

# **CMA Review Reference Book**



## **Part 2**

### **Strategic Financial Management**

#### **Section 2100-2600**

**2023**

**Surgent CMA Review:**

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### Strategic Financial Management

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# Surgent CMA Review

## Section 2100

### Basic Financial Statement Analysis (20%)

#### 2110 Basic Financial Statement Analysis

**2110.01** Financial statement analysis highlights key historical relationships and trends. Financial statements can be prepared to show data as a comparison. Forms of that analysis are:

- a. **Horizontal Analysis:** Horizontal (common base year) analysis compares similar data between periods either on an absolute or relative scale, e.g., cash increased \$2,000,000 or 34% from last year to this year. Typically, the earlier year is the base figure upon which change is measured.
- b. **Vertical Analysis:** Vertical (common size) analysis compares data from the same reporting period to a base figure; e.g., current assets are 20% of total assets as of the reporting date. Typically, the 100% base figure is revenue or total assets (or the equivalent). The following is an example of a common-size income statement.

|                    | Income Statement | Common-Sized<br>Income Statement |
|--------------------|------------------|----------------------------------|
| Revenue            | 100,000          | 100%                             |
| Cost of Sales      | <u>58,000</u>    | <u>58%</u>                       |
| Gross Profit       | 42,000           | 42%                              |
| SG&A Expenses      | <u>24,000</u>    | <u>24%</u>                       |
| Operating Income   | 18,000           | 18%                              |
| Interest and Taxes | <u>8,000</u>     | <u>8%</u>                        |
| Net Income         | 10,000           | 10%                              |

The balance sheet can be prepared in a similar schedule. A time-series analysis can identify trends in the ratios that reveal important variations. A comparison of the common-size percentages can also be made with other companies within the industry.

- c. **Growth Analysis:** Companies set growth rates and then determine if they actually attain the growth estimate. There are different methods of setting growth; one common growth computation is growth of earnings per share (EPS). It is computed as follows:

$$\frac{\text{EPS (end of year)} - \text{EPS (beginning of year)}}{\text{EPS (beginning of year)}}$$

Other growth measures include changes in total revenues, dividends per share, and total assets. These growth measures can then be compared to company expectations and to other companies in the industry.

**d. Ratio Analysis:** Ratio analysis compares datum or data to related items, e.g., cost of goods sold (COGS) to inventory. When comparing data that covers a period of time to data as of a point in time (beginning or ending inventory), more meaningful results are possible if an average (beginning plus ending inventory divided by 2) of the point data is used.

**1. User's Objective:** Users may have different needs and criteria in analyzing financial ratios; accordingly, ratios can be characterized by objective. There are liquidity ratios to assist short-term creditors who are interested in how well a firm meets its currently maturing obligations. Activity ratios measure how effectively the assets of an entity are employed. Profitability ratios are of particular interest to investors (both long-term creditors and equity investors) because they indicate the magnitude of the return on investment. Long-term creditors and investors also look to leverage/coverage ratios to measure the degree of protection afforded their investment.

**2. Usefulness:** By itself, any single ratio is not conclusive or even very meaningful. Ratios become informative when compared to industry standards (if accounting standards are uniform), prior years' performance, budgets, or used in conjunction with other ratios. Pitfalls in relying exclusively on ratio analyses include:

- Since the statements are historical in nature, the comparisons reflect past, not future relationships.
- Ratios have not been standardized.
- Accounting methods, e.g., LIFO versus FIFO can produce different data and thus ratios.

**2110.02 Purpose and Components of Financial Statements:** A full set of financial statements will include each of the following:

- Financial position (balance sheet) at the end of the period.
- Earnings for the period (income statement).
- Comprehensive income for the period.
- Cash flows during the period.
- Investments by and distributions to owners during the period.

Note that a statement of financial position does not purport to show the value of a business enterprise.

**a. Financial Position – Balance Sheet:** The balance sheet provides information concerning the nature of the firm's financial resources, the claims of creditors against those resources, and the equity of the owners in the net resources of the firm. In order to provide useful information to users of the financial statements, the balance sheet is normally broken down into various classifications.

- 1. Current Assets:** Cash and other assets that will be converted into cash, sold, or consumed within one year or the operating cycle, whichever is greater, are classified as current. Included are such items as marketable securities, notes and accounts receivable and inventories.
- 2. Long-Term Investments:** This category includes investments in related companies, bonds which are not intended to be liquidated within the operating cycle, funds accumulated to retire debt, and the cash surrender value of life insurance.
- 3. Property, Plant and Equipment:** Land, buildings, plant, fixtures, furniture, leasehold improvements and the capitalized value of certain leased assets are included along with various depreciation contra accounts.
- 4. Intangible Assets:** Patents, copyrights, trademarks and goodwill are included.
- 5. Other Assets:** This is for assets that do not fit into another category such as deferred items and prepayments.

- 6. Current Liabilities:** This category includes those obligations that will be liquidated by the use of current assets or the creation of other current liabilities within one year or the operating cycle, whichever is greater.
  - 7. Long-Term Liabilities:** These are liabilities that will be paid in more than one year. Included are items such as debentures, mortgages, and obligations under capital leases.
  - 8. Stockholders' Equity:** This is the category that represents the various ownership interests in the business. Common and preferred stock, retained earnings and treasury shares are the usual components.
- b. Earnings for the Period (Income Statement):** The income statement's function is to report the results of operations for a given period of time. Presented in the statement are revenues and expenses from ongoing business activities and gains and losses in the ordinary course of business. These constitute "income from continuing operations." A company may also experience discontinued operations, "extraordinary" items, and the need to report the cumulative effect of a change in accounting principle. These are presented separately after income from continuing operations. This is the "all-inclusive" concept. Proponents of the "current operating performance" concept believe that only regular earnings from normal operations should be included in the income statement. They contend that other types of gains and losses (i.e. extraordinary items) should be taken directly to Retained Earnings as they do not reflect the regular earnings capacity of a company. APB No. 9 requires application of the "all-inclusive" approach in practice.
- c. Earnings Concept and Comprehensive Income:** The concept of earnings set forth in SFAC 5 is similar to net income for a period in present practice; however, it excludes certain accounting adjustments of earlier periods that are recognized in the current period – cumulative effect of a change in accounting principles is the principal example from present practice. Comprehensive income is a broad measure of the effects of transactions and other events on an entity. It includes all changes in equity (net assets) during a period from transactions and other events and circumstances except those resulting from investments by owners and distributions to owners. It should be noted, therefore, that earnings and comprehensive income are not the same. Comprehensive income includes net income plus all the other non-owner derived changes in equity that do not go through the income statement.



- d. **Cash Flows Statement:** A statement of cash flows directly or indirectly reflects an entity's cash receipts classified by major sources and its cash payments classified by major uses during a period, including cash flow information about its 1) operating, 2) financing, and 3) investing activities. The primary purpose of the statement of cash flows is to provide information about the entity's cash receipts and cash disbursements during a period, i.e. the changes that occurred between reporting periods. Through such information, investors, creditors, and others may:
- Assess the enterprise's ability to generate positive future net cash flows.
  - Assess the enterprise's ability to meet its obligations, its ability to pay dividends, and its needs for external financing.
  - Assess the reasons for differences between net income and associated cash receipts and payments.
  - Assess the effects on an enterprise's financial position of both its cash and non-cash investing and financing transactions during the period.
- e. **Statement of Investments by and Distributions to Owners:** This reflects an entity's capital transactions during a period – the extent to which and in what ways the equity of the entity increased or decreased from transactions with owners as owners.

## 2111 Common Size Financial Statements

**2111.01** Common size financial statements display each item as a percentage of some base item. Not all companies are the same size. A company has more cash, inventory, or revenue than another company. This makes it hard to compare the financial statements of the two companies. By using common size financial statements, companies can compare two companies and gather usable information.

**2111.02 Common Size Balance Sheet:** In a common sized balance sheet, each asset is displayed as a percentage of total assets, each liability as a percentage of total liabilities, and each equity item is a percentage of total equity. Example below:

|                     | <u>Standard<br/>Balance Sheet</u> | <u>Common Size<br/>Balance Sheet</u> |
|---------------------|-----------------------------------|--------------------------------------|
| <b>Assets</b>       |                                   |                                      |
| Cash                | 5,000                             | 50%                                  |
| Inventory           | 3,500                             | 35%                                  |
| Accounts Receivable | <u>1,500</u>                      | 15%                                  |
| Total Assets        | 10,000                            | 100%                                 |
| <b>Liabilities</b>  |                                   |                                      |
| Accounts Payable    | 6,000                             | 33%                                  |
| Notes Payable       | <u>9,000</u>                      | 67%                                  |
| Total Liabilities   | 15,000                            | 100%                                 |
| <b>Equity</b>       |                                   |                                      |
| Common Stock        | 20,000                            | 40%                                  |
| Retained Earnings   | <u>30,000</u>                     | 60%                                  |
| Total Equity        | 50,000                            | 100%                                 |

**2111.03 Common Size Income Statement:** In a common sized balance sheet profit and loss is detailed as a percentage of total sales/revenue.

|                    | <u>Standard<br/>Income Statement</u> | <u>Common Size<br/>Income Statement</u> |
|--------------------|--------------------------------------|-----------------------------------------|
| Sales              | 50,000                               | 100%                                    |
| Cost of Goods Sold | <u>20,000</u>                        | <u>40%</u>                              |
| Gross Profit       | 30,000                               | 60%                                     |
|                    |                                      |                                         |
| Taxes              | 6,600                                | 13%                                     |
|                    |                                      |                                         |
| Net Income         | 23,400                               | 47%                                     |

## 2112 Common Base Year Financial Statements

**2112.01** Common base year financial statements are constructed by dividing the current year account value by the base year account value.

**2112.02** Common base year balance sheet example.

|                     | <u>Standard<br/>Balance Sheet</u> |               | <u>Common Base<br/>Year Balance Sheet</u> |
|---------------------|-----------------------------------|---------------|-------------------------------------------|
|                     | 20X9                              | 20X0          |                                           |
| <b>Assets</b>       |                                   |               |                                           |
| Cash                | 5,000                             | 7,000         | 140%                                      |
| Inventory           | 3,500                             | 4,000         | 114%                                      |
| Accounts Receivable | <u>1,500</u>                      | <u>1,000</u>  | 67%                                       |
| Total Assets        | 10,000                            | 12,000        | 120%                                      |
| <b>Liabilities</b>  |                                   |               |                                           |
| Accounts Payable    | 6,000                             | 8,000         | 133%                                      |
| Notes Payable       | <u>9,000</u>                      | <u>8,000</u>  | 89%                                       |
| Total Liabilities   | 15,000                            | 16,000        | 107%                                      |
| <b>Equity</b>       |                                   |               |                                           |
| Common Stock        | 20,000                            | 20,000        | 100%                                      |
| Retained Earnings   | <u>30,000</u>                     | <u>32,000</u> | 107%                                      |
| Total Equity        | 50,000                            | 52,000        | 104%                                      |

**2112.03 Common Size Income Statement:** In a common sized balance sheet profit and loss is detailed as a percentage of total sales/revenue.

|                    | <u>Standard<br/>Income Statement</u> |               | <u>Common Size<br/>Income Statement</u> |
|--------------------|--------------------------------------|---------------|-----------------------------------------|
|                    | 20X9                                 | 20X0          |                                         |
| Sales              | 50,000                               | 60,000        | 120%                                    |
| Cost of Goods Sold | <u>20,000</u>                        | <u>45,000</u> | <u>225%</u>                             |
| Gross Profit       | 30,000                               | 15,000        | 50%                                     |
| Taxes              | 6,600                                | 3,150         | 49%                                     |
| Net Income         | 23,400                               | 11,850        | 51%                                     |

## 2120 Financial Ratios

### 2121 Liquidity

**2121.01 Objectives:** Short-term liquidity ratios and other measures provide information about how well a firm is able to meet its currently maturing obligations.

- a. **Creditor and Management:** This is of special interest to creditors, but also important for management to know in order for them to be able to avoid embarrassing last minute scrambles. Liquidity refers to the composition of current assets and liabilities, primarily assets. A higher proportion of cash or marketable securities is more liquid than a low proportion.
- b. **Short-term Liquidity:** Operating activity and cash flow ratios are analyzed as part of short-term liquidity. Operating activity ratios measure how effectively and efficiently the firm is carrying out its business – making sales, collecting on sales, and managing inventory. Companies with slow turning inventory and slow paying customers are less liquid. Cash flow gives an indication of the liquidity of a company as does the speed with which noncash current assets convert to cash.

#### 2121.02 Definitions

- a. **Current Assets:** Cash and other assets that will be converted into cash, sold, or consumed within one year or the operating cycle, whichever is longer. Items are usually listed from highly liquid to less liquid. Increasing current assets are a use of short-term funds for a business. Typical categories are:
  - Cash and cash equivalents
  - Marketable securities (trading and available-for-sale-classifications at fair value)
  - Notes and accounts receivable (at net realizable value)
  - Inventories
  - Prepaid expenses (at unexpired cost)
- b. **Current Liabilities:** Current liabilities are defined as liabilities to be paid within one year or the operating cycle, whichever is longer. Items are usually presented in order of their liquidation dates and reported at the amount to be paid. Increasing current liabilities are a source of short-term funds for a business. Typical categories are:
  - accounts payable arising from the acquisition of goods and services
  - other accrued liabilities, such as wages payable and interest payable

- notes payable such as but not limited to commercial paper, short term bank credit loans, factoring
  - collections of amounts in advance (unearned or deferred revenues)
  - currently maturing portions of long-term debt
- c. **Working Capital:** Working capital is simply the difference between Current Assets and Current Liabilities. Creditors are especially interested in working capital as it is the source from which they will be paid.

### 2121.03 Ratios, Computational Issues, and Analysis

- a. **Current Ratio:** Measures short-term solvency – the ability to meet current obligations. Generally higher is better, however the composition of current assets is also important. A quick rule of thumb is that a company should have a current ratio exceeding 2.0. However, many successful efficient companies run well at 1.0. Too high a ratio, say 3.0, may indicate inefficient use of capital. Creditors often look at the trend in the Current Ratio or compare it to other companies as gauges of liquidity.

$$\frac{\text{Current Assets}}{\text{Current Liabilities}}$$

**Example:** A company has current assets of \$400,000 and current liabilities of \$500,000. The company's current ratio would be increased by:

1. The purchase of \$100,000 of inventory on account
2. The payment of \$100,000 of accounts payable
3. The collection of \$100,000 of accounts receivable
4. Refinancing a \$100,000 long-term loan with short-term debt

**Answer:** The present current ratio is:

$$\frac{400,000}{500,000} = 0.8$$

1.  $\frac{500,000}{600,000} = 0.83$
2.  $\frac{300,000}{400,000} = 0.75$
3. No change; current assets increase and decrease by the same amount
4.  $\frac{400,000}{600,000} = 0.67$

**Example:** The Solvent Corporation's current ratio is 2.0 to 1 and its bond indenture specifies the current ratio must remain above 1.5 to 1. If current liabilities are 25 million, what is the maximum new short-term debt that can be taken out to finance inventory?

**Answer:** If Solvent's current ratio is 2.0 and the current liabilities are \$25 million, then current assets must be \$50 million. The maximum increase to both current assets and liabilities is:

$$\frac{50 + X}{25 + X} = 1.5, \text{ or } 50 + X = 1.5(25 + X), \text{ or } 0.5X = 12.5, \text{ or } X = \$25 \text{ million maximum increase}$$

- b. Acid-Test (or Quick) Ratio:** Measures short-term liquidity, excluding inventory (which may be obsolete, difficult to sell, or slow in converting to cash), prepaid expense, and other non-liquid current assets. This is a more conservative measure of the firm's ability to pay short-term obligations. It provides greater assurance to short-term lenders about the company's ability to repay them. A quick ratio of 1.0 is often considered average and adequate. A level trend of the quick ratio over time is often a meaningful indicator of good management.

$$\frac{\text{Cash} + \text{Cash Equivalents} + \text{Receivables} + \text{Marketable Securities}}{\text{Current Liabilities}}$$

**Example:** A company has a current ratio of 2 to 1 and a quick ratio (acid test) of 1 to 1. A transaction that would change the company's quick ratio, but not its current ratio is:

- a. The sale of short-term marketable securities for cash that results in a profit
- b. The sale of inventory on account at cost
- c. The collection of accounts receivable
- d. The payment of accounts payable

**Answer: b.** Inventory is the only item mentioned that is in the current ratio, but not the quick ratio. The increase in accounts receivable would affect the quick ratio, but the sale of inventory would not. All other items would affect both ratios in the same way.

- c. Receivables Turnover:** Indicates the efficiency of receivables collection and the quality of receivables. The higher the quality, the shorter the time between the sale and the collection of cash. Net credit Sales excludes cash sales and reflects all other sales during a year(period).

**1. Calculation:**

$$\frac{\text{Net Credit Sales}}{\text{Average Trade Receivables (Net)}}$$

If no information is available about cash sales, then total sales are used as an estimate of credit sales. The average Trade Receivables is usually calculated as:

$(\text{Net A/R at the beginning of the period} + \text{Net A/R at the end of the period})/2$

- 2. Comparison Problems:** Because companies do not usually report cash versus credit sales, turnover can be difficult to pin down precisely. Inclusion of cash sales will artificially increase the turnover figure. Additionally, bad debt reserves should be deducted from total AR to arrive at net AR. Receivable turnover rates will vary widely across industries and will also be affected by credit policies, aggressiveness of collection efforts, and economic trends. If the ending A/R balance is used instead of the average, the ratio gives a more current snapshot of the current situation (assuming average daily sales remains constant over the year). This may not be a good assumption for a seasonal business, but in that case the ratio could provide better insight into seasonal variations.
- d. Average Collection Period (or Days Sales Outstanding):** The average time in days that receivables are outstanding (date of sale to date of collection). Because this ratio is calculated by dividing 365 days by the receivables turnover, its interpretation is inversely related to that of the receivables turnover ratio (discussed above)—the greater number of days outstanding, the greater the possibility of delinquencies becoming uncollectible. This ratio should ideally be less than the terms extended to customers. If you offer net 30 day terms and everybody pays exactly on time, the ratio should be 30 days.

$$\frac{365}{\text{Receivables Turnover}}$$

- e. Inventory Turnover:** Measures how effectively the inventory portion of working capital is being used in terms of the number of times inventory is replaced every year. Calculations are similar to receivables insofar as wanting to measure turnover (higher is better) and length of turnover (shorter is better). High inventory turnover can mean high liquidity and/or good merchandising. It could also mean frequent stockouts and lost potential sales. Conversely, low turnover could mean obsolete merchandise or excessive inventory accumulation.

**1. Calculation:**

$$\frac{\text{Cost of Sales}}{\text{Average Inventory}}$$

The average inventory is usually calculated as:

$$\frac{(\text{Inventory at the beginning of the period} + \text{Inventory at the end of the period})}{2}$$

2. **Comparisons:** To be meaningful, this ratio should be compared to the standard for the particular industry. The inventory turnover is a function of the technology of the industry as well as the operating efficiency of the enterprise. For instance, it takes a certain number of days for a farmer to raise chickens to a certain size, no matter what else he does. Similarly, beer requires a certain amount of fermentation time no matter what. Other factors are more controllable.
3. **Values to Use:** Inventory accounts include raw materials, work-in-progress, and finished goods. Analysis may be conducted on any portion of or the total inventory, but is usually done on the total. Inventory is valued at the lower of cost or market, not at the price for which it will be sold. Sometimes the inventory turnover ratio is calculated using sales instead of cost of goods sold in the numerator. However, cost of sales is a better base for calculating turnover because it eliminates any changes due solely to sales price changes.

**Example:** The following information is available for the years indicated:

|                    | 20X1        | 20X2        |
|--------------------|-------------|-------------|
| Sales              | \$1,400,000 | \$1,800,000 |
| Inventory          | 190,000     | 210,000     |
| Bad Debt Expense   | 12,000      | 10,000      |
| Cost of Goods Sold | 840,000     | 920,000     |

Calculate the inventory turnover for 20X2.

Select only the information actually needed.

$$\frac{920,000}{(190,000 + 210,000)/2} = \frac{920,000}{200,000} = 4.6$$

**Example:** Earth Corporation has budgeted sales of \$144,000 and costs of sales of \$90,000 during a year. It is earning 11% currently on its investment in certificates of deposit. If Best can increase inventory turnover from its present level of 9 times per year to 12 times per year, how much can it save?



**Answer:** \$275, calculated below

If inventory turnover is currently 9 times per year, then we can use the inventory turnover ratio formula and the information about cost of sales to calculate average inventory:

$$\frac{\text{Cost of Sales}}{\text{Average Inventory}} = 9 \rightarrow \text{Average Inventory} = \frac{\text{Cost of Sales}}{9} = \frac{\$100,000}{9} = \$10,000$$

If inventory turnover were 12 instead of 9 times per year, average inventory would be:

$$\frac{\text{Cost of Sales}}{12} = \frac{\$100,000}{12} = \$7,500$$

The average reduction in inventory would be:  $\$10,000 - \$7,500 = \$2,500$  per year

At a rate of return of 11%, the savings would be:  $\$2,500 \times 11\% = \$275$

- f. Number of Days in Inventory (or Days Sales in Inventory):** Measures the average length of time in days that merchandise is in inventory (the length of time necessary to sell an item of inventory). Because this ratio is calculated by dividing 365 days by the inventory turnover, its interpretation is inversely related to that of the inventory turnover ratio (discussed above).

$$\frac{365}{\text{Inventory Turnover}}$$

- g. Accounts Payables Turnover:** Measures how many times per period accounts payable are paid. The turnover ratio is not used as frequently as the Days Purchases in Accounts Payable, discussed below.

$$\frac{\text{Cost of Goods Sold (COGS)}}{\text{Average Accounts Payable}}$$

- h. Days Purchases in Accounts Payable:** Measures how many days' worth of inventory purchases are still unpaid. This gives some information about how well a company is paying its bills to its suppliers. Previous cautions about data quality in receivables and inventory apply here too.

$$\frac{365}{\text{Accounts Payable Turnover}}$$

In theory it would be preferable to segregate inventory purchases from all other payables, but this information is seldom given to outsiders. Therefore, COGS and A/P must be used as surrogates.

The two payables ratios are not used as frequently as the receivables and inventory ratios, but they come into play when determining the operating cycle, below.

- i. **Operating Cycle:** The operating cycle represents the average number of days it takes to sell inventory and then collect on the sales. It is a key measure of an enterprise's operating efficiency and financial health. A shorter operating cycle indicates a company is more efficient than either it was last year or than a competitor with equivalent products and markets. A longer cycle time indicates just the reverse. Not only are the absolute numbers important, but the trend over time is often more important. For instance, short-term lenders will want to know how quickly they can expect to be paid back.

Average Collection Period + Number of Days in Inventory

**Example:** Given the following information, estimate the operating cycle.

Accounts Receivable Turnover Ratio 3.65

Inventory Turnover Ratio 3.30

**Answer:** The answer is calculated below.

$$\text{Average Collection Period} = \frac{365}{\text{AR Turnover}} = \frac{365}{3.65} = 100 \text{ days}$$

$$\text{Average days in Inventory} = \frac{365}{\text{Inventory Turnover}} = \frac{365}{3.30} = 110.6 \text{ days}$$

$$\text{Operating Cycle} = 100 + 110.6 = 210.6 \text{ days}$$

- j. **Cash Flow Cycle:** A related concept is the Cash Flow Cycle (or Cash-to-Cash or Cash-on-Cash cycle). This simply takes the Operating Cycle and deducts the days purchases in accounts payable. This gives recognition to the fact cash is not used to purchase inventory at the time it is acquired. However, the longer Operating Cycle is more frequently taught and used for analysis.

**Example of Cash Flow Cycle:** If the average age of inventory is 60 days, the average age of accounts receivable is 40 days, and the average days purchases in accounts payable is 35 days, the length of the cash flow cycle is:

$$60 + 40 - 35 = 65 \text{ days}$$

- k. Cash Ratio (or Cash to Current Liabilities):** Severe liquidity problems with receivables and inventories, or pledging of those assets, may require an even more conservative analysis of liquidity. The cash ratio includes only cash and current assets that are readily converted to cash (i.e., cash equivalents and marketable securities) in the numerator. Thus, it is more conservative than either the current ratio or the acid-test (quick) ratio for measuring the company's short-term liquidity.

$$\frac{\text{Cash} + \text{Cash Equivalents} + \text{Marketable Securities}}{\text{Current Liabilities}}$$

- l. Cash Flow Ratio:** Measures the cash generated from operations compared to the current liabilities. This ratio looks at the flow of cash over the course of time rather than the static amount of cash on hand. Greater operating cash flow leads to a higher likelihood that sufficient cash will be generated to pay current obligations.

$$\frac{\text{Cash Flow from Operations}}{\text{Current Liabilities}}$$

- m. Liquidity Index:** A more comprehensive ratio for trend analysis and comparative analysis across companies is the liquidity index. It is measured in days and can be considered a weighted average conversion time for current assets.

$$\frac{\text{Total Dollar-Days in Current Assets}}{\text{Current Assets}}$$

**Example:** An example is the easiest way to understand the liquidity index.

| CA Component          | \$ Amount     | × | Days to Convert to Cash | = | Dollar-Days      |
|-----------------------|---------------|---|-------------------------|---|------------------|
| Cash                  | 25,000        |   | 0                       |   | 0                |
| Marketable Securities | 5,000         |   | 2                       |   | 10,000           |
| Accounts Receivable   | 20,000        |   | 45 <sup>a</sup>         |   | 900,000          |
| Inventory             | <u>50,000</u> |   | 60 <sup>b</sup>         |   | <u>3,000,000</u> |
| Total Current Assets  | 100,000       |   |                         |   | 3,910,000        |

<sup>a</sup> The days to convert A/R to cash is equal to the number of days it takes to collect A/R (i.e., the average collection period)

<sup>b</sup> The days in the operating cycle (i.e., the number of days to convert inventory to cash plus the number of days it takes to collect A/R)

$$\text{Liquidity Index} = \frac{\text{Dollar-Days}}{\text{Dollar Amount}} = \frac{3,910,000}{100,000} = 39.1 \text{ days}$$

This number is not necessarily meaningful in itself but it gains significance when compared to other periods or other entities. A higher or increasing

liquidity index is a sign of less liquidity, while a lower or declining index indicates greater liquidity.

## 2122 Leverage

### 2122.01 Operating leverage

- a. Business risk is built partially on the degree a company uses fixed costs in its operations. The higher the fixed costs, the greater the risk that the breakeven point will not be reached given a drop in sales. When fixed costs are high, a small drop in sales can result in a loss for the period.

**Operating leverage** relates the percentage changes in EBIT to the percentage change in revenue. The greater the operating leverage, the greater the change in operating income will be given a particular change in sales. Therefore, a company with a high degree of operating leverage would have a large change in operating income for a relatively small change in sales.

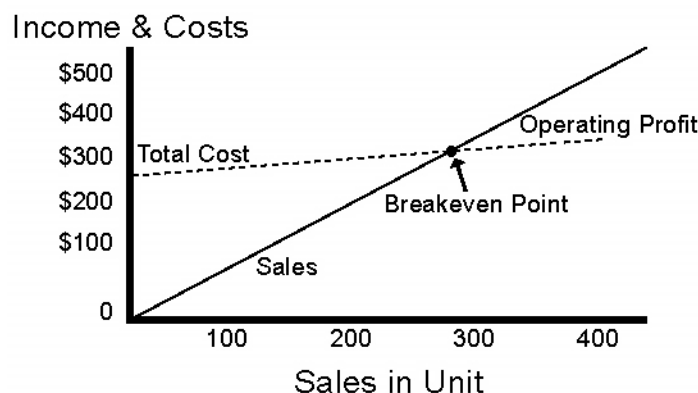
- b. The **degree of operating leverage (DOL)** is the percentage change in EBIT related to a given percentage change in revenue.

$$\text{DOL} = \frac{\% \text{ change in net operating income}}{\% \text{ change in sales}} = \frac{\text{Contribution margin}}{\text{Contribution margin} - \text{Fixed costs}}$$

A DOL of 2 means that the percentage change of EBIT will be twice the size of the percentage change in sales. If sales increase by 20%, then EBIT will increase by 40%; however, if sales decrease by 20%, then EBIT will decrease by 40%.

- c. A firm can change the DOL by changing the proportion of fixed costs to variable costs. The larger the proportion of fixed costs, the higher the DOL and the higher the breakeven point. The higher the proportion of variable costs, the lower the DOL and the lower the breakeven point.

Also, notice that after the breakeven point is reached with a high DOL, the operating profit increases quickly; thus, the additional risk associated with high fixed costs also contains the possibility of higher profits in the event of a positive sales outcome. The following diagram shows how income can increase rapidly after reaching the breakeven point if high fixed costs and low variable costs are used in the production process.



The lower the fixed costs, the lower the DOL and breakeven point will be. Given the same sales as in the above diagram, a lower percentage of fixed cost will cause the breakeven point to be reached at an earlier sales level; however, the operating profit will increase slowly in relation to increased sales. The operating profit (loss) is the difference between the sales and total costs.

- d. **Illustration:** Tally Company has the following information available regarding sales and costs from the last period:

|                         |          |
|-------------------------|----------|
| Sales in units          | 10,000   |
| Selling price per unit  | \$10.00  |
| Variable costs per unit | \$6.00   |
| Fixed costs for period  | \$20,000 |

What is the DOL?

**Solution:**

$$\begin{aligned}
 \text{DOL} &= \frac{\text{Contribution margin}}{\text{Contribution margin} - \text{Fixed costs}} \\
 &= \frac{10,000 \text{ Units } (\$10.00 - \$6.00)}{10,000 \text{ Units } (\$10.00 - \$6.00) - \$20,000} = 2
 \end{aligned}$$

## 2122.02 Financial leverage

- Financial leverage** refers to the extent to which debt and preferred stock (fixed income securities) are used in the capital structure. The larger the percentage of debt and preferred stock that is used for financing, the greater the risk that the company will not earn enough to cover the fixed interest and preferred dividend payments. The more leverage, the greater the risk, and the higher the cost of capital.
- Degree of financial leverage (DFL)** is the percentage change in earnings available to common stockholders related to a given percentage change in EBIT.

$$DFL = \frac{\% \text{ change in net income}}{\% \text{ change in net operating income}} = \frac{EBIT}{EBIT - \text{Interest}}$$

When there is no debt financing used, the DFL will equal 1. When debt does exist, a change in EBIT will result in a greater proportional change in the earnings per share.

If the DFL were 2, then a 10% increase in EBIT would result in a 20% (10% × 2) increase in earnings per share.

If the organization has preferred stock, the DFL equation is modified to:

$$DFL = \frac{EBIT}{EBIT - \text{Interest expense} - \frac{\text{Preferred dividends}}{1 - \text{Tax rate}}}$$

- c. If a firm has no debt and begins to substitute debt for equity, at first the value of the firm will rise, reach a peak, and then begin to fall due to the increased risk of additional debt. This peak in maximized value is the target capital structure.
- d. **Illustration:** Tally Company has the following information available about sales and costs from the last period:

|                           |          |
|---------------------------|----------|
| Sales in units            | 10,000   |
| Selling price per unit    | \$10.00  |
| Variable costs per unit   | \$6.00   |
| Fixed costs for period    | \$20,000 |
| Interest costs for period | \$15,000 |

What is the DFL?

$$\begin{aligned} \text{Solution: } DFL &= \frac{EBIT}{EBIT - \text{Interest expense}} \\ &= \frac{10,000 \text{ Units } (\$10.00 - \$6.00) - \$20,000}{[10,000 \text{ Units } (\$10.00 - \$6.00) - \$20,000] - \$15,000} \\ &= 4 \end{aligned}$$

### 2122.03 Total leverage (degree of combined leverage)

- a. If a company used both high degrees of operating and financial leverage, only small changes in sales will result in large fluctuations in EPS. This can be shown in equation form:

$$\text{Degree of total leverage} = \frac{\% \text{ change in net income}}{\% \text{ change in sales}} = DOL \times DFL$$

- b. This ratio can be used to predict the effect of a change in sales on income and ultimately the earnings available to common stockholders.
- c. This ratio is determined by the relationship between operating and financial leverage. For example, if risk is lowered by reducing the degree

of operating leverage, then the firm would be in a better position to increase the use of debt, thus increasing the financial leverage.

- d. The financial statement effects of DOL and DFL can be shown by using the income statement format:

|          |          |                       | Previous  | Percentage Increase | Resulting Change |
|----------|----------|-----------------------|-----------|---------------------|------------------|
| DTL of 8 | DOL of 2 | Sales                 | \$100,000 | 10%                 | \$110,000        |
|          |          | Variable costs        | 60,000    |                     | 66,000           |
|          |          | Fixed costs           | 20,000    |                     | 20,000           |
|          |          | EBIT                  | 20,000    | 20%                 | 24,000           |
|          | DFL of 4 | Fixed financing costs | 15,000    |                     | 15,000           |
|          |          | EBT                   | 5,000     |                     | 9,000            |
|          |          | Taxes (40%)           | 2,000     |                     | 3,600            |
|          |          | Net income            | \$ 3,000  | 80%                 | \$ 5,400         |

Please note that the results were based on the assumptions that the cost relationships remain unchanged (fixed and variable) as well as the firm's capital structure, including the amount of the fixed financing payments. As the relationships change, the DOL, DFL, and DTL would also change.

- e. **Illustration:** Tally Company has the following information available about sales and costs from the last period:

|                           |          |
|---------------------------|----------|
| Sales in units            | 10,000   |
| Selling price per unit    | \$10.00  |
| Variable costs per unit   | \$6.00   |
| Fixed costs for period    | \$20,000 |
| Interest costs for period | \$15,000 |

What is the DTL?

**Solution:**  $DTL = DOL \times DFL$

$$\begin{aligned}
 &= \frac{10,000 (\$10 - \$6)}{10,000 (\$10 - \$6) - \$20,000} \times \frac{10,000 (\$10 - \$6) - \$20,000}{10,000 (\$10 - \$6) - \$20,000 - \$15,000} \\
 &= 2 \times 4 = 8
 \end{aligned}$$

## 2123 Activity

- 2123.01** Activity ratios measure how effectively the assets of an entity are employed. Coverage of activity ratios is included in section **2121**.

## 2124 Profitability

**2124.01 Profitability (asset utilization)** is the measure of success in terms of income defined in a variety of ways over a period of time. In analyzing profitability, earnings are compared to a base such as sales, productive assets, or equity. Increased profitability provides the potential for increased dividend payments as well as from stock appreciation. Increased profitability also provides greater security for debt holders.

### 2124.02 Gross margin

- a. The **gross margin ratio** compares the gross margin (gross profit) generated by the net sales revenue. In other words, what percentage of the sales dollars were used to cover the cost of goods sold? The remaining amount is left to cover the general and administrative expenses as well as to provide a profit. This is also known as the gross profit ratio.

$$\text{Gross margin in ratio} = \frac{\text{Gross margin}}{\text{Net sales revenue}}$$

- b. This ratio is generally more useful to management than to creditors or investors since the data necessary to analyze why changes occurred in the ratio are only available internally. Changes are caused by one of the following elements or a combination of the following items.

(1) Increase/decrease in unit sales price

(2) Increase/decrease in cost per unit

- c. Calculation using data from the Sample Company for 20X2 (section 2124.07):

$$\begin{aligned}\text{Gross margin in ratio} &= \frac{\text{Gross margin}}{\text{Net sales revenue}} \\ &= \frac{\$400,000}{\$1,000,000} = 40\%\end{aligned}$$

### 2124.03 Profit margin

- a. The **profit margin ratio** calculates the percentage of each dollar of sales that is recognized as net income. In other words, it measures the efficiency of earnings as compared to sales. It indicates how well management has controlled expenses in relationship to revenues earned. This ratio is an excellent way to compare the profits of companies of varying sizes. This is also known as the return on sales ratio.

$$\text{Profit margin ratio} = \frac{\text{Net income}}{\text{Net sales}}$$



- b. In alternative definitions, the numerator for this ratio can take a variety of forms—operating income, net income, income available to stockholders, or income from recurring operations.
- c. The use of accrual income includes estimates and items over which management has little or no control.
- d. Calculation using data from the Sample Company for 20X2 (section **2124.07**):

$$\begin{aligned}\text{Profit margin ratio} &= \frac{\text{Net income}}{\text{Net sales}} \\ &= \frac{\$75,000}{\$1,000,000} = 7.5\%\end{aligned}$$

#### **2124.04 Asset turnover**

- a. The **asset turnover ratio** indicates how many dollars of sales were created by each dollar of total assets. It helps to determine whether the available assets were used efficiently to create sales. One goal of management is to generate the highest possible amount of sales per dollar of invested capital. Note that different industries tend to have different reasonable ranges for this ratio.
- $$\text{Asset turnover} = \frac{\text{Net sales revenue}}{\text{Average total assets}}$$
- b. As in all turnover ratios, a high asset turnover is a desirable outcome since it results from an effective use of available assets; however, it is not unusual for a company that has recently expanded to see a drop in asset turnover until the new facility is fully utilized.
  - c. For internal use, it is desirable to calculate this ratio comparing divisional sales to divisional assets.
  - d. Comparison between firms within an industry can be difficult due to the fact that the age of the assets used in the production of the sales may vary. This is a limitation caused by the use of historical costs as opposed to fair market values for the productive assets. There is also a problem when comparing a capital-intensive firm to a labor-intensive firm.
  - e. There are also problems created due to the fact that the generally used formula does not take into account that certain assets make no tangible contribution to sales. It is assumed that an asset's participation in generating sales is related to its recorded amount. Adjustments to the asset figure are used in attempts to compensate for this problem. For example, long-term investments are not involved in the production and sale of the product and are often not included in the calculation.

- f. Calculation using data from the Sample Company for 20X2 (section 2124.07):

$$\begin{aligned}\text{Asset turnover} &= \frac{\text{Net sales revenue}}{\text{Average total assets}} \\ &= \frac{\$1,000,000}{\frac{\$1,050,000 + \$1,000,000}{2}} = 0.98\end{aligned}$$

### 2124.05 Return on assets (ROA)

- a. The **return on assets ratio** measures the productivity of assets in terms of producing income. This ratio depends upon the organization's ability to get a high profit from each sales dollar while generating high sales per dollar of invested capital. A consistently high ROA is an indication that management is making effective decisions and that the organization is a growth company.

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}}$$

- b. The DuPont equation breaks ROA down to the asset turnover and profit margin.

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Net sales}} \times \frac{\text{Net sales}}{\text{Average total assets}}$$

Through the use of the DuPont equation, ROA is broken down to the profit margin showing the effective control of cost (Net income/Net sales) and the asset turnover showing the efficient use of assets (Net sales/Average total assets).

- c. Since neither profit margin nor asset turnover can increase indefinitely, at some point the only way to create further increases in earnings is to increase the asset base by adding to production capacity.
- d. Limitations specific to this ratio include the use of accrual net income that is subject to estimates and does not reflect actual cash return. The rate of return is also based upon historical asset costs that do not reflect current market values.
- e. The numerator can use a variety of income figures, including EBIT. The philosophy behind the use of EBIT is that the earnings available to three parties, stockholders, creditors, and the government (taxes) is created through the use of the assets available to the organization. The denominator is often restricted to only income-producing assets by excluding long-term investments and intangibles.

- f. Calculation using data from the Sample Company for 20X2 (section 2124.07):

$$\begin{aligned} \text{Return on assets} &= \frac{\text{Net income}}{\text{Average total assets}} \\ \frac{\$75,000}{(\$1,050,000 + \$1,000,000) \div 2} &= 7.3 \end{aligned}$$

### 2124.06 Return on equity (ROE)

- a. The **return on equity ratio** measures the return to common stockholders. The ratio calculates how many dollars were earned for each dollar of common equity. When comparing this ratio with ROA (return on assets), the investment of the creditors is removed. This ratio is affected by the net income available to the stockholders (Net income – Preferred dividends), the profit margin available to the stockholders, the asset turnover, and the extent to which assets are financed by common stockholders. The method of financing used (debt vs. equity) has a major effect on this ratio.

$$\text{Return on equity} = \frac{\text{Net income} - \text{Preferred dividends}}{\text{Average common equity}}$$

or, using the DuPont equation:

$$\text{ROE} = \frac{\text{Net income} - \text{Preferred dividends}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average assets}} \times \frac{\text{Average assets}}{\text{Average stockholders' equity}}$$

- b. The denominator consists of the average of the total equity less preferred shares and minority interest. One of the major problems with this ratio is that the historical issue price is used as opposed to the current market value.
- c. The **common stockholders' leverage ratio** (Average assets/Average stockholders' equity used above) measures the portion of assets that are financed through common equity (also called the equity multiplier). The larger this ratio, the greater the financial leverage will be. Various organizations within an industry will have potentially dramatic differences in ROE resulting from financing decisions—debt vs. equity. If ROA is greater than the cost of borrowing, then ROE will be higher than ROA due to the impact of financial leverage.
- d. Calculation using data from the Sample Company for 20X2 (section 2124.07):

$$\begin{aligned} \frac{\text{Net income} - \text{Preferred dividends}}{\text{Average common equity}} &= \text{Return on equity} \\ \frac{\$75,000 - \$15,000}{(\$300,000 + \$250,000) \div 2} &= 22\% \end{aligned}$$

**2124.07 Sample data**

Many different ratios are computed and used to analyze the operating characteristics of enterprises by investors and creditors, both present and potential, as well as management. Some of the frequently used ratios are described in the previous and following sections using hypothetical information for the Sample Company for the years 20X1 and 20X2.

| Sample Company<br>Comparative Balance Sheets<br>December 31, 20X2 and 20X1 |                    |                    |
|----------------------------------------------------------------------------|--------------------|--------------------|
|                                                                            | 12/31/20X2         | 12/31/20X1         |
| <b>Assets</b>                                                              |                    |                    |
| Cash                                                                       | \$ 250,000         | \$ 200,000         |
| Net Accounts Receivable                                                    | 200,000            | 100,000            |
| Inventories                                                                | <u>100,000</u>     | <u>150,000</u>     |
| Total Current Assets                                                       | 550,000            | 450,000            |
| Net Plant and Equipment                                                    | 400,000            | 450,000            |
| Goodwill                                                                   | <u>100,000</u>     | <u>100,000</u>     |
| Total Assets                                                               | <u>\$1,050,000</u> | <u>\$1,000,000</u> |
| <b>Liabilities and Equities</b>                                            |                    |                    |
| Accounts Payable                                                           | \$ 200,000         | \$ 150,000         |
| Long-Term Debt                                                             | 450,000            | 500,000            |
| Preferred Stock, \$100 par                                                 | 100,000            | 100,000            |
| Common Stock, \$10 par                                                     | 200,000            | 200,000            |
| Retained Earnings                                                          | <u>100,000</u>     | <u>50,000</u>      |
| Total Liabilities and Equities                                             | <u>\$1,050,000</u> | <u>\$1,000,000</u> |

| Sample Company<br>Income Statement<br>For the Year Ended December 31, 20X2 |                  |
|----------------------------------------------------------------------------|------------------|
| Net Sales                                                                  | \$1,000,000      |
| Cost of Goods Sold                                                         | <u>600,000</u>   |
| Gross Profit on Sales                                                      | 400,000          |
| Operating Expenses                                                         | 100,000          |
| Selling and Administrative Expenses                                        | <u>125,000</u>   |
| Income from Operations                                                     | 175,000          |
| Interest on Long-Term Debt                                                 | <u>50,000</u>    |
| Income Before Taxes                                                        | 125,000          |
| Income Taxes                                                               | <u>50,000</u>    |
| Net Income                                                                 | <u>\$ 75,000</u> |
| Dividends Declared on Preferred Stock                                      | <u>\$15,000</u>  |
| Dividends Declared on Common Stock                                         | <u>\$10,000</u>  |
| Net Earnings per Common Share                                              | <u>\$3</u>       |
| Market Price per Share on December 31, 20X2                                | <u>\$17</u>      |

## 2125 Market

### 2125.01 Market measures

Investors use a variety of ratios to analyze the price and yield behavior of securities. These measures use a variety of market data as well as financial statement information.

### 2125.02 Price-earnings ratio

- a. The **price-earnings ratio** indicates the relationship of common stock to net earnings. The market price is the investors' perception of the future; therefore, this ratio combines the performance measure of the past (EPS) to perceptions of the future.

$$\text{Price-earnings ratio} = \frac{\text{Price market of stock}}{\text{Earnings per share}}$$

- b. The earnings per share computation is subject to arbitrary assumptions and accrual income. EPS is not the only factor affecting market prices.
- c. A high P/E ratio is a possible indication of a growth company and/or of a low-risk organization.
- d. Calculation using data from the Sample Company for 20X2 (section 2124.07):

$$\begin{aligned} \text{Price-earnings ratio} &= \frac{\text{Price market of stock}}{\text{Earnings per share}} \\ &= \frac{\$17.00}{\$3.00} = 5.67 \end{aligned}$$

### 2125.03 Dividend yield

- a. The **dividend yield ratio** shows the return to the stockholder based on the current market price of the stock.

$$\text{Dividend yield} = \frac{\text{Dividend per common share}}{\text{Market price per common share}}$$

- b. Dividend payments to stockholders are subject to many variables. The relationship between dividends paid and market prices is a reciprocal one.
- c. This ratio is calculated using the current market price; however, most of the shareholders did not purchase their shares at the current price, thus making their personal yield different than the calculated yield.

- d. Calculation using data from the Sample Company for 20X2 (section 2124.07):

$$\begin{aligned}\text{Dividend yield} &= \frac{\text{Dividend per common share}}{\text{Market price per common share}} \\ &= \frac{\$10,000 \div 20,000 \text{ shares}}{\$17.00 \text{ per share}} = 2.9\%\end{aligned}$$

#### 2125.04 Payout ratio to common shareholders

- a. The **payout ratio to common shareholders** measures the portion of net income to common shareholders that is paid out in dividends.

$$\begin{array}{lcl}\text{Payout ratio common} & & \\ \text{shareholders} & = & \frac{\text{Common dividends}}{\text{Net income} - \text{Preferred dividends}}\end{array}$$

- b. Income does not necessarily measure cash available for dividend payment. Payments are heavily influenced by management policy, the nature of the industry, and the stage of development of the particular firm. All of these items diminish comparability between companies.
- c. Organizations that have high growth rates generally have low payout ratios since most earnings are kept as retained earnings with the funds being reinvested in the company instead of providing cash dividends. A firm that has consistently paid a dividend and suddenly lowers its dividend payout often is signaling a lack of available cash and the existence of liquidity or solvency problems.
- d. Calculation using data from the Sample Company for 20X2 (section 2124.07):

$$\begin{aligned}\begin{array}{lcl}\text{Payout ratio common} & & \\ \text{shareholders} & = & \frac{\text{Common dividends}}{\text{Net income} - \text{Preferred dividends}}\end{array} \\ &= \frac{\$10,000}{\$75,000 - \$15,000} = 16.67\%\end{aligned}$$

#### 2125.05 Economic value added (EVA)

- a. **Economic value added (EVA)** is the economic profit as opposed to the GAAP profit. The focus of this ratio is on the earnings above the required cost of capital for shareholders. In other words, if the required rate of return is 12% and the company earns 16%, then value has been created for the shareholders; therefore, it could be said that the investors value the firm above the amount of capital that was originally invested.
- b. Another way of looking at EVA is that a cost is assigned to the equity capital in addition to the cost of debt. On the traditional income statement, interest expense represents the cost of debt; however, there is nothing to denote the cost of equity. Since EVA focuses on economic