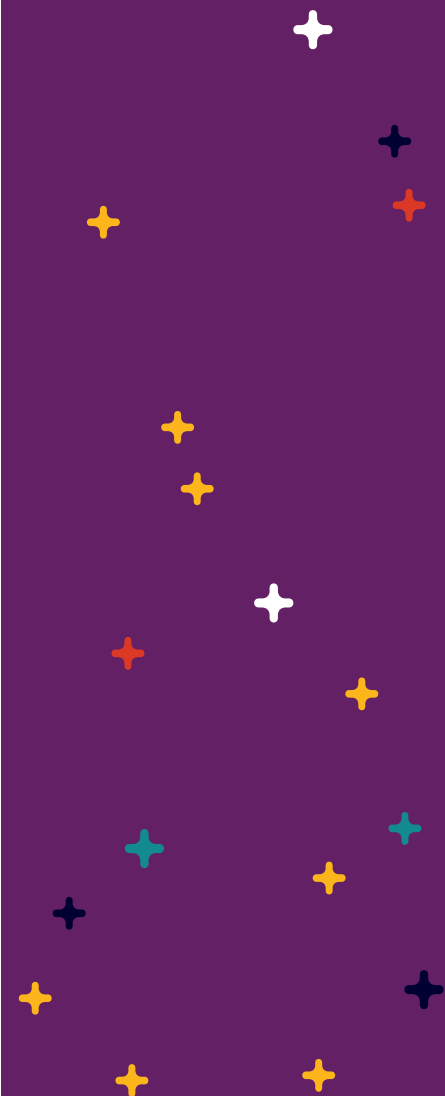


2A. Financial Statement Analysis

Module

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NOTES

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.

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 | <u>500,000</u> | Cost of goods sold | <u>10,000</u> |
| Gross profit | 500,000 | Gross profit | 30,000 |
| Operating expenses | <u>450,000</u> | Operating expenses | <u>24,000</u> |
| Net income | <u>\$ 50,000</u> | Net income | <u>\$ 6,000</u> |

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 | <u>500,000</u> | <u>50%</u> | Cost of goods sold | <u>10,000</u> | <u>25%</u> |
| Gross profit | 500,000 | 50% | Gross profit | 30,000 | 75% |
| Operating expenses | <u>450,000</u> | <u>45%</u> | Operating expenses | <u>24,000</u> | <u>60%</u> |
| Net income | <u>\$ 50,000</u> | <u>5%</u> | Net income | <u>\$ 6,000</u> | <u>15%</u> |

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).

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

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 | <u>160,000</u> |
| Total current assets | 290,000 |
| Property, plant, and equipment, net | <u>120,000</u> |
| Total assets | <u><u>\$410,000</u></u> |
| Liabilities and stockholders' equity: | |
| Current liabilities: | |
| Accounts payable | \$110,000 |
| Notes payable | <u>50,000</u> |
| Total current liabilities | 160,000 |
| Stockholders' equity: | |
| Common stock | 190,000 |
| Retained earnings | <u>60,000</u> |
| Total liabilities and stockholders' equity | <u><u>\$410,000</u></u> |

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

(continued)

(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.

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 | <u>(1,390,000)</u> | <u>(1,200,000)</u> | <u>(880,000)</u> |
| Gross profit | \$ 710,000 | \$ 600,000 | \$ 420,000 |
| Total operating expenses | (380,000) | (300,000) | (200,000) |
| Income taxes | <u>(28,000)</u> | <u>(30,000)</u> | <u>(12,000)</u> |
| Net income | <u>\$ 302,000</u> | <u>\$ 270,000</u> | <u>\$ 208,000</u> |

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.

(continued)

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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 | <u>(1,390,000)</u> | <u>(1,200,000)</u> | 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 | <u>(28,000)</u> | <u>(30,000)</u> | 233.33% | 250.00% |
| Net income | <u>\$ 302,000</u> | <u>\$ 270,000</u> | 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.

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

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 | <u>(1,390,000)</u> | <u>(1,200,000)</u> | <u>(880,000)</u> |
| Gross profit | \$ 710,000 | \$ 600,000 | \$ 420,000 |
| Total operating expenses | (380,000) | (300,000) | (200,000) |
| Income taxes | <u>(28,000)</u> | <u>(30,000)</u> | <u>(12,000)</u> |
| Net income | <u>\$ 302,000</u> | <u>\$ 270,000</u> | <u>\$ 208,000</u> |

| 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 | <u>310,000</u> | <u>250,000</u> | <u>120,000</u> |
| Total assets | <u>\$705,000</u> | <u>\$550,000</u> | <u>410,000</u> |
| 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 | <u>210,000</u> | <u>100,000</u> | <u>60,000</u> |
| Total liabilities and stockholders' equity | <u>\$705,000</u> | <u>\$550,000</u> | <u>\$410,000</u> |

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

(continued)

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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 | <u>(1,390,000)</u> | <u>(1,200,000)</u> | <u>(880,000)</u> | 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 | <u>(28,000)</u> | <u>(30,000)</u> | <u>(12,000)</u> | (6.67%) | 150.00% |
| Net income | <u>\$ 302,000</u> | <u>\$ 270,000</u> | <u>\$ 208,000</u> | 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 | <u>310,000</u> | <u>250,000</u> | <u>120,000</u> | 24.00% | 108.33% |
| Total assets | <u>\$705,000</u> | <u>\$555,000</u> | <u>410,000</u> | 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 | <u>210,000</u> | <u>100,000</u> | <u>60,000</u> | 110.00% | 66.67% |
| Total liabilities and stockholders' equity | <u>\$705,000</u> | <u>\$555,000</u> | <u>\$410,000</u> | 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:

- Horizontal analysis.
- Vertical analysis.
- Growth rate analysis.
- 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 | |
|--------------------|-------------------------|---------------|---------------|--|---------------|
| | <u>Year 3</u> | <u>Year 2</u> | <u>Year 1</u> | <u>Year 3</u> | <u>Year 2</u> |
| 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?

- 124.56%
- 96.00%
- 87.05%
- 97.63%

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 | |
|--------------------|-------------------------|---------------|---------------|--|---------------|
| | <i>Year 3</i> | <i>Year 2</i> | <i>Year 1</i> | <i>Year 3</i> | <i>Year 2</i> |
| 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

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

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.

$$\begin{array}{c} \uparrow \\ \frac{\text{Numerator}}{\text{Denominator}} = \text{Resulting ratio} \quad \uparrow \end{array}$$

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

$$\begin{array}{c} \uparrow \\ \frac{\text{Numerator}}{\text{Denominator}} = \text{Resulting ratio} \quad \downarrow \end{array}$$

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.

**Gi Company
Balance Sheet**

| | Year 2 | Year 1 |
|---|---------------------------|---------------------------|
| Current Assets | | |
| Cash and cash equivalents | \$ 50,000 | \$ 35,000 |
| Trading securities | 75,000 | 65,000 |
| Accounts receivable | 300,000 | 390,000 |
| Inventory | <u>290,000</u> | <u>275,000</u> |
| 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 | <u>(180,000)</u> | <u>(150,000)</u> |
| | 1,720,000 | 1,650,000 |
| Total fixed assets | <u>30,000</u> | <u>35,000</u> |
| Total assets | <u><u>\$2,815,000</u></u> | <u><u>\$2,750,000</u></u> |
| Current Liabilities | | |
| Accounts payable | \$ 150,000 | \$ 125,000 |
| Notes payable | 325,000 | 375,000 |
| Accrued and other liabilities | <u>220,000</u> | <u>200,000</u> |
| Total current liabilities | 695,000 | 700,000 |
| Long-Term Debt | | |
| Bonds and notes payable | <u>650,000</u> | <u>700,000</u> |
| Total liabilities | <u>1,345,000</u> | <u>1,400,000</u> |
| Stockholders' Equity | | |
| Common stock (100,000 shares outstanding) | 500,000 | 500,000 |
| Additional paid-in capital | 670,000 | 670,000 |
| Retained earnings | <u>300,000</u> | <u>180,000</u> |
| Total equity | 1,470,000 | 1,350,000 |
| Total liabilities and equity | <u><u>\$2,815,000</u></u> | <u><u>\$2,750,000</u></u> |

**Gi Company
Income Statement**

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

(continued)