PART 2

1

2A. Financial Statement Analysis

Module

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MODULE

1 A.1. Financial Statement Analysis

Part 2
Unit 1

This module covers the following content from the IMA *Learning Outcome Statements*.

CMA LOS Reference: Part 2—Section A.1. Financial Statement Analysis

The candidate should be able to:

a. for the balance sheet and income statement, prepare and analyze common-size financial statements; i.e., calculate percentage of assets and sales, respectively; also called vertical analysis

b. for the balance sheet and income statement, prepare a comparative financial statement horizontal analysis; i.e., calculate trend year over year for every item on the financial statement compared to the base year

c. calculate the growth rate of individual line items on the balance sheet and income statement

1 Vertical and Horizontal Analysis

1.1 Vertical Analysis

LOS 2A1a

Common-size financial statements, also called vertical analysis, show each item in the financial statements as a percentage of a base account within each statement.

1.1.1 Income Statement: Vertical Analysis

All line items in the income statement are expressed as a percentage of net sales revenue allowing comparison of operating performance between two differently sized entities, especially those in the same industry. Entities in the same industry generally have similar percentages during a period. Understanding the composition of costs enables users to identify significant items that influence profitability.

$$\text{Common-size income statement} = \left[\frac{\text{Income statement line item}}{\text{Net sales revenue}}\right] \times 100$$

Vertical analysis can also be used by applying a different denominator within an income statement account. For example, if general and administrative (G&A) costs are the focus, then total G&A expense could be used as the denominator (base) for all expense line items that are included in that total.

The benefit of this is that it may make differences in some expense accounts more obvious by using a smaller base, as opposed to being less obvious when using revenue as the sole base.

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Illustration 1 Income Statement Analysis

Taylen Inc. has an opportunity to invest either in an established restaurant in Big City (BC) or in a locally owned restaurant in Taylen's hometown. To determine which investment is better, Taylen reviews the income statement for each company for the most recent quarter:

Big City Restaurant		Local Restaurant	
Sales	$1,000,000	Sales	$40,000
Cost of goods sold	500,000	Cost of goods sold	10,000
Gross profit	500,000	Gross profit	30,000
Operating expenses	450,000	Operating expenses	24,000
Net income	$ 50,000	Net income	$ 6,000

While the numbers for the restaurant located in Big City are much larger and show a greater profit than the numbers and profit for the local restaurant, a comparison using vertical analysis, with each line item as a percentage of sales revenues, reveals that the local restaurant had a higher operating margin:

Big City Restaurant			Local Restaurant		
Sales	$1,000,000	100%	Sales	$40,000	100%
Cost of goods sold	500,000	50%	Cost of goods sold	10,000	25%
Gross profit	500,000	50%	Gross profit	30,000	75%
Operating expenses	450,000	45%	Operating expenses	24,000	60%
Net income	$ 50,000	5%	Net income	$ 6,000	15%

Based upon the vertical analysis, Taylen determines that the BC restaurant was less profitable per sales dollar than the local restaurant. The BC restaurant's cost of goods sold as a percentage of sales was double the rate for the local restaurant and therefore diminished the profit potential for the BC restaurant. Although the local restaurant's operating expenses as a percentage of sales were higher, the local restaurant generated a 15 percent return for every dollar of sales revenue earned by the local restaurant, compared to a 5 percent return for the BC restaurant.

1.1.2 Balance Sheet: Vertical Analysis

All line items in the balance sheet are expressed as a percentage of total assets (or the sum of total liabilities and stockholders' equity, which equals total assets).

$$\text{Common-size balance sheet} = \left[\frac{\text{Balance sheet line item}}{\text{Total assets}}\right] \times 100$$

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Different accounts can be used as the base in order to make comparisons. Depending on the size of the company, the base could be total fixed assets, total current assets, total current liabilities, or total long-term debt.

Example 1 Balance Sheet Analysis

Facts: Apex Corp.'s management has set targets for specific balance sheet accounts as a percentage of total assets, as set forth below:

	% of Total Assets
Cash	5%
Property, plant, and equipment	50%
Current liabilities	10%

The balance sheet for the current year reflects the following balances:

Apex Corp.
Balance Sheet
December 31, Year 1

Current assets:	
Cash	$ 50,000
Accounts receivable, net	80,000
Inventory	160,000
Total current assets	290,000
Property, plant, and equipment, net	120,000
Total assets	$410,000
Liabilities and stockholders' equity:	
Current liabilities:	
Accounts payable	$110,000
Notes payable	50,000
Total current liabilities	160,000
Stockholders' equity:	
Common stock	190,000
Retained earnings	60,000
Total liabilities and stockholders' equity	$410,000

Required: To determine if Apex is meeting its goals, prepare a common-size balance sheet based on total assets.

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(continued)

Solution: To determine individual percentages (rounded to one decimal place), divide each line item amount by $410,000, the amount of total assets:

Apex Corp.
Common-Size Balance Sheet
December 31, Year 1

Current assets:	
Cash	12.2%
Accounts receivable, net	19.5%
Inventory	39.0%
Total current assets	70.7%
Property, plant, and equipment, net	29.3%
Total assets	100.00%
Liabilities and stockholders' equity:	
Current liabilities:	
Accounts payable	26.8%
Notes payable	12.2%
Total current liabilities	39.0%
Stockholders' equity:	
Common stock	46.4%
Retained earnings	14.6%
Total liabilities and stockholders' equity	100.00%

Apex currently has 12.2 percent of total assets in cash—more than double the percentage desired by management. Property, plant, and equipment represent only 29.3 percent of total assets—significantly below the 50 percent target. Apex's management should consider investing excess cash in property, plant, and equipment (capital expenditures) to reach its targets.

Current liabilities are 39.0 percent of total assets, exceeding Apex's 10 percent target. By obtaining an understanding of the relationship of each balance sheet account to total assets, management can better direct the activities of the company. An alternative to spending Apex's excess cash on capital expenditures would be to pay off current liabilities, minimizing the ratios for cash and current liabilities. Apex could then issue more equity to fund investments in property, plant, and equipment, achieving its target of 50 percent.

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1.2 Horizontal Analysis

LOS 2A1b

Management can use horizontal analysis (base-year trend analysis) in combination with common-size statements to examine the changes in accounts over time. Horizontal analysis helps focus on account balance increases or decreases in relation to a specific base year in order to identify notable trends. The base year is the earliest year reported, and all successive years are expressed in proportion to that base-year amount. This method provides a constant base against which multiple years may be analyzed.

A horizontal analysis of the income statement may review growth in targeted line items over time. This type of analysis can be performed for any income statement account for which management desires to identify possible trends. A horizontal analysis of the balance sheet allows management to review growth over time in targeted individual balance sheet accounts as well as broader changes to total assets, total liabilities, and total equity.

$$\text{Common base-year statements} = \left[\frac{\text{Current year line item amount}}{\text{Base year line item amount}}\right] \times 100$$

Example 2 Horizontal Analysis

Facts: Apex Corp.'s management is analyzing the income statement for Year 2 and Year 3 to evaluate trends in the financial statement results. Below are the income statements for the past three years.

Apex Corp.
Income Statement
for the Years Ended December 31

	Year 3	Year 2	Year 1
Net sales	$2,100,000	$1,800,000	$1,300,000
Cost of goods sold	(1,390,000)	(1,200,000)	(880,000)
Gross profit	$ 710,000	$ 600,000	$ 420,000
Total operating expenses	(380,000)	(300,000)	(200,000)
Income taxes	(28,000)	(30,000)	(12,000)
Net income	$ 302,000	$ 270,000	$ 208,000

Required: Prepare a horizontal analysis for Apex's Year 2 and Year 3 income statements using Year 1 as the base year and discuss any notable trends.

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(continued)

Solution:

Apex Corp.
Income Statement
for the Years Ended December 31

	Year 3	Year 2	Year 3	Year 2
Net sales	$2,100,000	$1,800,000	161.54%	138.46%
Cost of goods sold	(1,390,000)	(1,200,000)	157.95%	136.36%
Gross profit	$ 710,000	$ 600,000	169.05%	142.86%
Total operating expenses	(380,000)	(300,000)	190.00%	150.00%
Income taxes	(28,000)	(30,000)	233.33%	250.00%
Net income	$ 302,000	$ 270,000	145.19%	129.81%

This analysis shows that all income statement line items increase in Years 2 and 3 when compared to Year 1. Note that the common base-year amount for each line item reveals the percentage change for that line item from Year 1. For example, Year 2 net sales expressed in terms of Year 1 are 138.46 percent, which means that Year 2 net sales are 38.46 percent higher than Year 1 net sales.

LOS 2A1b

1.3. Financial Statement Growth Rates

LOS 2A1c

To determine positive or negative growth from year to year, management should frequently review financial statement accounts. Unlike horizontal analysis where a single base year is used for all calculations, measuring growth rates using annual dollar amounts involves shifting the base year forward by one year.

$$\text{Annual growth rate} = \left[\frac{(\text{Current year amount} - \text{Prior year amount})}{\text{Prior year amount}}\right] \times 100$$

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Example 3 Growth Rate Analysis

Facts: Apex Corp.'s management is reviewing the income statement and balance sheet for Years 1 through 3:

Apex Corp.
Income Statement
for the Years Ended December 31

	Year 3	Year 2	Year 1
Net sales	$2,100,000	$1,800,000	$1,300,000
Cost of goods sold	(1,390,000)	(1,200,000)	(880,000)
Gross profit	$ 710,000	$ 600,000	$ 420,000
Total operating expenses	(380,000)	(300,000)	(200,000)
Income taxes	(28,000)	(30,000)	(12,000)
Net income	$ 302,000	$ 270,000	$ 208,000

Apex Corp.
Balance Sheet
December 31

	Year 3	Year 2	Year 1
Current assets:			
Cash	$100,000	$ 80,000	$ 50,000
Accounts receivable	135,000	100,000	80,000
Inventory	160,000	120,000	160,000
Property, plant, and equipment, net	310,000	250,000	120,000
Total assets	$705,000	$550,000	410,000
Liabilities and stockholders' equity:			
Accounts payable	$125,000	$100,000	$110,000
Notes payable	90,000	70,000	50,000
Common stock	280,000	280,000	190,000
Retained earnings	210,000	100,000	60,000
Total liabilities and stockholders' equity	$705,000	$550,000	$410,000

Required: Prepare a growth rate analysis of Apex's income statement and balance sheet for Years 1 through 3.

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(continued)

Solution:

Apex Corp.
Income Statement
for the Years Ended December 31

	Year 3	Year 2	Year 1	% Chg. Y2–Y3	% Chg. Y1–Y2
Net sales	$2,100,000	$1,800,000	$1,300,000	16.67%	38.46%
Cost of goods sold	(1,390,000)	(1,200,000)	(880,000)	15.83%	36.36%
Gross profit	$ 710,000	$ 600,000	$ 420,000	18.33%	42.86%
Total operating expenses	(380,000)	(300,000)	(200,000)	26.67%	50.00%
Income taxes	(28,000)	(30,000)	(12,000)	(6.67%)	150.00%
Net income	$ 302,000	$ 270,000	$ 208,000	11.85%	29.81%

Apex Corp.
Balance Sheet
Years 1, 2, and 3

	Year 3	Year 2	Year 1	% Chg. Y2–Y3	% Chg. Y1–Y2
Current assets:					
Cash	$100,000	$ 80,000	$ 50,000	25.00%	60.00%
Accounts receivable	135,000	100,000	80,000	35.00%	25.00%
Inventory	160,000	120,000	160,000	33.33%	(25.00%)
Property, plant, and equipment, net	310,000	250,000	120,000	24.00%	108.33%
Total assets	$705,000	$550,000	410,000	28.18%	34.15%
Liabilities and stockholders' equity:					
Accounts payable	$125,000	$100,000	$110,000	25.00%	(9.09%)
Notes payable	90,000	70,000	50,000	28.57%	40.00%
Common stock	280,000	280,000	190,000	0.00%	47.37%
Retained earnings	210,000	100,000	60,000	110.00%	66.67%
Total liabilities and stockholders' equity	$705,000	$550,000	$410,000	28.18%	34.15%

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Evaluating the growth rate in this way reveals nuances that otherwise might be missed by only looking at a horizontal or vertical analysis. Calculating the percentage change year-over-year reveals that profits grew but at a slower rate in Year 3 than in Year 2 (11.85% vs. 29.81%).

The balance sheet supports the slowdown in sales as inventory increased 33.33 percent in Year 3 compared to a decline of 25 percent in Year 2. Apex issued no equity in Year 3 but did have an increase in both long-term debt (notes payable) and short-term debt (accounts payable), possibly to cushion operations as a result of slower growth than expected.

Question 1 **MCQ-12701**

A useful analysis to compare a large accounting firm's operating results with a small, local accounting firm is:

a. Horizontal analysis.
b. Vertical analysis.
c. Growth rate analysis.
d. Sensitivity analysis.

Question 2 **MCQ-12702**

Sweetwater Corp.'s accountant has been asked to recreate financial statement information that was destroyed when a disgruntled manager deleted files and destroyed paper documents. A partial growth rate analysis of an income statement was recovered:

	Percentage of Base Year			Growth Rate Analysis Increase (Decrease) From Previous Year	
	Year 3	*Year 2*	*Year 1*	*Year 3*	*Year 2*
Net sales	?	105.42%		4.82%	?
Cost of goods sold	?	95.74%		3.45%	?
Gross profit	?	99.63%		5.14%	?
Operating expenses	?	110.28%		(12.95%)	?
Income taxes	?	102.12%		3.34%	?
Net income	?	114.18%		?	?

Using growth rate analysis, what is the percentage change in operating expenses for Year 3 over the base year?

a. 124.56%
b. 96.00%
c. 87.05%
d. 97.63%

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Question 3 **MCQ-12703**

Sweetwater Corp.'s accountant has been asked to recreate financial statement information that was destroyed when a disgruntled manager deleted files and destroyed paper documents. A partial growth rate analysis of an income statement was recovered:

	Percentage of Base Year			Growth Rate Analysis Increase (Decrease) From Previous Year	
	Year 3	*Year 2*	*Year 1*	*Year 3*	*Year 2*
Net sales	?	105.42%		4.82%	?
Cost of goods sold	?	95.74%		3.45%	?
Gross profit	?	99.63%		5.14%	?
Operating expenses	?	110.28%		(12.95%)	?
Income taxes	?	102.12%		3.34%	?
Net income	?	114.18%		?	?

If Year 2 cost of goods sold is $344,644, what is the dollar amount for cost of goods sold in Year 1?

a. $361,255
b. $359,979
c. $356,534
d. $344,644

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MODULE

2 A.2. Financial Ratios: Part 1

Part 2
Unit 1

This module covers the following content from the IMA *Learning Outcome Statements*.

CMA LOS Reference: Part 2—Section A.2. Financial Ratios: Part 1

The candidate should be able to:

a. calculate and interpret the current ratio, the quick (acid-test) ratio, the cash ratio, the cash flow ratio, and the net working capital ratio

b. explain how changes in one or more of the elements of current assets, current liabilities, and/or unit sales can change the liquidity ratios and calculate that impact

c. demonstrate an understanding of the liquidity of current liabilities

d. define solvency

e. define operating leverage and financial leverage

f. calculate degree of operating leverage and degree of financial leverage

g. demonstrate an understanding of the effect on the capital structure and solvency of a company with a change in the composition of debt versus equity by calculating leverage ratios

h. calculate and interpret the financial leverage ratio, and determine the effect of a given change in capital structure on this ratio

i. calculate and interpret the following ratios: debt-to-equity, long-term debt-to-equity, and debt-to-total assets

j. define, calculate, and interpret the following ratios: fixed-charge coverage (earnings to fixed charges), interest coverage (times interest earned), and cash flow to fixed charges

k. discuss how capital structure decisions affect the risk profile of a firm

x. demonstrate a familiarity with the sources of financial information about public companies and industry ratio averages

y. evaluate the financial strength and performance of an entity based on multiple ratios

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1 Financial Ratios

Financial ratios are used to quantify the relationships between items on an entity's financial statements. Ratios may be compared for different periods for a single entity. Ratios can also be used to compare entities within an industry. These comparative analyses identify trends that may be important to investors, lenders, and other interested parties. The several categories of ratios address liquidity, leverage, activity, profitability, and market relationships.

Pass Key

Ratio questions may require a simple ratio calculation, an interpretation of what the ratio means, or an analysis of the effects of a change.

When asked to analyze whether a ratio is likely to increase or decrease, you can gain efficiency by knowing the following:

- The numerator has a direct relationship with the ratio. For example, an increase in the numerator results in an increase in the ratio.

$$\uparrow \frac{\text{Numerator}}{\text{Denominator}} = \text{Resulting ratio} \uparrow$$

- The denominator has an inverse relationship with the ratio. For example, an increase in the denominator results in a decrease in the ratio.

$$\uparrow \frac{\text{Numerator}}{\text{Denominator}} = \text{Resulting ratio} \downarrow$$

Sometimes, when both the numerator and denominator are affected by a given change, the final result (increase or decrease) is not easy to determine. The best way to answer questions such as these is to make up numbers and plug them into the ratio formula.

LOS 2A2x

1.1 Sources of Financial Information

The U.S. Securities and Exchange Commission (SEC) requires that all publicly traded entities file publicly available reports, including the entity's annual report (called Form 10-K) and quarterly reports (Form 10-Q). This information can be found on the SEC's EDGAR database (Electronic Data Gathering, Analysis, and Retrieval) and is also available in the investor information section of public company websites. Other sources of financial information and industry analysis include Dun & Bradstreet's Key Business Ratios, Moody's, and S&P Net Advantage. Other online resources include BizStats and Factiva.

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Gi Company
Balance Sheet

Current Assets	**Year 2**	**Year 1**
Cash and cash equivalents	$ 50,000	$ 35,000
Trading securities	75,000	65,000
Accounts receivable	300,000	390,000
Inventory	290,000	275,000
Total current assets	715,000	765,000
Investments available for sale	350,000	300,000
Fixed Assets		
Property, plant, and equipment	1,900,000	1,800,000
Less: accumulated depreciation	(180,000)	(150,000)
	1,720,000	1,650,000
Total fixed assets	30,000	35,000
Total assets	$2,815,000	$2,750,000
Current Liabilities		
Accounts payable	$ 150,000	$ 125,000
Notes payable	325,000	375,000
Accrued and other liabilities	220,000	200,000
Total current liabilities	695,000	700,000
Long-Term Debt		
Bonds and notes payable	650,000	700,000
Total liabilities	1,345,000	1,400,000
Stockholders' Equity		
Common stock (100,000 shares outstanding)	500,000	500,000
Additional paid-in capital	670,000	670,000
Retained earnings	300,000	180,000
Total equity	1,470,000	1,350,000
Total liabilities and equity	$2,815,000	$2,750,000

Gi Company
Income Statement

	Year 2	**Year 1**
Sales	$1,800,000	$1,700,000
Cost of goods sold	(1,000,000)	(940,000)
Gross profit	800,000	760,000
Operating expenses	(486,970)	(476,970)
Interest expense	(10,000)	(10,300)
Income before income tax	303,030	272,730
Income taxes	(103,030)	(92,730)
Net income	$ 200,000	$ 180,000
Earnings per share	$ 2.00	$ 1.80

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Other Financial Information		
Operating cash flows	$ 275,000	$ 265,000
Dividends per share	0.80	-0-
Market price per share	12.00	11.00

Additional assumptions:

- All sales are credit sales.
- Reduction in long-term notes and bonds payable is due to annual principal payments required starting in Year 2.
- Credit purchases amount to 40 percent of cost of goods sold for the year.
- Depreciation expense is $30,000 each year.
- The bonds payable are convertible into 50,000 shares of common stock.

LOS 2A2a

2 Liquidity Ratios

The focus of liquidity ratios is on the current liabilities side of a company's balance sheet, and on whether a company will have enough in current assets and other funds to pay the liabilities when they are due. Key liquidity ratios include the current ratio, quick ratio, cash ratio, cash flow ratio, and net working capital ratio.

2.1 Current Ratio

The current ratio is a measure of how much in current assets is available to pay current liabilities. All else being equal, a current ratio greater than 1.0 is better because it implies that current assets exceed current liabilities.

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

$$\text{Year 2} = \frac{\$715{,}000}{\$695{,}000} = 1.03$$

$$\text{Year 1} = \frac{\$765{,}000}{\$700{,}000} = 1.09$$

(Industry average = 1.50)

The ratio, and therefore Gi Company's ability to meet its short-term obligations, decreases from Year 1 to Year 2 and is low compared with the industry average.

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2.2 Quick Ratio

The quick ratio, also known as the acid-test ratio, is similar to the current ratio, except it excludes inventory and includes only the more liquid current assets, such as cash, short-term marketable securities, and receivables. A higher quick ratio implies that more liquid current assets are available to pay current liabilities. A shift to less liquid assets or an increase in current liabilities will decrease this ratio.

$$\text{Quick ratio} = \frac{\text{Cash and cash equivalents} + \text{Short-term marketable securities} + \text{Receivables (net)}}{\text{Current liabilities}}$$

$$\text{Year 2} = \frac{\$50{,}000 + \$75{,}000 + \$300{,}000}{\$695{,}000} = 0.61$$

$$\text{Year 1} = \frac{\$35{,}000 + \$65{,}000 + \$390{,}000}{\$700{,}000} = 0.70$$

(Industry average = 0.80)

Gi's ratio decreases from Year 1 to Year 2 and is lower than the industry average, which indicates that Gi may have trouble meeting short-term obligations.

2.3 Cash Ratio

The cash ratio is the most conservative liquidity ratio. The numerator includes only cash and marketable securities. A higher ratio indicates that there is sufficient cash on hand to pay off liabilities that are due within a year or one operating cycle from the reporting date.

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

$$\text{Year 2} = \frac{\$50{,}000 + 75{,}000}{\$695{,}000} = 0.18$$

$$\text{Year 1} = \frac{\$35{,}000 + 65{,}000}{\$700{,}000} = 0.14$$

(Industry average: 0.50)

Gi Company's cash ratio has increased slightly from Year 1 to Year 2, but is lower than the industry average, and suggests that Gi may need more cash on hand.

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2.4 Operating Cash Flow Ratio

This ratio measures the ability to pay current liabilities with cash generated from operating activities, as reported on the statement of cash flows. A higher ratio is desired, as it implies that a company is generating cash from its core activities to pay its current liabilities. Positive and sustainable cash flows from operations are crucial for the ongoing success of a company and an indicator of future financial health.

$$\text{Cash flow ratio} = \frac{\text{Cash flow from operating activities}}{\text{Current liabilities}}$$

$$\text{Year 2} = \frac{\$275{,}000}{\$695{,}000} = 0.40$$

$$\text{Year 1} = \frac{\$265{,}000}{\$700{,}000} = 0.38$$

(Industry average: 0.45)

Gi has more cash from Year 2 operations available to cover the company's Year 2 current liabilities. Although still lower than the industry average, this ratio is trending upward.

2.5 Net Working Capital Ratio

The net working capital ratio is the ratio of net working capital (current assets minus current liabilities) to total assets. An increasing net working capital ratio implies that an entity has a higher proportion of current assets and a lower proportion of non-current assets.

$$\text{Net working capital ratio} = \frac{\text{Net working capital}}{\text{Total assets}}$$

$$\text{Year 2} = \frac{\$715{,}000 - \$695{,}000}{\$2{,}815{,}000} = 0.007$$

$$\text{Year 1} = \frac{\$765{,}000 - \$700{,}000}{\$2{,}750{,}000} = 0.024$$

(Industry average: 0.05)

Gi's net working capital ratio is below the industry average and suggests that Gi is less liquid than the industry as a whole.

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2.6 Effect of Changes on Liquidity Ratios

LOS 2A2b

Liquidity ratios decrease with decreases in current assets and/or with increases in current liabilities. The quick ratio and the cash ratio decline as dollars are shifted from more liquid to less liquid current assets.

When cash is used to pay current liabilities, the numerator and denominator of the current, quick, and cash ratios decrease by the same amount (the amount of cash used to pay the current liabilities). The effect that this numerator and denominator decrease has on each ratio will depend on whether the ratio is above or below 1.00 prior to the change.

Example 1 Changes to Liquidity

Facts: At the end of Year 1, Williams Corp. has a current ratio of 3.0, a quick ratio of 1.0, and a cash ratio of 0.5. The following transactions occurred in January of Year 2:

1. Collected $15,000 of accounts receivable.
2. Paid $100,000 cash for a building.
3. Purchased inventory on account for $50,000.
4. Sold inventory with a cost of $30,000 for $45,000 cash.
5. Sold inventory with a cost of $30,000 for $45,000 on account.
6. Paid accrued payroll from Year 1 in the amount of $20,000.

Required: Indicate whether each transaction would increase, decrease, or have no effect on the current, quick, and cash ratios. Each transaction is independent of all other transactions.

Solution: To work through problems like these on the exam, insert numbers into the fact pattern ratios and then work the problem. For example, start with the current ratio of 3.0 and assume that current assets are $3,000,000 and current liabilities are $1,000,000. For the quick ratio of 1.0, assume that liquid assets are $1,000,000 and current liabilities are $1,000,000. For the cash ratio of 0.5, assume that cash and marketable securities are $500,000 and current liabilities are $1,000,000. Determine the answer to each question by adding or subtracting the appropriate amount, set forth in the facts, from each ratio's numerator and/or denominator.

1. **Collected $15,000 of accounts receivable.**

   No effect on the current ratio or quick ratio because an increase in cash and a corresponding decrease in accounts receivable results in no change to current assets and has no impact on current liabilities. The cash ratio increases because the numerator increases by $15,000 and the denominator is unaffected.

2. **Paid $100,000 cash for a building.**

   All three ratios decrease because the numerator of each ratio decreases by $100,000. The building is a non-current asset and does not affect the ratios.

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3. **Purchased inventory on account for $50,000.**

   All three ratios decrease. The current ratio decreases because both the numerator and denominator increase by $50,000 and the ratio was greater than one before the transaction (e.g., $3,050,000 / $1,050,000 = 2.9). The quick ratio and the cash ratio decrease because the numerators do not include inventory and are unchanged, and the denominators increase by $50,000.

4. **Sold inventory with a cost of $30,000 for $45,000 cash.**

   The current ratio increases because the numerator increases by $15,000 (i.e., the $45,000 increase to cash is greater than the $30,000 decrease to inventory) and there is no change to the denominator. The quick ratio and the cash ratio both increase because cash increases by $45,000 and there is no change to the denominator. The change in inventory does not affect the quick and cash ratios.

5. **Sold inventory with a cost of $30,000 for $45,000 on account.**

   The current ratio increases because the numerator increases by $15,000 (i.e., the $45,000 increase to accounts receivable is greater than the $30,000 decrease to inventory) and there is no change to the denominator. The quick ratio increases because accounts receivable increases by $45,000 and there is no change in the denominator of the quick ratio. There is no effect on the cash ratio because neither accounts receivable nor inventory is used in the calculation of the cash ratio.

6. **Paid accrued payroll from Year 1 in the amount of $20,000.**

   The current ratio increases because both the numerator and denominator decline by $20,000 and the current ratio was greater than one before the transaction (e.g., $2,080,000 / $980,000 = 3.04). The quick ratio does not change because an equal dollar decrease to the numerator and to the denominator keeps the ratio at 1.0. The cash ratio decreases because both the numerator and the denominator decline by $20,000, and the current ratio was greater than one before the transaction (e.g., $2,080,000 / $980,000 = 3.04).

LOS 2A2c

2.7 Current Liability Liquidity

Liquidity indicates the ability of an entity to pay its current liabilities as they become due. Entities with strong liquidity ratios have a healthy balance between current assets and the current liabilities. Weak ratios indicate difficulties paying short-term obligations and indicate a potential need for outside financing and/or for liquidation of non-current assets.

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2.8 Using Liquidity Analysis to Measure Performance

LOS 2A2y

Example 2 Liquidity and Performance Measures

Facts: Parkers Corp.'s management is analyzing operating performance for the current year. The accountant has provided the following balance sheets and income statements for the two most recent years.

Assume the following:

- All sales are on credit.
- Credit purchases are equivalent to 50 percent of the amount of cost of goods sold.
- Parkers issued all 36,000 shares of common stock at the beginning of Year 1 and issued the 4,000 additional shares of common stock on April 1 of Year 2.
- Early in Year 2, Parkers issued convertible bonds at par for $50,000 that may be converted into 10,000 shares of common stock on November 1 of Year 2. The bonds issued in Year 1 are not convertible.

Parkers Corp.
Balance Sheet

	Year 2	Year 1
Current assets		
Cash and cash equivalents	$ 25,000	$ 20,000
Trading securities	75,000	80,000
Accounts receivable (gross and net)	125,000	100,000
Inventory	200,000	150,000
Short-term notes receivable	20,000	50,000
Total current assets	445,000	400,000
Fixed assets		
Property, plant, and equipment (net)	400,000	400,000
Total assets	$845,000	$800,000
Current liabilities		
Accounts payable	$ 75,000	$100,000
Salaries payable	45,000	35,000
Short-term notes payable	60,000	60,000
Accrued liabilities	25,000	75,000
Total current liabilities	205,000	270,000
Long-term liabilities		
Bonds payable	200,000	150,000
Total liabilities	405,000	420,000
Stockholders' equity		
Common stock ($5 par)	200,000	180,000
Additional paid-in capital	100,000	80,000
Retained earnings	140,000	120,000
Total liabilities and stockholders' equity	$845,000	$800,000

(continued)

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Parkers Corp.
Income Statement

	Year 2	Year 1
Sales	$750,000	$700,000
Cost of goods sold	500,000	430,000
Gross profit	250,000	270,000
Operating expenses	50,000	90,000
Earnings before interest and taxes	200,000	180,000
Interest expense	20,000	15,000
Income tax expense	54,000	49,500
Net income	$126,000	$115,500
Cash inflows from operating activities	$ 80,000	$100,000
Current market price of stock	22.00	20.00
Dividends issued per share	1.58	1.00
Degree of operating leverage		1.21
Degree of financial leverage		0.70
Depreciation expense	$ 20,000	$ 20,000

Required: Calculate the following ratios for Years 1 and 2, and indicate strengths or weaknesses relating to these ratios and any improvement or deterioration over time:

1. Current ratio
2. Quick ratio
3. Cash ratio
4. Cash flow ratio
5. Net working capital ratio

Solution:

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

Year 2		Year 1	
$\frac{\$445,000}{\$205,000}$	= 2.17	$\frac{\$400,000}{\$270,000}$	= 1.48

The current ratio improved in Year 2, and Parkers is currently in a good position to pay its existing obligations. In order to maximize earnings, this ratio level should be maintained but not increased significantly as current assets tend to earn lower returns than other investments.

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2. $$\text{Quick ratio} = \frac{\text{Cash and cash equivalents} + \text{Short-term marketable securities} + \text{Receivables (net)}}{\text{Current liabilities}}$$

Year 2		Year 1	
$\frac{\$25{,}000 + \$75{,}000 + \$125{,}000}{\$205{,}000}$	$= 1.10$	$\frac{\$20{,}000 + \$80{,}000 + \$100{,}000}{\$270{,}000}$	$= 0.74$

The quick ratio improved between Year 1 and Year 2 and should be maintained to facilitate payment of current liabilities but not increased significantly, because current assets tend to earn lower returns than other investments.

3. $$\text{Cash ratio} = \frac{\text{Cash and cash equivalents + Short-term marketable securities}}{\text{Current liabilities}}$$

Year 2		Year 1	
$\frac{\$25{,}000 + \$75{,}000}{\$205{,}000}$	$= 0.49$	$\frac{\$20{,}000 + \$80{,}000}{\$270{,}000}$	$= 0.37$

Although this ratio improved, it is still reflecting insufficient liquid assets to cover upcoming liabilities. If a majority of current liabilities become due at the same time, Parkers may have to borrow to pay current liabilities.

4. $$\text{Cash flow ratio} = \frac{\text{Cash flows from operations}}{\text{Current liabilities}}$$

Year 2		Year 1	
$\frac{\$80{,}000}{\$205{,}000}$	$= 0.39$	$\frac{\$100{,}000}{\$270{,}000}$	$= 0.37$

This ratio slightly improved from Year 1, but is not strong. Parkers may need to sell off assets or issue more debt because operating cash flows are not sufficient to cover current liabilities.

5. $$\text{Net working capital ratio} = \frac{\text{Net working capital}}{\text{Total assets}}$$

Year 2		Year 1	
$\frac{\$445{,}000 - \$205{,}000}{\$845{,}000}$	$= 0.29$	$\frac{\$400{,}000 - \$270{,}000}{\$800{,}000}$	$= 0.16$

The net working capital ratio increased, is positive, and indicates that management has increased the dollar amount of net working capital relative to the dollar amount for all assets.

Overall, Parkers appears to be in a good position to meet its obligations. To increase Parkers' cash available to pay current liabilities, Parkers may want to encourage its credit customers to pay their balances faster.

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LOS 2A2d
LOS 2A2k

3 Leverage Ratios

The ability to meet long-term obligations is referred to as solvency. Whereas liquidity relates to short-term obligations, solvency focuses on an entity's long-term prospects. Leverage ratios are used to evaluate an entity's ability to satisfy its debt obligations.

The capital structure of an entity is the mix of debt (long-term and short-term) and equity (common and preferred) used to finance the entity's operations and growth. Using equity to raise capital is less risky because equity does not affect either an entity's profitability or an entity's solvency. With equity, there are no required interest payments and no increase in either interest coverage ratios or debt ratios. However, interest on debt is tax deductible and reduces income tax payments. Appropriate levels of debt increase favorable financial leverage, which may increase returns to shareholders.

LOS 2A2e
LOS 2A2f

3.1 Operating Leverage

Operating leverage is the degree to which a company uses fixed operating costs rather than variable operating costs. Capital-intensive industries generally have high operating leverage. Labor-intensive industries generally have low operating leverage.

A company with high operating leverage:

- Must produce sufficient sales revenue to cover its high fixed-operating costs. High operating leverage is beneficial when sales revenue is high. High contribution margin indicates high operating leverage.
- Will have greater risk but greater possible returns. There is risk because the variability of profits is greater with higher operating leverage.
- May struggle to cover its fixed costs when sales decline. However, beyond the breakeven point, a company with higher fixed costs will retain a higher percentage of additional revenues as operating income (earnings before interest and taxes or EBIT).

3.1.1 Degree of Operating Leverage

The degree of operating leverage (DOL) measures the degree to which a company's operating income or earnings before interest and taxes (EBIT) change if sales change.

$$\text{DOL} = \frac{\text{Percentage change in EBIT}}{\text{Percentage change in sales}}$$

Or:

$$\text{DOL} = \frac{\text{Contribution margin}}{\text{EBIT}}$$

Because a company's fixed costs do not change with changes in sales volume, the degree of operating leverage measures the potential volatility of operating income due to the level of fixed costs. Companies with higher levels of fixed costs have a higher degree of operating leverage, meaning that past the breakeven point an increase in sales results in a greater percentage change in operating income. This also represents greater risk to companies because they incur these fixed costs regardless of whether or not they generate sales.

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3.2 Financial Leverage

Financial leverage is the degree to which a company uses debt rather than equity financing. When debt is issued, the firm generally must pay fixed interest costs, although those interest costs are tax deductible. Equity issuances do not result in an increase in fixed costs because dividend payments are not required.

A company with high operating leverage:

- Must produce sufficient operating income (also known as earnings before interest and taxes, or EBIT) to cover its fixed interest costs. However, once fixed interest costs are covered, additional EBIT will go straight to net income and earnings per share.
- Will find that a relatively small change in earnings before interest and taxes (increase or decrease) has a greater effect on profits and shareholder value.
- May be at risk of bankruptcy if it is unable to make its debt payments and may be unable to find new lenders in the future.

3.2.1 Degree of Financial Leverage

Degree of financial leverage (DFL) measures the degree to which a company's net income changes relative to changes in operating income. A company with a high degree of financial leverage will experience more volatility in net income.

$$\text{DFL} = \frac{\text{Percentage change in net income}}{\text{Percentage change in EBIT}}$$

Or:

$$\text{DFL} = \frac{\text{EBIT}}{\text{EBIT} - \text{Interest}}$$

Illustration 1 Degree of Operating and Financial Leverage

Gi Company
Income Statement

	Year 2
Sales	$1,800,000
Cost of goods sold	(1,000,000)
Gross profit	800,000
Operating expenses	(486,970)
Interest expense	(10,000)
Income before income tax	303,030
Income taxes	(103,030)
Net income	$ 200,000

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Gi's Year 2 income statement is based on sales of 60,000 units. Cost of goods sold and operating expenses comprise both variable costs ($1,200,000) and fixed costs (remainder). Gi has 100,000 shares of common stock outstanding.

The degree of operating leverage is calculated as shown below:

Sales price per unit = $1,800,000 / 60,000 units = $30/unit

Variable cost per unit = $1,200,000 / 60,000 units = $20/unit

Fixed costs = ($1,000,000 + $486,970) – $1,200,000 = $286,970

Contribution margin = 60,000 units × ($30 – $20) = $600,000

EBIT = Operating income = $800,000 gross profit – $486,970 operating expenses = $313,030

DOL = $600,000 / $313,030 = 1.92

This means that a 1 percent change in sales will lead to a 1.92 percent change in operating income (EBIT).

If Gi's variable costs were instead $600,000, the degree of operating leverage would be:

Variable cost per unit = $600,000 / 60,000 units = $10/unit

Fixed costs = ($1,000,000 + $486,970) – $600,000 = $886,970

Contribution margin = 60,000 units × ($30 – $10) = $1,200,000

DOL = $1,200,000 / $313,030 = 3.83

The increase in fixed costs in the capital structure results in a higher degree of operating leverage.

The degree of financial leverage is calculated as follows:

DFL = $313,030/ ($313,030 – $10,000) = 1.03

This means that a 1 percent change in operating income (EBIT) will lead to a 1.03 percent change in net income.

If Gi instead had interest costs of $50,000, the degree of financial leverage would be:

DFL = $313,030/ ($313,030 – $50,000) = 1.19

The increase in interest expense results in a higher degree of financial leverage.

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3.3 Financial Leverage Ratio

LOS 2A2h

The financial leverage ratio measures the proportion of assets acquired using debt. Because total assets is always greater than or equal to total equity, this ratio will never be less than 1.00. A high financial leverage ratio indicates more reliance on debt financing. As the percentage of debt in the capital structure decreases, the ratio approaches 1.00. At 1.00 the company has no debt.

Gi Company
Excerpt From the Balance Sheet

	Year 2	Year 1
Total assets	$2,815,000	$2,750,000
Total liabilities	$1,345,000	$1,400,000
Total equity	$1,470,000	$1,350,000

$$\text{Financial leverage ratio} = \frac{\text{Total assets}}{\text{Total equity}}$$

$$\text{Year 2} = \frac{\$2{,}815{,}000}{\$1{,}470{,}000} = 1.91$$

$$\text{Year 1} = \frac{\$2{,}750{,}000}{\$1{,}350{,}000} = 2.04$$

(Industry average: 1.60)

In Year 2, Gi's management lowered slightly the company's reliance on debt. Compared with the industry, Gi has higher debt and is a riskier investment.

3.4 Debt-to-Equity Ratio

LOS 2A2i

The debt-to-equity ratio indicates the degree of protection to creditors in case of insolvency. A lower ratio is better. A higher ratio indicates that the company employs more debt and has more risk.

$$\text{Debt-to-equity ratio} = \frac{\text{Total liabilities}}{\text{Total equity}}$$

$$\text{Year 2} = \frac{\$1{,}345{,}000}{\$1{,}470{,}000} = 0.91$$

$$\text{Year 1} = \frac{\$1{,}400{,}000}{\$1{,}350{,}000} = 1.04$$

(Industry average: 0.75)

Gi's debt-to-equity decreased in Year 2, because both current and long-term liabilities declined, and equity increased. They are still above industry average and therefore higher risk.

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3.5 Long-Term Debt-to-Equity Ratio

The long-term debt-to-equity ratio focuses on long-term debt instead of total debt. A higher ratio indicates a higher risk that the entity will be unable to satisfy debt obligations.

$$\text{Long-term debt-to-equity ratio} = \frac{\text{Total debt} - \text{Current liabilities}}{\text{Total equity}}$$

$$\text{Year 2} = \frac{\$1{,}345{,}000 - \$695{,}000}{\$1{,}470{,}000} = 0.44$$

$$\text{Year 1} = \frac{\$1{,}400{,}000 - \$700{,}000}{\$1{,}350{,}000} = 0.52$$

(Industry average: 0.30)

Gi's long-term debt-to-equity decreased from Year 1 to Year 2. Continuing to reduce the long-term debt will bring this ratio closer to the industry average.

3.6 Debt-to-Total-Assets Ratio

This ratio indicates the extent to which an entity is using debt to finance the entity's assets. A higher ratio indicates more leverage and, therefore, more risk. If a company wishes to lower its risk, it will have to reduce total liabilities or increase total assets without incurring more debt.

$$\text{Debt-to-total-assets ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

$$\text{Year 2} = \frac{\$1{,}345{,}000}{\$2{,}815{,}000} = 0.48$$

$$\text{Year 1} = \frac{\$1{,}400{,}000}{\$2{,}750{,}000} = 0.51$$

(Industry average: 0.40)

Gi's debt-to-total-assets ratio improves in Year 2. This change indicates a positive trend and will bring Gi closer to the industry average.

LOS 2A2g

3.7 Impact of Changing Capital Structure on Leverage Ratios

An entity's capital structure indicates how assets are financed: primarily with debt, or equity, or a combination of both. As the entity increases its use of debt versus equity, solvency (long-term viability) is reduced.

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Illustration 2 Changes to Capital Structure

Gi Company
Income Statement for the Year Ended

	Year 2
Sales	$ 1,800,000
Cost of goods sold	(1,000,000)
Gross profit	800,000
Operating expenses	(486,970)
Interest expense	(10,000)
Income before income tax	303,030
Income taxes	(103,030)
Net income	$ 200,000

At the beginning of Year 2, Gi determines that it needs $200,000 for an investment in productive equipment. Management is deciding whether to finance the investment with the issuance of $200,000 of new debt or $200,000 of new equity. Gi can borrow at a 7 percent interest rate.

If Gi decides to use debt to finance the purchase:

Total assets = $2,815,000 + $200,000 investment = $3,015,000

Total liabilities = $1,345,000 + $200,000 new debt issuance = $1,545,000

Total equity = $3,015,000 – $1,545,000 = $1,470,000

Total interest expense = $10,000 + ($200,000 × 0.07) = $24,000

DFL = $313,030 / ($313,030 – $24,000) = 1.08

Financial leverage = $3,015,000 / $1,470,000 = 2.05

Debt-to-equity ratio = $1,545,000 / $1,470,000 = 1.05

Long-term debt-to-equity ratio = ($1,545,000 – $695,000) / $1,470,000 = 0.58

Debt-to-total assets = $1,545,000 / $3,015,000 = 0.51

If Gi decides to use equity to finance the purchase:

Total assets = $2,815,000 + $200,000 investment = $3,015,000

Total liabilities = $1,345,000

Total equity = $1,470,000 + $200,000 = $1,670,000

Total interest expense = $10,000

DFL = $313,030 / ($313,030 – $10,000) = 1.03

Financial leverage = $3,015,000 / $1,670,000 = 1.81

Debt-to-equity ratio = $1,345,000 / $1,670,000 = 0.81

Long-term debt-to-equity ratio = ($1,345,000 – $695,000) / $1,670,000 = 0.39

Debt-to-total assets = $1,345,000 / $3,015,000 = 0.45

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Comparing these ratios demonstrates the impact of debt financing versus equity financing on an entity's leverage ratios:

	Ratios Before Additional Financing	Ratios With Debt Financing	Ratios With Equity Financing
Degree of financial leverage	1.03	1.08	1.03
Financial leverage ratio	1.91	2.05	1.81
Debt-to-equity ratio	0.91	1.05	0.81
L-T debt-to-equity ratio	0.44	0.58	0.39
Debt-to-total assets ratio	0.48	0.51	0.45

The use of debt financing increases leverage and decreases solvency, and equity financing reduces leverage and improves solvency.

LOS 2A2j

3.8 Other Debt Ratios

Three other ratios emphasize the importance of having sufficient cash flows to cover fixed financial charges. These three ratios are the fixed-charge coverage ratio, the interest coverage ratio, and the cash flow to fixed-charges ratio. Fixed financial charges consist of interest expense, required principal repayments, lease payments, and any other fixed, financial payment representing a recurring financial obligation.

3.8.1 Fixed-Charge Coverage Ratio (Earnings to Fixed-Charges Ratio)

This ratio measures the number of times that EBIT covers fixed charges. A higher ratio indicates that a firm is better able to pay its fixed charges. A ratio of less than 1.0 indicates an inability to cover annual fixed charges, and a ratio of greater than 1.0 indicates an ability to pay fixed charges. This ratio is an expanded version of the times interest earned ratio, as it includes all fixed charges in the denominator as opposed to just the interest charge.

$$\text{Fixed-charge coverage ratio} = \frac{\text{Earnings before fixed charges and taxes}}{\text{Fixed charges}}$$

$$\text{Year 2} = \frac{\$303{,}030 + \$10{,}000}{\$10{,}000 + \$50{,}000^*} = 5.22 \text{ times}$$

$$\text{Year 1} = \frac{\$272{,}730 + \$10{,}300}{\$10{,}300} = 27.48 \text{ times}$$

***This amount is the annual repayment of notes and bonds payable required starting in Year 2.**

(Industry average: 2.01 times)

Because Gi's only fixed charge for Year 1 was interest expense, the Year 1 fixed-charge coverage ratio is skewed and not comparable to future periods. Gi's fixed-charge coverage ratio for Year 2 is higher than the industry average and indicates that Gi should be able to meet its fixed financial charges, including the annual principal repayments.

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