into the profit margin and asset turnover ratios. Which of these two ratios measures cost control?

    a. Profit margin.
    b. Asset turnover.
    c. Neither ratio.
    d. Both ratios.

5. When a company has a small asset turnover, we argue that it needs to

    a. Increase its leverage.
    b. Cut costs.
    c. Improve its ability to use its assets to produce sales.
    d. Decrease sales.

Illustrative problem

Suppose Company A and Company B are in the same industry and both of them have ROAs of 6 percent. Company A has a profit margin of 4 percent and an asset turnover of 1.5 times. Company B has a profit margin of two percent and an asset turnover of three times. The industry average profit margin is 3 percent, the asset turnover is 2.5 times, and the ROA for the industry is 7.5 percent. Because both companies have below average ROAs, what actions would you recommend for these two companies?

Total DuPont system

$$ROE = \frac{\text{Net Income}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Assets}} \times \frac{\text{Assets}}{\text{Equity}}$$

Cost Control Sales Leverage

The following example highlights the use of the DuPont system.

	Companies			
	A	B	C	Industry
Profit margin	4.5%	6.0%	3.0%	5.0%
Asset turnover	1.8	1.5	3.0	2.0
Return on assets	8.0%	9.0%	9.0%	10.0%

What does this tell us about the profitability of the three companies? Company A is below average in both cost control and ability to generate sales. Clearly, company B is controlling its costs better than the others. However, company B has a low asset turnover. Its focus should be on producing sales. Company C has a large asset turnover but a low profit margin. Its focus should be on cost control.

	A	B	C	Industry
Return on assets	8%	9%	9%	10%
Equity multiplier	4	2	1.33	2
Return on equity	32%	18%	12%	20%

What has happened to the relative rankings? Company A has moved to the top because of its use of debt. Company C is run very conservatively, so it is penalized. Which company is best? From the use of debt point of view, there is no one answer; it is a risk/return trade-off. From the point of view of how well the company is run, company C is the best run company. What would happen to company C's ROE if C used an average amount of debt? It would rise to 18 percent.

Group exercise – Part A

	Profit Margin	Asset Turnover	ROA
1st Company	2%	6x	12%
2nd Company	6%	2x	12%
Industry Average	4%	4x	16%

Question: Both companies have the same return on assets, both are below the industry average. What actions would you recommend for these two companies?

Group exercise – Part B

	ROA	Equity Multiplier	ROE
3rd Company	12%	1.5x	18%
4th Company	10%	2.0x	20%
5th Company	8%	3.0	24%

Question: Which of these three companies is the most profitable?

Knowledge check

6. Suppose that a company has a profit margin of 5 percent, an asset turnover of 3, and an equity multiplier of 2. Its ROE would be 30 percent. Also suppose that the average company in the industry had a profit margin of 6 percent, an asset turnover of 3 times, and an equity multiplier of 1.5. Therefore, the industry average ROE is 27 percent. We can conclude that

    a. The company is definitely more profitable than the average company in the industry.
    b. The company's return to shareholders is greater than the average company in the industry.
    c. The company's rate of return based on the size of its assets is below average.
    d. The company's return to shareholders is greater than the average company in the industry and the company's rate of return based on the size of its assets is below average.

7. Compute the ROE for a company with a debt to asset ratio of 50 percent, a profit margin of 5 percent and an asset turnover of 2 times. It is

    a. 20 percent.
    b. 10 percent.
    c. 5 percent.
    d. Some other number.

EBITDA analysis

EBITDA refers to earnings before deduction of interest expense income taxes, depreciation and amortization (depletion). This number is often used in ratio analyses prepared by stock analysts. By using this number, the analyst attempts to reduce the effect of outside influences (such as interest expense), the impact of timing (depreciation), and the impact of authorities on profit.

For these ratios we also use operating assets. Operating assets are total assets less investments and other assets, and they, therefore, include most current assets and property plant and equipment.

$$\text{Operating ROA} = \frac{\text{EBITDA}}{\text{Operating Assets}}$$

This ratio provides a measure of profitability that focuses on operations without the outside influences discussed above.

As in the DuPont system, we can identify the two components that make up the operating ROA. They are as follows:

$$\frac{\text{EBITDA}}{\text{Operating Assets}} = \frac{\text{EBITDA}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Operating Assets}}$$

Operating ROA = Operating Margin × Operating Asset Turnover

Operating margin measures the efficiency of operations in producing operating profits. That is, it measures the number of pennies of EBITDA per dollar of sales.

Operating asset turnover measures management efficiency in utilizing operating assets to generate revenues.

Earnings quality

The quality of a company's earnings depend upon its perceived ability to continue profits at this level or better and the relationship of earnings to cash flow. The key word here is perception because the measurement of earnings quality is judgmental and the analyst must rely on several factors to form an opinion.

Knowledge check

8. Earnings quality is measured by two things, the relationship of earnings to cash flow and

    a. The firm's ROE.
    b. The perceived ability of the firm to continue earning as the current level or better.
    c. Both of the previous answers.
    d. The current ratio.

Continuation of earnings

Continuation of earnings can be measured by examining five factors. These include

- strength of the balance sheet,
- presence of one-time transactions,
- age of the assets,
- adequacy of research and development, and
- age and incentive of key managers.

If a company has a weak balance sheet, it may not be able to maintain earnings. Recall that a weak balance sheet would mean a company has excessive debt or inadequate liquidity or both. In either case the company's earnings will suffer more when there is an inevitable downturn in the business cycle. Excessive debt will lever-down the earnings when economic times become tough.

Knowledge check

9. A strong balance sheet implies _____ earnings quality.

    a. Good.
    b. Poor.
    c. No relationship with.
    d. No.

Second, a company that has increased its earnings through one-time transactions will not be able to maintain its' earnings. For example, suppose a company has a gain because it sold fixed assets at a profit, or because it sold its investment in financial securities. These transactions cannot be repeated

year after year. The presence of one-time transactions reduces the quality of earnings. You might consider removing the effect of one-time transactions from profit and profitability ratios when you examine the company.

Third, you should examine the age of the company's assets. If a company does not replace its assets, sometime in the future it will potentially be faced with considerable investment. Thus, with aging assets it will not be able to maintain its profits over the long run. To estimate the age of assets you can divide the accumulated depreciation by the year's depreciation expense.

$$\text{Estimated Age of Assets} = \frac{\text{Accumulated Depreciation}}{\text{Depreciation Expense}}$$

Fourth, you should examine a company's research and development expenditures across time and relative to its industry. If a company stops research and development, even temporarily, future profits will suffer. This is especially true in industries with rapid technological changes, such as the computer or electronics industries. However, it may be relatively less important in other industries. To examine this concept you should compute the research and development expenses relative to sales across time and if available to an industry average.

$$\text{Relative R \& D Expenses} = \frac{\text{R \& D Expense}}{\text{Sales}}$$

Knowledge check

10. Suppose that a company's ratio of accumulated depreciation to depreciation expense increased from 3.5 to 5.9 over the past four years. This would be a sign of _____ earnings quality.

    a. Good.
    b. Poor.
    c. Neither good nor poor.
    d. This ratio is unrelated to earnings quality.

Finally, you should examine the age of the key managers and the incentive systems within the company, especially when the managers have a defined benefit retirement system. As managers move closer to retirement age, and if their pay is closely tied to corporate earnings, there are incentives created to inflate current corporate earnings, their pay, and therefore their retirement benefits. Please note that we are not arguing that older managers are less effective or dishonest. However, as analysts, we need to be aware that the possibility exists for these misaligned incentives.

Knowledge check

11. If all senior managers are nearing retirement age, we argue that this is a sign of _____ earnings quality.

    a. Poor.
    b. Good.
    c. Neither good nor poor.
    d. Manager age is unrelated to earnings quality.

Relationship to cash flow

There are four things for you to examine when determining the relationship of earnings to cash flow. The first is fraud. Fraud can take many forms, and unless a company has discovered the fraud, the effect of it on earnings quality cannot be determined. Second, you should look at the company's accounting policies in relationship with the industry, and determine the effect of any recent accounting changes. There is considerable latitude given companies in the selection of accounting principles. The selection of one type of procedure vs. others can affect earnings. It may be difficult to determine the exact effect of one procedure vs. the others, but you can look for several of the following:

- Look at the accounting policies of the company in relationship to those of two or three other companies in the same industry. Are they the same, different?
- Has the company recently changed (reduced) the amount of expense that they allocate for bad debts, warranties, or other reserve and contingency accounts? If so, this may overstate earnings.
- Has the company changed auditors recently? If so, it may be the result of a disagreement over accounting principles. However, some companies change auditors for more legitimate reasons, so a change does not always indicate an earnings quality problem.
- Do the footnotes indicate a recent change in accounting practices? If so, does the company show the effect on earnings?
- If deferred taxes are growing rapidly, more rapidly than in previous years, this indicates a big difference between financial reporting income and tax income. This may mean that the company has used aggressive accounting practices for financial reporting but conservative practices for taxes.
- Does the auditor's report contain any qualifications? If so, the auditor may have a disagreement with management over the presentation of the financial results. You would need to estimate the effect of this disagreement on earnings.

Third, you need to look into the possibility that a company accelerated sales at year end. If a company has run a promotion at year-end with excessive discounts or with overly liberal credit terms, the sales for the current year may be overstated. This would tend to boost the current year's earnings at the expense of the future, and would make the earnings less related to cash flow. One thing to watch for would be dramatic increases in accounts receivable. While this often occurs because of other problems or policies, it may occur when a company has attempted to accelerate its sales.

Finally, you should compare the various earnings ratios with those that use cash flow instead of earnings. The cash return on equity is a good example. You compute this ratio by dividing net cash from operations by stockholders' equity.

$$\text{Cash Return of Equity} = \frac{\text{Net Cash Provided by Operations}}{\text{Stockholders' Equity}}$$

The interpretation of this ratio is the same as for the ROE, but you are examining cash flow instead of income. Similarly, you can compute a cash return on assets or a cash margin. Thus, a complete DuPont analysis is possible with cash instead of income.

Why would you want to examine cash flow in addition to income? It is cash flow that keeps a company afloat. A company pays its creditors and employees in cash. Shareholders that expect dividends are generally paid in cash. Cash is the basis for most transactions and is necessary for a business to survive. It is possible for a company to have positive income, but negative cash flow from operations. So, monitoring cash along with income is appropriate.

Knowledge check

12. The perceived ability to continue earning at the current rate would be questioned if

    a. A material portion of the company's earnings came from an extraordinary gain.
    b. The ratio of R&D to sales increased.
    c. The age of a company's assets decreased.
    d. There is a wide range of manager ages.

13. When a company has used the same auditor for a long period of time, this implies what type of earnings quality?

    a. Poor.
    b. Good.
    c. It can imply good or poor earnings quality, but may have no effect on earnings quality.
    d. Good earnings quality as long as the auditor has a good reputation.

Review questions

1. What is the DuPont system used for?

2. How is the profit margin a measure of cost control?

3. How does debt increase an ROE?

Chapter 4

Analysis of Financial Statements Using Causal Ratios

Learning objectives

- Identify which ratios are causal and which are not.
- Calculate each causal ratio.
- Recognize how each ratio affects profits, net worth, working capital, and debt.

Introduction

The purpose of this section is to provide a procedure that will tell the user why the firm's financial statements are changing. The procedure to be used is the analysis of a set of financial ratios. These ratios focus on why the statements are changing and not just on the change itself. The chapter covers the ratios and shows why they are causal in nature. The ratios covered are fixed assets to net worth, the collection period, net sales to inventory, net sales to net worth, the profit margin, and miscellaneous assets to net worth.

Causal ratios

Ratio analysis helps to set limits on the firm's liquidity, capital structure, and profitability.

What happens when you do the ratio analysis of any firm, XYZ?

The analyst will very likely find XYZ company deficient in several areas, but above average in others. What can we conclude about XYZ? The causal ratios help to provide an answer. By viewing the effect of these six ratios on the firm, we will understand why the firm is in the situation (good or bad) that it is.

An analogy may help at this point. A boy is running down the street. He steps into a pothole and falls. Stepping in the pothole caused him to fall. The fall did not cause him to step in the pothole.

Ratio analysis is very similar to this story. Most ratio analysis programs measure only the fall or the results of some action. Causal ratio analysis shows why the fall occurred.

- *Fixed assets to net worth* – measures over-investment in fixed assets
- *Collection period* – measures a rise in accounts receivable
- *Net sales to inventory* – measures a rise in inventory
- *Net sales to net worth* – measures overtrading or unrestrained growth
- *Net profit to net sales* – measures profitability
- *Miscellaneous assets to net worth* – measures the rise in "other" assets

Each of the causal ratios will be examined individually.

Fixed assets to net worth

When too much capital has been invested in fixed assets, there is less capital available for investment elsewhere. We can measure this potential cause with the ratio of fixed assets to net worth. When this ratio grows and becomes too large in a profitable company, it may be a sign of excessive investment in fixed assets.

It may be difficult to judge whether this ratio is low or high. The ratio may be high (or low) as a result of a management decision. The important thing to understand is the effects that this ratio has elsewhere in the company if it is too high (or low).

Why is this ratio an important causal ratio? If too much net worth is tied up in fixed assets,

- the firm will have too little working capital.
- the firm will over-utilize debt.
- profitability will suffer.

Knowledge check

1. If fixed assets to net worth increases for a profitable company, the company's debt ratios will likely
    a. Increase.
    b. Decrease.
    c. Not change.
    d. Debt ratios are unrelated to the fixed assets to net worth ratio.
2. In the short run, when a profitable company's ratio of fixed assets to net worth increases, the company's current ratio will likely
    a. Increase.
    b. Decrease if short-term debt or cash is used to pay for (finance) the new fixed assets.
    c. Not change if long-term debt financing is used.
    d. Both answers b. and c. are correct.

Compare two companies, A and B. The two companies are identical. Examine the effect of a large increase in fixed assets on working capital.

A and B	
Current assets	$3,500,000
Current liabilities	$1,750,000
Current ratio	2 to 1

Now B expands its fixed assets by $1,000,000 without an increase in net worth. A way to accomplish this expansion is to use up working capital in one of the following ways:

- Decrease current assets to $2,500,000.
- Increase current liabilities to $2,750,000.
- Use long-term debt.
- Combination of the above.

If the B company chooses short-term debt to finance the growth in fixed assets, then its liquidity and leverage risks are increased. We will assume both companies are identical otherwise.

Companies A and B	
Net sales	$15,000,000
Inventory	1,000,000
Receivables	1,500,000
Net worth	$2,750,000

B now has $3,500,000 in current assets and $2,750,000 (not $1,750,000) in current liabilities. The current ratio of B is 1.27, compared to 2.0 before the change.

Both companies are identical with respect to sales, inventory, receivables, and long-term debt. But B only has $750,000 in working capital. Further effect of this ratio can be seen in the following ratios:

	A	B
Net sales to working capital	10.00×	20.0×
Inventory to working capital	66.67%	133.3%
Receivables to working capital	85.71%	200.0%
Current debt to net worth	54.50%	90.9%
Current ratio	2 to 1	1.27 to 1

We can see the direct impact of the fixed asset to net worth ratio on the firm's working capital. Traditionally, an analyst would see only the working capital problems. More importantly, we can now see the cause. The cause was not the company's desire to have a shortage of working capital. The cause was an over-investment in fixed assets or an under-utilization of net worth financing or both.

If long-term debt had been used, then a much larger debt to asset ratio would have resulted. Instead of liquidity problems, the firm would have used up its debt capacity. Therefore, this ratio can affect the firm's capital structure.

How fixed assets affect profit

The fixed asset to net worth ratio also affects profits through

- interest expense.
- increased depreciation. (This may put a firm in violation of its debt covenants.)
- increased property taxes and insurance costs.
- reduced working capital (to the point that cash discounts are lost).
- late charges.
- inventory stockouts.
- reduced bank balances (to the point that service charges are incurred).

We would see the effect on profit in any profitability ratios (ROA, ROE, profit margin, and so on). If long-term debt had been used to finance the assets, then increased interest charges would have resulted.

Knowledge check

3. In the short run, an increase in fixed assets to net worth generally causes profits to

    a. Increase.
    b. Decrease.
    c. Not change.
    d. There is no relationship between fixed assets to net worth and profit.

Ratios that could be changed by the fixed assets to net worth ratio

- Current ratio
- Net sales to working capital
- Inventory to working capital
- Trade receivables to working capital
- Long-term debt to working capital
- Total debt to net worth
- Long-term liabilities to net worth
- Net income to net sales
- Net income to net worth
- Net sales to net worth
- Miscellaneous assets to net worth
- Net sales to fixed assets

All of these ratios are affected by the fixed asset to net worth ratio; thus we can see that it is a causal ratio. These other ratios fall into the category of working capital, profitability, debt, and net worth ratios.

What can we tell our clients about this ratio? Beyond some point fixed asset expansion must be supported by net worth. If profits are sufficient, then perhaps no external equity is required. If profits are insufficient, then outside equity will be required so that the company may grow without growing out of business.

This is a real problem in small “growth” companies, which often expand faster than profits allow. Small companies have limited access to long-term debt or equity markets. The solution may be to reduce expansion, or to expand, but to realize where the liquidity problems are coming from.

Correction procedures

Excessive fixed assets

- Raising additional capital from existing owners or through attracting equity investors
- Selling idle machinery and parts, unused vehicles, and unnecessary equipment
- Arranging sale and leaseback of plant and equipment
- Restricting further investment in fixed assets
- Developing compensating advantages
- Securing long-term loans from banks, finance companies, or factors
- Resorting to Small Business Administration (SBA) loans or Small Business Investment Company (SBIC) financing
- Seeking longer terms from key suppliers

Knowledge check

4. One possible solution for a company with financial troubles that have been caused by a growth in fixed assets (increase fixed assets to net worth ratio) is to

    a. Raise equity capital.
    b. Restrict further investment in fixed assets.
    c. Both of the previous answers.
    d. Neither of the previous answers.

Collection period

$$\text{Collection Period} = \frac{\text{Accounts Receivable}}{\text{Sales per day}}$$

This ratio is a measure of the credit and collection efficiency of the firm, the probability of bad debt write-off, and the company's receivable position over time and as compared to the industry. It is computed by dividing trade receivables by credit sales per day.

If this ratio is too high, it can indicate inefficiency or a decision to allow loose credit terms. In either event it affects many other things in the company. So, whether it is too high as a result of inefficiency or as a result of a decision, its causal nature must be understood.

Why is this ratio an important causal ratio?

- *Sales attainment* – If you find a firm with terms of 2/10, net 30 and a 12-day collection period, the firm may be passing up sales. An excessively short collection period may be unprofitable.
- *Profitability* – A long collection period may cause receivables write-off, collection costs (collection agencies), and increased interest costs.
- *Borrowing* – To finance the increases in receivables when the collection period is large, debt may be used. Higher interest costs will result, reducing the firm's capacity for future debt financing.

Knowledge check

5. A growing collection period signals

    a. Customers are taking longer to pay.
    b. Inventory levels are inadequate.
    c. Inventory has increased rapidly.
    d. Fixed assets are growing too quickly.

Collection period: Example

Two firms are identical except that firm X has an 80-day collection period and firm Y has a 40-day collection period. This difference in collection periods is the cause of X's problems. The effect can be seen in the following ratios:

	Company X	Company Y
Cash	$100,000	$100,000
Accounts receivable	2,000,000	1,000,000
Inventory	1,200,000	1,200,000
Total current assets	$3,300,000	$2,300,000
Total current liabilities	$1,700,000	$ 750,000
Long-term liabilities	1,300,000	1,250,000
Total liabilities	$3,000,000	$2,000,000
Net worth	$3,000,000	$3,000,000
Sales	9,120,000	9,120,000
Current assets to current liabilities	1.9 times	3.1 times
Current liabilities to net worth	56.7%	25.0%
Total liabilities to net worth	100.0%	66.7%
Trade receivables to working capital	125.0%	64.5%

Company X has a reduced quantity and quality of working capital, as evident in the receivables to working capital ratio. Company X has slightly more working capital than company Y but X is really less liquid.

The collection period alone has caused these changes; hence, it is a causal ratio. Its effect goes beyond collections efficiency. Traditional ratio analysis would only have seen these effects without tracing them back to the collection period.

Knowledge check

6. When a company's collection period increases (and the increased receivables have been financed with short-term debt), the company's current ratio (which is 2 to 1 before the change in the collection period) will likely

    a. Increase.
    b. Decrease.
    c. Not change.
    d. It is impossible to determine from the information provided.

Illustrative problem

When the collection period increases, the company's accounts receivable increases. Because accounts receivables are a current asset and the current asset has increased, how could this reduce the company's liquidity?

Ratios that could be changed by the collection period

The effect of the collection period can be seen in all of the following ratios. Notice that it affects working capital, profitability, debt, and net worth ratios. Hence it affects the value of the company, that is, risk and return.

- Current ratio
- Current liabilities to net worth
- Total liabilities to net worth
- Accounts receivables to working capital
- Net profit to net sales
- Net profit to net worth
- Net sales to net worth
- Net sales to working capital
- Fixed assets to net worth
- Inventory to working capital
- Long-term debt to working capital
- Miscellaneous assets to net worth

Even if this ratio is too high by decision, the company must understand the problems that it causes.

Correction procedures

Abnormal collection period ratio

- Selling terms can be either shortened or lengthened to improve sales.
- Cash discount can be injected into selling terms, or existing cash discount can be increased, or cash discount can be eliminated entirely, thus restricting all sales to a net basis.
- Greater selectivity in accepting accounts can be imposed, or liberalization of credit policy can be instituted.
- A more systematic collection follow-up can be established, or a relaxing of arbitrary payment demands can be inaugurated.
- A professional credit manager can be hired, or the training of the employee now handling credit functions can be initiated.
- Slow receivables can be factored or discounted with a finance company or bank.
- Credit insurance can be obtained to protect against abnormal bad debt loss.
- Compensating advantages can, perhaps, be developed (that is, the other financial characteristics of the company can be improved).

Knowledge check

7. Which may shorten a company's collection period?

    a. Shorten selling terms.
    b. Eliminating cash discounts.
    c. Reduce its inventory.
    d. Increase sales.

8. Greater selectivity in accepting accounts will generally cause the collection period to

    a. Increase.
    b. Decrease.
    c. Have no change.
    d. None of the above.

9. A large collection period adversely affects profits because of the greater likelihood of

    a. Receivables write-off.
    b. Increased collection costs.
    c. Higher interest costs.
    d. All of the above.

10. Assume that a firm has receivables of $800,000, inventory of $900,000, net sales of $9,000,000, cost of goods sold of $7,000,000 and net profit of $100,000. Calculate its collection period using a 360-day year.

    a. 25.6 days.
    b. 32.0 days.
    c. 75.5 days
    d. There is insufficient information to compute the collection period.

Net sales to inventory (inventory turnover)

This ratio traditionally is used as a measure of the firm's inventory turnover and its "merchandising efficiency." A high ratio generally signals that management is able to move the inventory sufficiently. A low ratio often signals inventory problems. However, its effect goes beyond the measurement of inventory problems; therefore, it is our third causal ratio.

Alternate computations:

$$\frac{\text{Net Sales}}{\text{Inventory}} \quad \text{or} \quad \frac{\text{Cost of Goods Sold}}{\text{Inventory}}$$

A low ratio can signal

- deterioration of inventory,
- obsolescence,
- seasonal fluctuations in inventory levels,
- overvaluation of inventory,
- unsalable inventory, or
- change in customer preferences.

Through the audit process the auditor is in the best position to see these problems. This is shown in the following example.

Knowledge check

11. Assume that a firm has receivables of $800,000, inventory of $900,000, net sales of $9,000,000, cost of goods sold of $7,000,000 and net profit of $100,000. Calculate its collection period using a 360-day year. Compute the company's inventory turnover (with the sales formula).

    a. 10.0 times.
    b. 9.0 times.
    c. 11.5 times
    d. There is insufficient information to compute the inventory turnover.

12. An increasing inventory turnover ratio often signals

    a. Increasing inventory relative to sales.
    b. Decreasing inventory relative to sales.
    c. Excessive sales growth.
    d. A receivables problem.

13. A decreasing inventory turnover generally is a sign of _____.

    a. Increasing inventory.
    b. Decreasing inventory.
    c. Decreasing sales.
    d. Either increasing or decreasing inventory.

Net sales to inventory: Example

	Company X	Company Y
Cash	$1,500	$1,500
Accounts receivable	11,500	11,500
Inventory	12,500	25,000
Total current assets	$25,500	$38,000
Current liabilities	$13,000	$25,500
Long-term liabilities	3,000	3,000
Total liabilities	$16,000	$28,500
Net worth	$35,000	$35,000
Sales	100,000	100,000
Current ratio	2.0x	1.5x
Current liabilities to net worth	37.1%	72.9%
Total liabilities to net worth	45.7%	81.4%
Inventory to working capital	100.0%	200.0%
Net sales to inventory	8x	4x

Company X and Y are identical, except that company Y has double the inventory. Its turnover is four while company X has a turnover of eight. Notice that the extra $12,500 is financed with short-term debt.

We can see that slow-moving inventory hurts liquidity, increases debt, and causes over investment in the least liquid of the current assets (inventory), so the quality and quantity of working capital are reduced. If inventory had to be written off, profits would fall at the same time that the firm had a liquidity crunch.

Knowledge check

14. The reason we consider the inventory turnover to be a causal ratio is that when the ratio decreases, the increased inventory must be financed. The increased inventory is generally financed with a decrease in cash or an increase in short-term debt. Therefore, the company's quick ratio will generally _____ when the inventory turnover falls.

    a. Increase.
    b. Decrease.
    c. We cannot determine this answer from the information given.
    d. Not change.

Ratios that could be changed by net sales to inventory

The inventory turnover ratio affects ratios that are measures of working capital, debt, profits and net worth. Therefore, it directly affects the value of the firm and is more than a simple measure of "merchandise efficiency."

- Current ratio
- Current liabilities to net worth
- Total liabilities to net worth
- Inventory to working capital
- Net profit to net sales
- Net profit to net worth
- Net sales to net worth
- Net sales to working capital
- Fixed assets to net worth
- Accounts receivables to working capital
- Long-term debt to working capital
- Miscellaneous assets to net worth

Correction procedures

- Study of inventory records to detect items no longer used in the present manufacturing or marketing program
- Review of the turnover rate of the various inventory components
- Establishment of perpetual inventory records to ensure that articles are not purchased in excessive quantity or in advance of need
- Delegation of the purchasing and inventory control function to a single responsible person
- Study of the physical layout and the efficiency of the warehouse and storage areas
- Improve sales while holding inventory levels constant
- Development of compensating advantages to offset the competitive disadvantage of slow inventory turnover

Knowledge check

15. The establishment of perpetual inventory records should cause the inventory turnover to

    a. Increase.
    b. Decrease.
    c. Not change.
    d. Sometimes increase and sometimes decrease depending on sales growth.

16. A step to take when an inventory turnover has fallen is to

    a. Study which items in inventory are the problem.
    b. Review the turnover rate of inventory components.
    c. Both of the above.
    d. Neither of the above.

17. Which can cause liquidity to drop?

    a. An increasing fixed assets to net worth ratio.
    b. An increasing collection period.
    c. A decreasing inventory turnover.
    d. All of the above.

Net sales to net worth

The trading ratio

The trading ratio is a measure of the extent to which a company's sales volume is supported by invested capital (net worth).

$$\text{Trading Ratio} = \frac{\text{Net Sales}}{\text{Net Worth}}$$

The undertrader has a low ratio. This company's most pressing problem is to increase sales.

The overtrader has a substantially higher ratio than average. This company is stretching its invested dollars to the maximum. Generally, it is burdened by excessive debt, and insufficient working capital, and its survival hinges on the long-term continuation of optimum conditions. The overtrader may actually look like a healthy company on the surface.

If the trading ratio is too high, the company may be very profitable, but it is in a very risky position, in which it could easily be forced out of business. In fact, overtrading may be responsible for the demise of many businesses.

Why is this ratio important? Sales and capital are correlated. Only so much turnover can be obtained from each dollar of invested capital. An overtrader generally has expanded its business without putting new equity capital into the firm. It generally has borrowed a lot of money or has underinvested in working capital or both.

To correct the problem, the overtrader must either attract equity capital or hold back sales growth.

Trading ratio: Example

	Company X			
	200W	200X	200Y	200Z
Cash	$50,000	$50,000	$50,000	$50,000
Accounts receivables	350,000	650,000	1,250,000	2,450,000
Inventory	600,000	1,200,000	2,400,000	4,800,000
Total current assets	1,000,000	1,900,000	3,700,000	7,300,000
Fixed assets	450,000	450,000	1,450,000	2,450,000
Miscellaneous assets	50,000	50,000	50,000	50,000
Total assets	$1,500,000	$2,400,000	$ 5,200,000	$ 9,800,000
Notes payable	$ 0	$ 0	$900,000	$900,000
Trade payables	300,000	1,000,000	1,500,000	4,550,000
Total current liabilities	300,000	1,000,000	2,400,000	5,450,000
Long-term liabilities	0	0	1,000,000	1,750,000
Total liabilities	300,000	1,000,000	3,400,000	7,200,000
Equity/net worth	1,200,000	1,400,000	1,800,000	2,600,000
Total liabilities and net worth	$1,500,000	$2,400,000	$5,200,000	$9,800,000
Net sales	$3,600,000	$7,200,000	$14,400,000	$28,800,000
Net profit	100,000	200,000	400,000	800,000
Working capital	700,000	900,000	1,300,000	1,850,000

Company X is an example of an overtrader.

- Sales double each year 200W–200Z.
- Profit margin is held constant for the example (2.8 percent). In practice it may actually decline because of sales concessions, extensions into unprofitable territories, and so on.
- All profits are retained in the business. So equity is growing as fast as possible from internal sources.
- Inventory turnover is held to six times.
- Collection period is held to 30 days when in fact it will generally increase for an overtrader.
- All taxes have been paid.

How is the firm doing?

Despite retaining all of the earnings, the company has increased its trading ratio from 3 times in 200W to 11.1 times in 200Z.

There is a sharp increase in debt, and particularly in current debt. The debt is rising almost geometrically. This is a common overtrading problem.

The company did find long-term debt sources, but many small- and medium-sized companies would be forced to rely on short-term debt. So this company's problems would be worse if it had used only short-term debt.

In 200Y and 200Z the growth in sales caused further investments in fixed assets. Despite the new assets, the net sales to fixed assets climbed to 11.76 percent. Overtraders often have additional problems because FA/NW increases.

Unless sales growth is curtailed or new equity sources are found, additional working capital will have to be diverted to fixed assets.

Some of the major symptoms of overtrading are discussed below. Current ratio has declined from 3.33 to 1.34. Without the long-term loans it would be around 1.01. The strain on working capital can be seen several ways.

- Net sales to working capital – 5.14 times to 15.57 times.
- Inventory to working capital – 85.7 percent to 259.5 percent.
- Receivables to working capital – 50 percent to 132 percent, despite a falling collection period.

The ratio of net profit to net worth grew from 8.33 percent to 30.77 percent. Remember that the company appears to be very profitable. Profits doubled every year. This makes overtrading a difficult concept to explain to a client who may only be interested in profits.

Trading ratio: Example

	200W	200X	200Y	200Z
Causal Ratios				
Net sales to net worth	3.0x	5.1x	8.0x	11.0x
Fixed assets to net worth	38%	32%	81%	94%
Collection period	35 days	32.5 days	31.2 days	30.6 days
Net sales to inventory	6.0x	6.0x	6.0x	6.0x
Net profit to net sales	2.8%	2.8%	2.8%	2.8%
Miscellaneous assets to net worth	4.2%	3.6%	2.8%	1.9%
Liquidity Measures				
Inventory to working capital	85.7%	133.3%	184.6%	259.5%
Trade receivables to working capital	50.0%	72.2%	96.2%	132.4%
Current assets to current liabilities	3.3x	1.9x	1.5x	1.3x
Leverage Measures				
Current liabilities to net worth	25.0%	71.4%	133.3%	209.6%
Total liabilities to net worth	25.0%	71.4%	188.9%	276.9%
Profit Measures				
Net profit to net worth	8.33%	14.29%	22.22%	30.77%

Illustrative problem

If a company's trading ratio increases from 1.25 to 3.0, does that mean that the company will always be an overtrader?

Ratios that could be changed by the trading ratio

- Current assets to current liabilities
- Fixed assets to net worth
- Current liabilities to net worth
- Total liabilities to net worth
- Inventory to working capital
- Accounts receivables to working capital
- Long-term liabilities to working capital
- Net profit to net worth
- Net sales to fixed assets
- Net sales to net worth
- Net sales to working capital
- Miscellaneous assets to net worth

No company ever went out of business just from being an overtrader. Overtrading sets the business up, then some external shock puts it out of business. Overtrading affects the firm's liquidity, leverage, and profitability.

Overtrading characteristics

- Company maximizes sales (in other words, sales seems to be the single most important goal)
- Existing owners are reluctant to assume risk (no new equity)
- Company is vulnerable to unexpected problems
- Overtrading may overextend supply lines because of rapid growth
- Growth is unrestrained

If one of your clients seems overly preoccupied with sales growth and is unwilling to put new equity into the firm, the firm may be an overtrading candidate. Overtraders usually have numerous problems with finances, employees, and other matters. An overtrader's business will have the appearance of a CPA firm at tax time.

Growth at the micro and macro level is essential for a capitalistic system. However, unrestrained growth (overtrading) can very quickly put a firm out of business.

Excessive growth will be a misleading problem because the overtrader often looks extremely profitable. However, it is the weak balance sheet that harms the company.

Knowledge check

18. An undertrader is a company with a _____ ratio of sales to net worth.

    a. Large.
    b. Small.
    c. Average.
    d. Either large or small.

19. The solution to the overtrading and undertrading problems is

    a. Exactly the same.
    b. Similar.
    c. Completely different.
    d. None of the above.

20. Select the statement that is most true.

    a. Overtraders generally have very strong balance sheets.
    b. Overtraders generally have very weak balance sheets.
    c. Overtraders often have balance sheets that are about average in strength.
    d. Overtrading has no impact on a company's balance sheet.

21. Overtraders often are companies that are attempting to maximize

    a. Sales.
    b. Their current ratios.
    c. Managerial leisure time.
    d. Their debt ratios.

22. Assume that a firm has current assets of $2,500,000, fixed assets of $1,500,000, current liabilities of $900,000, long-term liabilities of $600,000, net sales of $9,000,000 and net profit of $300,000. Compute its trading ratio.

    a. 1.50 times.
    b. 3.60 times.
    c. 5.55 times
    d. Some other number.

Correction procedures

Overtrading or undertrading

- When undertrading is a problem, the analyst must consider the degree of profitability currently enjoyed.
- Whether the fault be overtrading or undertrading, borrowing from financial institutions or securing longer credit terms can provide temporary relief.
- Raising outside equity.
- Reducing payout ratios and owner's salaries.
- Improving cost control and the profit margin.
- Raising prices slightly to cut demand and improve the per unit profit margin.

Knowledge check

23. Select the statement that is most true.

    a. Raising external equity can improve an overtrader's financial condition.
    b. Raising external equity will hurt an overtrader's financial condition.
    c. Raising external equity will have no impact on an overtrader's financial condition.
    d. All of the above can be correct.

24. Which will improve an overtrader's problems?

    a. Reducing the payout to owners.
    b. Decreasing the company's prices.
    c. Both of the above.
    d. Neither of the above.

25. Which will improve an overtrader's financial problems?

    a. Improving cost control.
    b. Obtaining short-term loans to finance the growth.
    c. Both of the above.
    d. Neither of the above.

The profit margin

Every company has profit as its goal. This ratio is a measure of the percentage of sales kept as profits (the number of pennies kept per dollar of sales).

Why is this ratio a causal ratio? The difference between sales and profit is the company's expenses. This ratio is a measure of how well a company is controlling its expenses. The company must be able to reinvest profits back into the firm. If profits are not available to increase net worth, then working capital and/or debt problems often result.

	Company Q	
	201X	201Y
Cash	$300,000	$150,000
Receivables	700,000	700,000
Inventory	3,550,000	3,550,000
Total current assets	4,550,000	4,400,000
Fixed assets	1,600,000	1,500,000
Other assets	300,000	300,000
Total assets	$6,450,000	$6,200,000
Notes payable	$750,000	$850,000
Accounts payable	1,000,000	950,000
Total current liabilities	1,750,000	1,800,000
Long-term liabilities	1,150,000	1,100,000
Net worth	3,550,000	3,300,000
Total liabilities and net worth	$6,450,000	$6,200,000
Sales	$12,000,000	$12,000,000
Working capital	2,800,000	2,600,000
Net profit	400,000	(250,000)

The profit margin: Example

In 201X and 201Y, the inventory turnover and collection period have been held constant. But in 201Y, we have a loss, bringing a direct reduction in net worth.

	201X	201Y
Current ratio	2.6x	2.4x
Current liabilities to net worth	49.3%	54.6%
Inventory to working capital	127.0%	137. 0%
Net profit to net sales	3.33%	(2.08%)
Net sales to net worth	3.38x	3.64x
Net sales to inventory	3.38x	3.38x
Collection period	21 days	21 days

The negative profit margin is a problem by itself. However, it causes this firm's drop in liquidity and increase in leverage. These problems will continue and worsen until the firm can increase its profitability:

- The current ratio declined – Reduction of liquidity
- Current liabilities to net worth has risen – Risk has increased
- Inventory to working capital has increased – Reduced quality of working capital; risk has increased
- Trading ratio has risen, even with a constant sales amount

This ratio affects virtually all other ratios; therefore, it is a causal ratio. Traditional ratio analysis would only have examined the changes in liquidity and debt without ever revealing their cause.

Be sure that your client understands the full impact of continual losses, particularly if your client wants to make large withdrawals from the firm while the firm is losing money.

Correction procedures

Low or negative profit margin

- If sales are declining, then a low or negative profit margin may be the result. Correcting this problem means either generating more sales (sometimes easier said than done) or downsizing; that is, reducing the size of the firm and selling off assets.
- If sales are increasing or stable, a low or negative profit margin is a cost control problem. Compute a common size income statement with all expenses listed as a percent of sales. Compare this to the industry's "Robert Morris" size income statement to determine which expenses are out of line.

Knowledge check

26. When a company's profit margin becomes negative, its debt ratios will generally

    a. Increase.
    b. Decrease.
    c. Not change.
    d. The profit margin is unrelated to the debt ratios.

27. If sales are decreasing, then correcting a profit margin problem would entail

    a. Downsizing.
    b. Restoring the original level of sales.
    c. Either of the above would work.
    d. Raising prices.

28. When sales are stable or increasing, correcting a profit margin problem involves

    a. Increasing prices or cutting costs.
    b. Downsizing.
    c. Both of the above.
    d. Neither of the above.

Miscellaneous assets to net worth

- Affects working capital
- Affects profitability
- Affects net worth

Miscellaneous assets include

- loans to officers,
- advances to subsidiaries,
- prepaid expenses,
- investments in other than marketable securities,
- mortgage receivables,
- cash value of life insurance, and
- office supplies.

This ratio should not be too large. These assets generally earn less than a market rate of return so they cost the firm potential profits. This ratio is often a problem in small companies where the owner lends money to employees—the "one big happy family" syndrome.

This ratio can affect working capital and debt, because the miscellaneous assets have to be financed by something. Profits are also hurt.

Be sure to counsel your client that the miscellaneous assets to net worth ratio can cause all of the problems that the other causal ratios can. At least your clients should be made to understand that they should charge market rates of interest on these investments.

Knowledge check

29. When a company's miscellaneous assets to net worth ratio increases, the company's liquidity ratios will

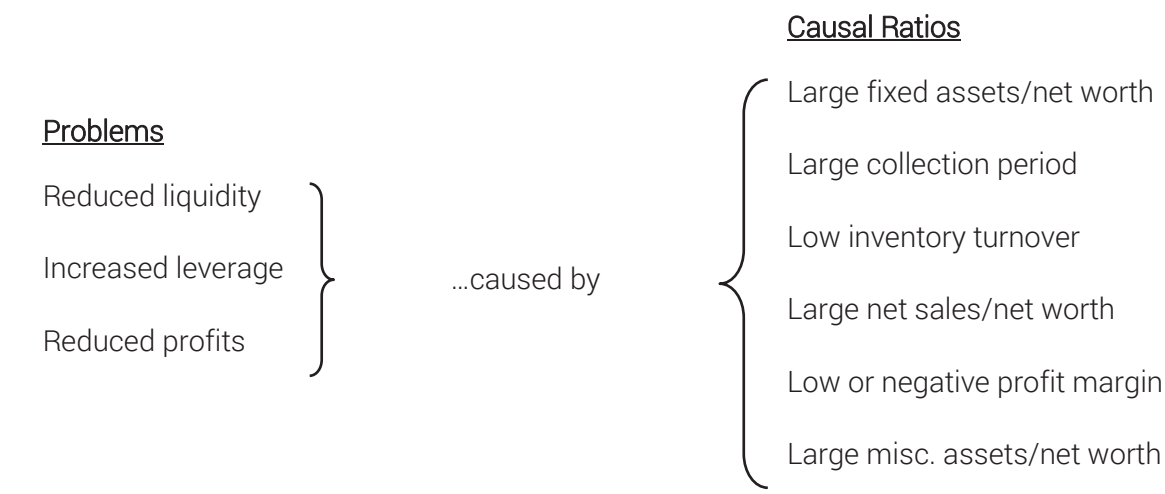
    a. Generally improve.
    b. Generally deteriorate.
    c. Improve or deteriorate depending on sales growth.
    d. Not be affected.

Correction procedures

Investment in miscellaneous assets

- Collect loans to officers.
- Call in advances to subsidiaries.
- Charge interest on these loans.
- Use term life insurance or market-rate paying whole life.

Causal ratio summary



How would you respond?

You are the CFO of a medium sized manufacturing company. The company sales have increased by an average of 15 percent per year for the past five years. Debt is at an all-time high. The newly promoted CEO (formerly the VP of marketing) wants to expand into new markets overseas that have the potential to double sales fairly quickly. The CEO has asked your opinion.

How would you respond? Things to consider…

- Debt is already high, will the expansion require additional debt?
- What would the cost of the new debt be?
- How profitable would the expansion be?
- Is now the time to expand with debt at record levels?

Review questions

1. Why is each ratio discussed a causal ratio?

2. Explain in detail how a change in the fixed assets to net worth ratio could affect a firm's working capital.

3. What would you tell your client about the fixed assets to net worth ratio?

4. How can a change in the firm's collection period affect its capital structure?

5. Of what is the net sales to inventory ratio a measure? How can a change in this ratio affect the firm's liquidity?

6. What is overtrading? Why is overtrading so deceptive? What are the major problems overtrading can cause?

7. What are the characteristics of an overtrader? How does overtrading destroy the firm? What are the cures for overtrading?

8. How can a change in a firm's net profit to net sales ratio affect the firm's net worth?

9. Make a list of you firm's miscellaneous assets. Why might an increase in this asset category be bad?

Chapter 5

How to Conduct a Financial Statement Analysis

Learning objectives

- Identify the appropriate steps to conduct a financial statement analysis.
- Identify the importance of time series and industry comparisons.
- Recognize the various sources of industry data.

Introduction

The purpose of this section is to provide general guidance on how to conduct a financial statement analysis and to discuss the importance of both time series and industry comparisons as critical components of that analysis. The success of that analysis is also dependent on the analyst's awareness of the various sources of industry data as well as the problems inherent in the use of that data.

How to conduct an analysis of financial statements

- Determine what problems exist by comparing the company's effect ratios to similar ratios for the company's industry and to the same ratios for previous years.
- Take a cursory look at the causal ratios, comparing them to previous years and to industry averages.
- Determine which of the causal ratios are at fault by looking back at the balance sheet and income statement. Remember, the causal ratios can affect each other, so try to determine which one(s) is (are) at fault.
- Take corrective action by attacking the cause of the problem, not the symptom.

Industry and time series analysis

There are two ways to compare ratios. The first is an industry comparison. Different industries behave differently and have different financial characteristics. To compare a ratio to some preconceived notion of what it should be does not make good economic sense. The analyst should compare a company's ratios to similar companies. This task can be done two ways. The first is comparing the company ratios to an industry average. This lets the analyst know how the company's financial condition compares to the average company in the industry. The second type of industry analysis is the comparison of company ratios to those of an industry leader. The company can then try to emulate the leader when possible.

A time series analysis of financial ratios compares the company's current ratios to those of previous years. The purpose is to understand how the company's financial condition is changing over time.

A complete analysis of a company should include both an industry and a time series comparison.

Knowledge check

1. A(n) _____ analysis lets the analyst know how a company compares to similar companies during the most recent time period.

    a. Time series.
    b. Industry.
    c. Ratio.
    d. Time series and an industry.

2. Select the statement that is most true.

    a. A complete analysis of a company can be accomplished by comparing company ratios to industry averages.
    b. A complete analysis of a company can be accomplished by examining a company's current year ratios to past years.
    c. A complete analysis of a company should include both an industry and time series comparison.
    d. None of the above.

Sources of industry averages

Primary sources

- *Industry Norms and Key Business Ratios* – 900 lines of business – 14 ratios by industry – provided by quartiles – common-sized financial statements. Dun's Analytical Service, Dun & Bradstreet, One Diamond Hill Road, Murray Hill, NJ, 07974-0027, 1-800-223-0141.
- *Risk Management Associates Annual Statement Studies* – 350 lines of business – 16 ratios – common-sized financial statements – size breakdown. Robert Morris Associates, One Liberty Place, Philadelphia, PA, 19103-7398.
- *Financial Studies of the Small Business*, for companies with total capitalization less than $1,000,000. Data provided by 1500 CPA firms. Ratios provided by industry size for 69 industries. Provides 16 ratios and common-sized income statement. Financial Research Associates, 510 Ave J, S.E., Winterhaven, FL, 33880.
- *The Almanac of Business and Industrial Financial Ratios* – 10 ratios by industry and asset size – also 12 items as a percent of sales. Prentice-Hall, Business and Professional Division, Englewood Cliffs, NJ, 07632.

Other sources

- *BusinessWeek Quarterly Corporate Scoreboard* – Provides a lot of sales and stock market data by industry.
- *Value Line Investment Surveys* – Provides a lot of detail on large industries.
- Various publications of *Moody's* and *Standard and Poor's*.
- *Trade journals* – Your clients may subscribe. There is a fairly comprehensive list of these in the back of RMA.

Knowledge check

3. Of the sources of industry data presented in the manual, the two sources that not only provide the industry averages, but also provide a "size" breakdown of the averages are

    a. "Risk Management and Associates Annual Statement Studies" and "The Almanac of Business and Industrial Financial Ratios."
    b. "Industry Norms and Key Business Ratios" and "Financial Studies of the Small Business."
    c. *Business Week* and *Moody's.*
    d. None of the sources provide a size breakdown.

Problems with using industry data

While it is very important to use industry ratios, there are many problems associated with the practice, including the following:

- Averages are not goals; they are just averages.
- Conglomerates—Which industry?
- Accounting differences within industry.
- Small sample of firms in industry.
- Size differences in the industry.
- Alternate calculations of ratios.
- Delay (at least eight months) in publication of industry ratios.

Knowledge check

4. A company with ratios that match the industry average is in _____ shape.

    a. Poor.
    b. Average.
    c. Great.
    d. Impossible to tell.

5. Which is not generally a problem with using industry averages?

    a. A company may be a conglomerate.
    b. The company may use different accounting procedures than the industry.
    c. Industry data is not available at year-end.
    d. All of the above.

An example of *computing* industry statistics from risk management associates (formerly Robert Morris) data

Assets	Percent
Cash	4.1
Marketable securities	1.3
Receivables, net	38.9
Inventory, net	20.7
All other current assets	2.5
Total current assets	67.5
Fixed assets, net	26.8
All other noncurrent assets	5.7
	100.0*
Liabilities and owners equity	
Notes payable, short-term	12.9
Account payables	16.5
Income taxes payable	3.2
Current maturities of long-term debt	2.6
All other current liabilities	8.7
Total current liabilities	43.9
Noncurrent debt, unsubordinated	11.0
Total unsubordinated debt	54.9
Subordinated debt	1.7
Tangible net worth	43.4
	100.0

The key to using a common-sized balance sheet provided with industry averages is to use the percentages as if they were dollar figures. So, you can use these numbers to find the industry average for, say, the current ratio. It would be 67.5% ÷ 43.9% = 1.5x. A word of caution is in order, however, as most providers of industry averages use the median when reporting the average, On the other hand, the common-sized financial statements are means. Means and medians will not be the same unless the distribution of ratios is symmetrical (for example, normal distribution). So the current ratio you computed here will not necessarily match the industry average of provided by Risk Management Associates.

An example of *computing* industry statistics from Dun and Bradstreet data

Net sales to net worth	3.8 times
Current debt to equity	75.1%
Current ratio	1.9 times
Collection period	60 days

Compute receivables to working capital from the four ratios provided by Dun and Bradstreet by following these eight simple steps:

1. Assume that net worth is $1,000,000.
2. Sales then are $3,800,000, since net worth turns 3.8 times per year.
3. Dividing $3,800,000 annual sales by 365, we find average daily sales to be $10,411.
4. Multiplying $10,411 by the 60-day collection period, we arrive at a receivables figure of $624,660.
5. Current debt is 75.1 percent of net worth ($1,000,000) or $751,000.
6. Current assets are 1.9 times current debt (as shown by the current ratio) or $1,426,900.
7. Subtracting $751,000 current debt from $1,426,900 current assets, we can establish that working capital is $675,900.
8. Dividing $624,660 receivables by $675,900, the working capital, we find that the ratio of trade receivables to working capital is 92.4 percent.

Illustrative problem

How would your answer change if the current ratio is 2.5 instead of 1.89?

Group exercise

Suppose that for this industry, the inventory turnover (net sales/inventory) is 4x. Compute the ratio of inventory to working capital and the quick ratio.

Guidelines to use in applying ratio analysis

- Ignore isolated figures; financial balance is relative.
- Compare likes; ratios of a company under study must be related to averages for the line of business in which the particular concern is engaged.
- Study any substantial deviation from normal, either high or low.
- Avoid concentration on astronomically high percentages or spectacular variances; the significant ratios may be less sensational in appearance.
- Remember that a ratio measures both components, the numerator and denominator.
- Recognize the seasonal factor and make appropriate allowance for it.
- Watch for trends.
- Be alert to compensating advantages—offsetting strengths in other financial areas.

Knowledge check

6. When conducting an analysis of financial statements, it is important to take corrective action by attacking the

    a. Underlying cause of the problems.
    b. Symptoms of the problem as indicated by the effect ratios.
    c. Profit ratios first and foremost.
    d. Bankers.

Review questions

1. What is the major advantage of the cause-and-effect ratio system?

2. What is the purpose of an industry analysis?

Chapter 6

Case Studies

Learning objective

- Recall measures that are useful in the analysis of financial statements and data.

The following four case studies provide examples of financial information upon which liquidity, leverage, profitability, and casual calculations may be performed. The first two case studies also contain example ratio summary and analysis. Considering this information, what problem areas regarding each company's financial health exist?

Two discussion cases are also provided, followed by questions related to the financial condition of the subject company.

Case study 1: Paper products company

Paper products company				
	20X0	20X1	20X2	20X3
Cash	$550,000	$450,000	$150,000	$ 50,000
Receivables	800,000	750,000	750,000	700,000
Inventory	900,000	850,000	850,000	800,000
All other	250,000	250,000	250,000	250,000
Total current	2,500,000	2,300,000	2,000,000	1,800,000
Fixed	1,500,000	1,450,000	1,400,000	1,300,000
All other	500,000	500,000	400,000	300,000
Total assets	$4,500,000	$4,250,000	$3,800,000	$3,400,000
Due banks	$ 400,000	$ 400,000	$ 400,000	$ 400,000
Due trade	400,000	500,000	700,000	1,050,000
Taxes	100,000	-0-	-0-	-0-
All other	-0-	-0-	-0-	-0-
Total current	900,000	900,000	1,100,000	1,450,000
Long-term liabilities	600,000	550,000	500,000	450,000
Total liabilities	1,500,000	1,450,000	1,600,000	1,900,000
Net worth	3,000,000	2,800,000	2,200,000	1,500,000
Total	$4,500,000	$4,250,000	$3,800,000	$3,400,000
Net sales	$9,000,000	$8,500,000	$8,000,000	$7,500,000
Net profit	300,000	(200,000)	(600,000)	(700,000)
Working capital	1,600,000	1,400,000	900,000	350,000

Paper products company (continued)					
	20X0	20X1	20X2	20X3	Industry average
Liquidity measures					
Current ratio	2.8×	2.6×	1.8×	1.2×	2.5×
Inventory to working capital	56%	61%	94%	229%	68%
Receivables to working capital	50%	54%	83%	200%	39%
Net sales to working capital	5.6×	6.1×	8.9×	21.4×	5.9×
Leverage and profitability measures					
Current liabilities to net worth	30.0	32.1%	50.0%	96.7%	29.6%
Total liabilities to net worth	50.0%	51.8%	72.7%	126.7%	60.3%
Net profit to net worth	10.0%	(7.1%)	(27.3%)	(46.7%)	8.6%
Causal ratios					
Fixed assets to net worth	50.0%	51.8%	63.6%	86.7%	55.9%
Net sales to net worth	3.0×	3.0×	3.6×	5.0×	2.5×
Net profit to net sales	3.3%	(2.4%)	(7.5%)	(9.3%)	3.5%
Net sales to inventory	10.0×	10.0×	9.4×	9.4×	9.2×
Collection period	32 days	32 days	34 days	34 days	33 days
Miscellaneous assets to net worth	25%	27%	29%	37%	16%

Case study 1: Causal ratio summary

- *Fixed assets to net worth* – With 86.7 percent against an industry average of 55.9 percent, the company appears to have excess investment in fixed assets relative to capital. This ratio is "bad" or at best "doubtful."
- *Net profit to net sales* – Loss of 9.3 percent on each dollar of sales, in contrast with the industry average profit of 3.5 percent, certainly reflects an alarming situation and immediately places their performance in the "bad" category.
- *Net sales to net worth* – With a trading ratio of 5 times per year in contrast to the industry average of 2.5, this measure points to an overtrading situation and should prompt the analyst to mark this ratio, too, as "bad."
- *Miscellaneous assets to net worth* – The present investment of 37 percent in this area is more than twice as large as the industry average of 16 percent. Any such major variance requires investigation; thus, a preliminary assessment of this ratio shows it as "bad."

Case study 2: National west airline

National west airline					
	20Y5	20Y6	20Y7	20Y8	20Y9
Assets					
Cash	$76,600	$26,049	$63,490	$66,780	$90,997
Marketable securities	0	0	4,958	12,877	19,705
Accounts receivable (net)	22,060	66,352	44,904	66,360	70,294
Parts and supplies	6,114	14,755	17,857	22,467	30,782
Prepaid expenses	9,933	15,047	15,063	26,940	39,360
Total current assets	114,707	122,203	146,272	195,424	251,138
Net property and equipment	206,583	401,751	470,389	613,789	867,968
Restricted cash	49,018	33,974	7,300	6,640	30,076
Other assets	15,098	14,327	15,516	20,032	16,074
Total assets	$385,406	$572,255	$639,477	$835,885	$1,165,256
Liabilities and equity					
Accounts payable	$17,420	$41,104	$37,422	$64,363	$111,974
Accrued wages	3,378	3,661	9,078	11,232	13,119
Accrued interest	4,551	6,798	7,269	12,298	18,346
Accrued taxes	4,867	9,199	12,167	14,718	16,760
Current portion of long-term debt	12,158	19,816	20,717	28,864	50,827
Other	22,156	40,042	67,225	82,833	134,783
Total current liability	64,530	120,620	153,878	214,308	345,809
Long-term debt	263,034	405,856	427,707	534,465	798,397
Net worth	57,842	45,779	57,892	87,112	21,050
Total liabilities and equity	$385,406	$572,255	$639,477	$835,885	$1,165,256
Operating revenues*	$328,926	$575,447	$775,675	$993,409	$1,315,804
Net income	3,027	(45,675)	13,111	29,324	(74,671)

* In 20Y6 revenues were $575,447 (not shown above). By 20Y9, revenues had grown to $1,315,804, which is a 3-year annual compound growth rate of 31.7 percent.

National west airline (continued)						
	20Y5	20Y6	20Y7	20Y8	20Y9	Ind.**
Liquidity						
Current ratio	1.78	1.01	0.95	0.91	0.73	1.36
Receivables/current assets*	19.2%	54.3%	30.7%	33.9%	28.0%	40.7%
Inventory/current assets*	5.3%	12.1%	12.2%	11.5%	12.3%	1.8%
Sales/current assets*	286.8%	470.9%	530.3%	508.3%	523.9%	235.6%
Debt						
Debt to net worth	566.3%	1,150.0%	1,004.6%	859.6%	5,435.7%	172.3%
Current debt/net worth	111.6%	263.5%	265.8%	246.0%	1,642.7%	91.9%
Profits						
ROE	5.2%	(99.8%)	22.6%	33.7%	(354.7%)	9.1%
Causal						
Fixed assets/net worth	357.2%	877.6%	812.5%	704.6%	4,123.4%	92.9%
Collection period	24.1 days	41.5 days	20.8 days	24.0 days	19.2 days	62.2 days
Inventory turnover	53.8x	39.0x	43.4x	44.2x	42.7x	26.3x
Net sales/net worth	5.68x	12.57x	13.4x	11.4x	62.5x	2.95x
Profit margin	0.9%	(7.9%)	1.7%	3.0%	(5.7%)	3.1%
Misc. assets/net worth	43.3%	64.2%	52.8%	53.9%	263.3%	N/A

* For these three ratios, receivables, inventory, and sales are generally divided by the working capital. However, working capital is negative, so we use current assets in the denominator. The interpretation is very similar.
** Per Dun and Bradstreet.

National west airline

Analysis

- *Liquidity* – The company's quantity of liquidity, as measured by the current ratio, has declined over this three-year period and is well below the industry average of 1.36. This pattern can also be seen in the sales to the current asset ratio, which is considerably above the industry average.
- *Debt* – The company's debt ratios each year are very large and considerably above average.
- *Profits* – The return on equity is very high in 20Y7 and 20Y8. However, a recession hits in 20Y9, and the company loses a lot of money.
- *Causes* – This is a classic case of a company that has grown too quickly. The fixed assets to net worth ratio and the trading ratio are *considerably* larger than the industry averages.

Case study 3: Firm A

Firm A (in 000s) – Selected figures					
	200V	200W	200X	200Y	200Z
Cash	$27,256	$25,205	$137,106	$185,561	$40,691
Trade receivables (net)	682,641	895,542	768,756	555,394	305,467
Inventory	1,892,830	2,342,941	2,331,676	1,634,425	646,842
Current assets	2,648,711	3,265,769	3,427,419	2,672,003	1,656,178
Fixed assets (net)	889,723	1,039,147	1,277,239	1,360,792	965,638
Other assets	68,000	124,400	231,400	146,062	131,673
Current liabilities	1,438,891	1,873,371	2,480,230	1,846,039	1,135,247
Long-term liabilities	932,541	948,170	1,327,068	1,984,981	2,015,346
Total liabilities	2,439,957	3,098,402	4,147,003	3,842,348	3,666,155
Net worth	1,876,148	2,149,073	1,696,455	1,501,880	32,629
Net sales	6,664,347	8,392,042	6,311,804	6,297,915	4,292,304
Net profit	186,680	369,562	397,328	(393,128)	(1,638,193)
Working capital (CA-CL)	1,209,820	1,392,398	947,189	825,964	520,931

Firm A (in 000s) – Selected figures (continued)					
	200V	200W	200X	200Y	200Z
Causal ratios					
Fixed assets to net worth	.47x	.48x	.75x	.91x	29.6x
Collection period	37 days	38 days	44 days	32 days	26 days
Net sales to inventory	3.52x	3.58x	2.7x	3.85x	6.6x
Net sales to net worth	3.55x	3.90x	3.72x	4.19x	131.5x
Net profits to net sales	2.8%	4.4%	6.3%	(6.24%)	(38.2%)
Misc. assets to net worth	3.6%	5.8%	13.6%	9.7%	403.5%
Effect ratios					
Current assets to current liabilities	1.84x	1.74x	1.38x	1.45x	1.46x
Current liability to net worth	76.7%	87.2%	146.2%	122.9%	3,479.3%
Total liability to net worth	130.1%	144.2%	244.5%	255.8%	11,235.9%
Inventory to working capital	156.5%	168.3%	246.2%	197.9%	124.2%
Trade receivables to working capital	56.4%	64.3%	81.16%	67.2%	58.6%
Long-term liabilities to working capital	77.1%	68.1%	140.1%	240.3%	386.9%
Net profit to net worth	9.9%	17.2%	23.4%	(26.2%)	(5,020.6%)
Net sales to fixed assets	7.49x	8.08x	4.94x	4.63x	4.45x
Net sales to working capital	5.51x	6.03x	6.66x	7.62x	8.24x

Case study 4: Store container corporation

Store container corporation balance sheet (millions of dollars)			
December 31,	200X	200Y	200Z
Assets			
Cash and equivalent	$8,290	$3,880	$15,400
Receivables	123,860	127,950	243,140
Inventories	152,660	148,350	238,210
Other current	38,440	40,000	33,710
Total current	323,250	320,180	530,460
Net property, plant, and equipment	657,660	642,560	924,360
Other assets	25,750	47,580	68,780
Total assets	$1,006,660	$1,010,320	$1,523,600
Liabilities and stockholders' equity			
Notes payable	$62,200	$57,630	$7,330
Accounts payable	53,000	57,970	105,250
Income taxes payable	3,740	4,120	5,880
Other current	45,440	45,410	84,950
Total current	164,380	165,130	203,410
Long-term debt	491,330	501,250	768,490
Deferred taxes	55,800	49,210	69,900
Total long-term debt	547,130	550,460	838,390
Total liabilities	711,510	715,590	1,041,800
Common stock	147,390	152,170	222,360
Retained earnings	147,760	142,560	163,250
Total common equity	295,150	294,730	385,610
Preferred stock	–	–	96,190
Total liabilities & equity	$1,006,660	$1,010,320	$1,523,600

Store container income statement (millions of dollars) (continued)			
Sales	200X	200Y	200Z
Net sales	$1,244,390	$1,229,150	$2,032,320
Other income	7,110	4,600	10,850
Total	1,251,500	1,233,750	2,043,170
Costs and expenses			
Cost of sales	925,870	944,150	1,564,610
Selling and administrative expenses	147,640	156,990	241,180
Depreciation and amortization	63,380	67,810	92,310
Interest expense	59,280	63,310	85,340
Total	1,196,170	1,232,260	1,983,440
Income (loss) before taxes	55,330	1,490	59,730
Provision (credit) for income taxes	21,670	(2,290)	24,320
Net income	$33,660	$3,780	$35,410

Store container corporation key ratios 200X-200Z				
Ratio	200X	200Y	200Z	Industry
Liquidity				
CA/CL	1.97×	1.94×	2.61×	1.80×
Cash + receivables/CL	0.80×	0.80×	1.27×	0.90×
Receivables/working capital	78.00%	83.00%	74.00%	69.00%
Inventory/working capital	96.00%	96.00%	73.00%	72.00%
Debt				
TL/equity	241.07%	242.80%	270.17%	129.10%
CL/equity	55.69%	56.03%	52.75%	50.90%
EBIT/interest	1.93×	1.02×	1.70×	5.76×
Profitability				
Net income/sales	2.71%	0.31%	1.74%	2.50%
Sales/total assets	1.24×	1.22×	1.33×	1.68×
Total assets/equity	3.41×	3.43×	3.95×	3.26×
Net income/equity	11.400%	1.280%	9.180%	13.70%
Causal				
Fixed assets/equity	222.82%	218.01%	239.71%	110.00%
Collection period	36.33 days	38.00 days	43.67 days	38.90 days
Sales/inventory	8.15×	8.29×	8.53×	12.30×
Sales/equity	4.22×	4.17×	5.27×	2.63×
Net income/sales	2.71%	0.30%	1.74%	5.20%
Miscellaneous assets/equity	8.72%	16.14%	17.83%	7.95%

Discussion case 1

Best Buy Company, Inc. Analyze this company's financial condition					
	Year 1	Year 2	Year 3	Year 4	Year 5
Assets					
Cash	$23,830	$27,063	$112,789	$7,138	$59,872
Receivables	7,318	8,716	15,981	37,968	52,944
Inventory	92,991	95,684	135,838	249,991	637,950
Prepaid expenses	3,224	7,602	856	332	756
Other current assets	642	541	7,627	9,497	13,088
Total	128,005	139,606	273,091	304,926	764,610
Net plant and equipment	27,359	39,572	58,250	126,442	172,724
Other assets	1,423	6,350	5,877	7,774	15,160
Total assets	$156,787	$185,528	$337,218	$439,142	$952,494
Liabilities					
Current portion of long-term debt	$2,598	$4,444	$38,096	$5,740	$8,899
Notes payable	0	0	4,174	8,571	11,156
Account payable	29,710	41,900	68,670	118,338	294,060
Taxes payable	3,223	2,178	1,496	6,545	11,694
Accruals	9,948	11,770	19,514	30,571	57,073
Other	4,128	14,691	14,324	16,240	19,146
Total current liabilities	49,607	74,983	146,274	186,005	402,028
Long-term debt	35,099	35,381	14,884	48,130	210,811
Other liabilities	5,931	18,423	18,492	22,724	28,211
Net worth	66,150	56,741	157,568	182,283	311,444
Total	$156,787	$185,528	$337,218	$439,142	$952,494
Revenues	$512,850	$664,823	$929,692	$1,619,978	$3,006,534
Net income	5,683	(9,457)	9,601	19,855	41,285

Best Buy Co., Inc. Analyze this company's financial condition (continued)						
	Year 1	Year 2	Year 3	Year 4	Year 5	Industry average
Liquidity						
Current ratio	2.58×	1.86×	1.87×	1.63×	1.90×	2.10×
Quick ratio	0.71×	0.58×	0.93×	0.30×	0.32×	0.60×
Receivables to working capital	9.30%	9.30%	13.50%	12.60%	14.60%	14.00%
Inventory to working capital	118.60%	122.10%	210.20%	197.10%	176.00%	124.00%
Debt						
Debt to equity	137.00%	226.90%	114.00%	140.90%	205.80%	77.50
Current debt to equity	75.00%	132.10%	92.80%	102.00%	129.10%	55.70%
Times interest earned (given)	12.51×	2.40×	12.64×	26.75×	29.18×	N/A
Causal ratios						
Fixed assets to net worth	41.40%	69.70%	36.90%	69.40%	55.50%	33.40%
Net sales to net worth	7.75×	11.72×	5.90×	8.89×	9.65×	4.56×
Profit margin	1.10%	(1.40%)	1.03	1.23	1.37	3.20
Net sales to inventory	5.52×	6.95×	6.84×	6.48×	4.71×	6.50×
Collection period (days)	5.14	4.72	6.19	8.44	6.34	11.00
Misc. assets to net worth	8.00%	25.50%	9.11%	9.66%	9.31%	N/A
DuPont analysis						
Profit margin	1.10%	(1.40%)	1.03	1.23	1.37	3.20
Asset turnover	3.27	3.58	2.75	3.69	3.16	2.03
ROA	3.60%	(5.02%)	2.85	4.53	4.32	6.50
Equity multiplier	2.37	3.26	2.14	2.40	3.05	2.29
ROE	8.53%	(16.64%)	6.07	10.87	13.24	14.89

Knowledge check

1. Over the five-year period, the relative quantity of Best Buy's liquidity has

    a. Increased.
    b. Decreased.
    c. Not changed materially.
    d. Cannot be determined.

2. The quality of Best Buy's liquidity has _____ over the five-year period.

    a. Deteriorated.
    b. Improved slightly.
    c. Improved considerably.
    d. Not changed.

3. Best Buy can be considered

    a. An overtrader.
    b. An undertrader.
    c. A company with a collection period problem.
    d. All of the above.

Discussion case 2

Biscayne apparel balance sheet			
	200X	200Y	200Z
Assets			
Cash	$1,568	$4,178	$312
Receivables	14,401	21,009	18,271
Inventory	8,419	22,584	25,890
Other	337	1,573	3,941
Total current assets	24,725	49,344	48,414
Property, plant, and equipment	2,098	2,984	3,652
Other assets	7,968	8,250	9,676
Total assets	$34,791	$60,578	$61,742
Liabilities			
Accounts payables	$2,343	$6,060	$3,841
Accruals	3,384	6,841	5,914
Notes payables	2,850	8,500	17,850
Current portion of long-term debt			1,250
Bridge note	–	4,776	–
Total current liabilities	8,577	26,177	28,855
Notes payable	6,444	7,944	6,444
Long-term debt	–	–	6,250
Other	210	576	358
Net worth	19,560	25,881	19,835
	$34,791	$60,578	$61,742
Revenue	$65,258	$72,350	$100,294
Net income	3,895	2,048	(6,127)

Biscayne apparel ratios (continued)				
	200X	200Y	200Z	Industry average
Liquidity				
Defensive interval	95.70	137.00	76.20	57.50
Current ratio	2.88	1.89	1.68	2.02
Quick ratio	1.90	1.02	0.78	1.18
Receivables to working capital	0.89	0.91	0.93	0.70
Inventory to working capital	0.52	0.97	1.32	0.83
Debt				
Debt to equity	0.78	1.34	2.11	1.00
Current debt to equity	0.44	1.01	1.45	0.77
Times interest earned	5.74	3.19	(1.39)	N/A
DuPont				
Profit margin	6.00%	3.00%	(6.00%)	4.00%
Asset turnover	1.88×	1.19×	1.62×	2.98×
ROA	11.28%	3.57%	(9.72%)	11.92%
Equity multiplex	1.78×	2.34×	3.11×	2.00×
ROE	20.08%	8.35%	(30.23%)	23.84%
Causal				
Fixed assets to net worth	10.70%	11.50%	18.40%	34.00%
Collection period (days)	79.40	104.50	65.60	33.50
Net sales to inventory	7.75×	3.20×	3.87×	9.10×
Net sales to net worth	3.34×	2.80×	5.06×	5.94×
Net profit to net sales	6.00%	3.00%	(6.00%)	4.00%
Misc. assets to net worth	0.00%	6.00%	8.00%	10.00%

Knowledge check

4. Biscayne has _____ leverage.

    a. Excessive.
    b. Inadequate.
    c. The right amount of.
    d. The wrong kind of.

5. To improve Biscayne's profit margin, what action would you suggest?

    a. Increase sales.
    b. Cut expenses.
    c. Downsize.
    d. None of the above would likely fix the problem.

Illustrative exercise

Describe causes of the Biscayne Company's financial problems.

Chapter 7

Users of Financial Statements

Learning objective

- Recognize the ratios creditors use to analyze a set of financial statements.

Introduction

In this section, we examine the different ways in which creditors and owners look at a set of financial statements. Creditors are more balance sheet oriented. Owners and managers are more income statement oriented.

Ratios examined by banks for short-term loans

Short-term creditors are primarily interested in the balance sheet, which shows the firm's current financial condition. These six ratios are commonly used for this purpose:

- Liquidity ratios such as the current ratio
- Cash and equivalents plus trade receivables to current debt
- Receivables to average day's net sales
- Inventory turnover or supply in days
- Debt to (tangible) net worth
- Net fixed assets to (tangible) net worth

Lenders and creditors are concerned with two things: the borrower's ability to repay and the security in case the borrower cannot repay.

Given these facts, how does a creditor view financial information? The answer depends upon whether we are dealing with short-term or long-term debt.

Knowledge check

1. When a company applies for a "short-term" bank loan, the ratios that the loan officer is most likely to base the loan decision on are

    a. Profit ratios.
    b. Liquidity ratios.
    c. Stock market ratios.
    d. All ratios.

Ratios examined by banks for long-term loans

The importance of the income statement increases with the length of the loan. Bankers place more emphasis on liquidity for short-term loans. Note that the first six ratios are the same as for short-term credit. With long-term credit notice, now income statement ratios become more important.

- Liquidity ratios such as the current ratio
- Cash and equivalents plus trade receivables to current debt
- Receivables to average day's net sales
- Inventory turnover or supply in days
- Debt to (tangible) net worth
- Net fixed assets to (tangible) net worth

As the duration of a loan increases, the importance of the income grows.

- Net profit margin
- Return on equity
- Net sales to net worth
- Accounts payable turnover
- Debt to assets ratio
- Debt to equity ratio
- Times interest earned ratio
- Fixed charge coverage ratio

Most important financial ratios for commercial loan departments

Ratio	Primary measure
Debt/equity	Debt
Current ratio	Liquidity
Cash flow/current maturities of long-term debt	Debt
Fixed charge coverage	Debt
Net profit margin after tax	Profitability
Times interest earned	Debt
Net profit margin before tax	Profitability
Degree of financial leverage	Debt
Inventory turnover in days	Liquidity
Accounts receivable turnover in days	Liquidity

Gibson's study

For his *Financial Statement Analysis: Using Accounting Information* (2013), pp. 483–485), Dr. Charles Gibson of Stanford University conducted a survey of loan officers at large banks. Gibson asked bankers to rank over 50 ratios based upon their importance when examining loan applications. The ratios listed above were deemed to be the most important ones. The significance number was a relative ranking procedure. A high significance number means that the relative importance of a particular ratio is large across the sample of credit analysts in the study. Notice that liquidity and debt ratios are heavily emphasized.

In addition to the previous ratios, many bankers will require more detailed information about specific accounts.

Commercial loan departments' ratios appearing most frequently in loan agreements

Creditors generally place certain restrictions on borrowers. Quite often these restrictions are in the form of ratios. Gibson's study points out the most common ratio restrictions.

Ratio	Primary measure
Debt/equity	Debt
Current ratio	Liquidity
Dividend payout ratio	*
Cash flow/current maturities of long-term debt	Debt
Fixed charge coverage	Debt
Times interest earned	Debt
Degree of financial leverage	Debt
Equity/assets	Debt
Cash flow/total debt	Debt
Quick ratio	Liquidity

Knowledge check

2. The two ratios that most likely appear in a loan agreement are

    a. Debt/equity and current ratio.
    b. Profit margin and return on equity.
    c. PE ratio and market to book ratio.
    d. The quick ratio and the times interest earned ratio.

Corporate controllers' most significant ratios

Ratio	Primary measure
Earnings per share	Profitability
Return on equity	Profitability
Net profit margin	Profitability
Debt/equity ratio	Debt
Net profit margin before tax	Profitability
Return on total invested capital after tax	Profitability
Return on assets after tax	Profitability
Dividend payout ratio	Other*
Price/earnings ratio	Other*
Current ratio	Liquidity

Dr. Gibson also surveyed controllers of large corporations. He asked them to rank ratios based upon their importance to their company.

Managers are concerned with profitability first and liquidity and debt second. This contrasts with the view taken by creditors. Corporate controllers were asked to rank the usefulness of ratios.

Ratios most often appearing in corporate objectives and their primary measures

Ratio	Primary measure
Earnings per share	Profitability
Debt/equity ratio	Debt
Return on equity after tax	Profitability
Current ratio	Liquidity
Net profit margin after tax	Profitability
Dividend payout ratio	Other
Return on total invested capital after tax	Profitability
Net profit margin before tax	Profitability
Accounts receivable turnover in days	Liquidity
Return on assets after tax	Profitability

Illustrative problem

After reviewing the information in this chapter, what are the primary differences in the ways that lenders view financial ratios versus others?

Review questions

1. Why do lenders differentiate between short-term and long-term credit? How is this differentiation reflected in the ratios that they use to analyze financial statements?

2. What would a creditor consider when looking at the following accounts?

    a. Accounts receivable and notes receivable

    b. Intangible assets

    c. Long-term liabilities

    d. Contingent liabilities

3. What are the dominant ratios looked at by owners and managers? Why are owners and managers concerned with these particular ratios? How do these ratios compare with those that are of the most interest to creditors?

Chapter 8

Forecasting Sustainable Growth

Learning objectives

- Recognize how growth can put a firm's balance sheet out of order.
- Identify the factors that would determine how much external financing is needed.

Introduction

This section develops a simple forecasting model that permits the analyst to determine how fast a growth pattern a company can sustain. This approach can be a valuable planning tool.

Definitions

SA **Spontaneous assets** – These are assets that generally need to increase as sales increase. They include most of the current assets, but not short term investments.

ΔFA **Change in net fixed assets** – This includes new, fixed asset acquisitions, less depreciation expenses.

PO **Payout ratio** – This is the proportion of earnings paid out as a dividend. The retention ratio is (1 – PO).

PM **Profit margin** – This is often called the net profit margin and is net income divided by net sales revenue.

EFN **External financing needed** – This is the amount of additional long-term financing needed from external debt and equity sources.

Derivation of the sustainable growth model

The model comes from the equation used in the sales method forecasting model.

$$(1)\quad EFN = \frac{SA}{S}\Delta S + \Delta FA - \frac{SL}{S}\Delta S - (S + \Delta S)(PM)(1 - PO)$$

An expression for new debt and new assets can be set up that equals our target debt to asset ratio for the increased business.

$$(2)\quad D/A = \frac{EFN + \frac{SL}{S}\Delta S}{\frac{SA}{S}\Delta S + \Delta FA} = \frac{\text{New Debt}}{\text{New Assets}}$$

By substituting the value of EFN from (1) into (2) and solving for ΔS, we can obtain the solution.

$$(3)\quad \Delta S = \frac{\Delta FA(1 - D/A) - S(PM)(1 - PO)}{\frac{SA}{S}(D/A - 1) + (PM)(1 - PO)}$$

By plugging in the values that we know, we can determine the maximum ΔS with our desired D/A ratio as a constraint.

Most companies place some limit on the amount of debt they are willing to assume. In addition, raising new equity capital is difficult and may be virtually impossible for most small businesses. Thus, as long as a target debt to asset ratio is not to be exceeded, growth is limited.

In order to determine the maximum growth potential for a given time period, one must begin with a determination of the amount of equity that can be raised internally. This amount depends upon the new sales level (which depends on the amount of internally generated equity). This joint dependence between the new sales level and new equity can be solved only with simultaneous equations:

- The model takes the EFN equation.
- Assumes that the company wants to limit its debt to asset ratio.
- Finds the maximum amount of sales growth:
  - Sales growth requires assets.
  - Assets require debt or equity or both.
  - Limited equity and desire to limit the debt to assets ratio limits the amount of new assets.
  - The limit on assets in turn limits sales.

The Alabama door company

20X7 balance sheet			
Cash	$5,000	Accounts payable	$3,000
Marketable securities	5,000	Taxes payable	12,000
Accounts receivable	10,000	Accruals	3,500
Inventory	35,000		
		Total	18,500
Total	55,000		
		Notes payable (8%)	15,000
Building	100,000	Bonds payable (12%)	30,000
Equipment	15,000	Common stock	48,000
		Retained earnings	58,500
Total assets	$170,000	Total debt and equity	$170,000

Selected income statement figures 20X7	
Sales	$245,000
Net income	19,008
Dividends	15,000

Assumptions

- Assume that $5,000 of new fixed assets are required.
- The Alabama Door Company wants to maintain its 37.4 percent debt to asset ratio.

Class exercise

- Compute the Alabama Door Company's maximum growth rate for 20X8 if no new externally generated equity is available.
- Recompute the Alabama Door Company's maximum growth rate for 20X8, assuming that $20,000 of new fixed assets are required.

Calculation of Alabama door growth rate

$$\Delta S = \frac{\Delta FA(1 - D/A) - S(P.M.)(1 - P.O.)}{\frac{SA}{S}(D/A - 1) + (P.M.)(1 - P.O.)}$$

$$\Delta S = \frac{5{,}000(1 - .375) - (245{,}000)(.07758)(1 - .7891)}{\frac{50{,}000}{245{,}000}(.374 - 1) + (.07758)(1 - .7891)}$$

$$\Delta S = \frac{-879}{-.1113935} = \$7{,}891$$

- The Alabama Door Company can have a sales increase of $7,891 with the $5,000 increase in fixed assets and the debt to asset ratio remaining at 37.4 percent. Growth beyond $7,891 will require new equity or a relaxation of the debt to asset constraint.
- If fixed assets must increase by $20,000, ΔS becomes negative, implying that assets cannot increase by the specified amount without new equity or a relaxation of the debt to asset constraint.

Improving sustainable growth

1. What would happen to ΔS if the profit margin increased to, say, 10 percent?

$$\Delta S = \frac{5{,}000(1-.375)-(245{,}000)(.10)(1-.7891)}{\frac{50{,}000}{245{,}000}(.374-1)+(.10)(1-.7891)}$$

$$\Delta S = \frac{3{,}130-5{,}167}{-0.12776+.02109} = \frac{-2037}{-.10667} = \$19{,}096$$

2. What would happen to ΔS if the payout ratio dropped to 50 percent as well as the change in (1) above?

$$\Delta S = \frac{5{,}000(1-.374)-(245{,}000)(.10)(1-.5)}{\frac{50{,}000}{245{,}000}(.374-1)+(.10)(1-.5)}$$

$$\Delta S = \frac{3{,}130-12{,}250}{-.12776+.05} = \frac{-9{,}120}{-.07776} = \$117{,}284$$

Knowledge check

1. If a company can increase its profit margin, its sustainable growth will

    a. Increase.
    b. Decrease.
    c. Not be able to be determined.
    d. Not change.

Sustainable growth: Available external equity

In some instances external equity is available to finance growth. Existing stockholders or new stockholders (partners) may have a fixed sum of equity to invest in the company.

If we define the amount of externally generated equity to be EE, then the growth formula becomes as follows:

$$\Delta S = \frac{\Delta FA(1-D/A) - S(P.M.)(1-P.O.) - EE}{\frac{SA}{S}(D/A-1) + (P.M.)(1-P.O.)}$$

If we return to the example of the Alabama Door Company, part 1, the growth in sales can be computed for the case in which $10,000 of external equity is available.

$$\Delta S = \frac{5{,}000(1-.374) - (245{,}000)(.07758)(1-.7891) - 10{,}000}{\left(\frac{50{,}000}{245{,}000}\right)(.374-1) + (.07758)(1-.7891)}$$

$$\Delta S = \$97{,}663$$

The change in sales for this example is considerably larger than that which could be afforded when no external equity was available. The increased equity allows for more debt financing while still keeping the debt to asset ratio at 37.4 percent. The increased debt and equity permits assets to grow sufficiently to support the larger sales volume.

Knowledge check

2. When owners add equity to a company, its sustainable growth will

    a. Increase.
    b. Decrease.
    c. Not be able to be determined.
    d. Not change.

Chapter 9

Forecasting Bankruptcy

Learning objectives

- Identify the ratios to be used in both of Altman's models for bankruptcy prediction.
- Recognize how a Z-score determines the likelihood of bankruptcy.

Introduction

The purpose of this section is to provide you with a way to forecast bankruptcy using five simple ratios to determine a Z-score for any firm. The ratios used to determine the Z-score are working capital to total assets, retained earnings to total assets, E.B.I.T. to total assets, the market value of the firm's equity to the book value of its debt, and sales to total assets. The Z-score is a measure of overall financial health.

Altman's bankruptcy prediction formula

$Z = .012X_1 + .014X_2 + .033X_3 + .006X_4 + .999X_5$

X_1 = working capital/total assets

X_2 = retained earnings/total assets

X_3 = earnings before interest and taxes/total assets

X_4 = total equity/total debt

X_5 = sales/total assets

Z = overall index

Altman's suggested Z-score cutoff

If Z is	*This indicates*
Less than 1.81	A problem
Between 1.81 and 2.99	Concern
Greater than 2.99	No problem

The Z-score was developed using a statistical procedure called discriminant analysis. This procedure allows the statistician to find variables that distinguish between groups. In this case the procedure found five ratios that distinguish between bankrupt and non-bankrupt companies. The coefficients in front of the X variables come from the statistical procedure.

Computational note

Variables X_1 to X_4 are to be computed as a percent, not as a decimal. For example, if X_1 is 21.8 percent, put it in the model as 21.8, not as 0.218.

Usage notes

The Z-score is a good measure of overall health. Do not become too hung-up on Altman's 1.81 cutoff. Observe how the Z-score varies across time. I would be less worried about a company whose Z-score remains between 1.70 and 1.85 for the last 10 years than about a firm that dropped from 2.8 to 1.95 in 1 year. Use your judgment regarding this ratio.

Knowledge check

1. A company's liquidity is considered in the Altman Z-score in variable

    a. X_1.
    b. X_2.
    c. X_3.
    d. X_4.

2. Suppose retained earnings were $4,000 and total assets were $100,000. Variable X_2 would be 4 percent. If written as a decimal, it would be 0.04. Which 2 numbers would you multiply by the coefficient 0.014?

    a. 4.0.
    b. 0.04.
    c. 400.
    d. 4,000.

Bankruptcy prediction example

Crystal Brands, Inc. selected financial data (in 000)					
	20X5	20X6	20X7	20X8	20X9
Net sales	$857,241	$868,465	$826,876	$486,893	$444,302
EBIT	84,758	84,393	(19,345)	1,103	(87,379)
Current assets	351,726	363,880	350,048	245,744	155,245
Current liabilities	167,558	172,179	199,761	77,165	313,392
Total assets	682,528	688,138	659,437	486,309	248,437
Total debt	444,779	421,963	465,946	362,128	340,556
Retained earnings	47,161	74,235	1,019	(66,801)	(282,917)
Number of shares	9,078	9,098	9,116	9,117	9,117
Market price/share	33.03	21.06	14.00	4.03	1.07
X_1	26.98%	27.86%	22.79%	34.66%	(63.66%)
X_2	6.91%	10.79%	0.15%	(13.74%)	(113.88%)
X_3	12.4%	12.2%	(2.9%)	(0.2%)	(35.17%)
X_4	67.41%	45.41%	27.39%	10.15%	2.86%
X_5	1.26	1.26	1.25	1.00	1.79
Z	2.49	2.42	1.59	1.29	(1.71)

Knowledge check

3. A Z-score of 3.66 implies _____ financial health.

    a. Good.
    b. Poor.
    c. Average.
    d. Decreasing.

4. Suppose that the Perfect Company's Z-score dropped from 3.55 to 1.45 over a 3-year period. What could we conclude?

    a. Prefect's overall financial health had deteriorated.
    b. Perfect is too deeply in debt.
    c. Both of the above.
    d. Neither of the above.

Altman's second model

In 1983 Altman developed a second model that is, perhaps, more useful for small companies (service companies and manufacturers). Each variable is computed as a percent, not as a decimal.

$$Z' = 0.0656Y_1 + 0.0326Y_2 + 0.0672Y_3 + 0.0105Y_4$$

Where

Y_1 = working capital to total assets

Y_2 = retained earnings to total assets

Y_3 = earnings before interest and taxes to total assets

Y_4 = net worth to total liabilities

Critical values

$Z' \leq 1.1$	Concern
$1.1 < Z' < 2.6$	Grey Area
$2.6 \leq Z'$	Strong Company

Several other bankruptcy prediction models have been proposed. Altman's models may work as well as most others. However, if you would like an additional model to choose from, we recommend the following:

- Fulmer, J.G, J.E. Moon, T.A. Gavin, and J.M. Erwin, "A Bankruptcy Classification Model for Small Firms." *The Journal of Commercial Bank Lending*, July 1984, pp. 25–37.
- Altman, E.I, R.G. Haldeman, and P. Narayanan, "Zeta Analysis: A New Model to Identify Bankruptcy Risk of Corporations." *Journal of Banking and Finance*, June 1977, pp. 29–54.

Review questions

1. Outline the procedure for calculating and using a Z-score to forecast bankruptcy.

2. What ratios are used in a Z-score analysis? Why is each ratio used? What does each ratio indicate that helps to forecast bankruptcy?

3. What are the decision criteria used in a Z-score analysis? How were they determined?

Appendix A

CASE PROBLEM

Introduction

The purpose of this section is to allow you to pull the information together and work with the systems explained earlier today. The problem allows you to use the causal ratios and the DuPont system of ratio analysis and to compare the results from the two systems. You must also use the percent of sales method to forecast the external financial needs of the company. Last, you must prepare *pro forma* statements under different financing alternatives to see the effect that this type of external financing has on the causal ratios and the DuPont system.

Marine supply company balance sheet

	Year 1	Year 2	Year 3	Year 4
Cash	$12,100	$17,400	$19,500	$17,480
Receivables	31,400	35,600	46,500	53,700
Inventories	64,700	79,000	100,800	97,320
Total current assets	108,200	132,000	166,800	168,500
Net plant	46,200	58,600	68,900	72,020
Miscellaneous assets	10,700	11,900	12,700	15,440
Total assets	$165,100	$202,500	$248,400	$255,960
Liabilities and capital				
Accounts payable	$7,000	$15,200	$24,600	$24,530
Other current liabilities	23,500	26,900	35,000	36,750
Total current liabilities	30,500	42,100	59,600	61,280
Long-term debt	12,400	28,700	45,700	46,040
Deferred taxes	2,570	4,580	5,380	7,140
Other liabilities	2,030	1,520	2,570	1,050
Total liabilities	47,500	76,900	113,250	115,510
Net worth	117,600	125,600	135,150	140,450
Total	$165,100	$202,500	$248,400	$255,960

Marine supply company selected income figures

	Year 1	Year 2	Year 3	Year 4
Net sales	$233,400	$280,200	$327,100	$304,480
Gross profit	83,970	95,290	111,999	107,840
Earnings before interest and taxes	29,930	33,300	40,550	34,850
Interest	1,230	2,100	4,730	6,600
Net income	$15,230	$15,660	$17,080	$13,390
Dividend	6,070	7,660	7,530	8,090
Addition to net worth	$9,160	$8,000	$9,550	$5,300

Marine supply company selected financial ratios

Causal Ratios	Year 1	Year 2	Year 3	Year 4	Industry
Fixed assets to net worth	39.2%	46.7%	51.0%	51.3%	45.5%
Collection period *	49.1 days	46.4 days	51.9 days	64.4 days	44.0 days
Net sales to inventory	3.61x	3.55x	3.25x	3.13x	4.1x
Net sales to net worth	1.98x	2.23x	2.42x	2.17x	2.10x
Net profit to net sales	6.5%	5.6%	5.2%	4.4%	6.2%
Misc. assets to net worth	9.1%	9.5%	9.3%	10.9%	**
DuPont analysis					
Profit margin	6.5%	5.6%	5.2%	4.4%	6.2%
Asset turnover	1.41x	1.38x	1.32x	1.18x	1.5x
Return on assets	9.2%	7.7%	6.9%	5.2%	9.3%
Equity multiplier	1.402x	1.610x	1.841x	1.827x	1.376x
Return on equity	12.9%	12.4%	12.7%	9.5%	12.8%
Other ratios					
Current ratio	3.55x	3.14x	2.80x	2.74x	2.40x
Current liab. to net worth	25.94%	33.52%	44.10%	46.63%	20.10%
Debt to asset ratio	28.8%	37.9%	45.6%	45.1%	27.3%
Times interest earned	24.3x	15.8x	8.6x	5.3x	8.6x
Inventory to working capital	83.3%	87.8%	94.0%	90.7%	91.07%
Receivables to working capital	40.4%	39.6%	43.4%	50.1%	44.9%
Net sales to fixed assets	5.1x	4.8x	4.7x	4.2x	6.4x
Net sales to working capital	3.0x	3.1x	3.1x	2.8x	4.0x

* Assume all sales are credit sales
** Industry ratio unavailable

Case problem requirements

1. Discuss the causal ratios (as they relate to the other ratios) and point out this company's strengths and weaknesses. If you were Marine Supply's auditor, what advice would you give their management?

2. Discuss the DuPont system of ratio analysis for the Marine Supply Company. Are the conclusions different from those drawn using the causal ratios? What can you tell your client, Marine Supply, about this system of ratios?

3. Suppose that the United States Navy has proposed the purchase of $150,000 of marine supplies. This contract, if accepted, would be renewed year after year.

   Use the percent of sales method to forecast Marine Supply's external financing requirements. Marine Supply will need to purchase new plant and equipment at a cost of $100,000 to meet these sales. In applying the percent of sales method, use Year 4 balance sheet relationships.

Glossary of Controllership and Financial Management Terms

Absorption costing – A costing method that treats all manufacturing cost (direct materials, direct labor, variable overhead, and fixed overhead) as product costs. It is also referred to as full costing.

Accept or reject decision – Decision resulting from a relevant cost analysis concerning whether to accept or reject a special order.

Accounts payable turnover ratio – A liquidity measure that shows the number of times on average that accounts payable are paid during the period; calculated by dividing net credit purchases by average accounts payable during the period.

Accounts receivable turnover ratio – A liquidity measure that shows the number of times on average that accounts receivable are collected during the period; calculated by dividing net credit sales by average accounts receivable during the period.

Action analysis report – A report detailing the costs that have been assigned to a cost object, such as a product or a customer; it also shows how difficult it would be to adjust the cost if there were a change in activity.

Activity – An event that causes the consumption of overhead resources within an organization.

Activity cost pool – A "bucket" in which costs that relate to a single activity measure are accumulated within an activity-based costing system.

Activity measure – An allocation basis within an activity-based costing system which, under ideal conditions, measures the amount of activity that drives the costs in an activity cost pool.

Activity-based costing (ABC) – A costing method that focuses on individual activities as primary cost objects and uses the costs of these activities as the basis for assigning costs to other cost objects such as products and services.

Activity-based management (ABM) – A management approach that focuses on managing activities as a way of eliminating waste, reducing delays, and minimizing defects.

Administrative cost – Any executive, organizational, and clerical cost associated with the general management of an organization.

Amortization – The process of allocating the cost of an intangible asset over its estimated useful life.

Asset turnover rate – The sales divided by the average operating assets figure. It represents the amount of sales generated from each dollar invested in operating assets by an investment center.

Average age of inventory – The number of days on average that a company holds inventory before it is sold; calculated by dividing 365 days by the inventory turnover ratio.

Average collection period – The number of days on average that an account receivable remains outstanding; calculated by dividing 365 days by the accounts receivable turnover ratio.

Average payment period – The number of days on average that an account payable remains unpaid; calculated by dividing 365 days by the accounts payable turnover ratio.

Balanced scorecard – An integrated set of financial, customer, internal business processes, and learning and growth performance measures that is derived from and supports an organization's strategy.

Benchmarking – A study of organizations considered to be among the best in performing a particular task. Involves establishment, through data gathering, of targets and comparators, through whose use relative levels of performance can be identified.

Bottleneck – Any machine or other part of a process that limits the total output of an entire system.

Break-even point – The level of sales, in units or dollars, where profit is zero. It can also be defined as the point where total sales equals total fixed and variable costs, or the point where total contribution margin equals total fixed costs.

Budget – A detailed plan for the future acquisition and use of financial and other resources over a specified period of time, usually expressed in formal quantitative terms.

Business process – The series of steps followed when carrying out some task in a business.

Capital budgeting – The process of planning significant outlays on projects that have long-term implications, such as the acquisition of new property and equipment or the introduction of a new product line.

Capital lease – A long-term agreement that allows one party (the lessee) to use the asset of another party (the lessor) in an arrangement accounted for like a purchase.

Cash budget – A detailed plan showing the primary sources and uses of cash resources over a specific time period.

Cash debt coverage ratio – A measure of solvency that can be calculated by dividing cash provided by operating activities by average total assets.

Change management – The process of coordinating a structured period of transition from one situation to another in order to achieve lasting change within an organization. It can be of varying scope, from continuous improvement to radical and substantial change involving organizational strategy.

Chief financial officer – Top management team member responsible for providing timely and relevant data to support planning and control activities and for preparing financial statements for external users.

Committed fixed cost – Any fixed cost that is considered to be difficult to adjust because it relates to the investment in facilities, equipment, or the basic organizational structure of a firm

Common cost – Costs that are incurred to support a number of costing objects but that cannot be traced to any one of those costing objects individually.

Constraint – Any limitation under which an organization must operate, such as limited available raw materials or machine time, that restricts the organization's ability to satisfy demand.

Contribution margin – The difference between total sales and total variable cost, or the difference between unit selling price and unit variable cost. It represents the amount contributed to covering fixed costs and providing a profit to the organization.

Contribution margin ratio – The ratio of total contribution margin to total sales, or the ratio of unit contribution margin to unit selling price. It is used in cost-volume-profit analysis.

Control – The process of establishing procedures and then obtaining feedback in order to ensure that all parts of the organization are functioning effectively and moving toward overall company goals.

Controller – The manager in charge of the organization's accounting department.

Controlling – Ensuring that a plan is actually implemented and appropriately modified as circumstances change.

Conversion cost – Costs of converting raw materials into finished goods. It is the sum of direct labor costs plus manufacturing overhead costs.

Core competencies – A bundle of skills and technologies that enable a company to provide a particular benefit to customers that gives it competitive differentiation.

Corporate governance – The system by which organizations are directed and controlled. Its structure specifies the distribution of rights and responsibilities among different participants in the organization and spells out the rules and procedures for making decisions on corporate affairs. The result is the structure through which corporate objectives are set and through which the means of obtaining those objectives and monitoring performance are achieved.

Cost behavior – How a cost reacts or responds to changes in activity levels. Costs may be fixed, variable, or mixed.

Cost center – A business segment whose manager has control over costs, but not over revenues or the use of invested funds.

Cost driver – A factor that causes overhead costs, such as machine-hours, labor hours, or computer time.

Cost management – The application of managerial accounting concepts, methods of data collection, data analysis, and data presentation so that relevant information can be provided for purposes of planning, monitoring, and controlling costs.

Cost object – Anything for which cost data are desired, such as products, product lines, customers, jobs, or organizational subunits.

Cost of capital – The average rate of return that a corporation must pay to its long-term creditors and shareholders for the use of their funds.

Cost of goods manufactured – Manufacturing costs associated with goods that are completed and become available for sale during the period.

Current cash debt coverage ratio – A measure of liquidity that can be calculated by dividing cash provided by operating activities by average current liabilities.

Current ratio – A measure commonly used to evaluate a company's liquidity and short-term debt-paying ability that can be calculated by dividing total current assets by total current liabilities.

Customer relationship management – A combination of customer information systems, personalization systems, content management systems, and campaign management systems.

Debt to asset ratio – A measure of solvency that shows the percentage of total assets financed with borrowed funds; calculated by dividing total liabilities by total assets.

Decentralization – The process of delegating decision-making authority throughout an organization by empowering managers at various operating levels within the organization to make key decisions relating to their area of responsibility.

Depletion – The process of allocating the cost of a natural resource over its estimated useful life.

Depreciation – The process of allocating the cost of an item of property, plant, and equipment over its estimated useful life.

Differential cost – Any difference in cost between two alternative courses of action under consideration. Also referred to as relevant cost.

Differential revenue – Any difference in revenue between two alternative courses of action under consideration. Also referred to as relevant revenue.

Direct allocation method – A method of allocating service department costs to operating departments that allocates all service department costs directly to those operating departments without recognizing any services provided to other service departments.

Direct cost – Any cost that can be easily and conveniently traced to a specified cost object.

Direct labor – Any manufacturing labor costs that can be conveniently and easily traced to individual units of product.

Direct labor budget – A detailed plan that shows the labor requirements needed to meet projected production requirements over a specified period of time.

Direct materials – Any manufacturing materials costs that can be conveniently and easily traced to individual units of product.

Direct materials budget – A detailed plan that shows the amount of raw materials that must be purchased during a specified period of time in order to meet production needs and provide for the desired level of ending raw materials inventory.

Directing – Mobilizing employees to carryout plans and perform routine operations.

Discretionary fixed cost – Any fixed cost that is considered to be relatively easy to adjust because it arises from annual decisions by management to spend in certain fixed cost areas such as advertising, employee development, or research and development.

Duration driver – In activity-based costing, a measure of the amount of time required to perform an activity.

Earnings per share (EPS) – A measure of the net income earned on each share of common stock outstanding; calculated by dividing net income minus preferred stock dividends by the average number of common shares outstanding during the year.

Economic value added (EVA) – A concept similar to residual income used for performance evaluation purposes.

Enterprise governance – The set of responsibilities and practices exercised by executive management and the board of directors with the goal of providing strategic direction, ensuring that objectives are achieved, ascertaining that risks are managed appropriately, and verifying that the organization's resources are used responsibly. It is wider than, and inclusive of, corporate governance.

Feedback – Accounting and non-accounting reports and other information that assist managers in monitoring performance and in focusing on problems and/or opportunities that might otherwise go unnoticed.

Financial accounting – Accounting activities concerned with providing information to external users such as stockholders, creditors, and government agencies.

Finished goods – Units of output that have been completed but not yet sold to customers.

First-stage allocation – The process through which manufacturing overhead costs are assigned to activity cost pools in an activity-based costing system.

Fixed cost – A cost that remains constant in total, within a relevant range, even as activity changes. On a per unit basis, it varies inversely with changes in activity.

Flexible budget – A budget that has been designed to cover a range of activity and that can be used to develop budgeted costs at any point within that range to compare to actual costs incurred.

Free cash flow – The amount of cash available from operations after adjusting for capital expenditures and cash dividends paid; calculated by subtracting capital expenditures and cash dividends paid from operating cash flow.

Horizontal analysis – A technique for evaluating a series of financial statement data over a period of time to determine the increase or decrease that has taken place, expressed as either an amount or a percentage.

Ideal standards – Standards in a standard costing system that allow for no machine breakdowns or other work interruptions and that require peak efficiency at all times.

Incremental cost – Any change in cost between two alternative courses of action under consideration.

Incremental revenue – Any change in revenue between two alternative courses of action under consideration.

Indirect cost – Any cost that cannot be easily and conveniently traced to a specified cost object.

Indirect labor – Labor costs of janitors, supervisors, materials handlers, and other factory workers that cannot be conveniently and easily traced to individual units of product.

Indirect materials – Materials costs for small items such as glue and nails that are an integral part of a finished product but cannot be conveniently and easily traced to individual units of product.

Intellectual capital – Comprised of human capital (knowledge, skills, experience), relational capital (external relationships including customers and suppliers), and structural capital (knowledge that remains within the entity and includes procedures and systems).

Internal control – The entire system of controls, both financial and non-financial, established in order to provide reasonable assurance of effective and efficient operation, internal financial control, and compliance with laws and regulations.

Internal rate of return – The rate or return promised by a capital investment project over its useful life. It is the discount rate at which the present value of all cash inflows exactly equals the present value of all cash outflows so that the net present value is zero.

Inventory turnover ratio – A liquidity measure that shows the number of times on average that inventory is sold during the period; calculated by dividing cost of goods sold by the average inventory during the period.

Investment center – A business segment whose manager has control over costs, revenues, and invested funds.

Joint cost – Any cost incurred up to the split-off point in a process that produces joint products.

Joint products – Two or more items that are produced using a common input.

Just-in-time (JIT) – A production and inventory control system where raw materials are purchased and units of output are produced only on an as-needed basis to meet customer demand.

Keep or drop decision – Decision resulting from a relevant cost analysis concerning whether a product line or segment should be retained or dropped.

Knowledge management – A collective phrase for a series of processes and practices used by organizations in order to increase their value by improving the effectiveness of the generation and application of intellectual capital.

Liquidity – The ability of a company to pay its short-term obligations as they are expected to become due within the next year or operating cycle.

Liquidity ratios – Measures of the company's ability to pay its short-term obligations as they become due and to meet unexpected needs for cash as they arise.

Make or buy decision – Decision resulting from a relevant cost analysis concerning whether an item should be produced internally or purchased from an outside source.

Management by exception – A system of management which involves setting standards for various operating activities and then comparing actual results to these standards, with any significant differences being brought to the attention of management as "exceptions."

Managerial accounting – Accounting activities concerned with providing information to managers for planning and control purposes and for making operating decisions.

Manufacturing overhead – Any manufacturing cost that cannot be classified as direct labor or direct materials.

Manufacturing overhead budget – A detailed plan that shows all production costs except direct materials and direct labor that are expected to be incurred over a specified time period.

Marketing or selling costs – Any cost associated with securing customer orders and delivering the finished product or service into the hands of the customer.

Master budget – A summary of the organization's plans in which specific targets are set for sales, production, distribution, and financing activities; generally includes a cash budget, budgeted income statement, and budgeted balance sheet.

Merchandise purchases budget – A detailed plan that shows the amount of goods a merchandising company must purchase from suppliers during the period in order to cover projected sales and provide desired levels of ending inventory.

Mission and vision statements – Statements that aim to describe the purpose of an organization, define its success, outline its strategy, and share its values.

Mixed cost – A cost that contains both fixed and variable elements.

Net operating income – Income before interest and income taxes have been deducted.

Net present value – The difference between the present value of all cash inflows and the present value of all cash outflows associated with a capital investment project.

Operating assets – Cash, accounts receivable, inventory, plant and equipment, and any other assets held for productive use by an organization.

Operating department – Any department or segment within an organization within which the central purposes of the organization are carried out.

Operating lease – An agreement allowing one party (the lessee) to use the asset of another party (the lessor) in an arrangement accounted for as a rental.

Opportunity cost – The potential benefit that is foregone when one alternative is selected over another.

Outsourcing – The use of external suppliers as a source of finished products, components, or services. Also known as contract manufacturing or subcontracting.

Payback period – The length of time that it takes for a capital investment project to fully recover its initial cash outflows from the cash inflows that it generates.

Performance report – A detailed report which compares budgeted data with actual results.

Period cost – Any cost that is reported on the income statement in the period in which it is incurred or accrued; such costs consist of marketing and administrative expenses.

Planning – Selecting a course of action and specifying how it will be implemented.

Planning and control cycle – The flow of management activities through planning, directing and motivating, and controlling, and then back to planning again.

Post-audit – The follow-up that occurs after a capital investment project has been approved and implemented to determine whether expected results are actually realized.

Practical standards – Standards in a standard costing system that allow for normal machine downtime and other work interruptions, and which can be attained through the reasonable but highly efficient efforts by the average worker.

Predictive accounting – The use of process information to project future financial and non-financial performance.

Present value – The value today of an amount to be received at some future date after taking current interest rates into account.

Prime cost – Cost of the inputs to the production process. It is the sum of direct materials costs plus direct labor costs.

Process reengineering – Improving operations by completely redesigning business processes in order to eliminate unnecessary steps, minimize errors, and reduce costs.

Product cost – Any cost associated with the purchase or manufacture of goods; not reported on the income statement until the period in which the finished product is sold; such costs consist of direct materials, direct labor, and manufacturing overhead.

Production budget – A detailed plan that shows the number of units that must to be produced during a period in order to cover projected sales and provide desired levels of ending inventory.

Profit center – A business segment whose manager has control over costs and revenues but not over invested funds.

Profit margin ratio – A measure of profitability that shows the percentage of each sales dollar that flows through to net income; calculated as net operating income divided by net sales.

Profitability index – The ratio of the present value of a capital investment project's cash inflows to the present value of its cash outflows.

Profitability ratios – Measures of the income or operating success of a company over a given period of time, usually one year.

Quality of earnings – Refers to the level of full and transparent information that is provided to external users of a corporation's financial statements.

Ratio – An expression of the mathematical relationship between two or more financial statement items that may be expressed as a percentage, a rate, or a proportion.

Ratio analysis – A technique for evaluating financial statements that expresses the relationship among two or more selected financial statement items.

Raw materials – Materials that are used to manufacture a finished product.

Reciprocal allocation method – A method of allocating service department costs to operating departments that gives full recognition to interdepartmental services.

Required rate of return – The minimum rate of return that any capital investment project must yield in order for it to be considered acceptable.

Residual income – The net operating income of an investment center that exceeds its minimum required return on operating assets.

Responsibility accounting – An accountability system under which managers are held responsible for differences between budgeted and actual results only for those items of revenue and expense over which they can exert significant control.

Responsibility center– Any business segment whose manager has control over cost, revenue, and/or invested funds.

Return on equity – A measure of profitability that shows the efficiency with which operating assets were used to generate returns to stockholders; can be calculated by dividing net operating income by average common stockholders' equity.

Return on investment – A measure of profitability that shows the efficiency with which operating assets were used to generate operating profits; can be calculated by dividing net operating income by average operating assets or by multiplying profit margin by asset turnover rate.

Sales budget – A detailed schedule that shows the expected sales for coming periods, typically expressed both in dollars and in units.

Second-stage allocation – The process by which activity rates are used to apply costs to products and customers in activity-based costing.

Segment – Any part of an organization that can be evaluated independently of other parts and about which management seeks financial data.

Segment margin – The amount remaining after a segment's traceable fixed costs have been subtracted from its contribution margin. It represents the amount available after a segment has covered all of its own traceable costs.

Sell or process further decision – Decision resulting from a relevant cost analysis concerning whether a joint product should be sold at the split-off point or sold after further processing.

Selling and administrative expense budget – A detailed plan that shows the expected selling and administrative expenses that will be incurred during a specified period of time.

Service department – Any department that provides support or assistance to operating departments but does not directly engage in production or other operating activities.

Simple rate of return – The rate of a return on a capital investment project that is determined by dividing its annual accounting net operating income by the initial investment required. Also referred to as Accounting Rate of Return.

Solvency – The ability of a company to pay interest as it comes due and to repay the principal amount of a debt at its maturity.

Solvency ratios – Measures of the ability of a company to pay its long-term obligations as they become due and to survive over time.

Special order – Any one-time order that is not considered part of the organization's normal ongoing business.

Split-off point – The point in the manufacturing process where some or all of the joint products can be recognized and sold as individual products.

Static budget – A budget created prior to the onset of the budgeting period that is valid only for the planned activity level.

Step allocation method – A method of allocating service department costs to operating departments that allocates service department costs to other service departments as well as to operating departments in a sequential fashion that typically starts with the service department that provides the greatest amount of service to other departments.

Strategic enterprise management – An approach to strategic management which focuses on creating and sustaining shareholder value through the integrated use of best practice modeling and analysis techniques, technologies, and processes in support of better decision making.

Strategic planning – The formulation, evaluation, and selection of strategies for the purpose of preparing a long-term plan of action in order to attain objectives.

Sunk cost – Any cost that has already been incurred or that cannot be changed by any decision made currently or in the future.

Theory of constraints – A management approach that emphasizes the importance of managing bottlenecks caused by scarce resources.

Times interest earned ratio – A solvency measure of the company's ability to meet interest payments as they come due that can be calculated by dividing income before interest expense and income taxes by interest expense.

Total manufacturing cost – Cost of all inputs to the production process during a period. It is the sum of direct materials used, direct labor incurred, and manufacturing overhead.

Total quality management – An integrated and comprehensive system of planning and controlling all business functions so that products and services are produced which meet or exceed customer expectations.

Traceable fixed cost – Any fixed cost that is incurred because of the existence of a particular business segment.

Transaction driver – In activity-based costing, a simple count of the number of times an activity occurs.

Treasury management – The corporate handling of all financial managers, the generation of internal and external funds for the business, the management of currencies and cash flows, and the complex strategies, policies, and procedures of corporate finance.

Value chain – The major business functions that add value to an organization's products or services, such as research and development, product design, manufacturing, marketing, distribution, and customer service.

Value-based management – The process of searching for and implementing those activities that will contribute most to increases in shareholder value.

Variable cost – A cost that varies in total, within a relevant range, in direct proportion to changes in activity. On a per unit basis, it remains constant as activity levels change.

Variable cost ratio – The ratio of total variable costs to total revenues, or the ratio of unit variable cost to unit selling price. It is used in cost-volume-profit analysis.

Variable costing – A costing method that treats only the variable manufacturing costs (direct materials, direct labor, and variable overhead) as product costs while it treats fixed overhead as a period cost. It is also referred to as direct costing.

Vertical analysis – A technique for evaluating financial statement data that expresses each item in a financial statement as a percent of a base amount.

Work in process – Units of product that have been only partially completed and will require further work before they are ready for sale to customers.

Working capital (Net) – A measure used to evaluate a company's liquidity and short-term debt-paying ability that can be calculated by subtracting total current liabilities from total current assets.

XBRL – A computer language for financial reporting known as Extensive Business Reporting Language. It allows companies to publish, extract, and exchange financial information through the Internet and other electronic means in a standardized manner.

Zero-based budget – A method of budgeting that requires managers each year to justify all costs as if the programs involved were being proposed for the first time.

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AICPA & CIMA

FINANCIAL STATEMENT ANALYSIS: BASIS FOR MANAGEMENT ADVICE

BY WALLACE DAVIDSON, PHD

Solutions

The AICPA publishes *CPA Letter Daily*, a free e-newsletter published each weekday. The newsletter, which covers the 10-12 most important stories in business, finance, and accounting, as well as AICPA information, was created to deliver news to CPAs and others who work with the accounting profession. Besides summarizing media articles, commentaries, and research results, the e-newsletter links to television broadcasts and videos and features reader polls. *CPA Letter Daily*'s editors scan hundreds of publications and websites, selecting the most relevant and important news so you don't have to. The newsletter arrives in your inbox early in the morning. To sign up, visit smartbrief.com/CPA.

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Solutions

Chapter 1

Solutions to review questions

1. Knowing how much a company is worth is very useful. There are two major valuation approaches: cash flow and asset valuation. If one considers a business to be a going concern, the cash flow approach is appropriate.

2. Owners of businesses need valuation techniques to know their net worth, especially in cases where the business is up for sale. Obviously, potential owners need to know the value of a business. Security analysts use valuation techniques to recommend "buy and sell" to their clients. CPAs may be called upon to help their clients find a company's value.

3. The cash flow approach to valuation is appropriate in all cases of going concern. Asset valuation approaches are appropriate when a company is to be liquidated. These approaches provide a valuation "floor."

4. $$\text{Value of a firm} = \frac{FCF_1}{R - G}$$

   FCF_1 is the cash flow producing ability of the company after taxes, that is, its effective dividend.

   R is the company's risk adjusted rate of return. As a firm's risk increases, its cost of capital increases.

   G is the growth rate of the firm's earnings.

5. Free cash flow is the excess cash flows of a business. Many businesses do not pay dividends, but they still have value. Do not think of free cash flow as the actual dividend. Instead, think of it as the dividend that could be paid.

6. We are speaking of growth in cash earnings. The larger the expected growth rate, the greater the value of the firm. Financial statement analysis can help us determine growth rates.

Knowledge check solutions

1.

a. Correct. An increase in profitability will cause firm value to increase. This makes intuitive sense because people should be willing to pay more for ownership rights in a company if it is more profitable.

b. Incorrect. Decrease is not correct because value is positively related to a company's earnings.

c. Incorrect. This is incorrect because value is positively related to a company's earnings.

d. Incorrect. Decrease is not correct because value is positively related to a company's earnings.

2.

a. Correct. Expected growth and firm value are positively related so value will increase as growth increases. You can also observe this in the valuation equation in the chapter. Growth has a negative sign in the denominator which will make the fraction (value) increase as "g" increases.

b. Incorrect. Decrease is not correct because investors are generally willing to pay more for a company that is expected to grow than they would if it were not expected to grow.

c. Incorrect. Decrease is not correct because investors are generally willing to pay more for a company that is expected to grow than they would if it were not expected to grow.

d. Incorrect. This is incorrect because investors are generally willing to pay more for a company that is expected to grow than they would if it were not expected to grow.

3.

a. Incorrect. Increase is not correct because value and risk are inversely related. That is, investors are generally willing to pay less for a riskier company.

b. Correct. An increase in risk causes the cost of capital to increase. When the cost of capital, R, increases, firm value will decrease. Therefore, an increase in risk will be associated with a decrease in value.

c. Incorrect. Increase is not correct because value and risk are inversely related. That is, investors are generally willing to pay less for a riskier company.

d. Incorrect. This is incorrect because value and risk are inversely related. That is, investors are generally willing to pay less for a riskier company.

4.

a. Correct. The correct solution would be $1,250,000. Using the valuation formula from the chapter, value would be

$$V = \frac{FCF}{R - G} = \frac{\$125{,}000}{12\% - 2\%} = \$1{,}250{,}000$$

b. Incorrect. Proper application of the valuation formula would not yield this result.

c. Incorrect. We would improperly obtain this answer if we did not consider the firm's expected growth rate. Proper application of the valuation formula would not yield this result.

d. Incorrect. We are able to prepare an estimate from these figures. See answer a.

5.

a. Incorrect. Proper application of the valuation formula would not yield this result.

b. Correct. Risk and value are inversely related, so the value would decrease. In this case, value would fall to

$$\text{Value} = \frac{\$125{,}000}{14\% - 2\%} = \$1{,}041{,}667$$

c. Incorrect. This is not correct because a change in the cost of capital will impact company value.

d. Incorrect. We are able to prepare an estimate from these figures. See answer b.

6.

a. Correct. Free cash flow is the company's cash flow after all necessary investments have been made. Some people call it "dividend paying ability."

b. Incorrect. Total cash flow is the cash flow before making investments.

c. Incorrect. The cash flow left over after all investments have been made could be either positive or negative.

d. Incorrect. The cash flow left over after all investments have been made could be either positive or negative.

Chapter 2

Solutions to review questions

1. The current ratio is a measure of the quantity of a company's liquidity. It is generally considered an effect ratio because managers do not decide to have a liquidity problem. Instead, a manager will make a decision that changes one of the causal ratios, which, in turn, causes the current ratio to decline. It is, therefore, an effect ratio.

2. If the collection period rises, generally current liabilities rise, causing the ratio of current liabilities to net worth to increase.

3. The debt to asset ratio is a measure of the proportion of assets that are financed with debt. A large debt ratio means the firm is deeply in debt and may have exhausted its debt capacity.

4. The times interest earned ratio is a measure of the number of times that a firm could have paid its interest charges. The fixed charge ratio is a measure of the number of times the firm could have paid not only interest, but also lease payments and preferred stock dividends.

5. The inventory to working capital ratio is a measure of the quality of liquidity. A firm can have a "good" current ratio and still have poor quality. The more inventory a firm has relative to working capital, the poorer its quality of liquidity is.

6. Receivables to working capital is a quality measure of liquidity. If this ratio rises, the firm's liquidity has decreased in terms of quality. The collection period measures the credit and collection efficiency of the firm. This ratio may indicate the existence of poor quality receivables that may never by collected.

7. The net profit to net worth ratio is the return on equity. This ratio can be increased by the profits. The most common but more dangerous method for increasing the ratio is to use debt rather than equity financing to decrease the denominator.

8. Sales obviously affect profitability. Therefore, if the ratio of sales to fixed assets rises, the return on fixed assets will often increase. On the other hand, if fixed assets to net worth rises because fixed assets have increased, then the return on fixed assets will fall.

9. The net sales to working capital ratio is a measure of liquidity or the demands made on working capital to support the sales volume of a firm. It is affected by all of the six causal ratios described in a later section, which affect the components of this ratio.

Knowledge check solutions

1.

a. Incorrect. The current ratio is a commonly used liquidity measure.
b. Incorrect. Defensive interval is a commonly used liquidity measure.
c. Correct. This ratio is a measure of leverage. It shows the ability of a company to afford its debt. See the ratio list and the discussion of the ratio in the chapter.
d. Incorrect. This is not correct because the current ratio and defensive interval are liquidity measures but times interest is not.

2.

a. Incorrect. A good value for the current ratio implies good quantity of liquidity, but a company can still have problems with other aspects of liquidity (for example, quality or timing of liquidity).
b. Correct. The current ratio measures the "quantity" of a company's liquidity. If the ratio is at a good level, it means the *quantity* of liquidity is okay but not other aspects of liquidity.
c. Incorrect. This statement incorrect because only answer a. above is false. Answer b. is true and the correct answer.
d. Incorrect. This statement incorrect because only answer a. above is false. Answer b. is true and the correct answer.

3.

a. Correct. Because the only difference between the current and quick ratios is inventory, the decrease in the quick ratio would have to be caused by an increase in inventory.
b. Incorrect. This cannot be correct because a decrease in inventory would not allow a stable current ratio and a decreasing quick ratio.
c. Incorrect. The difference between the current and the quick ratio has nothing to do with receivables. The biggest difference is caused by inventory.
d. Incorrect. The difference between the current and quick ratios has nothing to do with cash.

4.

a. Incorrect. Quantity is not correct because the inventory to working capital ratio does not tell us how much liquidity a company has. Quantity of liquidity is measured by the current and the quick ratios.
b. Incorrect. The inventory to working capital ratio does not measure the timing of liquidity. The timing of liquidity is measured by the defensive interval.
c. Correct. The inventory to working capital ratio measures the "quality" of liquidity. Because inventory is generally the least liquid current asset, as it grows relative to other working capital items, we argue that the quality of liquidity has decreased.
d. Incorrect. When this ratio changes, it tells us nothing about the dollar amount of liquidity.

5.

a. Incorrect. Increased is not correct because an increase in receivables to working capital means that the quality of liquidity has decreased.
b. Correct. Because receivables are less liquid than cash and securities, an increase in receivables relative to other working capital items means that liquidity quality has decreased.
c. Incorrect. Not changed is incorrect because an increase in receivables to working capital means that the quality of liquidity has decreased.
d. Incorrect. The quality of liquidity has decreased when receivables to working capital increases.

6.

a. Incorrect. The current ratio measures the quantity of liquidity and is useful at any point in time, but is no more useful than normal when sales grow rapidly.
b. Correct. While all liquidity measures are useful to watch during sales growth, the most important is the ratio of net sales to net worth. This ratio shows whether the growth in sales has been supported by growth in working capital.
c. Incorrect. The quick ratio measures the quantity of liquidity and is useful at any point in time, but is no more useful than normal when sales grow rapidly.
d. Incorrect. The debt to assets ratios is not a measure of liquidity.

7.

a. Correct. To compute the tangible debt to asset ratio, we deduct the intangible assets from total assets in the ratio's denominator. Therefore, the intangible debt ratio will be larger as its denominator is smaller.
b. Incorrect. Tangible debt ratios are never smaller than ordinary debt ratios.
c. Incorrect. Tangible debt ratios and ordinary debt ratios are only the same when there are no intangible assets.
d. Incorrect. The tangible debt ratio and the debt ratio are related. To compute the tangible debt to asset ratio, we deduct the intangible assets from total assets in the ratio's denominator. Therefore, the intangible debt ratio will be larger as its denominator is smaller.

8.

a. Correct. Because short-term debt has to be rolled-over more often than long-term debt, it has a greater chance of having a rollover problem.
b. Incorrect. Long-term debt is an incorrect answer because its rollover risk is smaller, not larger.
c. Incorrect. Bonds are a type of long-term debt, and long-term debt has smaller roller risk than short-term debt.
d. Incorrect. Mortgages of fixed assets are generally long-term debt and would have low rollover risk.

9.

a. Incorrect. This statement is true, but because answer b. is also true, the correct answer will be answer c. Short-term debt increases rollover risk because short-term debt must be continually renegotiated when used as permanent financing.
b. Incorrect. This statement is true, but because answer a. is also true, the correct answer will be answer c. Because a company must take what-ever the market rate of interest is at the time of loan renewal, short-term debt used as permanent financing increases interest rate risk.
c. Correct. Because both answers a. and b. are true, this is the best answer. Short-term debt used as permanent financing increases both rollover and interest rate risk for the borrowing company.
d. Incorrect. Both a. and b. are true statements.

10.

a. Correct. The fixed charge coverage and times interest earned ratios are similar, except the former includes financial obligations other than interested payments.
b. Incorrect. The fixed charge coverage ratio is extremely important for companies that lease instead of borrow because it adjusts for leasing costs.
c. Incorrect. This is not correct because the fixed charge coverage ratio adjusts for leases is different from times interest earned.
d. Incorrect. The fixed charge coverage ratio and the times interest earned ratio measure the ability to afford debt.

11.

a. Correct. Although these two ratios have the same numerator, the quick ratio measures the quantity of liquidity without inventory. The defensive interval is the ratio that measures survival time.
b. Incorrect. The quick ratio is incorrect because it is not a timing measure of liquidity; it is a quantity measure.
c. Incorrect. The net sales to working capital ratio is an overall liquidity measure that shows whether the company has sufficient working capital (liquidity) given its level of sales.
d. Incorrect. The debt to assets ratio measures debt usage or leverage; it does not measure survival time.

Chapter 3

Solutions to review questions

1. The DuPont system allows the analyst to determine whether profitability problems result from inadequate cost control, inadequate sales, or from a too conservatively financed balance sheet.

2. The profit margin shows the number of pennies left from each sales dollar after deducting expenses. When expenses rise proportionately more than sales, the profit margin will decline. Remember, a decrease in sales usually is also accompanied by a reduced profit margin.

3. Debt "levers-up" the ROA into a bigger ROE. If a lot of debt is in use, then equity, the denominator of the ROE, is small. This increases the ROE.

Knowledge check solutions

1.

   a. Correct. The DuPont system divides the ROE into three ratios: the profit margin, the asset turnover, and the equity multiplier.
   b. Incorrect. The debt to asset ratio measures the same thing as the equity multiplier but uses a different scale of measurement. It is not multiplied by the ROA to achieve the ROE.
   c. Incorrect. The asset turnover is multiplied by the profit margin to determine the ROA, not the ROE.
   d. Incorrect. We do not multiply by a constant such as 3 to find the ROE.

2.

   a. Incorrect. This is incorrect because the ROE is the product of the ROA and the equity multiplier. When we multiply the two numbers, their product does not equal 7.5 percent or 15 percent.
   b. Incorrect. This is incorrect because the ROE is the product of the ROA and the equity multiplier. When we multiply the two numbers, their product does not equal 15 percent.
   c. Correct. The ROE is the product of the ROA and Equity multiplier. So, 15% × 2 = 30%.
   d. Incorrect. See answer c., we can compute the ROE.

3.

a. Incorrect. When an equity multiplier increases, the ROE will increase, not decrease.
b. Correct. The equity multiplier increases when debt usage increases. As long as the ROA is positive, the ROE will increase as well, and the increase is only the result of the increased debt. The ROE will be 45 percent.
c. Incorrect. This is incorrect because we know the ROE must increase if the equity multiplier increases and because the product of 15 percent times 3 is not 22.5 percent.
d. Incorrect. It would increase to 45 percent.

4.

a. Correct. The profit margin measures cost control. A low profit margin signals the need to control costs.
b. Incorrect. The asset turnover is an incorrect answer because it measures the ability of a company to use its assets to produce sales.
c. Incorrect. Only the profit margin measures cost control; the asset turnover does not.
d. Incorrect. This is incorrect because the asset turnover does not measure cost control.

5.

a. Incorrect. The change in the asset turnover, does not suggest anything about leverage or debt usage.
b. Incorrect. This is incorrect because it is the profit margin, not the asset turnover that measures the need to cut costs.
c. Correct. The asset turnover measures how well a company is using its assets to produce sales.
d. Incorrect. Decreasing sales will not likely change the asset turnover.

6.

a. Incorrect. We cannot conclude that this is correct because, although the company has a larger ROE than average, its ROA is below average due to a low profit margin. Although the ROE for the company is larger than the industry average, it is larger because of leverage (equity multiplier).
b. Incorrect. The statement is correct because ROE for the company is larger than the industry average. However, answer d. is the best answer because it includes answers b. and c.
c. Incorrect. The statement is correct because the ROA for the company is 15 percent while the ROA for the industry is 18 percent. However, answer d. is the best answer because it includes answers b. and c.
d. Correct. Answers b. and c. are correct. Because this company has a below average profit margin, it should investigate cost control and/or price increases.

7.

a. Correct. The ROE is the product of the profit margin, the asset turnover, and the equity multiplier. In this case, we must first compute the equity multiplier from the debt to asset ratio. If debt to assets is 50 percent, then the equity to asset ratio is also 50 percent (because assets = liabilities + equity). If equity to assets is 50 percent, its inverse is assets to equity, which is the equity multiplier, and is 2 in this case. Therefore, the ROE = 5% × 2 × 2 = 20%.
b. Incorrect. The product of the three numbers does not equal 10 percent.
c. Incorrect. You must first convert debt to assets of 50 percent into the equity multiplier of 2. Then multiply this by the other two numbers.
d. Incorrect. This is incorrect because the ROE is 20 percent.

8.

a. Incorrect. This answer cannot be correct because the ROE measures the quantity, not the quality, of earnings.
b. Correct. Earnings quality is the perceived ability of a company to continue earning. Therefore, if we believe that a company can continue earning at its current level or better, we argue that it has "good" earnings quality.
c. Incorrect. This cannot be correct because the ROE measures the quantity, not the quality, of earnings and therefore answer a. is incorrect.
d. Incorrect. The current ratio measures liquidity and has no direct relationship with earnings quality.

9.

a. Correct. Having good liquidity and low debt ratios gives a company the ability to continue in operation in troubled times. Therefore, a strong balance sheet implies good earnings quality.
b. Incorrect. This is incorrect because a strong balance sheet likely allows a company to continue earnings in the future and would not signal poor earnings quality.
c. Incorrect. This is incorrect because a strong balance sheet implies good earnings quality and, therefore, has a relationship with earnings quality.
d. Incorrect. A strong balance sheet implies good earnings quality.

10.

a. Incorrect. When the ratio increases it is a sign of "poor" earnings quality. As assets get older, earnings quality decreases.
b. Correct. The ratio of accumulated depreciation to depreciation expense estimates asset age. When the ratio increases it is a sign of "poor" earnings quality. Short-term earnings may be increased, but later earnings may fall when the overdue replacement occurs.
c. Incorrect. When the ratio increases it is a sign of "poor" earnings quality.
d. Incorrect. The ratio of accumulated depreciation to depreciation expense is one measure of earnings quality.

11.

a. Correct. When all senior managers are nearing retirement age, they may have incentives to manage the company's earnings. Therefore, this would be a sign of poor earnings quality.
b. Incorrect. This is incorrect because when all senior managers are nearing retirement age it is a sign of poor earnings quality.
c. Incorrect. Poor earnings quality may be evidenced by the fact that all senior managers are nearing retirement age.
d. Incorrect. Manager age is related to earnings quality. See answer a.

12.

a. Correct. The extraordinary gain cannot be repeated, so earnings quality (the perceived ability to continue earning at the current rate) would be questioned.
b. Incorrect. An increase in the relative R&D expenditure would be considered good earnings quality and would generally improve long-term earnings, therefore, this is incorrect.
c. Incorrect. When the age of a company's assets decreases, this is evidence of good earnings quality.
d. Incorrect. A wide range of manager ages is a sign of good earnings quality.

13.

a. Incorrect. When companies change auditors, there may be good reasons to do so. However, some companies switch auditors to find a more lenient auditor. Not changing an auditor does not hurt earnings quality.
b. Incorrect. By using the same auditor for ten years, it is unlikely that the company is "audit opinion shopping." So keeping the same auditor for long periods is unlikely related to earnings quality.
c. Correct. It is unlikely that keeping the same auditor for an extended period of time will impact earnings quality. However, changing auditors frequently may be a cause for concern.
d. Incorrect. An auditor with a good reputation may enhance earnings quality but it is most likely unrelated.

Chapter 4

Solutions to review questions

1. A causal ratio measures an action taken by a company that "causes" debt, liquidity, or profitability problems. For example, if there is a change to one part of a balance sheet, other areas will be affected.

2. If the ratio of fixed assets to net worth increases, then fixed assets are rising faster than net worth. Either debt must increase or working capital decrease (increase current liabilities or decrease current assets). Thus a rise in the ratio of fixed assets to net worth can impair a firm's liquidity.

3. If this ratio rises because the company is expanding fixed assets, then liquidity, debt, and/or profitability problems can occur. When one of these three problems exists, look for an over-investment in fixed assets as a possible cause.

4. If a firm's collection period rises, accounts receivable has risen as well. These new receivables must be financed. Generally, some form of debt is used to finance the increase in receivables. Thus, debt problems can be caused by a rise in the collection period.

5. The net sales to inventory ratio is often called the inventory turnover. It is an indicator of the efficiency of inventory management. If this ratio is small or has decreased, then inventory may be a problem. Perhaps obsolete inventory exists and should be written off. Too much inventory hurts liquidity because inventory is generally financed with short-term debt.

6. Overtrading occurs when the trading ratio (net sales to net worth) is large. The overtrader is a company that has grown too rapidly and has not financed the growth with equity. This problem is deceptive because overtraders are generally profitable but have poor liquidity and large amounts of debt. An overtrader must have optimum internal and external conditions to exist.

7. Overtraders have maximum sales growth with no new equity to support growth. Overtraders have poor liquidity and large amounts of debt. Overtrading sets a company up for a fall by reducing its capacity to withstand external shocks. Companies that encounter temporary problems may not survive if liquidity is poor and the firm is deeply in debt. Excessive growth can be fatal to a company. Overtrading may be cured by obtaining longer credit terms, raising outside equity, reducing owner's compensation, improving cost control, and raising prices to reduce demand.

8. If the net profit to net sales ratio is negative, then net worth is declining. Debt and liquidity problems result.

9. Miscellaneous assets include the cash value of life insurance, non-trade receivables, long-term receivables, and prepaid expenses. Excessive investments in these assets require debt financing or reduced liquidity. In addition, these assets tend to earn below average rates of return, so profits may suffer.

Knowledge check solutions

1.

a. Correct. When the fixed asset to net worth ratio increases in a profitable company, fixed assets are increasing faster than equity. These assets are financed with either debt and/or working capital. So, generally, the debt ratios increase.
b. Incorrect. The increase in fixed assets is never associated with a decrease in debt, so this answer cannot be correct.
c. Incorrect. Generally when this ratio increases, the increased fixed assets are financed with debt. However, if a company financed the increase in fixed assets through its existing cash balance, then and only then would this answer be correct.
d. Incorrect. Debt ratios tend to increase when fixed assets to net worth increases. So they are related to this causal ratio.

2.

a. Incorrect. If fixed assets to net worth increases, the company's current ratio cannot increase because neither have current assets increased nor current liabilities decreased.
b. Incorrect. When fixed assets to net worth increases, the short-run effect will be a decrease in the company's liquidity if the company pays for the assets with cash or borrows short-term. However, answer d. is the best answer because it includes answers b. and c.
c. Incorrect. There will be no direct effect on liquidity if long-term debt financing is utilized. However, answer d. is the best answer because it includes answers b. and c.
d. Correct. Answers b. and c. are correct.

3.

a. Incorrect. Because costs such as insurance, property taxes, and interest increase, profits do not generally increase.
b. Correct. If the increase in fixed assets occurs, interest expense, property taxes, and insurance costs may increase before the new assets become profitable. Therefore, profits may decrease in the short-run.
c. Incorrect. Because costs such as insurance, property taxes, and interest increase, profits do not generally stay the same.
d. Incorrect. There is a relationship between fixed assets to net worth and profit. They are negatively related in the short-run.

4.

a. Incorrect. Raising equity capital will allow debt to be repaid. Therefore, this is a reasonable correction strategy. However, answer c. is the best answer because it includes answers a. and b.
b. Incorrect. Restricting further investment allows the company to retain earnings and retire debt over a period of time. Therefore, this is a reasonable correction strategy. However, answer c. is the best answer because it includes answers a. and b.
c. Correct. Answers a. and b. are reasonable corrections strategies.
d. Incorrect. Since both answer a. and b. are solutions for a company with a large fixed assets to net worth ratio, this answer cannot be correct.

5.

a. Correct. The collection period measures average collection time from customers. If the ratio increases, customers are taking longer to pay.
b. Incorrect. This is incorrect because the collection period has no direct effect on or is affected by inventory.
c. Incorrect. Rapidly increasing inventory has no impact on the collection period.
d. Incorrect. The collection period is not directly related to fixed assets growth.

6.

a. Incorrect. Increase is not correct because the increase in short-term debt causes the current ratio to decrease.
b. Correct. Decrease is correct because the increase in short-term debt causes the current ratio to decrease. For example if current assets are 200 and current liabilities are 100, the current ratio is 2. So if receivables increase by 50, current assets will be 250 and current liabilities will be 150 if the increased receivables have been financed with short-term debt. The current ratio will be less than 2, so it will have decreased.
c. Incorrect. This is incorrect because the increase in short-term debt causes the current ratio to decrease.
d. Incorrect. Since we can determine the change as in answer b., this answer cannot be correct.

7.

a. Correct. Shortening selling terms will reduce the collection period (it may also decrease sales).
b. Incorrect. Eliminating discounts, such as 2/10 net 30, will probably increase the collection period because these discounts would have encouraged faster payment.
c. Incorrect. Reducing inventory has no direct impact on a company's collection period.
d. Incorrect. Increasing sales will not likely shorten the collection period.

8.

a. Incorrect. This is common sense. Generally, when a company selects customers that pay on time and discourages sales to companies that pay slowly, its collection period will decrease not increase.
b. Correct. Selecting customers with better credit histories will generally reduce the collection period.
c. Incorrect. Selecting customers with better credit histories will generally reduce the collection period.
d. Incorrect. Answer b. is the correct solution so this answer must be incorrect.

9.

a. Incorrect. Receivables write-off can negatively impact profits as the collections period increases. This is correct, but so are two other responses.
b. Incorrect. Increased collection costs can negatively impact profits as the collection period increases. This answer is correct, but so are two other responses.
c. Incorrect. Higher interest costs can negatively impact profits as the collection period increases. This answer is correct, but so are two other responses.
d. Correct. Each of these things can negatively impact profits as the collection period increases. Therefore, answers a., b., and c. are correct, but because they all are, the correct response has to be d.

10.

a. Incorrect. This cannot be correct because the product of the divisions does not equal 25.6.
b. Correct. See the collection period formula in the chapter. The collection period is 32 days [800,000/(9,000,000/360)].
c. Incorrect. This cannot be correct because the product of the divisions does not equal 25.6.
d. Incorrect. There is sufficient information to compute the collection period. See answer b. above.

11.

a. Correct. The inventory is 10.0 times ($9,000,000/900,000).
b. Incorrect. This is not correct because inventory turnover is 10.0 times.
c. Incorrect. This is not correct because inventory turnover is 10.0 times.
d. Incorrect. There is sufficient information to compute the inventory turnover. See answer a. above.

12.

a. Incorrect. This cannot be correct because an increasing inventory turnover does not occur when inventory increases relative to sales.
b. Correct. A large or increasing inventory turnover ratio signals that a company is moving its inventory very well. Therefore, inventory is generally decreasing relative to sales.
c. Incorrect. While it may be related to sales growth (indirectly), it is not a sign of excessive sales growth.
d. Incorrect. The inventory turnover does not provide any direct information about a company's receivables.

13.

a. Correct. As inventory increases relative to sales, the inventory turnover ratio will fall.
b. Incorrect. A decreasing turnover cannot be caused by falling inventory.
c. Incorrect. The decreasing inventory turnover is not directly related to sales changes.
d. Incorrect. A decreasing turnover cannot be caused by falling inventory.

14.

a. Incorrect. Because a slow inventory turnover implies increased inventory, this will decrease the quick ratio most of the time.
b. Correct. Because a slow inventory turnover implies increased inventory, this will decrease the quick ratio most of the time. This is simple arithmetic. Inventory is deducted from current assets when computing the numerator of the quick ratio.
c. Incorrect. We can determine the answer as in answer b. above.
d. Incorrect. Because the quick ratio will not increase when inventory turnover falls, this answer cannot be correct.

15.

a. Correct. Perpetual inventory records permit buying in smaller quantities. This reduces the average inventory and increases the inventory turnover.
b. Incorrect. Because perpetual records allow for smaller levels of inventory, inventory turnover will increase.
c. Incorrect. Inventory turnover will not decrease when companies switch to perpetual records.
d. Incorrect. The inventory turnover will generally increase when a company establishes perpetual inventory records.

16.

a. Incorrect. Studying which items in inventory are the problems will help to determine why inventory turnover has fallen. However, answer c. is the best answer because it includes both answers a. and b.
b. Incorrect. Reviewing the turnover rate of inventory components will help to determine why inventory turnover has fallen. However, answer c. is the best answer because it includes both answers a. and b.
c. Correct. Correcting inventory problems needs to begin with determining what part of inventory is the problem. Because both answers a. and b. would be ways to determine the source of the inventory problem, answer c. is the best response.
d. Incorrect. Both answers a. and b. are correct.

17.

a. Incorrect. An increasing fixed assets to net worth ratio can cause liquidity to drop.
b. Incorrect. An increasing collection period can cause liquidity to drop.
c. Incorrect. A decreasing inventory turnover can cause liquidity to drop.
d. Correct. The idea of causality is that an action (or lack of an action) can cause unanticipated problems. The examples in the chapter show that when each of these three ratios deteriorate, liquidity will suffer. Because answers a., b., and c. are all correct, the best response would be d.

18.

a. Incorrect. Because undertraders generally have small ratios of sales to net worth, because their sales growth is less than the growth in equity.
b. Correct. Undertraders are companies with slow or no sales growth. Although they may be profitable in the short-run, if sales begin to fall, they can have trouble. Hence they will generally have small trading ratios.
c. Incorrect. Undertraders have small trading ratios not average sized trading ratios.
d. Incorrect. Undertraders have small trading ratios as discussed above.

19.

a. Incorrect. The solutions to the overtrading and undertrading problems are completely different.
b. Incorrect. The undertrader needs to increase sales and the overtrader has excessive sales.
c. Correct. This is clearly false. The undertrader needs to increase sales. The overtrader is burdened with excessive sales growth.
d. Incorrect. Answer c. is correct.

20.

a. Incorrect. Overtraders have weak balance sheets because they tend to borrow a lot of money and have poor liquidity.
b. Correct. The typical overtrader has growing sales and profits, but has a weak balance sheet with excessive debt and inadequate liquidity.
c. Incorrect. Overtraders generally have weak balance sheets.
d. Incorrect. Overtrading generally has a very negative impact on a company's balance sheet.

21.

a. Correct. Overtraders are companies that generally attempt to maximize sales and sales growth.
b. Incorrect. Overtraders generally do not focus on their balance sheet and often do not plan their liquidity.
c. Incorrect. They tend to be sales maximizers.
d. Incorrect. Overtraders generally have a lot of debt, but that is not their goal; the excessive debt is a byproduct of the sales growth.

22.

a. Incorrect. Dividing the sales by net worth does not produce a trading ratio of 1.5, so a cannot be correct.
b. Correct. Total assets would be $4,000,000. Total liabilities would be $1,500,000, so net worth would be $2,500,000. Dividing sales of $9,000,000 by the net worth produces a trading ratio of 3.6 times.
c. Incorrect. Dividing sales by net worth does not produce a trading ratio of 5.55.
d. Incorrect. Dividing the sales by net worth produces a trading ratio of 3.6 times.

23.

a. Correct. Bringing in external equity will strengthen the balance sheet of the overtrader. Improving equity corrects one of the big problems for an overtrader.
b. Incorrect. Because overtraders have excessive sales relative to net worth, an increase in equity will improve the situation.
c. Incorrect. Raising external equity will improve an overtrader's financial condition.
d. Incorrect. Only answer a. is correct.

24.

a. Correct. Reducing payout improves equity and strengthens the balance sheet. This corrects the problem of an overtrader.
b. Incorrect. Decreasing prices would further stimulate sales growth and would hurt the overtrading company.
c. Incorrect. Answer b. is incorrect.
d. Incorrect. Answer b. is correct.

25.

a. Correct. Improving cost control makes each sale more profitable. Retaining these earnings improves the overtrader's balance sheet.
b. Incorrect. The overtrader has a weak balance sheet, so more short-term debt would hurt the company by weakening its balance sheet further.
c. Incorrect. Answer b. is incorrect, so all of the above cannot be correct.
d. Incorrect. Answer a. is correct, so none of the above cannot be correct.

26.

a. Correct. When profits are negative, net worth decreases. The debt ratios will increase as a result. See the example in the chapter.
b. Incorrect. Debt ratios do not ever decrease simply because a company has negative net income, so "decrease" is not correct.
c. Incorrect. Debt ratios will increase, so this is incorrect.
d. Incorrect. Debt ratios will increase, so this is incorrect.

27.

a. Incorrect. If sales cannot be restored, then the company must downsize to become profitable at the lower level of sales. However, answer c. is the best answer because it includes both answers a. and b.
b. Incorrect. Decreasing sales can cause a profit margin problem. Restoring the sales would fix the profit margin problem if there is a way to increase the sales. However, answer c. is the best answer because it includes both answers a. and b.
c. Correct. Because both a. and b. are good solutions, the best response has to be c.
d. Incorrect. Raising prices when sales are decreasing will generally cause sales to decrease further.

28.

a. Correct. By cutting costs or by increasing prices the profit margin will increase. The price increase will only work if competition is not too severe.
b. Incorrect. Downsizing would be a good solution if the company's profit margin problems were caused by falling sales.
c. Incorrect. This cannot be correct because downsizing is not a recommended solution.
d. Incorrect. Answer a. is correct.

29.

a. Incorrect. The growth in these assets must be financed. Therefore, liquidity does not improve when these assets increase.
b. Correct. When this ratio has grown, the "other" assets must be financed. Because they are often financed with short-term debt or a reduction in the cash balance, liquidity ratios will suffer.
c. Incorrect. They will generally deteriorate.
d. Incorrect. An increasing miscellaneous assets to net worth ratio will have an impact on a company's liquidity.

Chapter 5

Solutions to review questions

1. This approach not only details a company's financial problems, but it also determines the underlying causes. Knowing the cause lets the analyst recommend the appropriate solution. For example, one does not cure a cold with a box of tissue—instead one must attack the underlying virus. In correcting a company's financial problem, knowing the cause rather than just the symptoms provides direction for a solution.

2. An industry analysis lets the analyst show where a company differs from similar companies. It does not make sense to compare a computer software store to a dental clinic. Industry comparisons improve the analyst's ability to identify problems.

Knowledge check solutions

1.

a. Incorrect. Time series cannot be correct because comparing a company to similar companies is called an industry comparison, not a time series comparison.
b. Correct. The time series analysis compares the company's current results with those in prior years.
c. Incorrect. The term ratio analysis is too general to be correct.
d. Incorrect. Time series is incorrect; see above.

2.

a. Incorrect. The industry and time series comparison provide the analyst with more complete information than just an industry analysis.
b. Incorrect. The industry and time series comparison provide the analyst with more complete information than just a time series analysis.
c. Correct. Doing both an industry comparison and a time series analysis will provide the analyst with a more complete analysis.
d. Incorrect. A company should do a time series and an industry comparison for a complete ratio analysis.

3.

a. Correct. *Robert Morris and Associates Annual Statement Studies* and *The Almanac of Business and Industrial Financial Ratios* each provide the industry averages and a "size" breakdown of the averages.
b. Incorrect. This is not correct because *Industry Norms and Key Business Ratios* and *Financial Studies of the Small Business* do not provide a size breakdown of the ratios.
c. Incorrect. These two sources do not generally provide ratio averages with a size breakdown.
d. Incorrect. *Robert Morris and Associates Annual Statement Studies* and *The Almanac of Business and Industrial Financial Ratios* each provide the industry averages and a "size" breakdown of the averages.

4.

a. Incorrect. Poor cannot be correct because a company that matches the averages is at least as good as the average company in the industry.
b. Correct. Industry averages are not goals, they are averages. So a company that matches the averages is "average."
c. Incorrect. A company that matches industry averages is not in great shape, they are average within the industry.
d. Incorrect. If a company matches the averages, the company is simply average.

5.

a. Incorrect. If a company is a conglomerate, there may be a problem when using industry averages.
b. Incorrect. If the company uses different accounting procedures than the industry, there may be a problem when using industry averages.
c. Incorrect. If industry data is not available at year-end, there may be a problem when using industry averages.
d. Correct. Each of these things in answers a., b., and c. is a problem to consider when using industry averages making the best response, d.

6.

a. Correct. It is the cause of the problem, rather than the symptoms, that should be attacked.
b. Incorrect. When conducting an analysis of financial statements, it is important to take corrective action by attacking the root cause of the problem rather than the symptoms. Attacking the symptoms will provide only temporary solutions.
c. Incorrect. Focusing on profits is always a good idea, but to correct a company's problems one should examine the causes of the problems.
d. Incorrect. While sometimes we can blame problems on bankers, fixing a company's problems will rarely be helped by antagonizing their bankers.

Chapter 6

Solutions to cases

Case study 1:

Four of the six causal ratios are out of normal bounds. The next step should be to reexamine them more closely.

Fixed asset to net worth ratio

- In 20X0 the company was average. Something happened over the next three years to cause a change.
- Fixed assets actually declined over the period.
- The decline in this ratio is caused by the reduction in net worth.
- Fixed asset investment is not this company's major problem.

The *net profit to net sales* ratio appears to be a real problem.

- The company has lost money on sales for the last three years.
- The effect of these losses is to distort all of the other ratios.
- Net worth has been cut in half over the period.
- Clearly, corrective steps must be taken immediately: You can develop a discussion of this by using the list of corrective actions that were associated with the net-profit to net-sales ratio in the causal ratio chapter.

The *net sales to net worth* ratio also appears out of line.

- Sales have actually decreased over this period, but net worth has declined by a greater amount.
- Overtrading is not one of this company's greatest problems.

The *miscellaneous assets* to net worth ratio is a problem.

- Even in 20X0 it was higher than the industry average.
- However, miscellaneous assets have declined so that the reduction in net worth is still the major culprit.

This company's basic problems come from (1) a loss on sales and (2) a decline in sales volume. This case shows that it is easy to over interpret ratios. The whole picture must be examined.

Case study 2:

- *Liquidity* – The company's quantity of liquidity, as measured by the current ratio, has declined over this three-year period and is well below the industry average of 1.36. This pattern can also be seen in the sales to the current asset ratio, which is considerably above the industry average.
- *Debt* – The company's debt ratios each year are very large and considerably above average.
- *Profits* – The return on equity is very high in 20Y7 and 20Y8. However, a recession hits in 20Y9, and the company loses a lot of money.
- *Causes* – This is a classic case of a company that has grown too quickly. The fixed assets to net worth ratio and the trading ratio are *considerably* larger than the industry averages.

Case study 3:

Fixed assets to net worth

- From 200V to 200Y it grew 91 percent.
- In 200Z it went way out of sight.
- Fixed assets actually fell from 200Y to 200Z, but net worth fell even more. (The effect ratios can highlight some of the effects of the drop in net worth.)
- The decrease in net worth has caused long-term liabilities to increase dramatically.
- A rise in fixed assets is not the problem.

Collection period

- Declines since 200X.
- Receivables are declining faster than credit sales.
- There is no real receivables problem for the firm.

Net sales to inventory

- Has increased since 200X.
- Inventory is declining faster than sales.

- Inventory is not a major problem for the firm.

Net sales to net worth (trading)

- Rises generally since 200V.
- Sales are actually declining, but net worth is declining even more.
- Costs are rising (particularly interest costs).
- This appears to be an overtrader, but overtrading is not the real problem.
- The problem is net worth. However, this company still has all of the problems of an overtrader.

Net profit to net sales

- Has declined since 200X.
- Decreasing sales and increasing interest costs are part of the reason.
- This is the real problem for Firm A.

Miscellaneous assets to net worth

- Has also increased, but once again, the problem is net worth.

Conclusion: Firm A has suffered major losses since 200Y. This has caused rising debt and a slight drop in liquidity. The losses have put the firm in an overtrading position.

Case study 4:

Liquidity looks sound, except that receivables/working capital is a little high.

Debt is well beyond the industry norms and is rising as measured by total liabilities to equity. Current debt is only slightly above average, but times interest earned is below average.

Profitability is below average.

Causes

- Excessive fixed assets without equity financing
- Excessive receivables
- Excessive inventory
- Overtrading
- Inadequate cost control low profit margin during sales growth
- Excessive miscellaneous assets

Discussion case 1

Overall, this is an example of a company with a large fixed asset to net worth and trading ratio. Similarly, its profit margin is low and profits are below average. Its debt ratios are large. This is an example of an overtrader.

Discussion case 2

This company is in the apparel business with factories in the U.S., Hong Kong, and Honduras. They operate in all phases of the apparel market up to, but not including, retail sales.

The loss in 200Z can be explained by rising expenses (see DuPont analysis), the rising collection period in 200Y, and falling inventory turnover.

Knowledge check solutions

1.

a. Incorrect. This answer cannot be correct because these two ratios have decreased.
b. Correct. The current ratio and quick ratio have both decreased over this 5-year period, from 2.58 to 1.90 and 0.71 to 0.32, respectively. These two ratios measure the quantity of liquidity. Therefore, the liquidity decreased.
c. Incorrect. This answer cannot be correct because these two ratios have decreased.
d. Incorrect. The answer can be determined. See answer b.

2.

a. Correct. The ratios of receivable and inventory to working capital have both increased. An increase in these ratios implies a worsening of the quality of liquidity.
b. Incorrect. This statement cannot be correct because these two ratios have increased, and they are the measures of the quality of liquidity. Quality decreases when these two ratios decrease.
c. Incorrect. This statement cannot be correct because these two ratios have increased, and they are the measures of the quality of liquidity. Quality decreases when these two ratios decrease.
d. Incorrect. The company's liquidity has changed.

3.

a. Correct. Best Buy is an overtrader, so answer a. is correct. The trading ratio has increased from 7.75 to 9.65 in an industry that has a trading ratio of 4.56. Other evidence of overtrading is a large and growing ratio of fixed assets to net worth and a small profit margin.
b. Incorrect. Because the trading ratio has increased, Best Buy is not an undertrader. An undertrader has a decreasing trading ratio.
c. Incorrect. Because the collection period has not grown, there does not seem to be a collection period problem.
d. Incorrect. A company cannot be an overtrader and an undertrader at the same time.

4.

a. Correct. The company's debt to equity ratio is 2.11 in an industry that averages 1.00. Part of the reason for this ratio being large is the loss in year 200Z, but the ratio was still larger than average the year before the loss.
b. Incorrect. Large debt ratios imply excessive leverage.
c. Incorrect. Large debt ratios imply excessive leverage.
d. Incorrect. I am not sure what the wrong kind of leverage would be in this case. So, this answer is incorrect because it makes no sense.

5.

a. Incorrect. This is not correct because sales growth has occurred and the lack of sales does not seem to be a problem. Increasing sales will only fix financial problems caused by the lack of sales.
b. Correct. Biscayne's profit margin has dropped from 6 percent to –6 percent. The industry average is four percent. This is clearly a problem. When sales are increasing (they increased from $65,258 to $100,294), a profit margin problem can be fixed by increasing prices or cutting costs. It is doubtful that in an industry that is as competitive as the apparel industry that a price increase would work. Cutting costs would be the best solution.
c. Incorrect. Downsizing would work only when sales are decreasing. In this case, sales are increasing.
d. Incorrect. Cutting costs would likely fix the problem. Therefore, neither of the above cannot be a solution.

Chapter 7

Solutions to review questions

1. Lenders look very carefully at a firm's balance sheet for short-term loan applications. This is because the firm will use its liquidity to pay off a short-term loan. A longer term loan will be paid off by the future cash flows that the firm will generate. Thus, for a long-term loan application, cash flow producing ability of a firm is crucial to a bank.

2. In each of these cases the lender will need to know all of the details. The lender will ask the questions, "when?, where?, and, how?" Creditors will want to know the age and collectability of the receivables. They will need to know if the intangible assets can be converted to cash to repay debt if needed. Creditors will be particularly interested in the terms of the long-term debt and must know the nature and extent to which assets serve as collateral. Often contingent liabilities exist that could severely damage the liquidity of the firm.

3. Owners and managers are more interested in profit ratios. Owners often try to increase profits at the expense of the balance sheet. Creditors are more interested in the balance sheet ratios. They are concerned about the borrower's ability to pay the debt and the security available if the borrowers should default.

Knowledge check solutions

1.

   a. Incorrect. Profit is not correct on a short-term loan, but would be if the loan life was longer.
   b. Correct. Bankers always place considerable importance on balance sheet ratios. For short-term loan applications, liquidity ratios are considered most important.
   c. Incorrect. Stock market ratios are rarely used in a bank's loan analysis.
   d. Incorrect. The most important ratios for short-term loans are balance sheet ratios.

2.

   a. Correct. The two ratios that most likely appear in a loan agreement are debt/equity and current ratio.
   b. Incorrect. This is incorrect because while profit margin and ROE may appear in a loan agreement, they are less likely to do so.
   c. Incorrect. Stock market ratios are rarely used in a bank's loan analysis.
   d. Incorrect. These two ratios are not the most common ratios in a loan agreement.

Chapter 8

Knowledge check solutions

1.

   a. Correct. Anything that improves the ability of a company to make and retain profits will increase sustainable growth.
   b. Incorrect. Increasing profits will never hurt a company's ability to sustain growth.
   c. Incorrect. The direction of the change can be determined See answer a.
   d. Incorrect. Increasing profits will never hurt a company's ability to sustain growth and should increase it.

2.

a. Correct. Adding equity improves sustainable growth.
b. Incorrect. Increasing equity will always increase sustainable growth, not decrease it.
c. Incorrect. We can determine the expected change to sustainable growth.
d. Incorrect. Increasing equity will always improve sustainable growth, not cause it to remain unchanged.

Chapter 9

Solutions to review questions

1. The Z-score is calculated by computing the five primary ratios, multiplying by the coefficients, and summing all the terms. See the manual for the equation.

2. The working capital to assets ratio is a liquidity measure. Retained earnings to assets is a measure of whether the firm has retained a sufficient amount of profits over the years. EBIT to assets is a measure of the sufficiency of current profits. Equity to debt is a measure of debt usage. Sales to assets is a measure of sales productivity. Each of these ratios was constructed so that a large value implies financial health and a small value implies a problem. For a Z-score to be low several of these primary ratios must be small.

3. A Z-score of less than 1.81 implies that bankruptcy is near. A ratio of greater than 2.99 implies relative financial health. In between these values is a grey area. These were determined by use of a statistical procedure called discriminant analysis.

Knowledge check solutions

1.

a. Correct. This variable is working capital divided by total assets and is a liquidity measure.
b. Incorrect. This variable measures another aspect of a company's financial condition.
c. Incorrect. This variable measures another aspect of a company's financial condition.
d. Incorrect. This variable measures another aspect of a company's financial condition.

2.

a. Correct. The correct answer is 4.0.
b. Incorrect. Using the decimal form would understate the Z-score, so b cannot be correct. This is true for each of the first four X-variables. The fifth X-variable uses the decimal form of the number. See the computational note in the chapter.
c. Incorrect. You do not multiply the dollar amount of retained earnings by the coefficient.
d. Incorrect. You do not multiply the dollar amount of retained earnings by the coefficient.

3.

a. Correct. In general this is true. A large Z-score (above 2.99) implies good financial health.
b. Incorrect. Altman suggested that Z-scores above 2.99 would make bankruptcy very unlikely in the near future, so false cannot be correct.
c. Incorrect. Altman suggested that Z-scores above 2.99 would make bankruptcy very unlikely in the near future, so false cannot be correct.
d. Incorrect. A single year's Z-score does not tell us anything about the trend in financial health. It only shows financial health at one moment in time.

4.

a. Correct. The Z-score measures overall financial health. Because the Perfect Company's Z-score dropped from 3.55 to 1.45 over a 3-year period we can conclude that Perfect's overall financial health had deteriorated.
b. Incorrect. While the conclusion that "Perfect is too deeply in debt" might be correct under some circumstances, we have no way to know given the information provided.
c. Incorrect. We can determine the poor financial health of the company but not its leverage position.
d. Incorrect. Because we can conclude that Perfect's overall financial health has deteriorated, answer c. is not correct.

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