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CMA

Preparatory Program

Part 2
Volume 1: Sections A and B

Strategic Financial Management

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Editorial Notes

This material is designed exclusively to assist people in their exam preparation. No information in the material should be construed as authoritative business, accounting, or consulting advice. Appropriate professionals should be consulted for such advice and consulting.

Acknowledgements

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Table of Contents

Introduction to CMA Part 2

The CMA Part 2 exam has six main sections. The six sections and their approximate weights on the exam are:

1) Financial Statement Analysis: 20%
2) Corporate Finance: 20%
3) Business Decision Analysis: 25%
4) Enterprise Risk Management: 10%
5) Capital Investment Decisions: 10%
6) Professional Ethics: 15%

The questions on the CMA exams focus on understanding, in-depth thinking on business strategy, and problem-solving ability, not just number crunching. To be successful, candidates need to understand the concepts and be able to apply them to situations that are brand new. HOCK can provide the tools for understanding in these study materials but cannot teach in-depth thinking and problem solving. A candidate's ability to put this information into practice to pass this exam will depend on the effort put into preparing for the exam.

Note: The ICMA's Content Specification Outlines state the following (on page 2) with respect to background that candidates for the CMA certification need before beginning to study for the CMA exams:

"5. With regard to U.S. federal income taxation issues, candidates will be expected to understand the impact of income taxes when reporting and analyzing financial results. In addition, the tax code provisions that impact decisions (e.g., depreciation, interest, etc.) will be tested."

Comment: The HOCK CMA study materials include brief descriptions of relevant U.S. federal income tax laws, but if candidates need additional information, they are encouraged to consult the U.S. Internal Revenue Code or other reliable resources.

"6. Candidates for the CMA designation are assumed to have knowledge of the following: preparation of financial statements, business economics, time value of money concepts, statistics, and probability."

Comment: Candidates are assumed to have the specified knowledge before beginning to study for the CMA exams. The HOCK CMA study materials cover specific topics listed in the ICMA's Learning Outcome Statements, but they do not cover the complete assumed knowledge material that is the background for the study materials. Candidates without that knowledge should plan to gain it by either taking university-level courses or consulting relevant textbooks.

Section A, *Financial Statement Analysis*, represents 20% of the exam. Financial Statement Analysis includes ratios, interpretation of ratios, and other financial statement analysis topics.

Section B, *Corporate Finance*, constitutes 20% of the exam. Corporate Finance includes several topics including risk and return, long-term financial management, raising capital, working capital management, corporate restructuring, and international finance.

Section C, *Business Decision Analysis*, is 25% of the exam. Topics covered in this section include cost-volume-profit analysis (or breakeven analysis), marginal analysis, and pricing.

Section D, *Enterprise Risk Management*, is 10% of the exam. It covers enterprise risk, risk assessment, and managing risk.

Section E, *Capital Investment Decisions*, comprises 10% of the exam. Investment Decisions is concerned with capital budgeting.

Section F, *Professional Ethics*, represents 15% of the exam. Ethics is tested in two contexts: ethical considerations for professionals and ethical considerations for the organization.

The exam will consist of 100 multiple-choice questions and 2 essay scenarios, each with several questions. The multiple-choice questions will **not** be presented in order according to sections. Thus, an exam might begin with a capital budgeting question, then follow that with a financial statement analysis question, and so forth.

Only candidates who score a minimum of 50% correct on the multiple-choice portion of the exam will be eligible to take the essay section of the exam.

Section A – Financial Statement Analysis

Introduction to the Financial Statement Analysis Section

The *Financial Statement Analysis* section comprises 20% of the CMA Part 2 Exam. Part 2 is a four-hour exam that will contain 100 multiple-choice questions and 2 essay scenarios. Topics within an examination part and the subject areas within topics may be combined in individual questions. Therefore, the number of multiple-choice questions on Financial Statement Analysis in any one exam cannot be predicted, nor can it be predicted whether an individual exam will have any essay questions on the topic. The best approach to preparing for the exam is to know and understand the concepts very well and be ready for anything.

In studying for the following section, make certain to know all the ratios listed, what each one means, and what each one is used for. Candidates need to be able to interpret the ratios, not just calculate them.

The flash cards that are a part of the HOCK Questions can be useful for studying the ratios more than for studying other topics because the ratios all need to be memorized. Using the flash cards will help to memorize the ratios.

A knowledge of financial accounting is needed for the Financial Statement Analysis portion of the exam.

Study Unit 1: A.1. Comparative Financial Statement Analysis

Measures of Income

Earnings Before Interest and Taxes (EBIT) and Earnings Before Taxes (EBT) are terms frequently used in financial statement analysis, although those terms are not used in published income statements.

Earnings Before Interest and Taxes and Earnings Before Taxes Defined

The standard multiple-step income statement format includes the following sections:

Revenues	$XXXXX	
Cost of goods sold	XXXX	
Gross profit	$XXXXX	
Selling, general, and administrative expenses	XXX	
Operating income	$XXXXX	
Interest and dividend income	XXX	
Interest expense	XXX	
Non-operating gains/(losses)	XXXX	
Income from continuing operations before income taxes	$XXXXX	
Provision for income taxes on continuing operations	XXXX	
Income from continuing operations		$ XXXX
Discontinued operations:		
Gain/(loss) from operations of discontinued Component X including gain/(loss) on disposal of $XXX	$ XXXX	
Income tax benefit or (income tax expense)	XXX	
Income (loss) on discontinued operations		$ XXXX
Net Income		$ XXXX

Note: "Income from continuing operations" on a multi-step income statement is **not** the same thing as "operating income."

Operating income includes revenues and expenses generated by the company's core business. Operating income does **not** include financial income (interest and dividend income) or financial expense (interest expense), nor does it include non-operating gains and losses or the provision for income taxes on continuing operations.

Income from continuing operations, on the other hand, **does** include financial income, financial expense, non-operating gains and losses, and income taxes on continuing operations, in addition to revenues and expenses generated by the company's core business.

Income from continuing operations refers to gain or loss that the company generated on all its activities that are expected to continue in the future. It is called income from **continuing** operations to distinguish it from gains and losses on **discontinued** operations. Income from continuing operations does **not** include income from discontinued operations because income from discontinued operations represents income or loss that is not expected to continue in the future. A potential investor in or lender to a company should look at the company's income from continuing operations instead of net income because income from continuing operations is income that will continue in the future.

The line "Income from continuing operations" appears on an income statement only if the company is reporting results of discontinued operations.

Earnings Before Interest and Taxes (**EBIT**) is not the same as operating income, though in some cases the two things may be the same.

A line titled "EBIT" does not appear on a standard, multi-step income statement because EBIT is a calculated amount used in financial statement analysis and other types of analysis. Earnings Before Interest and Taxes is equivalent to net income adjusted to add back any deduction for interest expense and any deductions for taxes. EBIT can be calculated in more than one way. Beginning with operating income, it would be calculated as follows, excluding any deductions for interest expense or income tax expense:

	Operating income	$XXXXX
+	Interest and dividend income	XXX
+/−	Non-operating gains/(losses)	XXXX
+/−	Gain/(loss) from operations of discontinued Component X including gain/(loss) on disposal of $XXXX (**before** tax)	XXXX
=	**Earnings Before Interest and Taxes** (**EBIT**)	$XXXXX

In summary, the differences between operating income and EBIT are:

- Operating income does not include interest and dividend income, whereas EBIT does include interest and dividend income.
- Operating income does not include non-operating gains and losses on acquisitions or investments, whereas EBIT does include non-operating gains and losses on acquisitions or investments.
- Operating income does not include pre-tax gains and losses on discontinued operations, whereas EBIT does include pre-tax gains and losses on discontinued operations.

Neither EBIT nor operating income include any deductions for interest expense or for taxes.

Therefore, if the company has gains and/or losses on acquisitions or investments, interest, or dividend income, and/or income/losses from discontinued operations, its Earnings Before Interest and Taxes will **not be the same as its operating income**. All those items constitute the difference between operating income and EBIT.

If the company has none of those items, its operating income will be the same as its EBIT, but that will be true only because the items that would create the difference do not exist.

Note: Non-operating gains and losses and interest and dividend income earned on investments may be excluded from EBIT if the analyst prefers. However, interest income earned on credit extended to customers should always be included in EBIT.

Exam Tip: Although operating income and EBIT are not the same thing, they may be used interchangeably, even on an exam, under the assumption that the income statement contains no gains/losses on acquisitions or investments, no interest or dividend income, and no gain/(loss) from discontinued operations.

Earnings Before Taxes (**EBT**) is Earnings Before Interest and Taxes (EBIT) minus Interest Expense.

	Operating income	$XXXXX
+	Interest and dividend income	XXX
+/−	Non-operating gains/(losses)	XXXX
+/−	Gain/(loss) from operations of discontinued Component X including gain/(loss) on disposal of $XXXX (**before** tax)	XXXX
=	**Earnings Before Interest and Taxes** (**EBIT**)	$XXXXX
−	Interest expense	XXX
=	**Earnings Before Taxes** (**EBT**)	**$ XXXX**

Comparative Financial Statement Analysis

One of the main difficulties in the comparison of financial statements between companies or between periods of time for the same company is the difference in size.

- When comparing two companies, one company may have a higher net income simply because it is bigger and not because it is more efficient, more effective, or sells a better product.
- When comparing financial statements for the same company over several accounting periods, the income statements may report significant sales growth during one of the periods, making comparison difficult.

One of the ways to deal with these size differences is through **comparative financial statement analysis**. Comparative financial statements state each item of the financial statement not as a numerical amount, but rather as a percentage of a relevant base amount.

Comparative financial statements can be either vertical or horizontal.

- **Vertical analysis**, also called **common-size financial statements**, makes it possible to compare the performance of companies of different sizes during the same period.
- Horizontal or **trend analysis**, also called **common-base year statements**, enables comparison of data for a single company or a single industry year-over-year.

Vertical Common-Size Financial Statements

A simple vertical common-size financial statement covers one year's operating results and expresses each component as a percentage of a total.

- Line items on the income statement are usually presented as percentages of sales revenue. For example, selling expense is stated as a percentage of sales revenue.
- Line items on the balance sheet are usually presented as percentages of total assets. For example, cash is not stated as a monetary amount but rather as a percentage of total assets.

However, common-size financial statements do not need to relate each balance sheet item to total assets only. For example, the analysis might focus on the company's inventory and calculate percentages of raw materials, work in process, and finished goods in total inventories. Or the analysis might focus on the composition of the company's investments, both current and noncurrent.

A vertical common-size income statement might state each classification of sales revenue or expenses as a percentage of total revenues. Alternatively, it might state general and administrative expenses and selling expenses each as a percentage of total operating expenses. A common-size financial statement can be anything an analyst wants to see or analyze.

An analyst might also compare a company's common-size income statement with industry common-size income statements to potentially reveal a problem. For instance, if cost of goods sold as a percentage of total sales revenue is significantly higher than the norm for other companies in the same line of business, it could indicate that "inventory shrinkage" (in other words, theft) is taking place.

In addition, common-size financial statements for one company can be arranged side by side for a period of several years to reveal trends over time in individual line items as percentages of total assets or sales revenue.

Common-size financial statements by industry are available in published form from several sources. Two of them are:

1) A book called *Annual Statement Studies* is published by the Risk Management Association (formerly Robert Morris Associates), a bankers' trade association. The statement studies information is provided by RMA member banks from the financial statements of their small and medium-size business customers. The information covers more than 300 industries and is broken down by asset size and sales size, so that a particular company's common-size statement can be compared with those of businesses in its industry that are approximately its own size. The *Annual Statement Studies* can be purchased either in hard copy or as online access through RMA's website at: https://www.rmahq.org/?gmssopc=1.

2) Dun & Bradstreet® *Key Business Ratios on the Web* (KBR), published by Mergent, Inc., provides industry benchmarks compiled from Dun & Bradstreet's database of public and private companies. KBR provides common-size financial statements and 14 key ratios developed from actual company income statements and balance sheets.

The sources above contain data on both public and nonpublic companies, though most of the information in the *Annual Statement Studies* is on nonpublic companies.

Much more information is available for public companies than for nonpublic companies. Various Internet sites provide data on public companies that is already in a form that can be easily analyzed. Some of this information is free and some is on a subscription basis. In the U.S., information on any company that files reports with the SEC (U.S. Securities and Exchange Commission) is available for free at: https://www.sec.gov/.

An example of a vertical common-size financial statement follows.

Example: **A vertical common-size financial statement.** Following is a balance sheet and income statement for a company with the actual numbers in the first column and the common size vertical numbers in the second column (in thousands, 000 omitted). Each individual balance sheet item has been divided by the total assets and each individual income statement item has been divided by the total net revenues. This common-size vertical statement can be compared with common-size statements for other companies, regardless of their sizes or can be prepared for several years for the same company to enable side-by-side comparison.

	20X3 Actual	20X3 Common Size
Balance Sheet:		
ASSETS		
Current Assets:		
Cash & cash equivalents	$ 2,895	10.9%
Marketable securities - current	14,100	53.2%
Accounts receivable, net	700	2.7%
Inventories	400	1.5%
Other current assets	300	1.1%
Total current assets	$ 18,395	69.4%
Noncurrent Assets:		
Intangible assets	$ 4,500	17.0%
Property, plant & equipment, net	2,400	9.1%
Other noncurrent assets	1,200	4.5%
Total assets	$ 26,495	100.0%
LIABILITIES		
Current Liabilities:		
Accounts payable	$ 600	2.3%
Accrued liabilities	500	1.9%
Other current liabilities	1,700	6.4%
Total current liabilities	$ 2,800	10.6%
Noncurrent Liabilities:		
Long-term debt	$ 5,000	18.8%
Other noncurrent liabilities	4,300	16.2%
Total liabilities	$ 12,100	45.7%
STOCKHOLDERS' EQUITY		
Preferred stock	$ 100	0.4%
Common stock	1,685	6.4%
Paid-in capital	5,780	21.8%
Retained earnings	6,830	25.8%
Total stockholders' equity	$ 14,395	54.3%
Total liabilities and stockholders' equity	$ 26,495	100.0%
Income Statement:		
Revenues:		
Net revenues	$ 10,400	100.0%
Cost of goods sold	3,200	30.8%
Gross profit	$ 7,200	69.2%
Operating expenses:		
Research and development	$ 3,000	28.9%
Selling, general and administrative	1,500	14.4%
Total operating expenses	$ 4,500	43.3%
Operating income	$ 2,700	25.9%
Non-operating income and expenses:		
Gains (losses) on equity securities	(344)	(3.3%)
Financial income:		
Interest and dividend income	177	1.7%
Earnings before interest and taxes (EBIT)	$ 2,533	24.3%
Interest expense	(400)	(3.8%)
Earnings before tax (EBT)	$ 2,133	20.5%
Income tax expense	(533)	(5.1%)
Net income	$ 1,600	15.4%

Horizontal Trend Analysis

Horizontal trend analysis is used to evaluate trends for a single business over a period of several years. In analyzing the income statement, changes in revenues or expenses over time can indicate, for example, the effectiveness of a company's change in pricing strategy or its efforts to improve operations. In analyzing the balance sheet, changes in assets and liabilities over time can illustrate changes in liquidity and solvency.

Horizontal trend analysis can be in the form of **common base year**, also called **"index number,"** analysis, or as a **variation analysis**, a presentation of the **annual growth rates of line items**.

Base year financial statements used for index number analysis use the first year presented as the base year. Financial statement amounts for subsequent years are presented not as monetary amounts but as index numbers relative to the base year index number. The base year index number is 100, and the index numbers for subsequent years are each a percentage of the base year index number. For example, each year's inventories are stated as percentages of the base year inventories and each year's fixed assets are stated as percentages of the base year fixed assets.

$$\text{Base Year Analysis Line Item Index Number} = \frac{\text{Current Year Line Item Amount}}{\text{Base Year Line Item Amount}} \times 100$$

Example of a base year analysis where 20X1 is the base year with a value of $9,900:

	20X3	20X2	20X1
Net revenues	$8,000	$11,100	$9,900
Base year analysis:			
% of base year amount	(8,000/9,900×100) 80.8%	(11,100/9,900×100) 112.1%	
Index number	81	112	100

Horizontal analysis can also be done as a **variation analysis** in the form of a presentation of the **annual** growth rates of individual line items. For each line item on either the income statement or the balance sheet, the percentage of change year-over-year is calculated by dividing the current year line item amount by the previous year line item amount, subtracting 1 from the quotient, and multiplying the resulting decimal by 100 to convert it to a percentage.

Instead of being a percentage of the base year amount as in common base year financial statements, each year's percentage is the percentage of change **from the previous year's value**.

$$\text{Annual Growth Rate of Line Item (\%)} = \left(\frac{\text{Current Year Line Item Amount}}{\text{Previous Year Line Item Amount}}\right) - 1 \times 100$$

If a line item has decreased from the previous year, the growth rate will be negative.

Example of a variation analysis, where the line item increases and then decreases:

	20X3	20X2	20X1
Net revenues	$8,000	$11,100	$9,900
Variation analysis - growth rate:			
% change from previous year	(8,000/11,100) – 1 –27.9%	(11,100/9,900) – 1 +12.1%	

Study Unit 2: A.2. Introduction to Financial Ratio Analysis

Financial ratio analysis is used to analyze a company's financial statements. Ratio analysis is the process of looking at the relationships between different numbers in the financial statements to see if they indicate positive or negative trends developing within a company.

A company's existing and potential equity investors, security analysts, existing and potential lenders, and other creditors such as suppliers use ratios calculated from the company's financial statements to make investment and credit decisions. While the ultimate purpose of ratio analysis is to enable evaluation of risk and return, different users need different information.

- Short-term creditors, such as banks and trade creditors, use ratios to determine the company's immediate **liquidity**, which is the ability of the company to pay its short-term obligations as they come due.
- Longer-term creditors such as bondholders use ratios to determine a company's long-term **solvency**, which is the company's ability to pay its long-term obligations as they come due.
- Both short-term and long-term creditors use financial statement analysis to gain assurance that the company has the necessary resources to be able to pay its interest and principal obligations.
- Equity investors use ratios to determine the company's long-term earning power. The equity investors' analysis needs to be more in-depth than the creditors' analysis because equity investors bear the **residual risk** of the company. In the event of bankruptcy, the equity investors' claims on the company's funds are settled only after the claims of suppliers and lenders are settled.
- Analysts collect, process, interpret, analyze, and disseminate information about financial prospects of companies for use by decision-makers. They include security analysts, investment newsletters, investment advisers, and debt raters. Some analysts are employed by investment companies and pension funds, and their analysis is for internal use. Other analysts provide analysis and recommendations for outside use, to the public or privately to clients for a fee. Analysts use financial statement ratios to make specific recommendations regarding buying, holding, or selling stocks and bonds.

A calculated ratio is only a number. For this number to be meaningful, an analyst needs to put it into context by comparing it with another number. These comparisons can be made through:

- Trend analysis of a **single company** by comparing its current financial ratios to its previous years' ratios. Trends can be particularly useful in analyzing a company's financial condition. For example, ratios that are becoming less favorable over time may be an indication of financial difficulty. The financial difficulty may not yet be apparent, but if the ratios do not improve, it will manifest itself in the future. Ratio analysis can thus provide an early warning of trouble ahead.
- Comparison with **other companies in the same industry** or with **industry averages** after any necessary adjustments have been made to assure that the financial statements are comparable. If a company's financial ratios are less favorable than those of other companies in its industry, the company will not be able to compete successfully in its market.
- Comparison with **management's expectations**, for example comparison with the budget.

Ratios are classified into various categories based on what they are measuring. The classifications used on the CMA exam are:[1]

1) **Liquidity ratios**, which measure the sufficiency of the company's cash resources to meet its short-term cash obligations.

2) **Leverage**, **capital structure**, **solvency, and earnings coverage ratios**, which evaluate the company's ability to satisfy its fixed financing charges, including debt obligations and obligations to make lease payments, by looking at the mix of its financing sources and its historical earnings.

3) **Activity ratios**, which provide information on a company's ability to manage efficiently its current assets (accounts receivable and inventory) and current liabilities (accounts payable).

4) **Profitability ratios**, including profitability ratios per share such as earnings per share analysis and other ratios that describe the company's profitability and financial condition per share of its outstanding stock; and company profitability ratios, which measure the company's gross profit and net income in relation to its sales revenue and its return on invested assets.

Ratios are **based on accounting data**. Because many items in the accounting system use historical costs rather than current fair values, ratios often do not reflect the current values of the items they are measuring.

Note: Two rules should always be followed when calculating ratios that include both balance sheet and income statement items:

1) **Average balances of balance sheet items** are used instead of ending balances whenever a ratio calculation is relating an **income statement** amount to a **balance sheet** amount. The average balance amount should be the average balance of the balance sheet item **during the same period as is covered by the income statement item**. Using the average balance of the balance sheet item over the same period as is covered by the income statement item makes the relationship of the two amounts meaningful. The average balance is usually calculated as the average of the beginning and ending balances of the period.

   If a year-end balance sheet amount were used in the ratio, that amount would represent the balance sheet item's balance only as of one moment in time, and thus it would not be comparable to an income statement figure covering a range of "moments in time."

   Note: If both the numerator and the denominator of a ratio are balance sheet amounts, year-end balances can be used instead of average balances for both the numerator and the denominator of the ratio.

2) When the period represented by an income statement amount in a ratio is less than one year, the goal is to **annualize** the income statement item by expressing it as if that same level of revenue or expense had persisted for a full year. To annualize an income statement amount that is for less than a full one-year period, annualize it as follows.
   - If the income statement amount is for one quarter, multiply it by 4 to annualize it.
   - If the income statement amount is for one month, multiply it by 12 to annualize it.
   - If the income statement amount is for five months, divide it by 5 months to find one month's revenue or expense and then multiply the result by 12 months to annualize it.
   - If the income statement amount is for a period not evenly divisible by 4 or 12 or a number of months (for example, for 35 days or 54 days or any such amount), divide the income statement amount by the number of days to find one day's revenue or expense and then multiply the result by 365 days to annualize it.

   However, the average balance used for the balance sheet amount in the ratio should be for **only the period covered by the partial-period income statement**, not for a full year.

[1] The ratios in the HOCK study materials for the CMA exams are presented as they appear on the ICMA's *Financial Ratio Summary* formula sheet included in their Exam Support Package and are the way the ratios will be tested on the CMA exam.

Study Unit 3: A.2. Liquidity Ratios

Note: This is the first of four categories of ratios.

Liquidity reflects the ability of a company to meet its short-term obligations by using assets that are most readily converted into cash without significant loss in value or the necessity of making significant price concessions. A company's liquidity also refers to its ability to sell assets quickly to raise cash.

Assets that can be converted into cash within a short period of time without significant loss are referred to as **liquid assets**, and they are identified in financial statements as **current assets**. Current assets may also be referred to as **working capital**, since they represent the resources needed for the day-to-day operations of the company's long-term, capital investments. Current assets should be used to satisfy current liabilities.

A company needs current assets to cover its current obligations for daily operations. A company should maintain a level of current assets sufficient to pay its current obligations. At the same time, the company should not have a greater amount of current assets than necessary because current assets do not provide as much return on investment as can generally be earned from investing in long-term, productive assets.

A lack of liquidity can cause a company to be unable to take advantage of prompt payment discounts and other benefits available to a company with adequate liquidity. A lack of liquidity may also cause a company to be unable to pay its obligations by their due dates, leading to financial distress and even to bankruptcy.

Net Working Capital

Net working capital is the difference between current assets and current liabilities. A company's net working capital bridges the gap between the production process and the collection of cash from sales. The amount of liquidity a company needs depends on the length of its operating cycle. The operating cycle is the period from the time cash is committed for investment in goods and services (the purchase or manufacture of, not the payment for, inventory) to the time that cash is received from the investment (from the collection on the sale of the inventory).

For example, a company that produces and sells goods has an operating cycle that consists of four phases:

1) Purchase raw material and produce goods, investing in inventory.
2) Sell goods, generating sales, which may or may not be cash sales.
3) Extend credit, creating accounts receivable.
4) Collect accounts receivable, generating cash.

Net working capital is total current assets less total current liabilities.

Net Working Capital = Total Current Assets – Total Current Liabilities

Exam Tip: **Working capital** and **net working capital** are often used interchangeably to refer to current assets minus current liabilities. Net working capital can be referred to as working capital and working capital can be referred to as net working capital.

Since the term "working capital" may be used to refer either to current assets or to current assets minus current liabilities, some interpretation may be necessary if the term "working capital" appears in an exam question.

Note: The **operating cycle** of a company is the amount of time between the acquisition of inventory and the receipt of cash from the sale of the product.

The **cash cycle**, or **net operating cycle**, is the length of time it takes to convert an investment of cash in inventory back into cash, recognizing that some purchases are made on credit. Thus, the cash cycle is the time between the **payment** for the inventory and the receipt of cash from the sale of the inventory.

The difference between the operating cycle and the cash cycle is the number of days of purchases in payables. All of these will be covered in more detail later.

Liquidity Ratios

Several ratios are used to evaluate a company's liquidity and the level of its net working capital. The liquidity ratios are:

1) Current Ratio
2) Quick Ratio or Acid Test Ratio
3) Cash Ratio
4) Cash Flow Ratio
5) Net Working Capital Ratio

Current Ratio

The current ratio is the most common measure of short-term liquidity, as it relates current assets to the claims of short-term creditors. Whereas net working capital expresses this relationship as an amount of currency, the current ratio expresses the relationship as a ratio.

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

Generally, a company's current ratio should be proportional to its operating cycle. The shorter the operating cycle is, the lower the current ratio can be because the operating cycle will generate cash more quickly for a company with a shorter operating cycle than it will for a company with a longer operating cycle. The cash generated can be used to settle the liabilities.

The effective management of working capital requires that working capital be kept as low as possible while at the same time being balanced against the risk of illiquidity (the inability to satisfy current liabilities with current assets). Companies with an aggressive financing policy that are willing to assume more risk of illiquidity will have lower current ratios, while companies with conservative financing policies will have higher current ratios. The less risk the company's management wants to assume, the higher its current ratio and level of working capital will be.

The standard for the current ratio is 2:1. A lower ratio indicates a possible liquidity problem.

The **quality** of the accounts receivable and merchandise inventory should be considered when assessing a company's current ratio. If the inventory and receivables can be quickly converted to cash, then a lower level of working capital and thus a lower current ratio can be maintained. However, if the receivables and inventory cannot be easily converted to cash, higher levels of working capital are necessary.

The length of time required for accounts receivable and inventory to be converted to cash is measured by receivables and inventory **activity ratios**, both of which are covered later in this section. Greater lengths of time required for accounts receivable and inventory to be converted into cash indicate the need for a higher level of cash and cash equivalents.

In interpreting a company's current ratio, it is important to be aware of its limitations. The current ratio is just an indication of what would happen if cash flows were to stop completely, and if today's current assets had to be liquidated to pay off today's current liabilities. This is seldom the question an analyst wants answered. To answer the questions that an analyst needs answers to, cash flow projections are required. However, the current ratio continues to be used because it is simple and understandable, and the information needed to calculate it is readily available.

Quick or Acid Test Ratio

The quick ratio**,** also called the acid test ratio**,** is a more conservative version of the current ratio. The quick ratio measures the company's ability to pay its short-term debts using its most liquid assets.

$$\text{Quick Ratio (Acid Test Ratio)} = \frac{\text{Cash \& Cash Equivalents + Marketable Securities Classified as Current Assets + Net Accounts Receivable}}{\text{Current Liabilities}}$$

Cash equivalents are very liquid, short-term investment instruments with a maturity date of less than 90 days when they were acquired that are easily converted into known amounts of cash without significant loss in value. Cash equivalents are the short-term investments a company makes to earn a return on excess cash for short periods until the cash is needed for operations.

Marketable securities included in the numerator of the quick ratio are investments in equity and debt securities that have an active secondary market **and** are classified as current assets.

Note: Marketable securities may be classified as either current or non-current assets. To be included in the numerator of the quick ratio, marketable securities must be classified as current assets. According to ASC 210-10-45-1f, a marketable security is to be classified as a current asset **if it represents cash available for current operations**.

According to ASC 210-10-45-4b, investments in securities (whether marketable or not) or advances made for the purposes of control, affiliation, or other continuing business advantage are to be classified on the balance sheet as non-current assets. Since such assets would not be current assets, they would not be included in the numerator of the quick ratio.

Whether a held-to-maturity debt security is to be classified as a current or a non-current asset is not specified in the *Codification*®. However, ASC 320-10-25-1c states that a debt security is to be classified as held-to-maturity only if the investor has the positive intent and ability to hold it to its maturity date. Since funds so invested would not represent cash available for current operations, they would generally not be current assets and would not be included in the numerator of the quick ratio.

Inventory is **not** included in the numerator of the quick ratio, because the company will need to replace sold inventory, and that requires cash. If a company uses liquidation of its inventory to pay its liabilities without replacing the inventory, the company will have no means of generating future cash flows. For that reason, inventory should not be liquidated to pay off short-term liabilities. Furthermore, inventory is not as liquid an asset as, for instance, accounts receivable.

Note that prepaid expenses are also **not** included in the numerator of the quick ratio. Prepaid expenses are not current assets in the sense that they can be converted into cash, but only in the sense that, if not paid in advance, they would require the use of current assets during the operating cycle. Therefore, they are not included.

Accounts receivable **are** included in the numerator of the quick ratio, for two reasons:

1) Receivables are only one step away from conversion to cash in contrast to inventory, which is two steps away.

2) A company can almost always collect its receivables immediately by factoring them. *(Factoring is covered in detail in Working Capital Management in Section B in this volume.)*

The standard for the quick ratio is 1:1.

Cash Ratio

The cash ratio is another version of the current ratio that is even more conservative than the quick ratio. The cash ratio is the ratio between cash and current liabilities. Only cash and securities that are easily convertible into cash are used in the numerator, so cash equivalents and marketable securities classified as current assets are included in the numerator along with cash for purposes of calculating the cash ratio.

$$\text{Cash Ratio} = \frac{\text{Cash \& Cash Equivalents} + \text{Marketable Securities Classified as Current Assets}}{\text{Current Liabilities}}$$

As with the quick ratio, only marketable securities classified as current assets are included in the numerator of the cash ratio.

Cash Flow Ratio

The cash flow ratio is the net cash flow generated by operations compared with current liabilities. It measures how many times greater the cash flow generated by operations is than current liabilities. If a company has positive working capital but it is not generating enough cash from operations to settle its obligations as they become due, the company is probably borrowing to settle current liabilities. Over the long term, borrowing to fulfill current liabilities will lead to solvency problems, because the company is simply exchanging one current liability for another current liability and there is a limit to how much financing a company can obtain. Therefore, it is much better if the company can generate adequate cash flow from its operations to settle its current liabilities.

$$\text{Cash Flow Ratio} = \frac{\text{Operating Cash Flow}}{\text{Period-End Current Liabilities}}$$

Operating cash flow in the numerator is net cash provided by operating activities as reported on the statement of cash flows.

In the cash flow ratio, the **period-end balance** for current liabilities is used instead of the average balance for current liabilities. An average balance incorporates past balances. The cash flow ratio is an indicator of the company's ability to pay **future** obligations as they come due. Future cash flow will be required to pay off current liabilities that are outstanding **as of the balance sheet date**, not the average of current liabilities over a past period. Therefore, use of the period-end balance for current liabilities is preferred in the cash flow ratio because it is more conservative.

The net cash provided by operating activities in the numerator should be annualized. "Annualized" means that if the cash provided by operating activities figure being used is for a period of less than a year (such as a quarter or a month), it should be annualized by multiplying it by whatever is necessary to express it in terms of the equivalent annual operating cash flow before dividing it by current liabilities as of the balance sheet date. For example, if the statement of cash flows for which net cash provided by operating activities

is reported is for a period of one quarter, the operating cash flow figure should be multiplied by 4 to annualize it. If it is for a one-month period, it should be multiplied by 12.

An annualized cash flow ratio of 0.40 or higher is a standard for a healthy company.

Net Working Capital Ratio

Net working capital (also called working capital) is current assets minus current liabilities. The **net working capital ratio** is the proportion of total assets (total capitalization) represented by net working capital. The net working capital ratio measures the company's ability to meet its obligations and expand by maintaining sufficient working capital.

$$\text{Net Working Capital Ratio} = \frac{\text{Net Working Capital (Current Assets – Current Liabilities)}}{\text{Total Assets}}$$

The net working capital ratio is particularly meaningful when compared with the same ratio in previous years, especially if it is decreasing. Consistent operating losses will cause net working capital to shrink relative to total assets, an indication of possible future business failure.

If working capital is negative (current liabilities are greater than current assets), the net working capital ratio will also be calculated as a negative number. A negative net working capital ratio is not meaningful since the proportion of total assets represented by net working capital cannot be less than zero percent. However, negative working capital is an indicator of very serious problems because it means the company does not have enough current assets to cover its current liabilities.

Effects on Liquidity Ratios of Changes in Their Elements and in Sales Volume

If an element in the numerator of one of the liquidity ratios increases (decreases), the ratio will increase (decrease), an indication of higher (lower) liquidity.

If an element in the denominator of one of the liquidity ratios increases (decreases), the ratio will decrease (increase), an indication of lower (higher) liquidity.

If both the numerator and the denominator change, the ratio may either increase or decrease, depending on which one changes more in proportion to its previous value.

An increase in sales volume will typically cause increases in current assets (accounts receivable and inventory) and current liabilities (accounts payable and, if the company is a manufacturer, wages payable for production personnel and other accrued liabilities). Assuming the additional sales are made at a profit, accounts receivable should increase more than the increase in payables.

However, the liquidity ratios may decrease rather than increasing because cash will decrease. Although sales growth is desirable, it creates cash flow problems. Sales growth requires cash to support the increases in receivables and inventory, and unless the company is extremely profitable, the cash needed will outstrip the cash available from profits. Cash will decrease precipitously, and the cash flow ratio and possibly other liquidity ratios will decrease.

Sales growth should not be funded with short-term debt, because the company will not be able to repay debt until its sales growth slows down. The needed cash should be provided by long-term sources such as additional equity or possibly long-term debt. If the needed long-term financing can be accessed, the result should be an increase in the liquidity ratios because some of the current liabilities will be replaced by non-current liabilities or equity. But if the cash need is supplied by short-term debt, the liquidity ratios will decrease.

A decrease in sales volume will have the opposite effect on cash, but it will be short lived. A sales decrease will lead to decreases in accounts receivable as the older receivables are collected and not replaced with the same level of new receivables. As a result, cash will increase temporarily. Purchases of new inventory will slow down, leading to a decrease in inventory and lower accounts payable, as well. The cash flow ratio may increase in the short term even as the current ratio and quick ratio decrease because of decreased receivables. Over the longer term, collections will decrease because of lower receivables. Current liabilities will increase because cash inflow will slow and the company's ability to pay its current liabilities will decrease. In the longer term, all the liquidity ratios will decrease because of the decrease in current assets and the increase in current liabilities. A sustained sales decrease will lead to liquidity and cash flow problems and eventually, insolvency.

Liquidity of Current Liabilities

The term "liquidity of current liabilities" refers to the **quality** of current liabilities. The quality of current liabilities includes the following considerations:

- How **urgent** is the payment of the current liabilities? Tax liabilities must be paid when due, no matter what else must be paid, and thus they have top priority. Payroll liabilities also have a priority claim on cash inflows. Any time tax liabilities or payroll liabilities are higher than normal, they must be questioned, because the increase could indicate the company is not paying those obligations in a timely manner. Liabilities to suppliers with whom the company has a long-standing relationship may have more latitude and can sometimes be delayed for a short period if necessary. However, too much delay in paying suppliers' invoices will result in the company's losing its credit privileges and suppliers will begin requiring the company to pay cash in advance for everything.
- Does the company have any **unrecorded liabilities** that have a claim on current funds? Examples of unrecorded liabilities are purchase commitments or short-term leases that are expensed.
- Are the company's **loan payment obligations** current? Failure to remain current with loan payment obligations is a default that renders debt immediately due and payable.
- Is the company in violation of any of its **loan covenants**? A violation of loan covenants also constitutes a default and as such, renders a long-term debt due and payable immediately, even if debt service payments are current.

Thus, the analyst has a responsibility to look beyond the numbers on the balance sheet and determine whether those numbers need to be adjusted to reflect the company's actual condition, because the company's actual condition may be quite different from what is implied by a simple ratio that is indiscriminately calculated.

Note: A "covenant" is a condition or a requirement in a loan agreement or a bond indenture. A bond indenture is the legal contract that specifies the bond's features such as the maturity date, the interest rate, the timing of interest payments, and all the applicable terms and conditions of the bond. Covenants may restrict the actions of the borrower or require that they maintain certain ratio requirements. If the borrower fails to meet the requirements of the loan agreement, the loan becomes in default, just as if the borrower had failed to make scheduled loan payments.

Study Unit 4: A.2. Leverage and Coverage Ratios

Note: This is the second of four categories of ratios.

Leverage in general refers to the potential to earn a high level of return relative to the amount of cost expended. Leverage can be advantageous, but it can also be risky because debt must be repaid. Two kinds of leverage will be covered in this ratio category: financial leverage and operating leverage.

Capital structure refers to the way a company chooses to finance its business. A company may obtain financing by borrowing (issuing bonds or borrowing from a financial institution) or by issuing equity (common or preferred shares). The proportions of debt and equity in the company's total financing determines the company's capital structure.

Equity represents ownership, and it does not need to be repaid. On the other hand, debt must be repaid, either as interest and principal payments paid together or interest only during the term of the borrowing with all the principal due on the debt's maturity date.

The choice a company makes between debt and equity will influence the company's flexibility and thus its ability to make certain decisions in the future. If the company chooses to use debt, it will need to service the debt in the future by making regular interest or interest and principal payments. On the other hand, additional debt does not cause the owners of the company to lose any voting control or dilute their ownership. In contrast, if additional common equity is used, the company will not be obligated to make interest payments. However, the ownership interest of the present owners will be diluted, and they will lose some voting control.

Though there is no one correct answer to this question of debt versus equity, the goal of the company will be to obtain the lowest-cost financing possible. Another consideration in attempting to obtain low-cost financing is the fact that the more financing (either debt or equity) a company has, the more expensive each additional amount of financing will be.

The topic of debt versus equity as sources of financing will be covered in more detail later. For the topic of ratios, candidates need to be familiar with the impact that debt and equity have on various ratios.

Solvency is the ability of the company to pay its long-term obligations as they come due. A company is solvent if its assets are greater than the sum of its debt obligations.

Note: **Solvency** is the ability of a company to pay its long-term obligations from earnings as they come due. A company is solvent if its assets are greater than the sum of its debt obligations.

Liquidity is the ability of a company to pay its short-term obligations by using assets that are most readily converted into cash with neither a significant loss in value nor the need to make significant price concessions.

The composition of a company's capital structure is an important part of solvency analysis. An increase (decrease) in the level of debt will increase (decrease) the company's interest expense and its financial leverage, all other things being equal. If the increase (decrease) in the level of debt also increases (decreases) the company's debt relative to the level of its equity, the increase (decrease) in financial leverage will decrease (increase) the company's solvency.

In addition to capital structure, solvency depends on successful, profitable operations, because profits are the source of the cash to make interest and principal payments. Therefore, solvency analysis also involves analysis of earnings and the ability of those earnings to cover necessary company expenditures, including the required debt service.

A company with more equity than debt is more stable and solvent than a company with more debt than equity. A company can invest equity financing in long-term assets and expose them to business risk without any risk that the financing will be recalled. Debt financing, however, may be recalled if the company defaults on the debt. A default on a debt is not only the failure to make scheduled payments. Default can also occur

without the company's missing any interest or principal payments. If the borrowing agreement includes covenants such as a required current ratio or a required debt-to-equity ratio that must be maintained, failure to adhere to the debt covenants can result in default and cause the entire principal plus accrued interest to become due and payable.

If a company has a lot of long-term debt relative to its equity, it has **lower solvency** than a company with less long-term debt. A company with higher long-term debt assumes more risk of default and insolvency than a company with lower long-term debt because with higher long-term debt, more of the company's assets will be required to meet the scheduled interest and principal payments. Because these payments must be made whether the company has positive or negative future earnings, a high level of debt financing increases the risk of default and insolvency.

A company can change its capital structure in several ways. If the company issues stock and uses the proceeds to pay off long-term debt, it decreases its debt while increasing its equity, thus increasing its solvency. If outstanding convertible bonds are converted to equity, solvency is also increased. On the other hand, if a company borrows and uses the borrowed funds to purchase treasury stock[2], it increases its debt and decreases its equity, thus decreasing its solvency.

Earnings coverage ratios focus on the company's earning power because the company's earnings are the source of its ability to make interest payments and principal repayments on debt.

Financial Leverage

Financial leverage is the use of debt to increase earnings. Financial leverage refers to the potential to earn a high level of return relative to the amount of cost expended in interest expense on debt. It measures the use of fixed interest expense charged on debt financing to generate greater returns for equity investors. Interest is the cost of using debt to finance operations. Interest is a fixed charge because unlike dividends, interest must be paid whether the company is profitable or not. The use of financing that carries a fixed charge is called financial leverage.

Financial leverage is a part of solvency analysis.

- An increase in the level of debt will increase the company's interest expense and its financial leverage, all other things being equal. If the increase in the level of debt increases the company's debt relative to the level of its equity, the increase in financial leverage will decrease the company's solvency.

  Example: Borrowing and using the borrowed funds to purchase treasury stock increases the company's debt and decreases its equity, thus decreasing its solvency.

- A decrease in the level of debt will decrease the company's interest expense and its financial leverage, all other things being equal. If the decrease in the level of debt decreases the company's debt relative to the level of its equity, the decrease in financial leverage will increase the company's solvency.

  Example: Issuing stock and using the proceeds to pay off long-term debt decreases the company's debt while increasing its equity, thus increasing its solvency.

- Increased leverage can be advantageous, but it can also be risky because debt must be repaid.

Financial leverage **magnifies** the effect of both managerial success (profits) and managerial failure (losses). When financial leverage is being used, an increase in earnings before interest and taxes (EBIT) will cause

[2] Treasury stock is the company's own stock, repurchased by the company on the market. Treasury stock is not an asset of the company but is a reduction of the company's equity.

an even greater proportionate increase in net income, and a decrease in EBIT will cause an even greater proportionate decrease in net income.

Financial leverage ratios measure a company's use of debt to finance its assets and operations. Financial leverage can also be defined as the percentage of fixed cost financing in a company's overall capital structure, because the increased amount of debt causes the company's financial costs (interest expense) to increase.

Higher financial leverage indicates that shareholders are accepting greater risk because the higher the leverage, the more fixed interest costs the company will be required to pay. On the other hand, if the company generates more net income from its investment of the borrowed funds than is required to pay its debt service obligations for the borrowed funds, the shareholders will benefit from the high financial leverage because profits will increase.

Because financial leverage magnifies both profit and loss, it requires careful consideration from a financial manager.

Note: Financial leverage is successful if the company earns more by investing the borrowed funds than it pays in interest to use them. It is not successful if the company is not able to earn more by investing the borrowed funds than it pays in interest for them.

Benefits of Using Financial Leverage
• If financial leverage is used successfully, the interest expense paid on the debt capital will be less than the return earned from investing it, and the excess return will benefit the equity investors. • Interest paid on debt is tax-deductible, and its tax deductibility effectively reduces interest as an expense.
Limitations of Using Financial Leverage
• The financial leverage may be used unsuccessfully, and if so, the return earned from investing the debt capital will be less than the interest expense paid on it, which will hurt the value of the equity investors' investments. • Too much financial leverage causes the cost of all the company's capital to increase because investors will perceive greater risk and will require a greater return on their investment.

A company's financial leverage is measured by its **financial leverage ratio** and by its **degree of financial leverage**.

Financial Leverage Ratio, or Equity Multiplier

The **financial leverage ratio**, also called the **equity multiplier**, is calculated as follows:

$$\text{Financial Leverage Ratio (Equity Multiplier)} = \frac{\text{Total Assets}}{\text{Total Equity}}$$

The financial leverage ratio indicates the amount of debt a company is using to finance its assets. Borrowing money to finance assets will cause total assets to increase and total liabilities to increase while total equity remains unchanged. Since the financial leverage ratio is calculated as total assets divided by total equity, the company's financial leverage ratio will increase as more money is borrowed to finance additional assets. **The more debt the company has**, **the higher its financial leverage ratio will be**.

As a company increases its financial leverage, it is incurring more fixed charges of interest that must be paid. The more fixed charges the company pays in interest, the less income it will have available for distribution as dividends. If a company has a high financial leverage ratio in combination with high volatility of

sales or operating profit (meaning that they change greatly from period to period), the risk is greater that the company will not be able to service its debt and will default on it.

On the other hand, issuing equity to finance assets will cause total assets and total equity to increase by the same absolute amount. Since beginning total assets are greater than beginning total equity, the proportional increase in total assets will be less than the proportional increase in total equity. Since the numerator of the financial leverage ratio will increase less, proportionately, than the denominator will, the result will be a decrease in the financial leverage ratio.

A company with financial leverage is said to be "trading on the equity." "Trading on the equity" is simply a term that means the company is using financial leverage (debt) in an effort to achieve increased returns. Trading on the equity, or financial leverage, may or may not be successful.

- If a leveraged company's return on assets **is greater than** its after-tax cost of debt, and therefore return on common equity is higher than it would be without the debt and the investment of the borrowed funds, it is said to be **successfully** trading on the equity, and its common shareholders will benefit.
- If a leveraged company's return on assets **is less than** its after-tax cost of debt, it is said to be **unsuccessfully** trading on the equity, and its common shareholders will be hurt.

Remember that "trading on the equity" is only a term that is used to mean that a company is borrowing money to invest in assets. The company is borrowing to invest because it expects the investment to earn a greater return than the company will pay in interest, resulting in increased profits. In fact, by borrowing a portion of the funds it invests, a company can greatly increase its rate of return on the amount of its own funds that it has invested.

Example of the effect of financial leverage: A company is planning a $1,000,000 capital investment project that it expects to return 15% annually after tax. At a return rate of 15%, the net return expected on the investment after tax is $150,000 per year.

The company borrows half of the investment amount, or $500,000, at an interest rate of 6% after tax and thus pays interest after tax of $30,000 per year. It will have invested $500,000 of its own funds. If the expected profit materializes, the company will earn $150,000 minus $30,000 interest expense each year on the investment, for a net annual after-tax return of $120,000 annually on a $500,000 investment of its own funds. Until such time as the principal needs to be repaid, that represents a 24% return on its $500,000 investment.

Thus, the return on its own invested funds can actually be greater than just the difference between the investment return (here, 15%) and the interest rate on the borrowed funds (here, 6%).

However, as stated above, trading on the equity may not always be so successful. Because the borrowed principal must be repaid along with interest, the company assumes risk by borrowing. The company is required to repay the debt with interest whether or not the expected return from investment of the proceeds materializes. If the actual return is lower than expected, the repayment of the principal and interest will need to come from cash flow generated by other projects. Any loss on the company's investment will be magnified by the debt, just as a positive return is magnified by the debt.

Note: Financial leverage has the effect of magnifying both profits and losses.

Comparing the company's return on assets with its after-tax cost of debt can give an analyst some insight into whether the company's management is using financial leverage successfully.

Degree of Financial Leverage (DFL)

Another measure of financial leverage is the **degree of financial leverage** (**DFL**). A company's degree of financial leverage predicts the effect on its future EBT (earnings before taxes) of a given future percentage increase in EBIT (earnings before interest and taxes), because the difference between EBIT and EBT is interest expense.

When financial leverage is used, a given percentage increase in EBIT will result in an even greater percentage increase in EBT, because interest expense (the difference between EBIT and EBT) is a fixed expense. Once interest expense has been covered by EBIT, further increases in EBIT flow straight to EBT. However, the opposite is also true: a given percentage decrease in EBIT will result in an even greater percentage decrease in EBT.

The degree of financial leverage is the **multiplication factor** by which EBT and net income can be expected to change in the future in relation to a future change in earnings before interest and taxes, since interest on debt is a fixed expense. Thus, degree of financial leverage measures both the opportunity and the risk inherent in debt from the standpoint of the shareholder. The higher the degree of financial leverage, the higher the multiplication factor, whether positive (opportunity) or negative (risk of loss).

When the current income statement and a projected income statement are both available, degree of financial leverage is calculated as the percentage of change in the projected net income versus the current net income divided by the percentage of change in the projected EBIT versus the current EBIT.

The degree of financial leverage at a given level of expected future net income is:

$$\text{Degree of Financial Leverage (DFL)} = \frac{\text{\% Change in Projected Net Income}}{\text{\% Change in Projected EBIT (Earnings Before Interest and Taxes)}}$$

When projected financial information is not available, the DFL that predicts the amount by which net income can be expected to change in the future in relation to a future change in EBIT can be calculated using the current period operating results as follows.

$$\text{Degree of Financial Leverage (DFL)} = \frac{\text{Earnings Before Interest and Taxes (EBIT)}}{\text{Earnings Before Taxes (EBT)}}$$

For the two methods of calculating DFL to result in the same DFL, the following assumptions are required:

- Interest expense is the same in both periods.
- Because the percentage of change method uses the percentage of change in net income, which is an after-tax amount, the income tax rate must be the same in both periods so that the percentage of change in net income is the same as the percentage of change in earnings before taxes.

The degree of financial leverage is meaningful at only one level of income and interest expense. When those levels change, the degree of financial leverage will change as well.

Note: For the purposes of calculating degree of financial leverage, EBIT, EBT and net income are calculated as follows:

	Total operating revenue
–	Total operating expense
=	Operating income
+	Interest and dividend income
+/–	Non-operating gains/(losses)
+/–	Gains/(losses) on discontinued operations
=	**Earnings before interest and taxes** (**EBIT**)
–	Interest expense
=	**Earnings before taxes** (**EBT**)
–	Income taxes
=	**Net income**

An example of the calculation of degree of financial leverage follows.

Example of degree of financial leverage calculated both ways:

	Year 1 Actual	Year 2 Projected	% of Change
Sales revenue	$4,000	$4,500	
Variable costs (50% of Sales)	2,000	2,250	
Contribution margin	$2,000	$2,250	
Fixed costs	600	600	
Operating income	$1,400	$1,650	
Non-operating gains/(losses)	300	300	
Interest income	20	20	
EBIT	$1,720	$1,970	+14.535%
Interest expense	(80)	(80)	
EBT	$1,640	$1,890	+15.244%
Income taxes (20% of EBT)	(328)	(378)	
Net income	$1,312	$1,512	+15.244%

$$\textbf{DFL for Year 1} = \frac{\%\ \Delta \text{ in Year 2 Projected Net Income}}{\%\ \Delta \text{ in Year 2 Projected EBIT}} = \frac{15.244\%}{14.535\%} = \textbf{1.04878}$$

$$\textbf{DFL for Year 1} = \frac{\text{EBIT Year 1}}{\text{EBT Year 1}} = \frac{\$1{,}720}{\$1{,}640} = \textbf{1.04878}$$

The DFL of 1.04878 means that the 14.535% projected increase in EBIT for Year 2 is projected to result in an increase of 15.244% in Year 2's EBT, because 14.535% × 1.04878 equals 15.244%. And that is, in fact, the case. The percentage increase in projected EBT in Year 2 is calculated as [$1,890 – $1,640] divided by $1,640, which equals 15.244%. Thus, looking forward from Year 1, an analyst could say that if EBIT increases by 14.535% during the coming year, EBT will increase by 14.535% × 1.04878, or 15.244%, assuming interest expense does not change.

Note: Assuming the income tax rate remains the same from one year to the next, the percentage of change in net income will be the same as the percentage of change in EBT. In the two income statements used in the example above, EBT and net income both increase by 15.244% in Year 2 over Year 1 because income taxes are 20% of EBT in both years.

Even though in the long term all costs are variable, within the relevant range of activity some costs are not affected by changes in production volume or sales volume. Costs that do not vary within the relevant range of activity are called fixed costs or fixed expenses. Because fixed costs do not vary as volume changes, a change in sales volume causes a more than proportional change in EBIT. A higher proportion of fixed expenses in total operating expenses results in higher operating leverage.

Until a company's contribution margin (sales minus all variable expenses) is adequate to cover its fixed expenses, the company will operate unprofitably. Once fixed expenses are covered by the contribution margin, though, increases in the contribution margin due to increases in sales flow straight to profits, if the fixed expenses do not change. The existence of the fixed costs **magnifies** the effect of increased sales on EBIT.

A company that has invested heavily in automated production equipment is an example of a company with high operating leverage. The company will have high fixed costs for the equipment. At the same time, it will have low variable costs. Labor is a variable cost of production, and the company with automated production equipment will have less need for labor and thus lower variable costs than would a company with labor-intensive production processes. For the high operating leverage to be successful, however, the company must earn a contribution margin that is high enough to cover the high fixed costs. Once the contribution margin has covered the fixed costs, though, increases in the contribution margin from increased sales go straight to increase EBIT. The necessity to earn a contribution margin high enough to cover the fixed costs creates business risk for the company, but along with the increased business risk, the company receives the potential of higher rewards.

Note: Business risk refers to the risk of variability in earnings. Business risk is caused by variability of demand for the company's products or services, variability in the company's selling prices, variability of the price of inputs to the product, and changes to the company's degree of operating leverage.

When a company is performing near its breakeven point (where profits are $0), the company will have greater changes in EBIT relative to changes in sales than it will when it is operating above or below its breakeven point. At sales levels above and below the breakeven point, the magnification effect will still be present, but it will not be quite as pronounced as it will be near the breakeven point.

When comparing two or more companies' operating results, the company with a higher proportion of fixed costs in its cost structure will have higher operating leverage (all other things being equal). For the company with higher operating leverage, small changes in sales will lead to larger changes in EBIT, both positive and negative. If the company's sales increase, EBIT will increase relatively more than the sales increase. If sales decrease, EBIT will decline relatively more than the sales decrease.

Note: Operating leverage has the effect of magnifying both profits and losses.

Degree of Operating Leverage (DOL)

A company's operating leverage is measured by its **degree of operating leverage (DOL)**. A company's degree of operating leverage predicts the effect on its future EBIT of a future change in sales. The degree of operating leverage is the multiplication factor by which future earnings before interest and taxes (EBIT) can be expected to change in response to a future change in sales, assuming the contribution margin ratio and fixed operating costs do not change.

If the contribution margin ratio and fixed expenses remain the same, increases and decreases in the contribution margin caused by increases and decreases in sales flow directly to EBIT. The degree of operating leverage decreases as sales revenue and the contribution margin increase.

Like degree of financial leverage, degree of operating leverage can be calculated two ways. When the current income statement and a projected income statement are available, DOL is the percentage of change in the projected EBIT versus the current EBIT divided by the percentage of change in the projected sales versus the current sales.

$$\text{Degree of Operating Leverage (DOL)} = \frac{\text{\% Change in Projected EBIT}}{\text{\% Change in Projected Sales}}$$

When projected operating results are not available, the degree of operating leverage that predicts the effect on future EBIT of a future change in sales is calculated using the current period operating results as follows.

$$\text{Degree of Operating Leverage (DOL)} = \frac{\text{Contribution Margin}}{\text{EBIT}}$$

For the two methods of calculating DOL to result in the same DOL, the following assumptions are required:

- Variable costs represent the same percentage of revenue in both periods, so the contribution margin ratio (contribution margin divided by sales revenue) is the same for both periods.
- Total fixed costs are the same for both periods.
- Non-operating gains or losses, discontinued operations if applicable, and interest income are the same in both periods.

An example follows.

Example: Using the same financial statements as were used for the calculation of DFL, following is an example of degree of operating leverage calculated both ways:

	Year 1 Actual	Year 2 Projected	% of Change
Sales	$ 4,000	$ 4,500	12.500%
Variable costs (50% of Sales)	2,000	2,250	
Contribution margin	$ 2,000	$ 2,250	
Fixed costs	600	600	
Operating income	$ 1,400	$ 1,650	
Non-operating gains/(losses)	300	300	
Interest income	20	20	
EBIT	$ 1,720	$ 1,970	14.535%
Interest expense	(80)	(80)	
EBT	$ 1,640	$ 1,890	
Income taxes (20% of EBT)	(328)	(378)	
Net income	$ 1,312	$ 1,512	15.244%

$$\textbf{DOL for Year 1} = \frac{\text{\% } \Delta \text{ in Year 2 Projected EBIT}}{\text{\% } \Delta \text{ in Year 2 Projected Sales}} = \frac{14.535\%}{12.500\%} = \textbf{1.1628}$$

$$\textbf{DOL for Year 1} = \frac{\text{Contribution Margin Year 1}}{\text{EBIT Year 1}} = \frac{\$2{,}000}{\$1{,}720} = \textbf{1.1628}$$

The DOL of 1.1628 means that the 12.5% projected increase in sales for Year 2 is projected to result in a 14.535% increase in EBIT in Year 2, because 12.5% × 1.1628 equals 14.535%. And that is, in fact, the case. Projected EBIT in Year 2 is 14.535% greater than actual EBIT in Year 1.

Like the degree of financial leverage, degree of operating leverage is also not a static measurement. A company's degree of operating leverage varies with its level of sales. If the contribution margin ratio remains the same and the fixed costs and non-operating gains and losses remain the same, the degree of operating leverage decreases as sales revenue and the contribution margin increase.

Example of the effect of operating leverage on EBIT at different sales levels:

Sales revenues	$ 4,000	$ 4,500	$ 5,000	$ 5,500	$ 6,000
Variable costs (50% of Revenues)	2,000	2,250	2,500	2,750	3,000
Contribution margin	$ 2,000	$ 2,250	$ 2,500	$ 2,750	$ 3,000
Fixed costs	600	600	600	600	600
Operating income	$ 1,400	$ 1,650	$ 1,900	$ 2,150	$ 2,400
Non-operating gains/(losses)	300	300	300	300	300
Interest income	20	20	20	20	20
EBIT	$ 1,720	$ 1,970	$ 2,220	$ 2,470	$ 2,720
Interest expense	(80)	(80)	(80)	(80)	(80)
EBT	$ 1,640	$ 1,890	$ 2,140	$ 2,390	$ 2,640
Income tax @ 20%	(328)	(378)	(428)	(478)	(528)
Net income	$ 1,312	$ 1,512	$ 1,712	$ 1,912	$ 2,112
DOL (contribution margin ÷ EBIT)	1.163	1.142	1.126	1.113	1.103
DOL (% chg. in projected EBIT ÷ % chg. in projected Sales)	1.163	1.142	1.126	1.113	--

As sales revenues increase, DOL decreases. And as revenues increase by a given percentage, the percentage by which EBIT increases is the percentage increase in revenues multiplied by a factor equal to the DOL.

For example, when sales revenue increases from $5,000 to $5,500, the percentage increase in revenue is 10%. EBIT increases from $2,220 to $2,470, an increase of 11.26%. DOL at the revenue level of $5,000 is 1.126, and the increase of 10% in revenue multiplied by the DOL of 1.126 is equal to the increase of 11.26% in EBIT.

Degree of operating leverage can be calculated by dividing the contribution margin by EBIT only when financial statements prepared on a variable costing basis are available. Variable costing financial statements show sales revenue on the first line and variable costs on the second line, and the difference between them is the contribution margin. When statements are prepared on an absorption costing basis though, a contribution margin is not calculated because variable costs are not isolated from fixed costs. Therefore, only someone with access to variable costing income statements or internal records that can be used to segregate variable costs from fixed costs would be able to calculate DOL by dividing the contribution margin by EBIT.

However, if financial statements are presented on the absorption costing basis and a current year's income statement and a projected income statement for the following year are presented, the degree of operating leverage can be calculated for the current year by dividing the percentage of change in the future year's EBIT by the percentage of change in the future year's sales revenue.

Total Leverage

Total leverage incorporates both operating and financial leverage.

Degree of Total Leverage

Degree of total leverage expresses the degree to which a company uses fixed costs in its operations as well as the degree to which the company uses fixed rate financing in its capital structure. For a company with

high fixed operating costs and high fixed financing costs, a small change in sales will bring about a large change in net income.

Degree of Financial Leverage × Degree of Operating Leverage = Degree of Total Leverage

In addition to multiplying DFL and DOL, degree of total leverage can also be calculated directly in two ways.

$$\text{Degree of Total Leverage} = \frac{\text{\% Change in Projected Net Income}}{\text{\% Change in Projected Sales Revenue}}$$

Or,

$$\text{Degree of Total Leverage} = \frac{\text{Contribution Margin}}{\text{Earnings Before Taxes (EBT)}}$$

For the two methods of calculating DTL to result in the same DTL, the following assumptions, which incorporate the assumptions for both DFL and DOL, are required:

- Variable costs represent the same percentage of revenue in both periods, so the contribution margin ratio (contribution margin divided by sales revenue) is the same for both periods.
- Total fixed costs are the same for both periods.
- Non-operating gains or losses, discontinued operations, if applicable, and interest income are the same in both periods.
- Interest expense is the same in both periods.
- The income tax rate is the same in both periods.

Example: Using the same financial statements as were used for the calculation of DFL and DOL, following is an example of degree of total leverage calculated both ways and by multiplying DFL and DOL:

	Year 1 Actual	Year 2 Projected	% of Change
Sales revenue	$ 4,000	$ 4,500	12.500%
Variable costs (50% of Sales)	2,000	2,250	
Contribution margin	$ 2,000	$ 2,250	
Fixed costs	600	600	
Operating income	$ 1,400	$ 1,650	
Non-operating gains/(losses)	300	300	
Interest income	20	20	
EBIT	$ 1,720	$ 1,970	14.535%
Interest expense	(80)	(80)	
EBT	$ 1,640	$ 1,890	15.244%
Income taxes (20% of EBT)	(328)	(378)	
Net income	$ 1,312	$ 1,512	15.244%

(Continued)

Example (continued):

$$\textbf{DTL for Year 1} = \frac{\%\ \Delta \text{ in Year 2 Projected Net Income}}{\%\ \Delta \text{ in Year 2 Projected Sales}} = \frac{15.244\%}{12.500\%} = \textbf{1.2195}$$

$$\textbf{DTL for Year 1} = \frac{\text{Contribution Margin Year 1}}{\text{EBT Year 1}} = \frac{\$2{,}000}{\$1{,}640} = \textbf{1.2195}$$

Also, recall that in the previous examples of DFL and DOL, DFL for Year 1 was 1.04878 and DOL for Year 1 was 1.1628. Multiplying DFL by DOL equals DTL: DTL = DFL × DOL, or 1.04878 × 1.1628 = **1.2195**

A company's degree of total leverage also varies with its level of sales. As long as the company's fixed costs and fixed financing costs remain the same, its degree of total leverage will decrease as its sales revenue and thus its EBT increase.

Example of the effect of total leverage (both operating and financial) on EBT at different sales levels:

Sales revenues	$ 4,000	$ 4,500	$ 5,000	$ 5,500	$ 6,000
Variable costs (50% of revenues)	2,000	2,250	2,500	2,750	3,000
Contribution margin	$ 2,000	$ 2,250	$ 2,500	$ 2,750	$ 3,000
Fixed costs	600	600	600	600	600
Operating income	$ 1,400	$ 1,650	$ 1,900	$ 2,150	$ 2,400
Non-operating gains/(losses)	300	300	300	300	300
Interest income	20	20	20	20	20
EBIT	$ 1,720	$ 1,970	$ 2,220	$ 2,470	$ 2,720
Interest expense	(80)	(80)	(80)	(80)	(80)
EBT	$ 1,640	$ 1,890	$ 2,140	$ 2,390	$ 2,640
Income tax (20% of EBT)	(328)	(378)	(428)	(478)	(528)
Net income	$ 1,312	$ 1,512	$ 1,712	$ 1,912	$ 2,112
DTL (contribution margin ÷ EBT)	1.220	1.190	1.168	1.151	1.136
DTL (% chg. in projected NI ÷ % chg. in projected Sales)	1.220	1.190	1.168	1.151	--

As revenues increase by a given percentage, the percentage by which both EBT and net income increase is the percentage increase in revenues multiplied by a factor equal to the DTL.

For example, at the $5,000 revenue level, the DTL is 1.168. As revenues increase to $5,500, a 10% increase, EBT increases from $2,140 to $2,390, an increase of 11.68%, and net income increases from $1,284 to $1,434, also an increase of 11.68%. The increase of 10% in revenues multiplied by the DTL of 1.168 equals 11.68%, the increase in EBT and net income.

Capital Structure and Solvency Ratios

Capital structure and solvency ratios are also used to evaluate a company's leverage. Capital structure and solvency ratios include the following ratios:

- Debt-to-equity ratio.
- Long-term debt-to-equity ratio.
- Debt-to-total assets ratio.

Debt-to-Equity Ratio

The debt-to-equity ratio is a comparison of how much of the financing of assets comes from creditors with the amount of financing that comes from owners in the form of equity.

$$\text{Debt-to-Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Total Equity}}$$

In the debt-to-equity ratio, "total liabilities" means all liabilities, including accounts payable and other current liabilities; and "total equity" consists of all stockholders' equity including preferred equity.

A debt-to-equity ratio of 2.00, or 2:1, for example, means that the company's total liabilities are twice its total equity, or its debt financing consists of $2.00 of debt for every $1.00 of equity.

The debt-to-equity ratio can serve as a screening device for the analyst when looking at capital structure ratios. If this ratio is extremely low (for instance, 0.1:1), then there is no need to calculate other capital structure ratios because there is no real concern with this part of the company's financial situation. The analyst's time could be better spent looking at other aspects of the company's operations. However, if the debt-to-equity ratio is around 2:1 or higher, it would be important to do some extended analysis that focuses on other ratios such as profitability, as well as the company's future prospects.

Long-Term Debt-to-Equity Ratio

The **long-term** debt-to-equity ratio measures how much **long-term** debt a company has compared to its total equity.

$$\text{Long-term Debt-to-Equity Ratio} = \frac{\text{Total Debt} - \text{Current Liabilities}}{\text{Total Equity}}$$

Because the numerator of the above ratio is Total Debt − Current Liabilities, the numerator includes the non-current portion of long-term debt only. The current portion of long-term debt and other current liabilities are excluded.

A ratio greater than 1:1 indicates more reliance on long-term debt financing than on equity financing.

Debt-to-Total Assets Ratio

The debt-to-total assets ratio measures the proportion of the company's total assets that are financed by creditors, an indication of the company's long-term debt repayment ability.

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

Lenders and other creditors would like the debt-to-total assets ratio to be as low as possible because a lower ratio indicates a lower risk of the company's defaulting on its debt, whereas a higher ratio indicates a higher risk of default. Therefore, the higher the debt-to-total assets ratio is, the higher the company's cost of debt (interest rate) will be, because lenders and creditors will demand compensation for the increased risk they are bearing.

The numerator of the debt-to-total assets ratio includes all liabilities, including current liabilities such as accounts payable, even though accounts payable probably do not require interest payments; and because payables are always turning over (being paid and being replaced by other payables), they generally do not

decrease as would a loan on which principal payments are being made. Including all liabilities makes the debt-to-total assets ratio more conservative than ratios that include only long-term debt in the numerator.

Earnings Coverage Ratios

Earnings coverage ratios are related to financial leverage because one of the key issues related to debt is the fact that a fixed payment (interest) must be made on a regular basis. The more debt a company has, the bigger its interest obligation becomes. As the company's interest obligation becomes larger, the risk becomes greater that the company will not be able to cover its interest payments and will default on the debt.

While capital structure ratios such as those above can provide information on how much of a company's financing comes from debt, they cannot provide information on whether the company will have enough earnings to service the debt. Therefore, **earnings coverage** ratios are used to focus on the company's **earning power**, because the company's ability to generate earnings will be the source of its interest payments, as well as the source for its principal repayments. Earnings coverage ratios measure the relationship between the fixed interest charges the company is obligated to pay and the earnings available to meet those charges.

Note: **Earning power** refers to **earnings coverage**. Earnings coverage is important because it is the source of interest payments and principal repayments. Long-term earnings are necessary because they create liquidity, solvency, and borrowing capacity for a company.

The following three earnings coverage ratios measure the ability of the company to make interest payments.

- Interest coverage (times interest earned) ratio
- Fixed charge coverage (earnings to fixed charges) ratio
- Cash flow to fixed charges ratio

Interest Coverage (Times Interest Earned) Ratio

The interest coverage ratio, also called the **times interest earned** ratio, compares the funds available to pay interest (earnings **before interest** and taxes) with the amount of interest expense on the income statement. Interest expense on the income statement includes interest expense on debt obligations and on finance leases.

$$\textbf{Interest Coverage Ratio (Times Interest Earned)} = \frac{\textbf{Earnings Before Interest and Taxes (EBIT)}}{\textbf{Interest Expense}}$$

The Interest Coverage Ratio gives an indication of how much in earnings the company has available for the payment of its fixed interest expense. Earnings before interest and taxes is used in the numerator because interest is a tax-deductible expense. Therefore, pre-tax earnings can be used to pay interest.

A high interest coverage ratio is desirable. An interest coverage ratio of greater than 3.0 is excellent. When the interest coverage ratio gets down to 1.5, the company has a heightened risk of default. The further the ratio declines below 1.5, the higher the risk of default becomes.

However, the interest coverage ratio is a simplified measure because it does not include obligations for operating and short-term lease payments in the denominator, nor does it add back expensed operating and short-term lease payments to the numerator. The interest coverage ratio also does not include in the denominator required principal repayments on debt or required lease liability payments on finance leases, which are equivalent to principal payments on a loan.

Fixed Charge Coverage (Earnings to Fixed Charges) Ratio

The Fixed Charge Coverage ratio, also called the Earnings to Fixed Charges ratio, measures how much in earnings a company has available to cover its fixed financing charges, including interest, principal repayments on loans, and lease payments.

$$\text{Fixed Charge Coverage (Earnings to Fixed Charges)} = \frac{\text{Earnings Before Fixed Financing Charges and Taxes}}{\text{Fixed Financing Charges}}$$

"Fixed financing charges" are all contractually committed payments on both debt and leases, as follows:

- Interest and principal payments on debt
- Total lease payments on operating and finance leases, including interest and lease liability payments
- Total short-term lease payments

The Numerator: Earnings Before Fixed Financing Charges and Taxes

The **numerator**, earnings before fixed financing charges and taxes, is calculated as:

	EBIT (Earnings Before Interest and Taxes)
+	Operating and short-term lease payments expensed
=	**Earnings before fixed financing charges and taxes**

The Denominator: Fixed Financing Charges

The **denominator**, fixed financing charges, is calculated as:

	Interest expense on loans and finance leases
+	Required principal payments on loans and lease liability payments on finance leases
+	Total payments on operating and short-term leases
=	**Fixed financing charges**

Example: A company has outstanding loans, finance leases, operating leases, and short-term leases. The required principal payments on its loans total $125,000, while the required lease liability payments on its finance leases total $75,000. Interest expense on the loans and finance leases totals $60,000. In addition, its operating and short-term leases require annual lease payments totaling $45,000. Its earnings statement includes the following:

EBIT (Earnings before interest and taxes)	$ 1,175,000
Less: Interest expense on loans and finance leases	60,000
EBT (Earnings before taxes)	$ 1,115,000
Less: Income taxes @ 40%	446,000
Net Income	$ 669,000

(Continued)

Example (continued):

The **numerator** of the company's fixed charge coverage ratio is:

EBIT (Earnings before interest and taxes)	$ 1,175,000
Plus: Add back operating and short-term lease payments expensed	45,000
Earnings before fixed financing charges and taxes	**$1,220,000**

The **denominator** of the company's fixed charge coverage ratio is:

Interest expense on loans and finance leases	$ 60,000
Plus: Required principal payments on loans and lease liability payments on finance leases	200,000
Plus: Required total payments on operating and short-term leases	45,000
Fixed financing charges	**$ 305,000**

$$\text{Fixed Charge Coverage Ratio} = \frac{\$1,220,000}{\$305,000} = \mathbf{4.0}$$

A fixed charge coverage ratio of 4.0 is excellent. It means the company has four times as much in earnings as it needs to fulfill its contractual obligations to make interest and principal payments on its loans, lease liability payments on its leases, and operating and short-term lease payments.

Cash Flow to Fixed Charges Ratio

The fixed charge coverage ratio can be adapted to use adjusted cash flow from operations as the numerator instead of earnings before fixed charges and taxes. The cash flow to fixed charges ratio indicates more about availability of cash to fulfill contractual financing obligations than the fixed charge coverage ratio does because it is based on cash flow from operations.

The cash flow to fixed charges ratio indicates the amount of **cash flow from operations** the company has available to pay its contractual financing obligations.

$$\textbf{Cash Flow to Fixed Charges} = \frac{\textbf{Adjusted Cash Flow from Operations}\ (\text{Cash Flow from Operations [after tax]} + \text{Cash Fixed Financing Charges} + \text{Cash Tax Payments})}{\textbf{Fixed Financing Charges}}$$

Adjusted Cash Flow from Operations, the Numerator of the Cash Flow to Fixed Charges Ratio:

For the numerator of the cash flow to fixed charges ratio, cash fixed charges that **decreased cash flow from operations** should be added back to operating cash flow, but cash fixed charges that **did not decrease** cash flow from operations should **not** be added back.

Cash fixed financing charges, the second item used in calculating the numerator of the cash flow to fixed charges ratio includes:

- Cash interest paid on loans and finance leases. Those items decrease cash flow from operations, so they should be added back to calculate adjusted cash flow from operations. Cash interest paid is a disclosure on the Statement of Cash Flows.
- Cash paid for operating lease payments and short-term lease payments. These cash payments also decrease cash flow from operations, so they also should be added back to cash flow from operations.

Cash tax payments, the third item used in calculating the numerator of the cash flow to fixed charges ratio, means taxes paid in **cash**. Taxes paid in cash may be different from tax expense on the income statement because of accrual accounting. Cash tax payments decrease cash flow from operations, and so

the cash tax payments need to be added back to cash flow from operations to calculate adjusted cash flow from operations for the numerator of the cash flow to fixed charges ratio. Cash tax payments is a disclosure on the Statement of Cash Flows.

Note: Principal payments on loans and lease liability payments on finance leases **do not** decrease cash flow from operations because they are classified as financing activities on the Statement of Cash Flows, so those items should **not** be included in cash fixed charges to be added back to cash flow from operations to calculate the numerator of the cash flow to fixed charges ratio.

The Numerator: Adjusted Cash Flow from Operations

Adjusted cash flow from operations in the numerator of the cash flow to fixed charges ratio is calculated as:

Cash flow from operations after tax (from the Statement of Cash Flows)
\+ Cash fixed financing charges that reduced cash flow from operations (cash interest paid on loans and finance leases* and operating and short-term lease payments)
\+ Cash tax payments that reduced cash flow from operations (cash paid in taxes)*
= Adjusted cash flow from operations

*Disclosures on the Statement of Cash Flows

The Denominator: Fixed Financing Charges

The fixed financing charges amount in the denominator is calculated the same way as it is for the denominator of the fixed charge coverage ratio.

Interest expense on loans and finance leases
\+ Required principal payments on loans and lease liability payments on finance leases
\+ Total payments on operating and short-term leases
= Fixed financing charges

Example: A company has outstanding loans, finance leases, operating leases, and short-term leases. The required principal payments on its loans total $125,000, while the required lease liability payments on its finance leases total $75,000. Interest expense on the loans and finance leases totals $60,000. In addition, its operating and short-term leases require annual lease payments totaling $45,000. Its Statement of Cash Flows includes the following information:

Net cash flow from operations	$	500,000
Cash tax payments (a disclosure, a decrease to cash flow from operations)		475,000
Cash interest payments on loans and finance leases (a disclosure, a decrease to cash flow from operations)		60,000

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