Study Guide

Corporate Finance

By

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About the Author

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Printed in the United States of America

10/17/11
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INTRODUCTION

Welcome to Corporate Finance! This course will introduce you to some basic financial management and analysis concepts used in both large and small corporations. One of the most important components of every business operation is financial decision making. All business decisions have some financial implications, either directly or indirectly. Many of the financial concepts addressed in this course arise every day in large companies, and can also be applied to your personal financial and economic decisions.

Your course is divided into five major lessons based on your textbook, *Fundamentals of Corporate Finance*. The purpose of this study guide is to help you understand the key principles addressed in your textbook. To successfully complete your lessons, you must familiarize yourself with the contents of this study guide. You’ll be able to test your knowledge of each lesson with self-checks and examinations.

OBJECTIVES

When you complete this course, you’ll be able to

- Describe the main components of a balance sheet
- Apply the basic equations used to calculate a firm’s working capital and cash flow
- Read and understand basic balance sheets and income statements
- Calculate present values and future values
- Define what a bond is and discuss the different types of bonds
- Explain the differences between common stocks and preferred stocks
- Discuss the relative strengths and weaknesses of the various methods for analyzing investments
- Calculate the break-even point for a project
Calculate capital gains, losses, and overall returns in simple stock transactions

Define a variety of risk components and explain how they affect investment returns

Describe how investment portfolios are assembled and weighted

Describe the importance of diversification in an investment portfolio

Explain the debt and equity components of a firm’s capital structure

Discuss the concept of financial leverage

Define the basic types of corporate bankruptcy proceedings

Explain how options, employee stock options, warrants, and convertible bonds work

### ABOUT YOUR TEXTBOOK

Your textbook, *Fundamentals of Corporate Finance*, Ninth Edition, by Stephen A. Ross, Randolph W. Westerfield, and Bradford D. Jordan, will instruct you on all aspects of corporate finance. The examinations for this course will be based on material found in the textbook.

The textbook is organized in an easy-to-understand format. The preface of the textbook explains the organization of the text and introduces each chapter. Features of the text, such as “Chapter-Opening Vignettes,” “In Their Own Words,” “Work the Web,” and “Spreadsheet Strategies” are also introduced. Students often skip the preface and move right into the text. While you won’t miss any subject matter that way, you might miss hints that can make your study time more effective.

Each chapter in your textbook opens with a vignette, or story taken from real-world events, in the field of corporate finance. Next, the main concepts of the chapter are presented and illustrated with practical examples. Important key terms are
highlighted in bold print and defined in the margins. Other student aids include charts, tables, and mathematical examples.

Each chapter concludes with a summary, a review of important concepts, review questions, and Web exercises. Major parts of the textbook correspond with lessons in your study guide, and your self-checks and examination questions are based on the material in the textbook.

Also at the end of most chapters, you’ll find a feature called “Minicase,” in which the operations of a fictional company are outlined. Each case example highlights an important corporate finance topic. You’ll find these case studies interesting and valuable, but reading them is optional.

At the end of the textbook, you’ll find appendices that summarize some important information in an easy-to-find format. Appendix A provides several useful mathematical tables. Appendix B contains a reference list of important equations from each chapter in the textbook. Appendix C contains the answers to selected review questions.

The last section of your textbook is a subject index that lists specific page numbers for all the important topics and terms covered in the text. If you need more information, use the subject index to locate the page on which a topic is discussed.

**COURSE MATERIALS**

You should have received the following learning materials for this course:

2. Your study guide, which will help you understand major ideas presented and provide background information about specific topics. This study guide also includes

- Self-checks for each lesson
- Answers to the self-checks
- Examinations for the course
- Graded project assignment
- Summaries of abbreviations

**STUDY PLAN**

To help you understand the information in this course, complete the following steps:

1. Read the introductory material for each assignment. This information, found in the study guide, serves as “lecture notes” to help you grasp important concepts presented in your textbook.

2. Quickly skim the textbook pages mentioned in the assignment. Note any key terms that appear in boldface type, and write down these words for future reference. Some students choose to use index cards as study tools. You may write the key term on one side of the card and write the definition of the term on the reverse side. You can also write important financial equations on index cards. If a concept is confusing to you, place a question mark next to it.

3. Carefully reread the assigned pages in your textbook. Make sure you understand all of the information presented in the reading.

4. At the conclusion of each reading, review the summary and questions found in the textbook. If your schedule permits, complete the review exercises and Internet activities so that you may apply the concepts you’ve learned to real-life situations.
5. Complete the self-check at the conclusion of each assignment. Check your answers against those found at the end of the study guide. Be sure to review any questions you answered incorrectly. The self-checks are provided to help you prepare for the examination, but the school doesn’t grade them. Thus, do not submit your answers to these self-checks for grading.

6. When you feel you understand all of the material presented in the lesson assignments, you may take the examination for that lesson.

Remember, you may e-mail your instructor whenever you need help. The instructor can provide answers to any questions you may have about the course or your study materials.

Good luck with your course!
### Lesson 1: Corporate Finance Overview

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Examination 06058401  Material in Lesson 1

### Lesson 2: Future Cash Flow Valuation

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Examination 06058501  Material in Lesson 2

### Lesson 3: Capital Budgeting

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Examination 06058601  Material in Lesson 3

### Lesson 4: Risk and Return

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### Lesson 5: Cost of Capital and Financial Policy and Options

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<tr>
<th>For:</th>
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<tbody>
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<td>Pages 508–545</td>
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Examination 06058801  
Material in Lesson 5  
Graded Project 06058901
Corporate Finance Overview

INTRODUCTION

In Lesson 1, you’ll learn some important fundamentals of corporate finance. Much of the material in this lesson (and in others to follow later) will require you to perform mathematical calculations. You can use a regular calculator, a financial calculator, or a computer program such as Excel to assist you when you encounter example problems.

In Assignment 1, you’ll cover Chapters 1 and 2 in your textbook. Chapter 1 includes an introduction to corporate finance, and discusses the importance of the financial manager in the corporate environment. You’ll review the basic forms of business organization, and learn how financial management operates in each type of business. Then, you’ll be introduced to financial markets, and learn how cash flows affect business operations. Chapter 2 covers the basics of financial statements, including the balance sheet and income statement. You’ll learn about corporate taxes and how they’re calculated. You’ll also learn more about cash flow in a business, and how the various types of cash flows are calculated.

Assignment 2 includes the material from Chapter 3. This chapter is a more in-depth look at financial statements and long-term financial planning.

Assignment 3 covers Chapter 15. This assignment focuses on long-term financial planning and growth, and is designed to give you a broad understanding of capital markets. Your textbook identifies some useful Web sites that can help familiarize you with these concepts.

OBJECTIVES

When you complete this lesson, you’ll be able to

- Describe the main components of a balance sheet
- Apply the basic equations used to calculate a firm’s working capital and cash flow
Read and understand basic balance sheets and income statements

Discuss the differences between a firm’s average and marginal income tax rates

Use the common-sized financial statement approach to analyze a firm’s balance sheet and income statement

ASSIGNMENT 1

Read this introduction to Assignment 1. Then, read Chapters 1–2, pages 1–45, in your Fundamentals of Corporate Finance textbook.

The Balance Sheet

The balance sheet is a snapshot of a firm’s financial position, as represented by its assets, liabilities, and equity at a particular point in time. The relationship between assets, liabilities, and owner’s equity can be shown with the following formula:

$$\text{Assets} = \text{Liabilities} + \text{Owner’s Equity}$$

or

$$A = L + OE$$

Example: Suppose a firm has assets of $10,000 and owner’s equity of $4,700. What are the firm’s total liabilities?

Solution: Substitute the known values ($10,000 and $4,700) into the equation and solve.

$$\text{Assets} = \text{Liabilities} + \text{Owner’s Equity}$$

$$10,000 = L + 4,700$$

Solve for $L$ by subtracting $4,700 from both sides of the equation.

$$10,000 - 4,700 = L + 4,700 - 4,700$$

$$5,300 = L$$

Answer: The firm’s total liabilities are $5,300.
Assets are classified as either *current* or *fixed*, and liabilities are classified as either *current* or *long-term*. Current assets and current liabilities both have a life span of less than one year, which means that they will convert to cash in less than 12 months. A fixed asset has a longer life span, and may be either tangible or intangible. *Tangible assets* are real objects held by the company (such as equipment), while *intangible assets* are items such as patents and trademarks. A *long-term liability* is a debt that’s not due within the coming year (such as a five-year loan).

The difference between a firm’s current assets and current liabilities is called *working capital* (or *net working capital*). The net working capital can be calculated with the following formula:

\[
Net Working Capital = \text{Current Assets} - \text{Current Liabilities}
\]

or

\[
NWC = CA - CL
\]

**Example:** If your current assets are $2,500 and your current liabilities are $400, what is your net working capital? Is your net working capital a positive or negative amount?

**Solution:** Substitute the known values ($2,500 and $400) into the equation and solve.

\[
Net Working Capital = \text{Current Assets} - \text{Current Liabilities}
\]

\[
NWC = $2,500 - $400
\]

\[
NWC = $2,100
\]

**Answer:** Your net working capital is $2,100, which is a positive amount.

Three particularly important measures derived from a firm’s balance sheet include *liquidity, debt versus equity, and market value versus book value.*
The Income Statement

The income statement provides a measure of a firm’s operating performance over a period of time, usually one quarter or one year. The relationship between revenues, expenses, and income can be illustrated with the following formula:

\[ \text{Revenues} - \text{Expenses} = \text{Income} \]

or

\[ R - E = I \]

In this equation, the income amount represents taxable income (TI) or net income before tax (NIBT).

Example: If your revenues are $1,509 and your expenses are $885, what is your income (or taxable income or net income before tax)?

Solution: Substitute the known values ($1,509 and $885) into the equation and solve.

\[ \text{Revenues} - \text{Expenses} = \text{Income} \]

\[ $1,509 - $885 = I \]

\[ $624 = I \]

Answer: Your income is $624.

Taxes

Taxes often represent the single largest cash outflow for a firm. Federal marginal tax rates for corporations vary from 15 percent to 39 percent (depending on the amount of a firm’s income), but never exceed an average tax rate of 35 percent.

The average tax rate is a firm’s tax bill divided by its taxable income. The marginal tax rate is the amount of tax payable on the next dollar earned. The marginal tax rates for corporations that were in effect for the year 2007 are shown in Table 1.
Example: Suppose a corporation has a taxable income of $300,000. What is the firm’s corporate income tax?

Solution: First, calculate the 15 percent portion of the tax.

\[
15\% \text{ of }$50,000 = ?
\]

\[
0.15 \times $50,000 = $7,500
\]

Calculate the 25 percent portion of the tax.

\[
25\% \text{ of }($75,000 - $50,000) = ?
\]

\[
25\% \text{ of }$25,000 = ?
\]

\[
0.25 \times $25,000 = $6,250
\]

Calculate the 34 percent portion of the tax.

\[
34\% \text{ of }($100,000 - $75,000) = ?
\]

\[
34\% \text{ of }$25,000 = ?
\]

\[
0.34 \times $25,000 = $8,500
\]

Calculate the 39 percent portion of the tax.

\[
39\% \text{ of }($300,000 - $100,000) = ?
\]

\[
39\% \text{ of }$200,000 = ?
\]

\[
0.39 \times $200,000 = $78,000
\]

Add all of the tax amounts together to find the total tax.

\[
$7,500 + $6,250 + $8,500 = $78,000 = $100,250
\]
Answer: The firm’s corporate income tax is $100,250.

Example: For the same corporation described in the previous example, what is the firm’s marginal tax rate?

Solution: The firm earned $300,000. If it earned one additional dollar over that amount, the tax on that dollar would be 39 cents.

Answer: Therefore, the firm’s marginal tax rate is 39%.

Example: For the same corporation, find the firm’s average tax rate.

Solution: To calculate the firm’s average tax rate, divide the total corporate tax ($100,250) by the taxable income ($300,000).

\[
\frac{100,250}{300,000} = 0.33417, \text{ or } 33.417\%
\]

Answer: The average tax rate is 33.417 percent.

Taxes represent an expense, as shown by the following formulas:

\[
\text{Revenues} - \text{Expenses} = \text{Income Before Taxes}
\]

\[
\text{Income Before Taxes} - \text{Tax Expense} = \text{Net Income After Taxes}
\]

Example: Again, assume that your revenues are $1,509, your expenses (other than taxes) are $885, and your tax expense is $212. What is your net income?

Solution: Substitute the known values into the equations and solve.

\[
\text{Revenues} - \text{Expenses} = \text{Income Before Taxes}
\]

\[
1,509 - 885 = \text{Income Before Taxes}
\]

\[
624 = \text{Income Before Taxes}
\]

\[
\text{Income Before Taxes} - \text{Tax Expense} = \text{Net Income After Taxes}
\]

\[
624 - 212 = \text{Net Income After Taxes}
\]

\[
412 = \text{Net Income After Taxes}
\]

Answer: Your income before taxes is $624. Your net income after taxes is $412.

State corporate tax rates may also apply.
Cash Flow

Perhaps the most important piece of financial information that can be obtained from financial statements is *cash flow* (*CF*), as reported on the statement of cash flows. The statement of cash flows is covered in more detail in Lesson 2.

*Operating cash flow* (*OCF*) is the amount of cash generated from a firm’s normal business activities. The OCF can be calculated by using the following equation:

\[
OCF = Earnings \text{ Before Interest and Taxes (EBIT)} + \text{Depreciation} – \text{Taxes}
\]

**Example:** Assume that a firm has $5,296 in earnings before interest and taxes, $923 in depreciation expense, and $419 in taxes. What is the firm’s operating cash flow?

**Solution:** Substitute the known values into the equation and solve.

\[
OCF = EBIT + Depreciation – Taxes
\]
\[
OCF = 5,296 + 923 – 419
\]
\[
OCF = 5,800
\]

**Answer:** The firm’s operating cash flow is $5,800.

Review of Abbreviations

Throughout Assignment 1 of this first lesson, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table lists some of the important abbreviations that you should remember.
After you’ve carefully read pages 1–45 in the *Fundamentals of Corporate Finance* textbook, complete Self-Check 1. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 1, move on to Assignment 2.

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Assets</td>
</tr>
<tr>
<td>AD</td>
<td>Accumulated depreciation</td>
</tr>
<tr>
<td>B/S</td>
<td>Balance sheet</td>
</tr>
<tr>
<td>CA</td>
<td>Current assets</td>
</tr>
<tr>
<td>CF</td>
<td>Cash flow</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief executive officer</td>
</tr>
<tr>
<td>CFO</td>
<td>Chief financial officer</td>
</tr>
<tr>
<td>CL</td>
<td>Current liabilities</td>
</tr>
<tr>
<td>D</td>
<td>Depreciation</td>
</tr>
<tr>
<td>E</td>
<td>Expenses</td>
</tr>
<tr>
<td>EBIT</td>
<td>Earnings before interest and taxes</td>
</tr>
<tr>
<td>EPS</td>
<td>Earnings per share</td>
</tr>
<tr>
<td>FA</td>
<td>Fixed assets</td>
</tr>
<tr>
<td>GAAP</td>
<td>Generally accepted accounting practices</td>
</tr>
<tr>
<td>I/S</td>
<td>Income statement</td>
</tr>
<tr>
<td>L</td>
<td>Liabilities</td>
</tr>
<tr>
<td>LLC</td>
<td>Limited liability company</td>
</tr>
<tr>
<td>NFA</td>
<td>Net fixed assets</td>
</tr>
<tr>
<td>NI</td>
<td>Net income</td>
</tr>
<tr>
<td>NIBT</td>
<td>Net income before tax</td>
</tr>
<tr>
<td>NWC</td>
<td>Net working capital</td>
</tr>
<tr>
<td>NYSE</td>
<td>New York Stock Exchange</td>
</tr>
<tr>
<td>OCF</td>
<td>Operating cash flow</td>
</tr>
<tr>
<td>OE</td>
<td>Owner’s equity</td>
</tr>
<tr>
<td>OTC</td>
<td>Over the counter</td>
</tr>
<tr>
<td>R</td>
<td>Revenues</td>
</tr>
<tr>
<td>SEC</td>
<td>Securities and Exchange Commission</td>
</tr>
<tr>
<td>TI</td>
<td>Taxable income</td>
</tr>
<tr>
<td>WC</td>
<td>Working capital</td>
</tr>
</tbody>
</table>
Self-Check 1

At the end of each section of *Corporate Finance*, you’ll be asked to pause and check your understanding of what you’ve just read by completing a “Self-Check” exercise. Answering these questions will help you review what you’ve studied so far. Please complete Self-Check 1 now.

Indicate whether each of the following statements is True or False.

_____ 1. The basic equation used on a firm’s balance sheet is
   \[ \text{Assets} + \text{Liabilities} = \text{Owner’s Equity}. \]

_____ 2. Working capital (or net working capital) is calculated with the equation
   \[ \text{Current Assets} - \text{Current Liabilities} = \text{Working Capital}. \]

_____ 3. The basic equation used on a firm’s income statement is
   \[ \text{Revenues} - \text{Expenses} = \text{Income}. \]

_____ 4. A firm’s marginal tax rate and average income tax rate are always the same.

_____ 5. The basic equation used to calculate a firm’s net income is
   \[ \text{Revenues} - (\text{Nontax Expenses}) - \text{Tax Expense} = \text{Net Income}. \]

_____ 6. The basic equation used to calculate a firm’s operating cash flow is
   \[ \text{Earnings Before Interest and Taxes} + \text{Depreciation Expense} + \text{Tax Expense} = \text{Operating Cash Flow}. \]

In the “Questions and Problems” section on pages 41–42 of the *Fundamentals of Corporate Finance* textbook, answer questions 1, 2, 6, 7, and 10.

Check your answers with those on page 139.
ASSIGNMENT 2

Read this introduction to Assignment 2. Then, read Chapter 3, pages 46–86, in your Fundamentals of Corporate Finance textbook.

Cash Flow and Financial Statements

Business activities that increase the flow of cash represent sources of cash. Activities that spend, consume, or decrease cash represent uses of (or applications of) cash. The statement of cash flows provides a summary of both sources and uses of cash flow.

Cash flow, including both sources of cash and uses of cash, can be evaluated by looking at a company’s balance sheet. Compare the balance from the end of a period to the balance at the beginning of the next period. Recall that a balance sheet represents the financial position for a firm at a point in time. Additional cash flow can be evaluated by reviewing the company’s income statement for a particular period. Remember that an income statement summarizes the results of business operations for a period of time.

Therefore, a statement of cash flow is a financial statement that summarizes the cash flows for a period of time.

Figure 1 summarizes what you’ve just learned.

![Diagram of balance sheet, income statement, and statement of cash flow relationships](image-url)

FIGURE 1—This illustration shows the relationship between the balance sheet, the income statement, and the cash flow statement.
It’s very important that you understand the purpose of the balance sheet and the income statement before you proceed to study the cash flow statement.

**Example:** Assume that a firm provides the following balance sheet information. You then use this information to develop an Excel spreadsheet, where you show the net result of debits and credits.

![Table 2](image)
Solution: This example uses the same information developed and provided on page 48 of your textbook, but in a slightly modified form. In Table 2, for example, note that debits equal credits in the balance sheet for each year. This same relation has been retained in the change column, so that changes net out to zero. Also, note that the subtotals that would otherwise result in double-counting haven’t been extended to the change column.

Table 3 summarizes the sources and uses of cash from the firm’s balance sheet.

### Table 3

#### SUMMARY OF USES AND SOURCES OF CASH

<table>
<thead>
<tr>
<th>Sources of Cash</th>
<th></th>
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<tbody>
<tr>
<td>Increase in Accounts Payable</td>
<td>$32</td>
</tr>
<tr>
<td>Increase in Common Stock</td>
<td>$50</td>
</tr>
<tr>
<td>Increase in Retained Earnings</td>
<td>$242</td>
</tr>
<tr>
<td><strong>Total Sources</strong></td>
<td><strong>$324</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Uses of cash</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in Accounts Receivable</td>
<td>$23</td>
</tr>
<tr>
<td>Increase in Inventory</td>
<td>$29</td>
</tr>
<tr>
<td>Decrease in Notes Payable</td>
<td>$35</td>
</tr>
<tr>
<td>Decrease in Long-Term Debt</td>
<td>$74</td>
</tr>
<tr>
<td>Net Fixed Asset Acquisitions</td>
<td>$149</td>
</tr>
<tr>
<td><strong>Total Uses</strong></td>
<td><strong>$310</strong></td>
</tr>
</tbody>
</table>

Net Addition to/Source of Cash: $14

Add: Beginning Cash: $84

Equals: Ending Cash: $98

### Standardized Financial Statements

*Standardized financial statements* are also referred to as *common-sized financial statements*. This standardized approach can be applied to a firm’s balance sheet, income statement, and/or statement of cash flows. When these financial statements are standardized, it becomes easier to
make percentage comparisons for the same firm, from period to period or point to point. It’s also easier to make comparisons between different-sized firms within an industry.

Common-sized balance sheets allow comparisons between the components of assets, liabilities, and owners’ equity (recall that \( A = L + OE \)), where assets are set to equal 100 percent. Common-sized income statements allow comparisons between expenses, where net sales or revenues are set to equal 100 percent.

**Example:** Shown here is the balance sheet from page 48 of your textbook. Convert it to a common-sized format.

<table>
<thead>
<tr>
<th>PRUFROCK CORPORATION</th>
<th>2008 and 2009 Balance Sheets ($ in millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2006</td>
</tr>
<tr>
<td><strong>Assets</strong></td>
<td></td>
</tr>
<tr>
<td>Current Assets</td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>$84</td>
</tr>
<tr>
<td>Accounts Receivable</td>
<td>$165</td>
</tr>
<tr>
<td>Inventory</td>
<td>$393</td>
</tr>
<tr>
<td>Total</td>
<td>$642</td>
</tr>
<tr>
<td>Fixed Assets</td>
<td></td>
</tr>
<tr>
<td>Net Plant and Equipment</td>
<td>$2,731</td>
</tr>
<tr>
<td>Total Assets</td>
<td>$3,373</td>
</tr>
<tr>
<td><strong>Liabilities and Owners’ Equity</strong></td>
<td></td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>$312</td>
</tr>
<tr>
<td>Notes Payable</td>
<td>$231</td>
</tr>
<tr>
<td>Total</td>
<td>$543</td>
</tr>
<tr>
<td>Long-Term Debt</td>
<td>$531</td>
</tr>
<tr>
<td>Owners’ Equity</td>
<td></td>
</tr>
<tr>
<td>Common Stock and Paid-In Surplus</td>
<td>$500</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>$1,799</td>
</tr>
<tr>
<td>Total</td>
<td>$2,299</td>
</tr>
<tr>
<td>Total Liabilities and Owners’ Equity</td>
<td>$3,373</td>
</tr>
</tbody>
</table>
Solution: The following is a common-sized balance sheet consistent with the sheet on page 52 of your textbook.

### PRUFRock CORPORATION
**Common-Size Balance Sheets 2008 and 2009**

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assets</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td>2.5%</td>
<td>2.7%</td>
<td>+0.2%</td>
</tr>
<tr>
<td>Accounts Receivable</td>
<td>4.9%</td>
<td>5.2%</td>
<td>+0.3%</td>
</tr>
<tr>
<td>Inventory</td>
<td>11.7%</td>
<td>11.8%</td>
<td>+0.1%</td>
</tr>
<tr>
<td>Total</td>
<td>19.1%</td>
<td>19.7%</td>
<td>+0.6%</td>
</tr>
<tr>
<td>Fixed Assets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net Plant and Equipment</td>
<td>80.9%</td>
<td>80.3%</td>
<td>–0.6%</td>
</tr>
<tr>
<td>Total Assets</td>
<td>100.0%</td>
<td>100.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Liabilities and Owners’ Equity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current Liabilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accounts Payable</td>
<td>9.2%</td>
<td>9.6%</td>
<td>+0.4%</td>
</tr>
<tr>
<td>Notes Payable</td>
<td>6.8%</td>
<td>5.5%</td>
<td>–1.3%</td>
</tr>
<tr>
<td>Total</td>
<td>16.0%</td>
<td>15.1%</td>
<td>–0.9%</td>
</tr>
<tr>
<td>Long-Term Debt</td>
<td>15.7%</td>
<td>12.7%</td>
<td>–3.0%</td>
</tr>
<tr>
<td>Owners’ Equity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common Stock and Paid-In Surplus</td>
<td>14.8%</td>
<td>15.3%</td>
<td>+0.5%</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>53.3%</td>
<td>56.9%</td>
<td>+3.6%</td>
</tr>
<tr>
<td>Total</td>
<td>68.1%</td>
<td>72.2%</td>
<td>+4.1%</td>
</tr>
<tr>
<td>Total Liabilities and Owners’ Equity</td>
<td>100.0%</td>
<td>100.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

### Ratio Analysis

*Ratio analysis* is used to examine and compare a firm’s various financial characteristics. Financial ratios are usually classified in the following categories:

1. Short-term solvency, or liquidity, ratios
2. Long-term solvency ratios
3. Asset management, or turnover, ratios
4. Profitability ratios
5. Market value ratios
Short-term solvency, or liquidity, measures include the following:

- The current ratio
- The quick or acid-test ratio (which excludes a firm’s inventory in the numerator, as it’s the least liquid of the current assets)
- The cash ratio
- The net working capital to total assets ratio
- The interval measure ratio

Long-term solvency measures include the following:

- The total debt ratio
- The debt-equity ratio
- The equity multiplier ratio
- The long-term debt ratio
- The times interest earned ratio
- The cash coverage ratio

Asset management, or turnover, measures include the following:

- The inventory turnover ratio
- The days’ sales in inventory ratio
- The inventory turnover ratio
- The days’ sales in receivables ratio
- The net working capital turnover ratio
- The fixed asset turnover ratio
- The total asset turnover ratio
Profitability measures include the following:

- The profit margin ratio
- The return on assets ratio
- The return on equity ratio

Market value measures include the following:

- The price-earnings ratio
- The price-sales ratio
- The market-to-book ratio

Example: Assume that a firm has current assets of $12,674 and current liabilities of $9,260. What is the firm’s current ratio?

Solution: To find the firm’s current ratio, divide current assets by current liabilities.

\[
\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}
\]

\[
\text{Current Ratio} = \frac{12,674}{9,260} = 1.37
\]

Answer: The firm’s current ratio is 1.37.

The DuPont Identity

The DuPont Corporation popularized an equation, called the DuPont identity, that can be used to examine return on assets (ROA) and return on equity (ROE). In the DuPont identity, the difference represents a reflection on the use of debt financing. The identity decomposes ROE into three components: operating efficiency, asset use efficiency, and financial leverage.

Figure 3.1 on page 68 of your textbook provides an excellent flowchart of this information. While you should familiarize yourself with the DuPont identity, it isn’t necessary for you to commit it to memory.
**Example:** If a firm has a return on assets of 14.28% and an equity multiplier of 1.29, what is this firm’s return on equity?

**Solution:** To find the ROE, multiply the ROA by the equity multiplier.

\[
ROE = ROA \times Equity\ Multiplier
\]

\[
ROE = 14.28\% \times 1.29
\]

\[
ROE = 0.1428 \times 1.29
\]

\[
ROE = 0.1842, \text{ or } 18\%
\]

**Answer:** The firm’s ROE is 18%.

---

**Using Financial Statement Information**

Market information about a firm’s activities, whether it’s good news or bad news, will often have a significant and timely effect on a firm’s stock price. Good news may include information about a new contract that will increase revenues, or a buyout offer. Bad news may reveal that the Securities and Exchange Commission (SEC) is investigating the firm’s financial statements. News of this type may have more effect on a firm’s stock price than actual accounting information. However, the evaluation of historical financial statement information provides the foundation for use by both internal and external users.

For example, when a firm’s current ratio or net working capital position is improving over time, or if the firm’s financial ratios are improving (as compared to other firms in the same industry), the fact will be viewed favorably by observers.

**Example:** Assume that Firm A has a negative working-capital position. The firm’s current liabilities are higher than its current assets. This represents a negative working-capital position and has led to a decline in the firm’s stock price. However, while the firm’s stock price has declined from $10 per share to $2 per share, a buyout offer has just been announced at $5 per share. The information contained in the firm’s financial statements, the negative working-capital position, and the poor current ratio is information that’s
based on financial statements. However, the news announcement that Firm B is willing to pay $5 per share for Firm A results in an increase in Firm A’s stock price to $4.90 per share. Which information is more relevant or reliable?

Solution: The negative working-capital position, where current liabilities exceeded current assets, probably led to a decline in the firm’s stock price. The fact that Firm B is willing to pay $5 per share led to the increase in the firm’s stock price.

Answer: In this example, the offer for a buyout (market information) is more relevant than the financial statement information.

Review of Abbreviations

Throughout Assignment 2, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table summarizes some of the important abbreviations you should remember from this assignment.

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>NWC</td>
<td>Net working capital</td>
</tr>
<tr>
<td>PE Ratio</td>
<td>Price-earnings ratio</td>
</tr>
<tr>
<td>ROA</td>
<td>Return on assets</td>
</tr>
<tr>
<td>ROE</td>
<td>Return on equity</td>
</tr>
<tr>
<td>SEC</td>
<td>Securities and Exchange Commission</td>
</tr>
</tbody>
</table>

After you’ve carefully read pages 46–86 in the Fundamentals of Corporate Finance textbook, complete Self-Check 2. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 2, move on to Assignment 3.
Self-Check 2

Indicate whether each of the following statements is True or False.

_____ 1. The balance sheet presents a firm’s financial position at a point in time.

_____ 2. The income statement presents a firm’s results of operation for a point in time.

_____ 3. The statement of cash flows presents a firm’s sources and uses of cash for a period of time.

_____ 4. Standardized financial statements provide a means for comparing a firm’s balance sheet, from period to period, by setting total assets at 100 percent and presenting the components of the balance sheet as a percentage of total assets.

_____ 5. The current and quick ratios are examples of short-term solvency or liquidity measures.

_____ 6. Financial statement information and financial ratios are always more useful than market information or recent good or bad news releases about a firm.

In the “Questions and Problems” section on pages 81–85 of the Fundamentals of Corporate Finance textbook, answer questions 1, 2, and 26.

Check your answers with those on page 139.

ASSIGNMENT 3

Read this introduction to Assignment 3. Then, read Chapter 15, pages 471–507, in your Fundamentals of Corporate Finance textbook.

The Financing Life Cycle of a Firm

Banks and financial institutions rarely make loans to entrepreneurs who have ideas but no assets. For people who are seeking financing in the start-up or early stages of a firm’s
life cycle, venture capital (VC) may be the only available means of financing. Venture capitalists may require a high rate of return, due to the high risk associated with a start-up enterprise led by those without a successful track record.

**Selling Securities to the Public**

Firms that have publicly traded securities listed on a national exchange must file documents and financial statements with the Securities and Exchange Commission (SEC). You can access a significant amount of information about securities, as well as registrations and financial statements for publicly traded firms, on the SEC Web site:

http://www.sec.gov

**Alternative Issue Methods**

When a company decides to issue a new security, the first public offering made by the company is called an initial public offering or IPO. For equity sales, the public issue may be made by way of a general cash offer or a rights offer (also called a rights offering). You can learn more about initial public offerings of stock at the following Web site:

http://www.ipohome.com

**Underwriters**

*Underwriters* are investment firms that act as intermediaries between a company that’s selling securities and public investors. Underwriters are usually involved in public offerings of securities for cash, and facilitate the pricing and sale of new securities. Often, because of the risk involved in underwriting, the underwriters will combine to form a group of brokers and dealers called a *syndicate*. These brokers and dealers work to stimulate interest in the firm and its securities.
IPOs and Underpricing

It’s often difficult for underwriters to determine the correct price for an initial public offering of a new stock. For this reason, IPOs are sometimes overpriced or underpriced as compared to their true market value. If an IPO is overpriced, it may be unsuccessful and have to be withdrawn from the market. In contrast, if the IPO is underpriced, the existing shareholders will have an opportunity loss when they sell their shares.

New Equity Sales and the Value of the Firm

Seasoned offerings represent additional offerings of securities by firms that already have outstanding securities. Seasoned offerings tend to result in a decline in a firm’s already existing equity security. The reasons for this may include managerial information, the use of debt, and/or new equity security issuance costs.

The Costs of Issuing Securities

The costs of issuing securities can be classified in the following six categories:

1. Gross spread, which consists of the direct fees paid by the issuer to the underwriters
2. Other direct expenses, which are direct costs incurred by the issuer that aren’t part of the compensation to underwriters
3. Indirect expenses, which include the costs of management time working on the new issue and aren’t reported on the prospectus
4. Abnormal returns, which is the drop in the price of existing stock on the announcement of the issue
5. *Underpricing*, which includes losses that arise from selling the stock below the true market value

6. The *Green Shoe option*, which gives the underwriters the opportunity to buy additional shares at the offer price

**Rights**

A *preemptive right*, when included in a firm’s articles of incorporation, requires that existing shareholders be provided the first right to purchase additional shares during a new issue of common stock. This right helps the existing shareholders to avoid dilution of their ownership interests.

**Dilution**

*Dilution* refers to the loss of existing shareholder value. There are several kinds of dilution, as follows:

1. Dilution of percentage ownership
2. Dilution of market value
3. Dilution of book value and earnings per share

**Issuing Long-Term Debt**

More than 50 percent of all long-term debt is issued privately. The two basic forms of direct long-term financing include *term loans* (loans that have maturities of one to five years) and *private placements* (loans that have longer maturities as compared to term loans).

**Shelf Registration**

*Shelf registration* is a type of registration permitted by the SEC, and it’s available for both debt and equity issues. Shelf registrations permit corporations to register offerings that are reasonably expected to sell within the next two years, and to sell the securities at any time within a two-year window.
Review of Abbreviations

Throughout Assignment 3, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table lists some of the important abbreviations you should remember from this assignment.

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPO</td>
<td>Initial public offering</td>
</tr>
<tr>
<td>LT</td>
<td>Long term</td>
</tr>
<tr>
<td>VC</td>
<td>Venture capital</td>
</tr>
</tbody>
</table>

After you’ve carefully read pages 471–507 in the Fundamentals of Corporate Finance textbook, complete Self-Check 3. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from these three assignments, complete the examination for Lesson 1.

Self-Check 3

Indicate whether each of the following statements is True or False.

 _____ 1. For people who are seeking financing in the start-up stages of a firm’s life cycle, venture capital may provide the only available means of financing.

 _____ 2. For firms that have publicly traded securities on national exchanges, it’s optional to file documents and financial statements with the Securities and Exchange Commission (SEC).

 _____ 3. Underwriters are usually involved in a public offering of securities for cash.

(Continued)
Self-Check 3

4. Preemptive rights, if provided for in the firm’s articles of incorporation, prevent existing shareholders from being provided the first right of refusal to purchase any additional shares to avoid dilution of their ownership interests.

5. The abbreviation IPO stands for internal public offering.

6. Shelf registrations permit corporations to register an offering that’s reasonably expected to sell within the next two years; however, the firm may sell the security at any time within the two-year window.

In the “Questions and Problems” section on pages 505–507 of the Fundamentals of Corporate Finance textbook, answer questions 2 (a, b, and c only), 6, 8, and 14.

Check your answers with those on page 140.
Lesson 1
Corporate Finance Overview

1. Which of the following would result in a decrease in cash flow and a use of cash?
   A. A decrease in notes payable
   B. An increase in long-term debt
   C. A decrease in inventory
   D. A decrease in common stock

2. In the United States, for the 2007 tax year, federal corporate income tax rates never exceeded an average rate of
   A. 15%
   B. 35%
   C. 39%
   D. 34%

3. A firm has assets of $60,000 and owners’ equity of $33,000. Which of the following is the correct balance of the firm’s liabilities?
   A. $33,000
   B. $27,000
   C. $93,000
   D. $60,000
4. Which of the following would result in an increase in cash flow and a source of cash?
   A. A decrease in notes payable
   B. A decrease in long-term debt
   C. An increase in inventory
   D. An increase in common stock

5. A firm has current assets of $10,000 and current liabilities of $7,000. Which of the following is the correct net working capital for the firm?
   A. $10,000
   B. $7,000
   C. $3,000
   D. $13,000

6. If a firm has an accounts receivable balance of $18,800 at the end of 2007 and $16,500 at the end of 2008, which of the following statements about accounts receivable is correct?
   A. Accounts receivable decreased by $2,300 and represented a use of cash.
   B. Accounts receivable increased by $2,300 and represented a source of cash.
   C. Accounts receivable decreased by $2,300 and represented a source of cash.
   D. Accounts receivable increased by $2,300 and represented a use of cash.

7. If a firm has revenues of $15,090 and expenses of $8,850, what is the firm’s taxable income?
   A. $15,090
   B. $8,850
   C. $6,240
   D. $23,940

8. Which of the following statements about the issuance of an initial public offering (IPO) is correct?
   A. IPOs may be either underpriced or overpriced.
   B. IPOs are never overpriced.
   C. IPOs are never underpriced.
   D. IPOs are always correctly priced.

9. If a firm has revenues of $15,090, operating expenses of $8,850, and a tax expense of $2,120, what is the firm’s net income?
   A. $8,850
   B. $4,120
   C. $6,240
   D. $8,360

10. When you’re preparing a common-sized balance sheet, which of the following measures is set to equal 100 percent?
    A. Total liabilities
    B. Total assets
    C. Total owners’ equity
    D. Cash
11. Suppose that a corporation has a taxable income of $200,000. What is the firm’s corporate income tax for the current tax year? (You can use the following table to calculate the firm’s U.S. federal corporate tax.)

<table>
<thead>
<tr>
<th>Taxable Income More Than</th>
<th>Taxable Income Less Than</th>
<th>Tax Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0</td>
<td>$50,000</td>
<td>15%</td>
</tr>
<tr>
<td>$50,001</td>
<td>$75,000</td>
<td>25%</td>
</tr>
<tr>
<td>$75,001</td>
<td>$100,000</td>
<td>34%</td>
</tr>
<tr>
<td>$100,001</td>
<td>$335,000</td>
<td>39%</td>
</tr>
<tr>
<td>$335,001</td>
<td>$10,000,000</td>
<td>34%</td>
</tr>
<tr>
<td>$10,000,001</td>
<td>$15,000,000</td>
<td>35%</td>
</tr>
<tr>
<td>$15,000,001</td>
<td>$183,333,334</td>
<td>38%</td>
</tr>
<tr>
<td>$18,333,334</td>
<td></td>
<td>35%</td>
</tr>
</tbody>
</table>

A. $78,000
B. $6,250
C. $39,000
D. $61,250

12. Using the same table and information provided in Question 11, what is the firm’s average tax rate?

A. 39%
B. 30.625%
C. 34%
D. 31.625%

13. Using the same table and information provided in Question 11, what is the firm’s marginal tax rate?

A. 39%
B. 30.625%
C. 34%
D. 31.625%

14. Dilution refers to the loss of shareholder value, and may be represented by all of the following except dilution of

A. ownership percentage.
B. market value.
C. the firm’s current ratio.
D. book value per share.

15. If a firm has $6,940 in earnings before interest and taxes, $650 in depreciation expense, and $2,120 in taxes, what is the firm’s operating cash flow?

A. $4,120
B. $5,470
C. $6,240
D. $9,710
16. The type of financial statement that summarizes the sources and uses of cash over a specified period of time is called the
   A. statement of cash flows.
   B. income statement.
   C. balance sheet.
   D. inventory ratio statement.

17. The current ratio falls within which of the following classifications of financial ratios?
   A. Long-term solvency measures
   B. Asset management or turnover measures
   C. Short-term solvency or liquidity measures
   D. Profitability measures

18. If a firm has an accounts payable balance of $34,400 at the end of 2007 and $31,200 at the end of 2008, which of the following statements about accounts payable is correct?
   A. Accounts payable decreased by $3,200 and represented a use of cash
   B. Accounts payable increased by $3,200 and represented a source of cash
   C. Accounts payable decreased by $3,200 and represented a source of cash
   D. Accounts payable increased by $3,200 and represented a use of cash

19. Which of the following is not one of the six costs of issuing securities?
   A. Rights offering
   B. Abnormal returns
   C. Green Shoe option
   D. Gross spread

20. In the United States, for the 2007 tax year, federal corporate income tax rates never exceeded a marginal rate of
   A. 15%.
   B. 35%.
   C. 39%.
   D. 34%.
INTRODUCTION

In Lesson 2, you’ll learn how present values and future values are calculated, and some basics related to corporate stocks and bonds. This lesson includes four assignments.

In Assignment 4, you’ll cover the material in Chapter 5 of your textbook. This chapter discusses the time value of money, and you’ll learn how to calculate interest on various types of investments.

Assignment 5 includes the topics from Chapter 6. You’ll learn about annuities and perpetuities, and about the effect of compounding interest. You’ll also learn about various types of loans and how loans are amortized.

In Assignment 6, you’ll review the concepts from Chapter 7. The main focus of this chapter is bonds. Bonds form the debt component of a company’s capital structure. You’ll learn about different types of bonds, their valuation, features, ratings, and yields.

Assignment 7 covers the material in Chapter 8. This chapter is an in-depth look at stocks and stock markets. Stocks are the equity component of a firm’s capital structure. You’ll learn how common stocks and preferred stocks differ, and how various stocks are valued.

OBJECTIVES

When you complete this lesson, you’ll be able to

- Calculate present values and future values
- Explain the concepts of *discounting* and *compounding*
- Discuss the differences between an *ordinary annuity* and an *annuity due*
- Describe how returns are generated by simple and compound interest rates
- Explain how debt and equity securities work
- Define what a bond is and discuss the different types of bonds
- Explain the differences between common stocks and preferred stocks
- Summarize the basic differences between debt and equity financing alternatives

ASSIGNMENT 4

Read this introduction to Assignment 4. Then, read Chapter 5, pages 119–143, in your Fundamentals of Corporate Finance textbook.

Future Value and Compounding

The future value (FV) is the amount of money an investment will grow to over a period of time at a particular interest rate (or rate of return). Compounding is the process of accumulating interest on an investment over time, for more than one period. Compounding also includes the interest on interest or compound interest, which is the interest earned on the reinvestment of previous interest payments. This differs from simple interest, where the interest isn’t reinvested. Simple interest is earned each period, but only on the original principal.

Let’s look at an example problem.

Example: Suppose that today, you deposit $2,000 in an account that pays 10 percent interest annually. How much will you have in the account after one year?

Solution: This calculation is relatively simple. In this example, you’ve been provided with three variables. The present value is the amount you begin with, which is $2,000. The number of (compounding) time periods is one year. The interest rate is 10 percent annually. The missing variable that you need to calculate is the future value, which is the value of the investment at the end of one year.
Substitute the known values into the equation and solve:

\[
\text{Future Value} = \text{Present Value} \times (1.0 + \text{Interest Rate})^N
\]

\[
FV = \$2,000 \times (1.0 + 0.10)^1
\]

\[
FV = \$2,000 \times (1.1)^1
\]

\[
FV = \$2,000 \times 1.1
\]

\[
FV = \$2,200
\]

Answer: The future value of a $2,000 investment invested at 10 percent per year for 1 year is $2,200.

Now, consider what happens to the same investment when it’s deposited for a 2-year period.

**Example:** Today, you deposit $2,000 into an account that pays 10 percent interest annually. How much will you have in the account after 2 years?

**Solution:** In this problem, the present value is $2,000, the number of time periods is 2 years (two compounding periods), and the interest rate is 10 percent per year. Substitute the values into the equation and solve to calculate the future value of the investment.

\[
\text{Future Value} = \text{Present Value} \times (1.0 + \text{Interest Rate})^N
\]

\[
FV = \$2,000 \times (1.0 + 0.10)^2
\]

\[
FV = \$2,000 \times (1.1)^2
\]

\[
FV = \$2,000 \times 1.21
\]

\[
FV = \$2,420
\]

Answer: The future value of $2,000 invested at 10 percent per year for 2 years is $2,420.

Now, consider what happens to the same investment when it’s deposited for a 3-year period.

**Example:** Today, you deposit $2,000 into an account that pays 10 percent annually. How much will you have in the account after 3 years?

**Solution:** In this problem, the present value is $2,000, the number of time periods is 3 years (three compounding periods), and the interest rate is 10 percent per year. Substitute the values into the equation and solve to calculate the future value of the investment.
\[ \text{Future Value} = \text{Present Value} \times (1.0 + \text{Interest Rate})^N \]

\[ FV = 2,000 \times (1.0 + 0.10)^3 \]

\[ FV = 2,000 \times (1.1)^3 \]

\[ FV = 2,000 \times 1.331 \]

\[ FV = 2,662 \]

**Answer:** The future value of $2,000 invested at 10 percent per year for 3 years is $2,662.

The future value of an investment will be higher with higher interest rates and lower with lower interest rates.

**Example:** Today, you deposit $1,000 into an account that pays 12 percent annually. How much will you have in the account after 4 years?

**Solution:** In this problem, the present value is $1,000, the number of time periods is 4 years (four compounding periods), and the interest rate is 12 percent per year. Substitute the values into the equation and solve to calculate the future value of the investment.

\[ \text{Future Value} = \text{Present Value} \times (1.0 + \text{Interest Rate})^N \]

\[ FV = 1,000 \times (1.0 + 0.12)^4 \]

\[ FV = 1,000 \times (1.12)^4 \]

\[ FV = 1,000 \times 1.573519 \]

\[ FV = 1,573.52 \]

**Answer:** The future value of $1,000 invested at 12 percent per year for 4 years is $1,573.52.

---

**Present Value and Discounting**

Finding the **present value (PV)** of an investment is the opposite of calculating the future value. The present value is the current value of a future investment discounted at the appropriate discount rate. You would calculate the present value when you need to determine how much money to invest today to obtain some future goal. This is a useful tool in a variety of cases, including retirement planning. **Discounting** is the process of finding the present value of some future amount.

Let’s look at another example problem.
Example: Suppose you want to know how much money to invest today to reach a future goal of $2,000. You want to invest money for one year in an account that pays 10 percent interest annually.

Solution: For this problem, the future value of the investment is $2,000, the number of time periods is one year, and the interest rate is 10 percent per year. The missing variable that you need to calculate is the present value, which is the amount of money you'll need to invest today to reach your future goal. Substitute the values into the following equation and solve to calculate \( PV \):

\[
Present \ Value = Future \ Value \div [(1.0 + Interest \ Rate)^N]
\]

\[
PV = \frac{2,000}{(1.0 + 0.10)^1}
\]

\[
PV = \frac{2,000}{(1.1)^1}
\]

\[
PV = \frac{2,000}{1.1}
\]

\[
PV = 1,818.18
\]

Answer: You'll need to invest $1,818.18 today, at an interest rate of 10 percent per year, to have $2,000 after one year. We've discounted the desired future value to arrive at the present value.

The present value of an investment will be higher with lower interest (or discount) rates and lower with higher interest (or discount) rates.

More about Present and Future Values

The present value factor is the reciprocal of the future value factor. This means that the present value factor is equal to 1 divided by the future value factor, as shown here:

\[
Future \ Value \ Factor = (1 + I)^N
\]

\[
Present \ Value \ Factor = 1/(1 + I)^N
\]

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FV</td>
<td>Future value</td>
</tr>
<tr>
<td>PV</td>
<td>Present value</td>
</tr>
</tbody>
</table>
Review of Abbreviations

Throughout Assignment 4, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table summarizes the important abbreviations you should remember from this assignment.

After you’ve carefully read pages 119–143 in the *Fundamentals of Corporate Finance* textbook, complete Self-Check 4. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 4, move on to Assignment 5.
Indicate whether each of the following statements is True or False.

_____ 1. Compounding involves earning interest for only one time period, and includes interest on interest or compound interest.

_____ 2. In the case of simple interest, the interest earned on the investment isn’t reinvested, so interest is earned for each period only on the original principal.

_____ 3. Discounting is the process of finding the present value of some future investment amount.

_____ 4. The future value of an investment will be higher with higher interest rates and lower with lower interest rates.

_____ 5. The present value of an investment will be higher with lower interest rates and lower with higher interest rates.

_____ 6. The future value factor is the reciprocal of the present value factor.

In the “Questions and Problems” section on page 141 of the Fundamentals of Corporate Finance textbook, answer questions 1, 2, and 3.

Check your answers with those on page 140.
ASSIGNMENT 5

Read this introduction to Assignment 5. Then, read Chapter 6, pages 144–189, in your Fundamentals of Corporate Finance textbook.

Future and Present Values of Multiple Cash Flows

In the last assignment, you learned about future value, with a focus on single deposits. Now, you’ll learn about multiple cash flows. As you work through this assignment, review the examples carefully, preferably using a computer program such as Excel. This practice will benefit you, both in your work on this course and in your personal financial planning endeavors. For example, once you’ve mastered the problems in this assignment, you’ll be able to understand how payments are calculated for your home mortgage, automobile loan, cell phone, or lease payments.

Example: Today, you deposit $2,000 into an account that pays 12 percent annually. In one year, you’ll deposit another $3,000 in the account. How much will you have in the account after 2 years?

Solution: In this problem, the present value is $2,000, the number of time periods is 2 years (two compounding periods), and the interest rate is 12 percent per year. Substitute the values into the following equation and solve to calculate the future value of the investment at the end of the first year:

\[ FV = \frac{PV}{(1 + \text{Interest Rate})^N} \]

\[ FV = \frac{2,000}{(1 + 0.12)^1} \]

\[ FV = \frac{2,000}{1.12} \]

\[ FV = 2,240 \]

At the end of the first year, add the second deposit of $3,000.

\[ 2,240 + 3,000 = 5,240 \]

The value at the end of the first year is $5,240. Now, calculate the value at the end of the second year (with interest).
Future Value = Present Value × (1.0 + Interest Rate)\(^N\)

\[
FV = $5,240 \times (1 + 0.12)^1 \\
FV = $5,240 \times (1.12)^1 \\
FV = $5,240 \times 1.12 \\
FV = $5,868.80
\]

**Answer:** The final value of the investment at the end of the second year is $5,868.80.

Now, let's look at a problem that involves the present value of an investment with multiple cash flows.

**Example:** Suppose you need $2,000 in one year and $3,000 more in two years. If you can get an interest rate of 9 percent on your money, how much do you need to invest today to obtain those amounts in the future?

**Solution:** The problem is asking you to determine the present value of the two cash flows at 9 percent. First, calculate the present value of $3,000 in two years at 9 percent.

\[
PV = $3,000 \div [(1.0 + 0.09)^2] \\
PV = $3,000 \div (1.09)^2 \\
PV = $3,000 \div 1.1881 \\
PV = $2,525.04
\]

Next, calculate the present value of $1,000 in one year at 9 percent.

\[
PV = $2,000 \div [(1.0 + 0.09)^1] \\
PV = $2,000 \div (1.09)^1 \\
PV = $2,000 \div 1.09 \\
PV = $1,834.86
\]

Finally, add the two values together to determine the total present value.

\[
$2,525.04 + $1,834.86 = $4,359.90
\]

**Answer:** You'll need to invest $4,359.90 today to obtain the desired amounts in the future.
Valuing Level Cash Flows: Annuities and Perpetuities

An *annuity* is a fixed, periodic payment that occurs on an investment for a fixed period of time. An *ordinary annuity* is a series of constant cash flows that occur at the end of each period for a fixed number of periods. An *annuity due* is an annuity in which the cash flows occur at the beginning of the period. A *perpetuity* is an annuity in which the cash flows continue forever.

**Example:** An ordinary annuity promises to pay $100 at the end of each of the next four years. If you want to earn 10 percent on your money, how much should you offer for this annuity?

**Solution:** The problem is asking you to determine the present value of this ordinary annuity. In this example, the future value is $100, the interest rate is 10 percent, and the number of compounding periods is four. Substitute these values into the following equation, and calculate the present value. Note that the formula you used previously has been modified to reflect the four separate payments.

\[
PV = \frac{FV}{(1 + I)^1} + \frac{FV}{(1 + I)^2} + \frac{FV}{(1 + I)^3} + \frac{FV}{(1 + I)^4}
\]

\[
PV = \frac{100}{1.10} + \frac{100}{1.10^2} + \frac{100}{1.10^3} + \frac{100}{1.10^4}
\]

\[
PV = 90.91 + 82.64 + 75.14 + 68.30
\]

\[
PV = 316.99
\]

**Answer:** The present value is $316.99, so this is the amount you should offer for the annuity.

This information can also be displayed in table form. Figure 2 illustrates an ordinary annuity of $100 per period for four periods, with a discount rate of 10 percent per period.
**Example:** Calculate the present value of an annuity due of $100 per period for four periods, discounted at a rate of 10 percent per period.

**Solution:** In this example, the future value is $100 and the interest rate is 10 percent. You start with a value of $100 and then add the discounted value of $100 paid for each of three compounding periods. Substitute these values into the following equation, and calculate the present value. Note that the formula you used previously has been modified to reflect the separate payments.

\[
PV = \$100 + \frac{FV}{1 + I} + \frac{FV}{(1 + I)^2} + \frac{FV}{(1 + I)^3}
\]

\[
PV = \$100 + \frac{\$100}{1.10} + \frac{\$100}{1.10^2} + \frac{\$100}{1.10^3}
\]

\[
PV = \$100 + 90.91 + 82.64 + 75.14
\]

\[
PV = \$348.69
\]

**Answer:** The present value of this annuity due is $348.69.
Again, this information can be displayed in the form of a table. Figure 3 illustrates an annuity due of $100 per period for four periods, with a discount rate of 10 percent per period.

<table>
<thead>
<tr>
<th>Period</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annuity Amount:</td>
<td>$100.00</td>
<td>$100.00</td>
<td>$100.00</td>
<td>$100.00</td>
<td>$0</td>
</tr>
<tr>
<td>Present Value</td>
<td>$100.00</td>
<td>$90.91</td>
<td>$82.64</td>
<td>$75.14</td>
<td>$0</td>
</tr>
</tbody>
</table>

There’s another, easier method that can be used to calculate the value of an annuity due. Let’s look at this example again.

**Example:** Calculate the present value of an annuity due of $100 per period, discounted at a rate of 10 percent per period.

**Solution:** To find the present value of this annuity due, multiply the ordinary annuity value by \((1 + r)\), where \(r\) is the discount rate. You already calculated the ordinary annuity value of $316.99 in the preceding example problem.

\[
PV \text{ of Annuity Due} = \text{Ordinary Annuity Value} \times (1.0 + r)
\]

\[
PV = $316.99 \times (1.0 + 0.10)
\]

\[
PV = $316.99 \times 1.1
\]

\[
PV = $348.69
\]

**Answer:** The present value of this annuity due is $348.69.

Now, compare the last two example problems, where you calculated the value of the ordinary annuity and the annuity due. The comparison is illustrated in Table 4.
Notice that, given the same interest rate and number of time periods, an annuity due will always have a higher present value when compared to an ordinary annuity.

### Comparing Rates: The Effect of Compounding

Would you prefer to earn 12 percent interest per year on an investment, compounded annually, or 12 percent interest per year compounded semiannually? To illustrate the power of compounding, let’s look at a simple example. Assume that your initial investment is $1,000.

**Example:** You can earn 12 percent interest per year compounded annually, or 12 percent interest per year compounded semiannually. Calculate the principal and interest for each case for one year, based on an initial investment of $1,000. Which interest rate is better?

**Solution:** First, calculate the future value of the investment at 12 percent per year, compounded annually for one year.

\[
Future\ Value = Present\ Value \times (1.0 + Interest\ Rate)^N
\]

\[
FV = $1,000 \times (1 + 0.12)^1
\]

\[
FV = $1,000 \times (1.12)^1
\]

\[
FV = $1,000 \times 1.12
\]

\[
FV = $1,120
\]

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Ordinary Annuity</th>
<th>Annuity Due</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>$0.00</td>
<td>$100</td>
<td>$-100</td>
</tr>
<tr>
<td>1</td>
<td>$90.91</td>
<td>$90.91</td>
<td>$0.00</td>
</tr>
<tr>
<td>2</td>
<td>$82.64</td>
<td>$82.64</td>
<td>$0.00</td>
</tr>
<tr>
<td>3</td>
<td>$75.14</td>
<td>$75.14</td>
<td>$0.00</td>
</tr>
<tr>
<td>4</td>
<td>$68.30</td>
<td>$0.00</td>
<td>$68.30</td>
</tr>
<tr>
<td>Total</td>
<td>$316.99</td>
<td>$348.69</td>
<td>$31.70</td>
</tr>
</tbody>
</table>

Table 4

**COMPARISON OF ORDINARY ANNUITY AND ANNUITY DUE**
Second, calculate the future value of the investment at 12 percent per year, compounded semiannually for one year.

\[
FV = \frac{PV}{(1 + \text{Interest Rate})^N}
\]

\[
FV = \frac{1,000}{(1 + 0.06)^2}
\]

\[
FV = \frac{1,000}{(1.06)^2}
\]

\[
FV = 1,000 \times 1.1236
\]

\[
FV = 1,123.60
\]

Answer: The interest that’s compounded semiannually produces a future value of $1,123.60, which is slightly higher than the future value compounded annually.

Notice that the larger number of compounding periods results in the larger present value, despite the fact that both cases represent annual returns of 12 percent per year. This will always be the case. The greater the number of compounding periods, the greater the future value of the investment.

**Loan Types and Loan Amortization**

There are several types of loans available, in which the borrower receives money from a lender today and agrees to repay the money in the future. The type of repayment schedule varies with the type of loan.

For example, in a pure discount loan, the borrower receives money today and repays a single lump sum at some time in the future. An interest-only loan requires the borrower to pay interest each period and repay the entire original loan amount at some point in the future. With an amortized loan, the borrower repays parts of the loan amount over time. Most consumer loans (such as mortgages and car loans) are amortized loans.

**Example:** Suppose that you borrow $5,000 at an interest rate of 9 percent per year for five years, and agree to make interest and principal payments in the amount of $1,285.46 at the end of each year. Prepare a loan amortization schedule for each of the five years, showing the beginning principal
balance, the payments of $1,285.46, the interest component of the payment, the principal component of the payment, and the ending principal balance.

Solution: The following is the loan amortization schedule. (Note that some of the amounts in this schedule are rounded. This is why the sum of the “Interest Paid” column and the “Principal Paid” column differs slightly from the total payment.)

<table>
<thead>
<tr>
<th>Year</th>
<th>Beginning Balance</th>
<th>Total Payment</th>
<th>Interest Paid</th>
<th>Principal Paid</th>
<th>Ending Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$5,000</td>
<td>$1,285.46</td>
<td>$450</td>
<td>$835.46</td>
<td>$4,164.54</td>
</tr>
<tr>
<td>2</td>
<td>$4,164.54</td>
<td>$1,285.46</td>
<td>$374.81</td>
<td>$910.65</td>
<td>$3,253.89</td>
</tr>
<tr>
<td>3</td>
<td>$3,253.89</td>
<td>$1,285.46</td>
<td>$292.85</td>
<td>$992.61</td>
<td>$2,261.28</td>
</tr>
<tr>
<td>4</td>
<td>$2,261.28</td>
<td>$1,285.46</td>
<td>$203.52</td>
<td>$1,081.95</td>
<td>$1,179.33</td>
</tr>
<tr>
<td>5</td>
<td>$1,179.33</td>
<td>$1,285.46</td>
<td>$106.14</td>
<td>$1,179.32</td>
<td>$0</td>
</tr>
<tr>
<td>Total</td>
<td>$6,427.30</td>
<td>$1,427.32</td>
<td>$5,000.00</td>
<td>$5,000.00</td>
<td></td>
</tr>
</tbody>
</table>

Note that, while the payment amount is fixed at $1,285.46 for each period, the portion of the payment used to reduce the principal amount of the loan increases with each payment, and therefore, the amount of interest expense decreases with each payment. This is typical for automobile loans, home mortgages, and so on. Figure 4 illustrates this relationship for a hypothetical 30-year mortgage.

There are some exceptions to the type of loan described. One example is the adjustable rate loan or ARM. These loans are sometimes made to individuals who aren’t creditworthy, and often offer low introductory interest rates (called “teaser rates”) that are scheduled to readjust to much higher rates after a few years. When these interest rate adjustments occur, they can lead to much higher required loan payments, which the borrower may be unable to pay. In the case of
home mortgage loans, the increase in required monthly payments can result in loan defaults and home foreclosures. In some cases, these loans result in *negative amortization*, in which the monthly payment isn’t large enough to pay the interest due on the loan.

So, using the loan amortization schedule from the previous example problem, imagine that the Year 1 payment was only $400. This amount isn’t sufficient to pay the interest ($450), so the additional $50 of interest is added to the principal. The principal then increases to $5,050 ($5,000 plus $50). If a similar pattern is repeated for the second and third periods, the payment will increase in Period 4 to an amount greater than $1,285.46. Eventually, the borrower may be unable to pay the monthly payments.
After you’ve carefully read pages 144–189 in the Fundamentals of Corporate Finance textbook, complete Self-Check 5. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 5, move on to Assignment 6.

Self-Check 5

Indicate whether each of the following statements is True or False.

_____ 1. A perpetuity is an annuity in which the cash flows continue forever.

_____ 2. An ordinary annuity includes a payment in time period zero.

_____ 3. An annuity due includes a payment in time period zero.

_____ 4. In general terms, an annuity due will always have a lower present value as compared to an ordinary annuity.

_____ 5. A loan that has a fixed payment per period would provide for a decreasing principal component with each periodic payment.

_____ 6. A loan amortization schedule provides the breakdown of a payment into principal and interest components.

In the “Questions and Problems” section on pages 179–183 of the Fundamentals of Corporate Finance textbook, answer questions 2, 6, 22, and 42.

Check your answers with those on page 141.
ASSIGNMENT 6

Read this introduction to Assignment 6. Then, read Chapter 7, pages 190–230, in your Fundamentals of Corporate Finance textbook.

Bonds and Bond Valuation

When corporations want to borrow money on a long-term basis, they usually do so by issuing or selling debt securities called bonds. A bond is an interest-only loan in which the final interest and principal payment are made at maturity, which is the end of the bond term.

The amount that will be repaid at the end of the loan is referred to as the bond’s face value or par value. The number of years until the face value is paid is called the bond’s time to maturity.

Example: Assume that a corporation wants to borrow $1,000 for 30 years by issuing bonds. The interest rate required for similar bonds from similar corporations is 12 percent. What is the bond’s maturity? If the corporation makes annual interest payments, how much will they pay each year for the first 29 years? What is the bond’s face value? What is the bond’s par value? How much will the corporation pay at the end of 30 years?

Solution: If the corporation makes annual interest payments, they will pay 12 percent of $1,000 at the end of each year for the first 29 years. You can calculate the interest payments as follows:

\[
\text{Interest Payment} = \frac{1,000}{100} \times 12\%
\]

\[
\text{Interest Payment} = \frac{1,000}{100} \times 12\%
\]

\[
\text{Interest Payment} = 120
\]

Answer: The bond’s maturity is 30 years. The interest payments will be $120 per year for the first 29 years. The bond’s face value is $1,000. The bond’s par value is $1,000. The corporation will pay their final interest payment of $120 plus the principal amount of $1,000, for a total of $1,120, at the end of the 30th year.
Example: Illustrate the cash flows for the last five payments for the previous example.

Solution: The last five payments would result in cash outflows of $120 for years 26 through 29, and $1,120 for Year 30, as shown in the following illustration.

<table>
<thead>
<tr>
<th>Year</th>
<th>26</th>
<th>27</th>
<th>28</th>
<th>29</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>$120</td>
<td>$120</td>
<td>$120</td>
<td>$120</td>
<td>$120</td>
</tr>
<tr>
<td>Principal</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$1,000</td>
</tr>
<tr>
<td>Total</td>
<td>$120</td>
<td>$120</td>
<td>$120</td>
<td>$120</td>
<td>$1,120</td>
</tr>
</tbody>
</table>

More about Bond Features

The securities issued by corporations may be classified as equity securities or debt securities. In the case of debt, the individual or corporate entity making the loan is referred to as a creditor or lender and the individual or corporate entity borrowing the money is referred to as a debtor or borrower. The main differences between debt and equity are the following:

1. Debt doesn’t represent an ownership interest in the firm, so creditors don’t have voting rights.

2. The corporation’s payments of interest on debt are tax deductible. Dividends paid to stockholders aren’t tax deductible.

3. Unpaid debt is a liability of the firm. If the debt isn’t paid, the creditors can claim the assets of the firm, which may lead to corporate bankruptcy (liquidation or reorganization). This doesn’t occur when equity is issued.

An indenture is the written agreement between the corporation (borrower) and its creditors. It’s sometimes referred to as the deed of trust. It usually includes the following provisions:

- The terms of the bond
- The total amount of bonds issued
A description of the property used as security for the bond

The repayment arrangements

The call provisions

Details of any applicable protective covenants

Corporate bonds usually have a face value of $1,000. Corporate bonds are usually in registered form, in which the company registrar records the ownership of each bond. However, some bonds are issued in bearer form, which means that the bond is issued without a record of the owner’s name. Thus, payment is made to whomever holds the bond.

A debenture is an unsecured bond, for which no specific pledge of property is made. Some bonds are secured by specific assets or collateral, just as mortgage securities are secured by real property.

It’s common for bonds and other debt instruments to have different levels of seniority, which becomes relevant in the event of a corporate liquidation or bankruptcy. If a company defaults or fails to make timely interest and principal payments, senior debt securities are paid first, followed by junior or subordinated debt instruments.

Bonds are usually repaid at maturity. On this date, the bondholder usually receives the face value of the bond, or the bondholder may be repaid in part or in entirety before the maturity date. Some corporations use a sinking fund to plan and account for the repayment of the principal portion of these bonds. The company often retains a trustee and makes annual payments to the trustee; the trustee then manages the retirement of the bonds. This may occur prior to the maturity date, if the bonds are callable.

A call provision allows the corporation to repurchase or “call” part or all of the bonds at some stated price over a specific period.

Some bonds are issued with a protective covenant, which is a part of the loan agreement that limits certain actions the company can take during the term of the loan. A negative
covenant specifies actions that the company may not take. In contrast, a positive covenant describes the actions the company must take or conditions that it must abide by.

**Bond Ratings**

Firms often pay to have their bonds rated. Bond ratings are an assessment of the credit-worthiness of the corporation that issues the bonds. This rating is similar to the credit rating or FICO score that an individual might receive on his or her credit report.

The two leading bond-rating firms are Moody’s and Standard and Poor’s (S&P). These firms rate corporate and government bonds based on the creditworthiness of the firm, or how likely the firm or entity is to default on the bonds. For example, the most creditworthy firm would receive an “Aaa” rating from Moody’s and an “AAA” rating from S&P. The highest possible rating reflects the entities’ ability to pay the interest and principal on their debt instruments. A high rating by one or both of these bond-rating firms suggests a lower default risk, and will enable the issuing entity to successfully place or sell the debt while paying a lower interest rate. The same concept applies to individual credit scores. A person who has a favorable credit report will find it easier to borrow money at a lower rate of interest.

**Some Different Types of Bonds**

A variety of different bonds are available, including government bonds, zero coupon bonds, and floating rate bonds.

*Government bonds* are those issued by the U.S. Treasury to finance the national debt. Most government bonds are in the form of Treasury notes and bonds. Most of these U.S. bonds are coupon bonds, issued with maturities between 2 and 30 years, and have no default risk. Also, the interest received by the taxpayer for these bonds is tax-exempt for state income tax purposes. Bonds may also be issued by states, local governments, and municipalities (these bonds are often called “munis”), with varying degrees of default risk. Municipal bonds are exempt from federal income taxes.
Zero coupon bonds (often called “zeroes”) pay no coupon, but are issued at a discount. Over the life of the bond, the bond value increases until the bond’s stated value is achieved at maturity.

Floating-rate bonds (often called “floaters”) have adjustable-rate coupon payments. Adjustments are often tied to an interest rate index, such as the Treasury bill interest rate or the 30-year Treasury bond rate.

Example: Suppose that a firm issues a five-year, zero coupon bond with a $1,000 face value. The initial price is established at $497, and the bond yields (or earns) 15 percent to maturity. Prepare a schedule to show the beginning value, ending value, implicit interest expense, and straight-line interest expense for each of the five years, and in total.

Solution: The following illustration shows the schedule for the bond.

<table>
<thead>
<tr>
<th>Year</th>
<th>Beginning Value</th>
<th>Ending Value</th>
<th>Implicit Interest Expense</th>
<th>Straight-Line Interest Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$497.00</td>
<td>$572.00</td>
<td>$75.00</td>
<td>$100.60</td>
</tr>
<tr>
<td>2</td>
<td>$572.00</td>
<td>$658.00</td>
<td>$86.00</td>
<td>$100.60</td>
</tr>
<tr>
<td>3</td>
<td>$658.00</td>
<td>$756.00</td>
<td>$98.00</td>
<td>$100.60</td>
</tr>
<tr>
<td>4</td>
<td>$756.00</td>
<td>$870.00</td>
<td>$114.00</td>
<td>$100.60</td>
</tr>
<tr>
<td>5</td>
<td>$870.00</td>
<td>$1000.00</td>
<td>$130.00</td>
<td>$100.60</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>$503.00</td>
<td>$503.00</td>
</tr>
</tbody>
</table>

Bond Markets

Most bond trading occurs over the counter (OTC). Bonds (like stocks) have bid prices and ask prices. The bid price is the amount that a buyer is willing to pay for the bond. The ask price is the amount that a seller is willing to accept for a bond. The difference between the two prices, at any point in time, is referred to as the bid-ask spread (or simply, the spread).
Bond prices may change over the life of the bond. For example, suppose that a bond provides for semiannual interest payments on January 1 and July 1 of each year. What if you wanted to sell your corporate bond to someone on a date other than January 1 or July 1? In such a situation, the price paid and received would have to reflect the accrued interest for the period. So, if the exchange took place on April 1, halfway between the two interest payment dates, the buyer would expect to receive (and the seller would expect to pay) one-half of the interest payable in three more months on July 1. Recall that the interest to be paid on a bond is “stated” at the time of the bond issuance.

**Example:** Suppose that you buy a $1,000 bond with a 12 percent annual coupon, payable semiannually on January 1 and July 1. On both January 1 and July 1, the bondholder will receive $60, for a total annual interest payment of $120 ($60 + $60). Based on the principal and accrued interest only, how much would you expect to pay to purchase this bond on April 1?

**Solution:** At $120 per year, this bond pays interest of $10 per month. On April 1, the bond would have accrued three month’s worth of interest, or $30.

**Answer:** To buy the bond on April 1, you would expect to pay the $1,000 face value plus $30 in accrued interest for a total of $1,030.

**Inflation and Interest Rates**

Nominal interest rates are the stated interest rates you pay on a credit card or home mortgage. In contrast, a **real interest rate** is an interest rate adjusted for inflation. The rates of interest on corporate bonds are stated in nominal terms. Nominal interest rates include a real rate component and an inflation rate component (or an anticipated inflation rate component).

The relationship between nominal and real rates of interest can be illustrated with the following equation:

\[
Real \text{ Interest Rate} + \text{Inflation Rate (or Anticipated Inflation Rate)} = \text{Nominal Interest Rate}
\]
This information can also be illustrated as shown here:

### COMPARISON OF INTEREST RATES

<table>
<thead>
<tr>
<th></th>
<th>Home Mortgage</th>
<th>Credit Card</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real Interest Rate</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Plus: Risk or Default Risk Rate</td>
<td>2%</td>
<td>12%</td>
</tr>
<tr>
<td>Plus: Inflation Rate (or Anticipated Inflation Rate)</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Equals: Nominal Interest Rate</td>
<td>8%</td>
<td>18%</td>
</tr>
</tbody>
</table>

While some people might argue the validity of these nominal rates, focus on the components of the nominal rates. A home mortgage interest rate is usually lower than a credit card rate, because the home mortgage is secured by real property. In other words, if the borrower defaults on the home mortgage loan, the property can be foreclosed upon. A credit card, on the other hand, represents unsecured debt. For example, if you take a trip to Hawaii and finance the cost on your credit card, the trip can’t be repossessed. The inflation rate or anticipated inflation rate is held constant in each case, and the real rate of interest is held constant in each case. The different nominal rates for the home mortgage and credit card reflect the risk or default rate components of the debt.

**Example:** Generally, would you expect to pay a higher nominal interest rate for a home mortgage (secured debt) or a credit card (unsecured debt)?

**Answer:** You should expect to pay a higher nominal interest rate for an unsecured credit card.

**Example:** If the inflation rate is 5 percent, would you expect to pay more or less than 5 percent, in nominal terms, for a home mortgage?

**Answer:** The inflation rate is a component of the nominal interest rate charged by a lender. You should expect the lender to charge a nominal interest rate that’s higher than the inflation rate. Thus, at a time when the inflation rate is 5 percent, you should expect to pay more than 5 percent for a home mortgage.
Interest rates, discount rates, and rates of return are almost always stated in nominal terms. Therefore, the discount rate that’s used to calculate the present value of an investment alternative is stated in nominal terms, and includes an inflation (or anticipated inflation) component.

**Determinants of Bond Yields**

Short-term and long-term interest rates change over time. The relationship between short-term and long-term interest rates are called the term structure of interest rates. The term structure of interest rates tells us what the nominal interest rates are on default-free, pure discount bonds. Because the term default-free suggests zero risk of default, these rates represent pure interest rates.

*After you’ve carefully read pages 190–230 in the Fundamentals of Corporate Finance textbook, complete Self-Check 6. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 6, move on to Assignment 7.*

---

**Self-Check 6**

Indicate whether each of the following statements is True or False.

_____ 1. A bond is an interest-only loan in which the final interest and principal payment are made at maturity, which is the end of the bond term.

_____ 2. In the case of debt, the individual or corporate entity making the loan is referred to as a debtor or borrower.

_____ 3. The most creditworthy firm would receive an "Aaa" rating from Moody’s and an "AAA" rating from S&P.

*(Continued)*
ASSIGNMENT 7

Read this introduction to Assignment 7. Then, read Chapter 8, pages 231–259, in your Fundamentals of Corporate Finance textbook.

Common Stock Valuation

Shares of stock are priced to be sold in the public marketplace. There are several ways in which stock prices may be established for the marketplace. None of these methods are perfect and all are theoretical. The important point to understand is that a stock’s price reflects the present value of all future cash flows that the stock market, as a whole, anticipates will be generated by the firm. For this reason, positive news reports about increased anticipated earnings (and cash flows) result in increases in stock prices, and negative news reports about decreased anticipated earnings (and cash flows) result in decreases in stock prices.
Some Features of Common and Preferred Stocks

Common stock (C/S) is a type of company stock that has no special preference or priority for shareholders, either in receiving dividends or in bankruptcy. In contrast, preferred stock (P/S) is company stock that provides some sort of “preferential” treatment to the preferred stockholders, relative to the rights held by common stockholders. Usually, preferred stocks provide shareholders with a preference over dividends, as well as in the distribution of company assets in the event of liquidation or bankruptcy. Some preferred stocks may also come with special voting rights for their shareholders. For example, a class of preferred stock may come with the right to vote 10-to-1 as compared to the voting rights of a common shareholder.

Usually, preferred stocks deliver better dividends to shareholders than common stocks. Sometimes the dividends are cumulative, which means that the preferred shareholders must receive some minimal or stated dividend before any dividends are paid to the common shareholders. It’s the dividend preference that makes some investors view preferred stocks to be more like debt securities than equity securities.

If a firm has only one class of stock, it will be common stock. If a firm has two or more classes of stock, only one class of stock may be appropriately called common stock.

The Stock Markets

The stock market consists of a primary market and a secondary market. In the primary market, new stock issues are brought to market and sold to investors. In the secondary market, existing shares are traded among investors.

Most stock sales involve dealers and brokers. The dealers maintain an inventory of stocks and stand by, ready to buy or sell at any time. The brokers bring buyers and sellers together and charge each a commission to arrange for the purchase and sale of a security. In many cases, a seller is
both a broker and a dealer, arranging for purchases and sales between buyers and sellers, and also buying and selling their own inventory of securities.

The *New York Stock Exchange (NYSE)* is the largest stock market in the world. The NYSE is a publicly traded corporation, and exchange members must purchase a special license that entitles them to buy and sell shares in the exchange.

The second largest stock market in the United States is the *National Association of Securities Dealers Automated Quotations (NASDAQ)* system. The NASDAQ is a computer network of securities dealers. The NASDAQ is often referred to as an *over-the-counter (OTC) market*, which is a market characterized by dealers who buy and sell securities for their own inventory. In the late 1990s, the NASDAQ system was opened to *electronic communications networks (ECNs)*, which allow investors to trade directly with one another by using Web sites.

**Review of Abbreviations**

Throughout Assignment 7, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table lists some of the important abbreviations you should remember from this assignment.

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>C/S</td>
<td>Common stock</td>
</tr>
<tr>
<td>ECN</td>
<td>Electronic communications network</td>
</tr>
<tr>
<td>NASDAQ</td>
<td>National Association of Securities Dealers Automated Quotations</td>
</tr>
<tr>
<td>NYSE</td>
<td>New York Stock Exchange</td>
</tr>
<tr>
<td>P/S</td>
<td>Preferred stock</td>
</tr>
</tbody>
</table>

After you’ve carefully read pages 231–259 in the *Fundamentals of Corporate Finance* textbook, complete *Self-Check 7*. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from these four assignments, complete the examination for Lesson 2.
Self-Check 7

Indicate whether each of the following statements is True or False.

_____ 1. Common stock comes with special priorities for shareholders in receiving dividends.

_____ 2. Preferred stocks may provide shareholders with a preference in the distribution of company assets in the event of liquidation or bankruptcy, relative to the rights held by common stockholders.

_____ 3. In the secondary market, new stock issues are brought to market and sold to investors.

_____ 4. The New York Stock Exchange (NYSE) is the second largest stock market in the world.

_____ 5. The NASDAQ is often referred to as an over-the-counter market, which is a market characterized by dealers who buy and sell securities for their own inventory.

_____ 6. In the late 1990s, the NYSE was opened to electronic communications networks, which allow investors to trade directly with one another by using Web sites.

In the “Questions and Problems” section on pages 255–257 of the Fundamentals of Corporate Finance textbook, complete questions 2, 6, 10, 14, 18, and 20.

Check your answers with those on page 142.
Lesson 2
Future Cash Flow Valuation

1. What is the present value of $3,000, discounted at 8 percent interest per period, for two periods? (Round your answer to the nearest cent.)
   A. $2,777.78
   B. $2,572.02
   C. $3,499.20
   D. $3,240.00

2. The stated interest payment made on a bond is called the
   A. yield to maturity.
   B. maturity.
   C. face value.
   D. coupon.

3. An ordinary annuity of $500 per period, discounted at a rate of 8 percent per period for 3 periods, has a present value of $1,288.55. If this same annuity was an annuity due, what would its present value be? (Round your answer to the nearest cent.)
   A. $1,288.55
   B. $1,500.00
   C. $1,391.63
   D. $1,788.55

Questions 1–20: Select the one best answer to each question.

When you feel confident that you have mastered the material in Lesson 2, go to http://www.www.pennfoster.edu and submit your answers online. If you don’t have access to the Internet, you can phone in or mail in your exam. Submit your answers for this examination as soon as you complete it. Do not wait until another examination is ready.
4. The relationship between real returns, nominal returns, and inflation is commonly referred to as the
   A. dirty price.  
   B. Fisher effect.  
   C. Treasury yield curve.  
   D. bid-ask spread.

5. On an investment of $2,000, you’ll earn 10 percent interest per year compounded semiannually. What is the future value of this investment after one year?
   A. $2,205  
   B. $2,100  
   C. $2,420  
   D. $4,500

6. What is the future value of a $10,000 investment, earning 12 percent interest per period, after three periods? (Round your answer to the nearest cent.)
   A. $7,117.80  
   B. $11,200.00  
   C. $12,544.00  
   D. $14,049.28

7. Where does most bond trading occur?
   A. At the corporate headquarters of Moody’s  
   B. In the New York Stock Exchange (NYSE)  
   C. Electronically, over the counter  
   D. At the corporate headquarters of Standard and Poor’s

8. Suppose that you buy a $5,000 bond with a 12 percent annual coupon, payable semiannually on January 1 and July 1. On both January 1 and July 1, the bondholder will receive $300, for a total annual interest payment of $600 ($300 + $300). Based on the principal and accrued interest only, how much would you expect to pay to purchase this bond on May 1?
   A. $5,200  
   B. $5,000  
   C. $5,300  
   D. $5,600

9. Today, you deposit $1,000 into an account that pays 12 percent interest annually. How much will you have in the account after 4 years? (Round your answer to the nearest cent.)
   A. $635.52  
   B. $1,254.40  
   C. $1,120.00  
   D. $1,573.52

10. A type of loan that’s paid off by making regular principal reductions, usually according to a specified schedule, is called a(n)
    A. annuity due.  
    B. debenture.  
    C. amortizing loan.  
    D. corporate bond.
11. What is the present value of the right to receive four equal payments (ordinary annuity) of $500 per period, discounted at a rate of 10 percent per period? (Round your answer to the nearest cent.)

A. $341.51  
B. $454.55  
C. $1,584.94  
D. $732.05

12. On an initial investment of $1,000, you can earn 12 percent interest per year compounded annually, or 12 percent interest per year compounded semiannually. Which of the following statements is correct?

A. 12 percent per year, compounded annually, is the better interest rate for the investment.  
B. 12 percent per year, compounded semiannually, is the better interest rate for the investment.  
C. There’s no difference between the two interest rates; both rates will produce the same future value.  
D. It isn’t possible to determine the future value of this investment based on the information provided.

13. The payments made by a corporation to shareholders, either in cash or in stock, are called

A. dividends.  
B. capital gains.  
C. cash flows.  
D. bond yields.

14. What is the future value of a $1,500 investment, earning 10 percent interest per period, after two periods? (Round your answer to the nearest cent.)

A. $1,650.00  
B. $1,363.63  
C. $1,815.00  
D. $1,239.67

15. A stock’s expected cash dividend divided by its current price is called the

A. dividend yield.  
B. capital gains yield.  
C. constant growth.  
D. ask price.

16. Today, you deposit $6,000 into an account that pays 10 percent annually. In one year, you’ll deposit another $4,000 in the account. How much will you have in the account after two years?

A. $10,600  
B. $11,660  
C. $10,000  
D. $11,000

17. What is the present value of $2,200, discounted at 10 percent interest per period, for one period? (Round your answer to the nearest cent.)

A. $2,420.00  
B. $2,000.00  
C. $1,818.18  
D. $1,980.00
18. Which of the following statements about stock trading is correct?
   A. The NASDAQ is a computer network, with no physical location for trading.
   B. The number of NYSE exchange members is unlimited.
   C. The NASDAQ uses a specialist system for actively traded stocks.
   D. The NYSE does not have a physical location for stock trading activities.

19. You want to invest money for 3 years in an account that pays 7 percent interest annually. How much would you need to invest today to reach a future goal of $5,000? (Round your answer to the nearest cent.)
   A. $4,650.00          C. $4,762.90
   B. $6,125.22          D. $4,081.49

20. What is the present value of the right to receive four equal payments (annuity due) of $1,000 per period, discounted at a rate of 10 percent per period? (Round your answer to the nearest cent.)
   A. $1,909.09          C. $1,464.10
   B. $3,486.85          D. $2,486.85
Capital Budgeting

INTRODUCTION

Lesson 3 contains three assignments that review the basic concepts of capital budgeting. In Assignment 8, the material from Chapter 9 in your textbook is discussed. The assignment focuses on the variety of capital budgeting techniques used to evaluate investment decisions. You’ll learn about net present value, the payback rule, the average accounting return, the internal rate of return, and the profitability index.

Assignment 9 covers the material from Chapter 10, which focuses on project cash flows, particularly the conversion of pretax cash flows to aftertax cash flows. Aftertax cash flows are used when making net present value calculations, and in other discounted cash flow techniques. You’ll also learn about pro forma statements and cash flow analysis.

In Assignment 10, you’ll review the topics from Chapter 11. You’ll learn how to calculate a firm’s break-even point, and you’ll be introduced to the concept of operating leverage, which is associated with risk.

OBJECTIVES

When you complete this lesson, you’ll be able to

- Discuss the relative strengths and weaknesses of the various methods for analyzing investments
- Define the terms net present value, profitability index, internal rate of return, discounted payback, payback, and accounting rate of return
- Convert pretax cash flows to aftertax cash flows
- Calculate the break-even point for a project
- Explain the concept of operating leverage
ASSIGNMENT 8

Read this introduction to Assignment 8. Then, read Chapter 9, pages 260–297, in your Fundamentals of Corporate Finance textbook.

Net Present Value

The net present value (NPV) approach is a procedure used to determine whether an investment, project, or undertaking creates value in excess of its cost. The net present value, therefore, is the difference between an investment’s market value and its cost. The net present value is calculated by subtracting the present value of aftertax cash outflows from the present value of aftertax cash inflows. The following formula can be used to calculate NPV:

\[
NPV \text{ (Aftertax Cash Flows)} = PV \text{ (Aftertax Cash Inflows)} – PV \text{ (Aftertax Cash Outflows)}
\]

**Example:** A project requires an initial investment of $30,000 today. The present value of the cash inflows likely to result from this initial investment is $27,578. What is the net present value of this investment? Is the value positive or negative? Should the firm proceed with this investment?

**Solution:** In this example, the present value of the anticipated cash inflow from the investment is $27,578, and the present value of the cash outflow from the initial investment is $30,000. Substitute these values into the following formula and calculate the net present value.

\[
NPV = PV \text{ (Cash Inflows)} – PV \text{ (Cash Outflows)}
\]

\[
NPV = $27,578 – $30,000
\]

\[
NPV = –$2,422
\]

**Answer:** The net present value is negative $2,422. Because the NPV is a negative value, the firm shouldn’t proceed with this investment.
The Payback Rule

When a project is under consideration, the payback is the length of time it takes to recover the initial investment for the project. When the payback is calculated using the payback rule, the time value of money for the project or period is ignored. Thus, the payback rule is popularly used for short-term projects and during periods of relatively low rates of inflation, where time value of money considerations are less relevant.

**Example:** An investment project that requires an initial cash outlay of $1,000 will generate positive cash flows of $200 in Year 1, $400 in Year 2, and $1,000 in Year 3. What is the payback period?

**Solution:** The payback occurs between years 2 and 3, as follows:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash Outflow</th>
<th>Cash Inflow</th>
<th>Net Cash Flow</th>
<th>Cumulative Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>–$1,000</td>
<td>$200</td>
<td>–$800</td>
<td>–$800</td>
</tr>
<tr>
<td>Year 2</td>
<td>0</td>
<td>$400</td>
<td>$400</td>
<td>$400</td>
</tr>
<tr>
<td>Year 3</td>
<td>$0</td>
<td>$1,000</td>
<td>$1,000</td>
<td>$600</td>
</tr>
<tr>
<td>Total</td>
<td>–$1,000</td>
<td>$1,600</td>
<td>$600</td>
<td></td>
</tr>
</tbody>
</table>

**Answer:** The payback period for this investment is about two years and five months.

Three advantages of the payback rule are

1. It’s easy to understand.
2. It adjusts for the uncertainty of later cash flows.
3. It’s biased toward liquidity.

Four disadvantages of the payback rule are

1. It ignores the time value of money.
2. It requires an arbitrary cutoff point.
3. It ignores cash flows beyond the cutoff date.
4. It’s biased against long-term and new projects, including research and development.
The Discounted Payback

A discounted payback period is the length of time required for an investment’s discounted cash flows to equal its initial cost. Thus, the discounted payback has been discounted or adjusted for present value.

**Example:** Suppose that you require a 12.5 percent return on an investment of $300, and the investment produces cash flows of $100 for each of the first five years. What are the undiscounted and discounted cash flows? When are the payback and discounted payback?

**Solution:** The values are shown in the following illustration:

<table>
<thead>
<tr>
<th>Year</th>
<th>Cash Flow, Undiscounted</th>
<th>Cash Flow, Discounted</th>
<th>Accumulated Cash Flow, Undiscounted</th>
<th>Accumulated Cash Flow, Discounted</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$100</td>
<td>$89</td>
<td>$100</td>
<td>$89</td>
</tr>
<tr>
<td>2</td>
<td>$100</td>
<td>$79</td>
<td>$200</td>
<td>$168</td>
</tr>
<tr>
<td>3</td>
<td>$100</td>
<td>$70</td>
<td>$300</td>
<td>$238</td>
</tr>
<tr>
<td>4</td>
<td>$100</td>
<td>$62</td>
<td>$400</td>
<td>$300</td>
</tr>
<tr>
<td>5</td>
<td>$100</td>
<td>$55</td>
<td>$500</td>
<td>$355</td>
</tr>
<tr>
<td>Total</td>
<td>$500</td>
<td>$355</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Answer:** The undiscounted cash flow is $500, and the discounted cash flow is $355. The payback is in three years, and the discounted payback is in four years.

The Average Accounting Return

The average accounting return (AAR) represents an investment’s average net income divided by its average book value, and can be calculated by using the following formula:

\[ AAR = \frac{\text{Average Net Income}}{\text{Average Book Value}} \]

**Example:** Assume that a firm has an average net income of $50,000 and an average book value of $250,000. What is the firm’s average accounting return?
**Solution:** Substitute the values into the formula and solve.

\[
AAR = \frac{Average \ Net \ Income}{Average \ Book \ Value}
\]

\[
AAR = \frac{50,000}{200,000}
\]

\[
AAR = 0.25, \text{ or } 25\%
\]

**Answer:** The firm’s average accounting return is 25%.

---

**The Internal Rate of Return**

The most important (and popular) alternative to the net present value approach is the *internal rate of return (IRR)*. In the case of NPV, a project with an NPV of zero or greater is acceptable. In the case of IRR, projects with an IRR that exceeds some specified level is acceptable. The IRR on a project or investment is the required rate of return that would result in an NPV of zero, when the IRR is used as the discount rate. Therefore, the advantages associated with the IRR method are the following:

1. It’s closely related to NPV and can often lead to an identical decision.
2. The method is easy to understand and communicate.

Disadvantages with the IRR method are

1. It may result in multiple answers and/or may not properly account for unconventional cash flows.
2. It may result in incorrect decisions when comparing mutually exclusive investment or project alternatives.

---

**The Profitability Index**

The *profitability index (PI)* is the present value of an investment’s future cash flows divided by its initial cost. The PI represents an extension of the NPV technique, in which the index ranks projects in terms of relative NPVs.
The Practice of Capital Budgeting

All financial projections that result from capital budgets are subject to error or risk. For this reason, a variety of techniques may be used to evaluate a project or projects.

Review of Abbreviations

Throughout Assignment 8, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table lists some of the important abbreviations you should remember from this assignment.

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAR</td>
<td>Average accounting return</td>
</tr>
<tr>
<td>IRR</td>
<td>Internal rate of return</td>
</tr>
<tr>
<td>NPV</td>
<td>Net present value</td>
</tr>
<tr>
<td>PI</td>
<td>Profitability index</td>
</tr>
</tbody>
</table>

After you’ve carefully read pages 260–297 in the Fundamentals of Corporate Finance textbook, complete Self-Check 8. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 8, move on to Assignment 9.
Self-Check 8

Indicate whether each of the following statements is True or False.

_____ 1. A project with a negative net present value (NPV) is usually acceptable to investors.

_____ 2. The net present value (NPV) technique takes the time value of money into consideration.

_____ 3. The payback technique takes the time value of money into consideration.

_____ 4. The discounted payback technique takes the time value of money into consideration.

_____ 5. The internal rate of return (IRR) on a project or investment is the required rate of return that would result in a net present value of zero, when the IRR is used as the discount rate.

_____ 6. The accounting rate of return (ARR) takes the time value of money into consideration.

In the “Questions and Problems” section on pages 292–296 of the Fundamentals of Corporate Finance textbook, answer questions 4, 8, 12, 16, and 22.

Check your answers with those on page 143.

ASSIGNMENT 9

Read this introduction to Assignment 9. Then, read Chapter 10, pages 298–334, in your Fundamentals of Corporate Finance textbook.

Project Cash Flows: A First Look

A relevant cash flow for a project is a change in the firm’s overall future cash flow that comes about as a direct consequence of the decision to take that project.
Example: Suppose you’re considering the purchase or lease of a piece of equipment for your firm. Your firm rents its facility at a cost of $2,000 per month. How does the monthly rental fee of $2,000 enter into the decision?

Solution: The $2,000 monthly rent for the facility isn’t relevant to the decision to purchase or lease the piece of equipment.

### Incremental Cash Flows

The *incremental cash flows* for project evaluation consist of any and all changes in the firm’s future cash flows that are a direct result of taking the project. Incremental cash flows are the focus of most financial projections used to decide whether to proceed with or reject a capital investment project.

*Sunk costs* are costs that have already been incurred and can’t be removed, and therefore shouldn’t be considered in an investment decision. Sunk costs don’t change, in the short-term. For example, a mortgage payment for real property results in a cash outflow that’s fixed, periodic and sunk, in the short-term. In the long-term, the property may be sold and the mortgage paid from the proceeds of the sale.

An *opportunity cost* is the value of an investment that’s forgone (given up) to undertake another investment. For example, once you decide to spend your money on a particular investment, you’ll be missing out on other investment opportunities. The opportunity cost is the cost of the best alternative investment you could have made. The opportunity cost must be considered when you’re evaluating investments to make the best choice of where to place your money.
Pro Forma Financial Statements and Project Cash Flows

Pro forma financial statements are financial statements that project future years’ operations. Most often, project cash flows are used to gauge the desirability of a project.

More about Project Cash Flow

There are several components to project cash flows. Working capital is frequently required to initiate a capital investment project. When the project’s life is completed, this working capital is released for use elsewhere (for other projects). Working capital is already in aftertax terms, as Table 5 illustrates.

<table>
<thead>
<tr>
<th>Table 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>WORKING CAPITAL</td>
</tr>
<tr>
<td><strong>Current Assets</strong></td>
</tr>
<tr>
<td>Cash</td>
</tr>
<tr>
<td>Accounts Receivable</td>
</tr>
<tr>
<td>Inventory</td>
</tr>
</tbody>
</table>

Table 5 lists some components of working capital or net working capital. Remember that working capital is equal to current assets less current liabilities. Note that cash is already in aftertax dollars, as the accrual for corporate (income) taxes payable is matched with other balance sheet items. Therefore, the working capital used to finance a project at the beginning of the project’s life (and released for use elsewhere, at the end of the project’s life) is presumed to be in aftertax terms.

Revenues, operating expenses, and depreciation are all adjusted to convert from accrual-based net income to aftertax cash flows. Your textbook uses a corporate tax rate of 34 percent. Some texts use a 40 percent tax rate, which would include an average state corporate tax rate (for purely domestic corporations). In the following examples, we’ll use 34 percent for $T$ to be consistent with your textbook.
Generally, increased revenues result in increased cash flows at 1 minus the tax rate, as follows:

*Revenues increase cash flows at \((1 - T)\).*

Generally, operating expenses result in decreased cash flows at 1 minus the tax rate, as follows:

*Operating expenses decrease cash flows at \((1 - T)\).*

Therefore, revenues minus operating expenses results in net cash flows, when the difference is multiplied by \((1 - T)\).

Unlike revenues and expenses, the values of depreciation, amortization, and depletion represent noncash charges. For example, no one writes a check to pay for depreciation; however, the depreciation expense is an expense on a firm’s income statement and a deductible expense on the firm’s corporate income tax return. For this reason, depreciation expenses generate cash flows by reducing corporate income tax expenses, as follows:

*Depreciation expenses increase cash flows at \((T)\).*

Table 6 is adapted from your textbook. It will be used to illustrate the conversion from accrual-based income statement measures to cash flows. To achieve this objective, the components have been separated into revenues and expenses, or operating cash flows and depreciation-related cash flows.

<table>
<thead>
<tr>
<th>Table 6</th>
<th>PROJECTED INCOME STATEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operating Cash Flows</td>
</tr>
<tr>
<td>Unit price</td>
<td>$120</td>
</tr>
<tr>
<td>Unit sales</td>
<td>3,000</td>
</tr>
<tr>
<td>Revenues</td>
<td>$360,000</td>
</tr>
<tr>
<td>Variable costs</td>
<td>$180,000</td>
</tr>
<tr>
<td>Fixed costs</td>
<td>$25,000</td>
</tr>
<tr>
<td>Depreciation</td>
<td>$114,320</td>
</tr>
<tr>
<td>EBIT</td>
<td>$40,680</td>
</tr>
<tr>
<td>Taxes (34%)</td>
<td>$13,831</td>
</tr>
<tr>
<td>Net income</td>
<td>$26,849</td>
</tr>
</tbody>
</table>
Our focus is on aftertax cash flows, so it wouldn’t be appropriate to use a generally accepted accounting principle that’s based on the depreciation technique. Instead, we’ll use the technique required under the current tax law, which is called the modified accelerated cost recovery system (MACRS). This method allows for the accelerated write-off of property under various classifications. The MACRS schedules are based on a 200 percent or double-declining balance technique (or 150 percent for longer-lived assets) that has been adjusted for a first year modifying convention. These techniques differ from the straight-line approach to calculating depreciation expenses. The MACRS depreciation schedules are determined by law, so the depreciable life and depreciation technique is prescribed by tax law.

**Alternative Definitions of Operating Cash Flow**

In the bottom-up approach, a crude approximation of operating cash flow may be determined by simply adding depreciation expenses and other noncash charges to net income. This can be illustrated with the following equation:

\[ OCF = Net\ Income + Depreciation \]

**Some Special Cases of Discounted Cash Flow Analysis**

Discounted cash flow (DCF) techniques are used for a variety of decisions. Sometimes, these techniques are used to evaluate cost-cutting proposals. At other times, they may be used to make projections for new-product launches. There are no restrictions on the applications for discounted cash flow analysis.
Review of Abbreviations

Throughout Assignment 9, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table lists some of the important abbreviations you should remember from this assignment.

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF</td>
<td>Discounted cash flow</td>
</tr>
<tr>
<td>GAAP</td>
<td>Generally accepted accounting principles</td>
</tr>
<tr>
<td>MACRS</td>
<td>Modified accelerated cost recovery system</td>
</tr>
</tbody>
</table>

After you’ve carefully read pages 298–334 in the Fundamentals of Corporate Finance textbook, complete Self-Check 9. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 9, move on to Assignment 10.

Self-Check 9

Indicate whether each of the following statements is True or False.

_____ 1. Sunk costs are costs that can change in the short-term.

_____ 2. An opportunity cost is the value of an investment that’s forgone to undertake another investment.

_____ 3. Working capital is already in aftertax terms.

_____ 4. Revenues result in decreased cash flows at 1 minus the tax rate.

(Continued)
ASSIGNMENT 10

Read this introduction to Assignment 10. Then, read Chapter 11, pages 335–364, in your Fundamentals of Corporate Finance textbook.

Evaluating NPV Estimates

As you learned earlier, an investment has a positive net present value (NPV) if its market value exceeds its cost. Generally, NPV estimates are based on assumptions and projections. Therefore, the estimates are only as accurate as the underlying assumptions.

Scenario and Other What-If Analyses

When you’re evaluating cash flow and NPV estimates, you’ll need to perform an organized analysis in which you ask what-if questions. The goal in performing this type of analysis is to assess the degree of forecasting risk and to identify the most important components of the success or failure of the investment.

Self-Check 9

_____ 5. Operating expenses result in decreased cash flows at 1 minus the tax rate.

_____ 6. Depreciation generates cash flows by reducing corporate income tax expenses.

In the “Questions and Problems” section on pages 327–330 of the Fundamentals of Corporate Finance textbook, answer questions 2, 8, 12, 16, and 22.

Check your answers with those on page 143.
One basic type of what-if analysis is the *scenario analysis*. Using this method, you can determine what changes occur in your NPV estimates when various business scenarios are applied. Another type of what-if analysis is the *sensitivity analysis*. In this method, you can determine what happens to NPV estimates when only one variable is changed. Finally, a method called *simulation analysis* can be used, and it combines elements of both scenario analysis and sensitivity analysis.

**Break-Even Analysis**

When you’re making a new product or entering a new market, how much of the product can you sell? When a new business venture begins, the sales volume is often the most important variable, but is often the hardest to predict.

*Break-even (B/E) analysis* is a popular and commonly used tool for analyzing the relationship between sales volume and profitability. It involves the use of *fixed costs (FC)*, *variable costs per unit (VC)*, and *sales revenues per unit* to calculate the sales volume at which break-even is achieved. The *accounting break-even point* is the sales level that results in zero project net income.

The difference between the unit sales price and the unit variable cost is called the *unit contribution margin*.

\[
Unit \text{ Contribution Margin} = Unit \text{ Sales Price} - Unit \text{ Variable Cost}
\]

The break-even point can be calculated by dividing the fixed cost by the unit contribution margin.

\[
Break\text{-Even Point} = \frac{Fixed \text{ Costs}}{Unit \text{ Contribution Margin}}
\]

**Example:** Assume that an item costs $3 per unit to manufacture, and sells for $5 per unit. The firm has fixed costs of $900 per year. What is the unit contribution margin? What is the firm’s break-even point, in units?

**Solution:** Calculate the unit contribution margin.

\[
Unit \text{ Contribution Margin} = Unit \text{ Sales Price} - Unit \text{ Variable Cost}
\]

\[
Unit \text{ Contribution Margin} = \$5 - \$3
\]

\[
Unit \text{ Contribution Margin} = \$2
\]
Then, calculate the break-even point.

\[
\text{Break-Even Point} = \frac{\text{Fixed Costs}}{\text{Unit Contribution Margin}}
\]

\[
\text{Break-Even Point} = \frac{$900}{2}
\]

\[
\text{Break-Even Point} = 450 \text{ units}
\]

Answer: The contribution margin per unit is $2 per unit. The break-even point is 450 units.

**Operating Cash Flow, Sales Volume, and Break-Even**

Break-even may be calculated in terms of aftertax cash flows. The *cash break-even point* is the sales level that results in a zero operating cash flow. Table 11.1 on page 353 of your textbook summarizes the definitions and provides formulas to calculate several different break-even points.

**Operating Leverage**

*Operating leverage* is the degree to which a firm or project relies on fixed costs. Operating leverage is a measure of risk, and is comparable to financial leverage (from financial accounting). Remember that all assets are financed with debt or equity:

\[
\text{Assets} = \text{Liabilities} + \text{Owner’s Equity}
\]

Also, the total costs are either fixed costs or variable costs.

\[
\text{Total Costs} = \text{Fixed Costs} + \text{Variable Costs}
\]

Now, let’s consider both of these formulas together using Firm A and Firm B as examples.

<table>
<thead>
<tr>
<th></th>
<th>Assets</th>
<th>Liabilities</th>
<th>Owner’s Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm A</td>
<td>100%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Firm B</td>
<td>100%</td>
<td>70%</td>
<td>30%</td>
</tr>
</tbody>
</table>
Given this illustration, would you prefer to loan money to Firm A or Firm B? Firm A has less debt (liabilities) than Firm B, and Firm B is more financially leveraged, or at greater risk. Therefore, all other things being equal, it would be better to loan money to Firm A.

However, financial leverage can be beneficial. During a period of growth, financial leverage can generate higher returns for a firm. Suppose that Firm A and Firm B have these costs:

<table>
<thead>
<tr>
<th>Total Costs</th>
<th>Fixed Costs</th>
<th>Variable Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm A</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Firm B</td>
<td>70%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Now, given this illustration, would you prefer to have a cost structure like that of Firm A or Firm B? Firm A has a lower proportion of fixed costs as compared to Firm B. Firm B, with its higher proportion of fixed costs, has more operating leverage. Like financial leverage, operating leverage isn’t necessarily a bad thing, but it represents greater risk, particularly in the event of a period of slow growth (or no growth).

**Capital Rationing**

Firms, like individuals, don’t have unlimited resources for investment. *Capital rationing* is the situation that exists if a firm has positive NPV projects but can’t find the necessary funding. Generally, investment alternatives are ranked according to returns, and the project or investment with the highest return is selected first, the project with the second highest return is selected second, and so on.

**Review of Abbreviations**

Throughout Assignment 10, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table lists some of the important abbreviations you should remember from this assignment.
After you’ve carefully read pages 335–364 in the *Fundamentals of Corporate Finance* textbook, complete Self-Check 10. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from these three assignments, complete the examination for Lesson 3.

### ABBREVIATION

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/E</td>
<td>Break-even</td>
</tr>
<tr>
<td>CM</td>
<td>Contribution margin</td>
</tr>
<tr>
<td>FC</td>
<td>Fixed cost</td>
</tr>
<tr>
<td>VC</td>
<td>Variable cost</td>
</tr>
</tbody>
</table>

**Self-Check 10**

Indicate whether each of the following statements is True or False.

_____ 1. Business forecasts that use point estimates are at risk for error.

_____ 2. Break-even analysis is used to analyze the relationship between sales volume and profitability.

_____ 3. Operating leverage is a measure of risk.

_____ 4. The unit contribution margin is the same as the gross margin.

_____ 5. The break-even point may be calculated by dividing fixed costs by the unit contribution margin.

_____ 6. Rent is an example of a variable cost.

In the “Questions and Problems” section on pages 360–364 of the *Fundamentals of Corporate Finance* textbook, answer questions 2, 8, 12, 18, 22, and 30.

Check your answers with those on page 144.
Lesson 3
Capital Budgeting

EXAMINATION NUMBER
06058601

Whichever method you use in submitting your exam answers to the school, you must use the number above.

For the quickest test results, go to http://www.www.pennfoster.edu

When you feel confident that you have mastered the material in Lesson 3, go to http://www.www.pennfoster.edu and submit your answers online. If you don’t have access to the Internet, you can phone in or mail in your exam. Submit your answers for this examination as soon as you complete it. Do not wait until another examination is ready.

Questions 1–20: Select the one best answer to each question.

1. The amount of time required for an investment to generate cash flows sufficient to recover its initial cost is called the
   A. net present value.
   B. average accounting return.
   C. internal rate of return.
   D. payback period.

2. To calculate a firm’s break-even point, you need to
   A. divide fixed costs by variable costs.
   B. add fixed costs to variable costs, and divide the total by the unit contribution margin.
   C. divide fixed costs by the unit contribution margin.
   D. divide the unit contribution margin by variable costs.

3. The present value of an investment’s future cash flows divided by its initial cost is called the
   A. profitability index.
   B. average accounting return.
   C. net present value.
   D. discounted payback.
4. Assume that a firm has an average net income of $125,000 and an average book value of $500,000. What is the firm’s average accounting return?
   A. 25 percent
   B. 65 percent
   C. 40 percent
   D. 12.5 percent

5. A cost that has already been incurred and that should therefore not be considered in an investment decision is called a(n)
   A. pro forma.
   B. sunk cost.
   C. erosion.
   D. opportunity cost.

6. A situation in which a company can’t raise financing for a project under any circumstances is called
   A. simulation analysis.
   B. hard rationing.
   C. operating leverage.
   D. forecasting risk.

7. A project requires an initial investment of $75,000 today. The present value of the cash inflows likely to result from this initial investment is $98,293. What is the net present value of this investment?
   A. –$23,293
   B. $75,000
   C. $51,707
   D. $23,293

8. The discount rate that makes the net present value of an investment zero is called the
   A. average accounting return.
   B. internal rate of return.
   C. project cash flow.
   D. crossover rate.

9. Assume that an item costs $4 per unit to manufacture, and sells for $19 per unit. What is the unit contribution margin?
   A. $23
   B. 21 percent
   C. $15
   D. 4.75 percent

10. The difference between an investment’s market value and its cost is called the
    A. discounted cash flow.
    B. average accounting return.
    C. net present value.
    D. probability index.

11. When making capital budgeting decisions for a firm, the average net income divided by the average book value equals the
    A. average accounting return.
    B. internal rate of return.
    C. net present value.
    D. project cash flow.
12. A situation in which the taking of one investment will prevent the taking of another is called a(n)
   A. stand-alone investment.
   B. opportunity cost.
   C. marginal revenue investment.
   D. mutually exclusive investment decision.

13. When you’re discussing operating cash flow, the tax saving that results from the depreciation deduction, calculated as the depreciation multiplied by the corporate tax rate is called the
   A. discounted cash flow.
   B. accelerated cost recovery system.
   C. depreciation tax shield.
   D. net working capital.

14. Under U.S. tax law, the depreciation method that allows for the accelerated write-off of property under certain classifications is called the
   A. modified depreciation allowance.
   B. accelerated cost recovery system.
   C. bottom-up approach.
   D. depreciation tax shield.

15. A type of financial statement that provides projections for future years is called a
   A. pro forma statement.
   B. modified depreciation statement.
   C. discounted cash flow analysis.
   D. project cash flow statement.

16. A company manufactures an item that has a unit contribution margin of $9. The firm has fixed costs of $3,600 per year. What is the break-even point, in units?
   A. 27 units
   B. 400 units
   C. 32,400 units
   D. 200 units

17. The sales level that results in zero project net income is called the
   A. operating cash flow.
   B. accounting break-even point.
   C. opportunity cost.
   D. internal rate of return.

18. Which of the following statements about operating leverage is not correct?
   A. Operating leverage is a measure of risk.
   B. Operating leverage increases as fixed costs increase.
   C. Operating leverage decreases as variable costs decrease.
   D. Operating leverage is a combination of scenario and sensitivity analysis.
19. The degree to which a firm or project is committed to fixed production costs is called
   A. operating leverage.  
   B. accelerated cost recovery.  
   C. capital rationing.  
   D. sunk cost.

20. When a firm introduces a new product, it can have a negative effect on the cash flows from existing products. This negative effect is known as
   A. opportunity cost.  
   B. incremental cash flow.  
   C. erosion.  
   D. MACRS depreciation.
Risk and Return

INTRODUCTION

In Lesson 4, you’ll continue to develop your understanding of the components of risk and return measures. This lesson includes two assignments.

In Assignment 11, you’ll review the material from Chapter 12 in your textbook. This assignment reviews the importance of capital market history and shows you how you can extract useful information from historical market data. You’ll learn some basic computations for capital gains and losses, and you’ll be introduced to the efficient markets hypothesis.

Assignment 12 covers the concepts from Chapter 13. This assignment more fully develops the concepts of risk and introduces the capital asset pricing model, which is used to calculate a firm’s cost of capital. You’ll learn about systematic and unsystematic risk and how they affect investment returns. You’ll also review how investment portfolios are assembled, and the affect that diversification has on risk.

OBJECTIVES

When you complete this lesson, you’ll be able to

- Calculate capital gains, losses, and overall returns in simple stock transactions
- Describe the efficient markets hypothesis
- Define a variety of risk components and explain how they affect investment returns
- Describe how investment portfolios are assembled and weighted
- Describe the importance of diversification in an investment portfolio
- Explain the capital asset pricing model and how it relates to the firm’s cost of capital
ASSIGNMENT 11

Read this introduction to Assignment 11. Then, read Chapter 12, pages 365–400, in your *Fundamentals of Corporate Finance* textbook.

**Returns**

If you buy an asset, your gain (or loss) from that investment is called the *return* on your investment. In the case of a stock, this would include both dividends and capital gains (or losses).

**Example:** Suppose you purchased 100 shares of a stock at $37 per share (ignore all commissions). Assume the stock paid a dividend of $1.85 per share for the year. The stock price rose to $40.33 per share, and was then sold at that price. What was the total cost of the stock? What was the total amount of dividends received? What was the total amount of the capital gain (or loss)? What was the total dollar return?

**Solution:** Calculate the total cost of the stock.

\[
Total \ Cost = Stock \ Price \times Number \ of \ Shares
\]

\[
Total \ Cost = $37 \times 100 \ \text{shares}
\]

\[
Total \ Cost = $3,700
\]

Calculate the total amount of dividends received.

\[
Total \ Dividends = Dividend \times Number \ of \ Shares
\]

\[
Total \ Dividends = $1.85 \times 100 \ \text{shares}
\]

\[
Total \ Dividends = $185
\]

Calculate the total amount of the capital gain (or loss).

\[
Capital \ Gain \ or \ Loss = (Ending \ Stock \ Price - Beginning \ Stock \ Price) \times Number \ of \ Shares
\]

\[
Capital \ Gain \ or \ Loss = ($40.33 - $37) \times 100 \ \text{shares}
\]

\[
Capital \ Gain \ or \ Loss = $3.33 \times 100
\]

\[
Capital \ Gain = $333
\]
Calculate the total dollar return.

\[
\text{Total Dollar Return} = \text{Dividends Earned} + \text{Capital Gain}
\]

\[
\text{Total Dollar Return} = 185 + 333
\]

\[
\text{Total Dollar Return} = 518
\]

**Answer:** The total cost of the stock was $3,700. The total amount of dividends received was $185. The capital gain was $333, and the total dollar return was $518.

**Example:** Using the same stock purchase from the previous example problem, assume the sale price was $34.78 per share instead of $40.33. At this price, what was the total amount of the capital gain (or loss)? What was the total dollar return?

**Solution:** Calculate the total amount of the capital gain (or loss).

\[
\text{Capital Gain or Loss} = (\text{Ending Stock Price} - \text{Beginning Stock Price}) / \text{Number of Shares}
\]

\[
\text{Capital Gain or Loss} = (34.78 - 37) / 100 \text{ shares}
\]

\[
\text{Capital Gain or Loss} = -2.22 \times 100
\]

\[
\text{Capital Loss} = -222
\]

Calculate the total dollar return.

\[
\text{Total Dollar Return} = \text{Dividends Earned} + \text{Capital Loss}
\]

\[
\text{Total Dollar Return} = 185 + (-222)
\]

\[
\text{Total Dollar Return} = -37
\]

**Answer:** The capital loss was –$222. The total dollar return was –$37.

**The Historical Record**

A famous study by Roger Ibbotson and Rex Sinquefield examined rates of return in U.S. financial markets. Their study examined the year-to-year historical rates of return on portfolios consisting of the following five items:

- Large-company stocks
- Small-company stocks
Long-term corporate bonds
Long-term corporate bonds
U.S. Treasury bills

Using a starting year of 1925, the study calculated the returns on an investment made in each of these five categories, over an 80-year period that ended in 2005. The nominal, pretax returns were highest for the small-company stocks. However, these returns weren’t steadily achieved over the 80-year period. There was quite a lot of variability, and these results don’t suggest that small-company stocks will generate the highest returns for future years.

**Average Returns: The First Lesson**

A *risk premium* is the excess return required from an investment in a risky asset over that required from a risk-free investment. Table 7 summarizes the average annual returns and related risk premiums for different investments, over the years 1926 through 2005.

<table>
<thead>
<tr>
<th>Investment</th>
<th>Average Return</th>
<th>Risk Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large-Company Stocks</td>
<td>12.3%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Small-Company Stocks</td>
<td>17.4%</td>
<td>13.6%</td>
</tr>
<tr>
<td>Long-Term Corporate Bonds</td>
<td>6.2%</td>
<td>2.4%</td>
</tr>
<tr>
<td>Long-Term Government Bonds</td>
<td>5.8%</td>
<td>2.0%</td>
</tr>
<tr>
<td>U.S. Treasury Bills</td>
<td>3.8%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

The first thing to note is that the risk premium for U.S. Treasury bills is zero. This is because the U.S. Government has never defaulted on a debt (that is, failed to pay). Therefore, a zero historical default rate suggests a future default risk of zero, which is often called a *risk-free return*. This concept of a zero default risk or risk-free return is frequently used by those in the finance industry.
The Variability of Returns: The Second Lesson

The variability of returns from various investments is associated with lower levels of certainty and therefore, higher levels of risk. Let’s consider an example.

As people age and approach retirement age, they have less time to recover from personal investment losses. To protect their savings, therefore, they often want to reduce the risk in their investment portfolios. Typically, they do this by increasing the amount of their personal portfolio invested in bonds, and reducing the amount invested in stocks. However, they may retain certain stocks that have provided many years of quarterly dividend payouts. These stocks are viewed as less risky than others, and the steady history of quarterly dividend payouts tends to make the price of these stocks less volatile (relative to others in the stock market as a whole). The upside of keeping these stocks is that there’s little risk of stock price volatility. The downside, of course, is that the price of these stocks isn’t likely to suddenly increase. In other words, these stocks aren’t likely to jump in price and make the investor wealthy overnight.

In terms of stock prices, a lot of variability equals volatility. To help with stock price calculations and predictions, statisticians have found ways to quantify these measures in terms of variance and the standard deviation. The variance is the average squared difference between an investment’s actual return and its average return. The standard deviation is the positive square root of the variance.

A high degree of uncertainty about a firm’s future will usually lead to greater variability in the firm’s stock price. The return on this type of stock (including both increases in the stock price per share and dividends) will usually be more volatile than average, and have a higher variance and standard deviation.
Alternatively, a low degree of uncertainty about a firm’s future will usually lead to lesser variability in the firm’s stock price. The return on this type of stock will generally be less volatile than average, and will have a lower variance and standard deviation.

**More about Average Returns**

Stock returns may be calculated either geometrically or arithmetically. The geometric average return for a stock is defined as the average compound return earned per year over a multiyear period. The arithmetic average return is defined as the return earned in an average year over a multiyear period.

**Capital Market Efficiency**

In the fields of finance, economics, and accounting, an efficient capital market is defined as a market in which security prices reflect available information. This means that in an efficient capital market, based on the available information, there’s generally no reason to believe current security prices are either too low or too high. The efficient markets hypothesis (EMH) asserts that well-organized capital markets (such as the NYSE) are efficient.

Of course, there are exceptional cases in which market failures have occurred, even in a so-called efficient market. Two examples of famous market failures can be seen in the Enron and WorldCom corporations. In these examples, both the financial auditors and the capital markets failed to quickly and efficiently investigate these firm’s financial statements, and thus failed to detect the intentional deceit or fraud that occurred.

*After you’ve carefully read pages 365–400 in the Fundamentals of Corporate Finance textbook, complete Self-Check 11. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 11, move on to Assignment 12.*
Self-Check 11

Indicate whether each of the following statements is True or False.

_____ 1. The risk premium for U.S. Treasury bills is zero.

_____ 2. The gain or loss from an investment is called the return on the investment.

_____ 3. The excess return required from an investment in a risky asset over that required from a risk-free investment is called the variance.

_____ 4. A market in which security prices accurately reflect available information is called an efficient capital market.

_____ 5. A low degree of uncertainty about a firm’s future usually leads to greater levels of variability in the firm’s stock price.

_____ 6. Imagine that you purchased 25 shares of a stock at $28 per share. The stock paid a dividend of $1.45 per share for the year. Given this information, you can calculate that the total cost of the stock was $736.25.

In the “Questions and Problems” section on pages 396–398 of the Fundamentals of Corporate Finance textbook, answer questions 2, 6, 16, and 20.

Check your answers with those on page 145.
ASSIGNMENT 12

Read this introduction to Assignment 12. Then, read Chapter 13, pages 401–436, in your Fundamentals of Corporate Finance textbook.

Expected Returns and Variances

In this chapter, you’ll learn how to analyze returns and variances when the information you have concerns future possible returns and their probabilities.

The *expected return* is defined as the return on a risky asset expected in the future. The *risk premium* is the difference between the return on a risky investment and the return on a risk-free investment. The following formula can be used to calculate the risk premium:

\[
Risk\ Premiun = Expected\ Return - Risk-Free\ Rate
\]

The expected return may, of course, vary from any point estimate. The range of this variation can be used to calculate a variance and a standard deviation.

Portfolios

A *portfolio* is a group of assets (such as stocks and bonds) held by an investor. Portfolios may be assembled for individuals, other entities (such as pension funds), or for mutual funds. Any type of portfolio may be designed to include a specified level of risk or risk premium. Assembling a portfolio is complex, and investors need to make many decisions about how to invest their money. However, speaking in very general terms, investment advisors usually recommend that younger persons invest their money in higher-risk securities, because these may generate higher returns over the long term. In contrast, older individuals who are closer to the age of retirement are usually advised to participate in lower-risk portfolios.
Announcements, Surprises, and Expected Returns

The total annual return on any stock investment consists of two parts—expected returns and unexpected returns. The expected return is the normal return shareholders and the market expect to receive from the investment. The unexpected return is any additional return (either positive or negative) that results from unexpected information revealed during the year. This information may come from various sources, and may include good or bad news about the company, a sudden drop in interest rates, or a government announcement.

The total return can be expressed with the following formula:

\[
\text{Total Returns} = \text{Expected Returns} + \text{Unexpected Returns}
\]

Information that comes from news announcements tends to have more significant and faster effects on stock prices than information from other sources. It’s often difficult to predict the effects of a news announcement on stock prices, particularly if the news is surprising.

For example, suppose a small biotech firm has developed a new cancer drug. The drug is effective, but causes many dangerous side effects. For this reason, many people in the drug industry anticipate that the Food and Drug Administration (FDA) will refuse to approve the drug. However, the drug does in fact receive approval from the FDA. When the news of the FDA approval is announced, the news is likely to have an immediate and significant positive effect on the biotech firm’s stock price.

Risk: Systematic and Unsystematic

In the world of investments, risk can be classified as being either systematic or unsystematic. Systematic risk affects a large number of assets, while unsystematic risk affects only a small number of assets, or just one unique asset.
The unexpected components of returns may be classified as \textit{systematic} or \textit{unsystematic}, and can be represented with the following formula:

\[
\text{Unexpected Returns} = \text{Systematic Portion} + \text{Unsystematic Portion}
\]

Also, total returns on an investment can be calculated with the following formula:

\[
\text{Total Returns} = \text{Expected Returns} + \text{Systematic Portion} + \text{Unsystematic Portion}
\]

### Diversification and Portfolio Risk

In the process of \textit{diversification}, an investment is spread across assets to form a portfolio. The process of diversification will eliminate some (but not all) of the risk.

Some of the variability associated with individual assets is eliminated by diversification. When assets are combined in a portfolio, the unsystematic risk tends to be eliminated. A portfolio with many assets has almost no unsystematic risk. Therefore, the terms \textit{diversifiable risk} and \textit{unsystematic risk} are often used interchangeably, as shown here:

\[
\text{Diversifiable Risk} = \text{Unsystematic Risk}
\]

Diversification is recommended by the financial community as a way to remain invested in securities during economic downturns and upturns while reducing unsystematic risk.

### Systematic Risk and Beta

Unlike unsystematic risk, the systematic risk in an investment can’t be eliminated by diversification. According to the \textit{systemic risk principle}, the estimated return on a risky asset depends only on that asset’s systemic risk. Therefore, no matter how much total risk an asset has, only the systemic portion is relevant in determining the expected return.
The amount of systemic risk present in a particular risky asset relative to that in an average asset is defined as the *beta coefficient*. In calculations and formulas, the beta coefficient is represented by the Greek symbol $\beta$.

An average asset is defined as having a beta coefficient of 1.0. This means that an asset with a beta coefficient of less than 1.0 has less systemic risk than an average asset. An asset with a beta coefficient of greater than 1.0 has more systemic risk than an average asset. So, for example, an asset that has a beta coefficient of 0.5 has half as much systemic risk as an average asset. An asset with a beta coefficient of 2.0 has twice as much systemic risk as an average asset.

**The Security Market Line**

The *security market line* (SML) is a positively sloped straight line that illustrates the relationship between expected return and the beta coefficient. Perhaps the most practical application of the SML is the *capital asset pricing model* (CAPM), which is an equation that shows the relationship between expected return and beta. The CAPM equation is shown here:

$$E(R_i) = R_f + \left[ E(R_M) - R_f \right] \times \beta_i$$

In this formula, $E(R_i)$ stands for the expected return; $R_f$ is the risk-free rate of return (that is, the rate of return on treasury securities, which is calculated for you or available through research); $E(R_M)$ is the market rate of return for a comparable investment vehicle or security, and $\beta$ is the beta coefficient (calculated for you or available through research). The only value you must project or estimate is $E(R_M)$. Other measures are available through a variety of sources and can be researched on the Internet. Of course, the measures available are historical (not projected), and your projection of these measures may differ from historical rates.
The SML and the Cost of Capital:  
A Preview

The CAPM-based application of the SML, for our purposes, is very helpful toward explaining how one calculates a firm’s cost of capital. The cost of capital is the minimum required return on a new investment.

Review of Abbreviations

Throughout Assignment 12, you’ve been exposed to a variety of abbreviations commonly used by financial professionals. The following table lists some of the important abbreviations you should remember from this assignment.

<table>
<thead>
<tr>
<th>ABBREVIATION</th>
<th>MEANING</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPM</td>
<td>Capital asset pricing model</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration</td>
</tr>
<tr>
<td>SML</td>
<td>Security market line</td>
</tr>
</tbody>
</table>

After you’ve carefully read pages 401–436 in the Fundamentals of Corporate Finance textbook, complete Self-Check 12. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from these two assignments, complete the examination for Lesson 4.
Self-Check 12

Indicate whether each of the following statements is True or False.

_____ 1. When calculating the risk premium for an investment, you would subtract the risk-free rate from the expected return.

_____ 2. The total return on an investment can be calculated by adding the expected returns to the unexpected returns.

_____ 3. The terms diversifiable risk and unsystematic risk are often used interchangeably.

_____ 4. An average asset is defined as having a beta coefficient of 0.0.

_____ 5. An asset that has a beta coefficient of less than 1.0 has more systemic risk than an average asset.

_____ 6. In general terms, older persons are usually advised to invest their money in higher-risk securities, because these may generate higher returns over the long term.

In the “Questions and Problems” section on pages 432–435 of the Fundamentals of Corporate Finance textbook, answer questions 2, 6, 10, 14, 18, 24, and 26.

Check your answers with those on page 145.
Lesson 4
Risk and Return

1. The slope of the security market line, which is the difference between the expected return on a market portfolio and the risk-free rate, is called the
   A. market risk premium.
   B. portfolio variance.
   C. arithmetic average return.
   D. cost of capital.

2. A stock with a beta coefficient ($\beta$) of 2.0 has
   A. one-tenth of the risk of an average asset.
   B. the same systemic risk as an average asset.
   C. one-half the systemic risk of an average asset.
   D. twice as much systemic risk as an average asset.

3. In a market, when all information of every kind is reflected in stock prices, the market is said to be
   A. weak form efficient.
   B. geometrically efficient.
   C. strong form efficient.
   D. average return efficient.
4. Suppose that you purchased 200 shares of a stock at $46 per share (ignore all commissions). Assume the stock paid a dividend of $1.20 per share for the year. The stock price rose to $52.78 per share, and was then sold at that price. What was the total amount of dividends received?

A. $120  
B. $240  
C. $9,200  
D. $1,356

5. The term *diversifiable risk* is synonymous with which of the following?

A. Risk premium  
B. Unsystematic risk  
C. Systematic risk  
D. Total risk

6. The average *compound* return earned per year over a multiyear period is called the

A. arithmetic average return.  
B. normal distribution.  
C. geometric average return.  
D. standard deviation.

7. Which of the following is the formula used to describe the components of a risk premium?

A. \( \text{risk premium} = \text{expected return} + \text{projected return} \)  
B. \( \text{total returns} = \text{expected return} + \text{unexpected return} \)  
C. \( \text{unexpected returns} = \text{systematic portion} + \text{unsystematic portion} \)  
D. \( \text{risk premium} = \text{expected return} - \text{risk-free rate} \)

8. Suppose that you purchased 300 shares of a stock at $35 per share (ignore all commissions). Assume the stock paid a dividend of $1.45 per share for the year. The stock price rose to $42.50 per share, and was then sold at that price. What was the total dollar return?

A. $12,750  
B. $2,685  
C. $2,250  
D. $435

9. The concept that asserts that well-organized capital markets, such as the NYSE, are efficient is called the

A. geometric average return.  
B. normal distribution.  
C. efficient markets hypothesis.  
D. standard deviation.

10. The percentage of a portfolio’s total value placed in a particular investment is called the

A. portfolio weight.  
B. beta coefficient.  
C. portfolio variance.  
D. systematic risk.
11. The positively sloped straight line that shows the relationship between expected return and the beta coefficient is called the

- A. frequency distribution.
- B. bell curve.
- C. geometric average return.
- D. security market line.

12. Assume you purchased 150 shares of a stock at $18 per share (ignore all commissions). The stock paid a dividend of $0.75 per share for the year. What is the total cost of the stock?

- A. $112.50
- B. $2,812.50
- C. $1,800
- D. $2,700

13. A high degree of uncertainty about the future for a firm is likely to lead to

- A. greater variability in the firm’s stock price.
- B. lower variability in the firm’s stock price.
- C. a lower variance and standard deviation.
- D. less volatile returns on the stock.

14. The equation of the security market line that shows the relationship between expected return and beta is called the

- A. security market beta line.
- B. unsystematic risk equation.
- C. principle of diversification.
- D. capital asset pricing model (CAPM).

15. The minimum required return on a new investment is called the

- A. average return.
- B. cost of capital.
- C. beta coefficient.
- D. risk premium.

16. The return earned in an average year over a multiyear period is called the

- A. normal distribution.
- B. geometric average return.
- C. arithmetic average return.
- D. standard deviation.

17. Which of the following is the formula used to calculate the total return on a stock?

- A. Total Return = Expected Return + Unexpected Return
- B. Total Return = Unexpected Return + Stock Price
- C. Total Return = Stock Price × Number of Shares
- D. Total Return = Dividend × Number of Shares
18. The concept of spreading an investment across a number of assets to eliminate some (but not all) of the risk is called the

A. systematic component of return.  C. principle of diversification.
B. portfolio variance.  D. beta coefficient.

19. Suppose that you purchased 100 shares of a stock at $28 per share (ignore all commissions). Assume that the stock paid a dividend of $1.40 per share for the year. The stock price rose to $34.65 per share, and was then sold at that price. What was the total amount of the capital gain (or loss)?

A. $2,800  C. $140
B. $665  D. $3,465

20. When you move from a risk-free investment to a risky investment, the excess return required on the risky investment is called a

A. risk premium.
B. portfolio weight.
C. frequency distribution.
D. portfolio variance.
Cost of Capital and Financial Policy and Options

INTRODUCTION

Lesson 5 focuses on the cost of capital, financial leverage, and capital structure policy. The lesson contains three assignments.

Assignment 13 covers the material in Chapter 14 of your textbook. The main topic of this assignment is the cost of capital. You’ll learn about the weighted average cost of capital, which represents the discount rate used by a firm to calculate the net present value of investment alternatives. The separate components of debt and equity will be examined.

Assignment 14 includes the topics from Chapter 16. This assignment more fully develops the concepts associated with financial leverage, and the debt and equity components of a firm’s capital structure. You’ll also learn about the cost of bankruptcy and the proceedings that a firm uses to declare bankruptcy.

OBJECTIVES

When you complete this lesson, you’ll be able to

- Calculate the weighted average cost of capital and its components, the weighted average cost of debt and equity
- Explain the debt and equity components of a firm’s capital structure
- Discuss the concept of financial leverage
Define the basic types of corporate bankruptcy proceedings

Describe the costs associated with the bankruptcy process

ASSIGNMENT 13

Read this introduction to Assignment 13. Then, read Chapter 14, pages 437–470, in your Fundamentals of Corporate Finance textbook.

The Cost of Capital: Some Preliminaries

Remember that all assets are financed with debt or equity, as illustrated in the following basic equation:

\[
Assets = Liabilities + Owner's Equity
\]

Any bondholder or financial institution will require a profit (a rate of return) on money loaned to a firm, typically in the form of interest. In the same way, it’s reasonable for a firm’s shareholders to expect a rate of return, typically in the form of dividends or capital appreciation (an increase in value) of the firm’s stock price per share.

Combined, debt and equity are used to finance the assets a firm uses to generate revenues and profits, and both debt and equity holders expect some rate of return. Therefore, a cost is associated with the financing of a firm’s assets. This cost is called the cost of capital.

The most important point to remember is that the cost of capital associated with an investment depends on the risk of that investment. Therefore, the cost of capital depends primarily on the use of the funds, not the source.
The Cost of Equity

The cost of equity is the return equity investors require on their investment in a firm. This amount can be difficult to determine because it can’t be directly observed. Instead, the cost of equity must be estimated. There are two approaches to estimating a firm’s cost of equity:

1. The dividend growth model approach
2. The security market line (SML) approach

The dividend growth model approach uses the following formula for calculations:

\[ R_E = \frac{D_1}{P_0} + g \]

In this formula, \( R_E \) is the return shareholders require on the stock (or the firm’s cost of equity capital), \( D_1 \) is the next period’s projected dividend, \( P_0 \) is the stock price per share, and \( g \) is the constant rate at which the firm’s dividend is projected to grow.

The second method used to calculate a firm’s cost of equity is the security market line (SML) approach, which uses the following formula:

\[ E(R_i) = R_f + \left[ E(R_M) - R_f \right] \times \beta_i \]

Remember that in this formula, \( E(R_i) \) stands for the return shareholders require on the stock (or the firm’s cost of equity capital); \( R_f \) stands for the risk-free rate of return; \( E(R_M) \) is the market rate of return for a comparable investment, and \( \beta \) is the beta coefficient.

The dividend growth model is ideally suited for use in a firm that pays all or most of its earnings to shareholders in the form of dividends. In contrast, the SML approach is ideally suited for use in a growth firm. A growth firm is defined as a firm that pays few or no dividends and instead retains profits in the corporation for growth, providing shareholders with capital gains appreciation through an increase in stock values.
The Costs of Debt and Preferred Stock

The cost of debt is the return lenders require on a firm’s debt. The cost of debt is the interest rate a firm must pay on new borrowing, and can generally be directly observed.

Remember that a preferred stock has a fixed dividend paid every period forever, so a share of a preferred stock is basically a perpetuity. The cost of preferred stock can be calculated by using the following formula:

\[ R_p = \frac{D}{P_0} \]

In this formula, \( R_p \) stands for the return the shareholders require on the preferred stock, \( D \) stands for the next period’s projected dividend, and \( P_0 \) stands for the current price per share for the preferred stock.

The Weighted Average Cost of Capital

The weighted average cost of capital (WACC) is the overall return a company must earn on its existing assets to maintain the value of its stock and to satisfy its owners, creditors, and providers of capital. The WACC is equal to the weighted average of the cost of equity and the aftertax cost of debt. Again, consider the following formula:

\[ \text{Assets} = \text{Liabilities} + \text{Owner’s Equity} \]

In this formula, we can say that the WACC is the cost of the debt (liabilities) and equity used to finance assets. The WACC is the aftertax cost.

You should also remember the information you learned in an earlier lesson: operating expenses result in decreased cash flows at 1 minus the tax rate \( (1 - T) \).

The following formula can be used to calculate the weighted average cost of capital (WACC):

\[ \text{WACC} = \left( \frac{E}{V} \right) \times R_E + \left( \frac{D}{V} \right) \times R_D \times (1 - T_C) \]

In this formula, \( E \) stands for equity; \( V \) stands for the combined market value of debt and equity; \( D \) stands for debt; \( R_E \) stands for return on equity; and \( R_D \times (1 - T_C) \) stands for the aftertax interest rate.
Remember that the return on equity can be calculated using the following formula:

\[ E(R_i) = R_f + \left[ E(R_M) - R_f \right] \times \beta_i \]

There are a number of practical difficulties involved in calculating the return on equity (as well as the relative fair market values of debt and equity), but each firm chooses to resolve these issues in its own way. Our focus is on the application of the WACC, which is the discount rate used by firms to calculate the net present value (NPV) of projects.

As you learned in an earlier lesson, the *net present value (NPV) approach* is used to determine whether an investment, project or undertaking creates value in excess of its cost. The NPV is calculated as follows:

\[ PV \text{ (Aftertax Cash Inflows)} - PV \text{ (Aftertax Cash Outflows)} = NPV \text{ (Aftertax Cash Flows)} \]

A project with an NPV of zero or greater is acceptable. Therefore, an NPV of zero (using the WACC) must include a profit component. This makes sense, because the owner’s equity includes retained earnings (net income less dividends paid to shareholders). The growth in retained earnings increases the owner’s equity, resulting in the inclusion of a profit component in the WACC.

If the WACC didn’t contain a profit component, a project with an NPV of zero would be a break-even or unprofitable project, and no rational person would take the risk of investing in a project with zero profit potential. Instead, they would invest in low-risk or no-risk investments (such as U.S. Treasury securities).

**Divisional and Project Costs of Capital**

It’s appropriate to use the WACC as a discount rate for future cash flows only when the proposed investment is similar to a firm’s existing activities. Therefore, in a corporation that has more than one line of business, problems can arise when using the WACC. The divisional cost of capital is the cost of capital in each division of a corporation. Together, the *divisional costs of capital* add up to the firm’s overall cost of capital.
Problems can arise if you try to use the WACC inappropriately with a firm that has several different divisions. One solution is to use the pure play approach to estimate the required return on an investment. The pure play approach uses a WACC unique to a particular project, based on companies in similar lines of business. This approach allows the costs of capital to be calculated for the firm overall, or at the divisional level.

Flotation Costs and the Weighted Average Cost of Capital

As new projects are selected for investment, a firm may decide to borrow additional funds to finance these additional projects. The firm may raise money by issuing, or floating, new stocks or bonds. The costs associated with the new stock or bond issues are called flotation costs.

As this process of project investment leads to borrowing, the cost of borrowing increases. Increasing levels of financial leverage increase the risk to the lender, as debt-to-equity ratios increase. At some point, the increased cost of borrowing will prohibit the financing of additional projects. At that point, the incremental WACC becomes so high that an NPV of zero or greater can’t be achieved.

After you’ve carefully read pages 437–470 in the Fundamentals of Corporate Finance textbook, complete Self-Check 13. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from Assignment 13, move on to Assignment 14.
ASSIGNMENT 14

Read this introduction to Assignment 14. Then, read Chapter 16, pages 508–545, in your Fundamentals of Corporate Finance textbook.

The Capital Structure Question

The types of debt and equity a firm uses to finance its assets determine the firm’s capital structure. Financial managers attempt to identify the capital structure that maximizes the...
value of the firm. To do this, they vary the amount of debt and equity financing to minimize the firm’s weighted average cost of capital (WACC).

**The Effect of Financial Leverage**

*Financial leverage* refers to the extent to which a firm relies on debt. Higher levels of debt indicate the use of more financial leverage in a firm’s capital structure. Higher levels of debt (and financial leverage) may at first suggest increased *earnings per share* (EPS) and increased *return on equity* (ROE). However, the interest expense associated with these higher levels of debt reduces both EPS and ROE.

To illustrate the effects of financial leverage, a comparison of a firm’s capital structure under no debt and under 50 percent debt is shown in Table 8. The table illustrates the effect on EPS, ROE, and (because financial leverage results in interest expense) earnings before interest and taxes (EBIT). The table

| Table 8 |
|---------------------|---------------------|
| IMPACT OF CAPITAL LEVERAGE | | |
| | NO DEBT | 50% DEBT |
| Assets | $8,000,000 | $8,000,000 |
| Debt | $0 | $4,000,000 |
| Equity | $8,000,000 | $4,000,000 |
| Debt-to-Equity Ratio | 0 | 1.0 |
| Shares Outstanding | 400,000 | 200,000 |
| Interest Rate | 10% | 10% |
| EBIT | $1,000,000 | $1,000,000 |
| Interest Expense | $0 | $400,000 |
| Net Income | $1,000,000 | $600,000 |
| ROE | 12.5% | 15.0% |
| EPS | $2.50 | $3.00 |
ignores corporate income taxes to simplify the coverage of financial leverage. In the “50% Debt” column, note that the end result is an increase in both ROE and EPS. In this case, the use of financial leverage appears to have been beneficial to equity or shareholders.

Using a modern example, perhaps you've seen a “get rich with real estate” infomercial on late-night cable television. Some of these programs suggest they can teach you how to purchase real estate properties with little or no money down. These programs recommend using the highest possible levels of financial leverage when purchasing real estate, in anticipation of appreciating property values. This business model tends to work very well during a period of fast-rising real estate values and high prices. However, in periods of economic downturn, real estate values go down and the numbers of residential property foreclosures increase. These foreclosures illustrate the downside of the use of excessive levels of financial leverage. Financial leverage, therefore, can be beneficial in a “boom” economy or economic upturn, but devastating in a “bust” economy or recession.

**Capital Structure and the Cost of Equity Capital**

The cost of equity capital (without corporate income taxes) can be illustrated by the following formula:

\[ R_E = R_A + (R_A - R_D) \times (D/E) \]

In this formula, \( R_E \) stands for the return on the equity component of the firm’s capital structure; \( R_A \) stands for the required rate of return on the firm’s assets; \( R_D \) stands for the firm’s cost of debt; and \( D/E \) is the firm’s debt-to-equity ratio. Therefore, the firm’s cost of equity is dependent on \( R_A \), \( R_D \), and \( D/E \).

The cost of equity can be viewed as the combination of two risk components: business risk and financial risk. Business risk is the equity risk that comes from the nature of a firm’s operations. Financial risk is the equity risk that comes from a firm’s financial policy (that is, its capital structure).
Again, using the equation for the cost of equity capital, business risk and financial risk can be associated with its components, as follows:

\[ R_E = R_A + (R_A - R_D) \times (D/E) \]

Total Risk = Business Risk + Financial Risk

**M&M Propositions I and II with Corporate Taxes**

Two Nobel prize-winners for economics, Franco Modigliani and Merton Miller, developed the Modigliani-Miller theorem for corporate finance. This theorem proposed that under certain conditions, the value of a company isn’t affected by how it chooses to arrange its finances. In other words, the company’s value isn’t affected whether it’s financed by equity or debt.

In your textbook, the concepts from the Modigliani-Miller theorem are presented as M&M Propositions I and II. According to *M&M Proposition I*, the value of a firm is independent of the firm’s capital structure. Then, *M&M Proposition II* states that a firm’s cost of equity capital is a positive linear function of the firm’s capital structure.

Remember that the corporate interest expense paid on debt financing is tax deductible, but the dividends paid to compensate shareholders for the use of equity is taxed (not tax deductible). The cost of equity capital, with corporate income taxes, can be calculated by using the following formula:

\[ R_E = R_U + (R_U - R_D) \times (D/E) \times (1 - T_C) \]

In this formula, \( R_E \) stands for the return on the equity component of the firm’s capital structure. \( R_U \) stands for the unlevered cost of capital. (The *unlevered cost of capital* is the cost of capital for a firm that has no debt.) \( R_D \) represents the firm’s cost of debt, \( D/E \) represents the firm’s debt-to-equity ratio, and \( T_C \) is the firm’s marginal corporate income tax rate. Therefore, the firm’s cost of equity is dependent on \( R_U, R_D, D/E, \) and \( T_C \).
Bankruptcy Costs

As a firm’s debt-to-equity ratio rises, the increased level of financial leverage can be viewed as an increase in the level of risk (and default risk) associated with the firm’s capital structure. As debt rises, so do the payments required to service the debt (that is, cash outflows for interest expenses). Just as an individual can become overextended in his or her use of personal debt (home mortgages and credit cards), a corporation might use too much financial leverage and find itself unable to make corporate debt interest payments. If this happens, the firm may be forced into bankruptcy, and thereby incur both direct and indirect bankruptcy costs.

Optimal Capital Structure

Firms borrow money because the interest expenses from these debts are tax deductible, and this tax deductibility feature has economic value. At low levels of debt, the risk of bankruptcy is low, and the benefits from debt exceed the costs. The static theory of capital structure suggests that firms will borrow debt up to the point where the benefit from the last dollar of debt is equal to the cost associated with the increased probability of financial distress.

The Pie Again

The extended pie theory holds that all claims are paid from the cash flows of the firm, and include payments to the following:

- Stockholders
- Creditors
- The government
- Bankruptcy courts and lawyers
- All other claimants to the cash flows of the firm

In this model, the value of all claims against the firm’s cash flows isn’t affected by capital structure, but the relative values of claims change as the amount of debt financing is increased.
The Pecking-Order Theory

The *pecking-order theory* provides an alternative to the static trade-off theory. It suggests that firms prefer to use internal financing when possible. Under the pecking-order theory, there are several important points:

- There’s no optimal debt-equity ratio. Instead, a firm’s capital structure is determined by its need for external financing.
- Profitable firms will need less external financing and will therefore have less debt.
- To avoid selling new equity, companies will want to stockpile internally generated cash in a reserve called *financial slack*.

Observed Capital Structures

*Capital structure* is influenced by industry, but there’s no fully satisfactory theory that explains these regularities. Most U.S. corporations tend to have low debt-equity ratios.

A Quick Look at the Bankruptcy Process

One possibility of using debt is the possibility of *financial distress*, which may be defined as one of the following:

1. *Business failure*, in which a business terminates operations with a loss to creditors
2. *Legal bankruptcy*, in which a failing firm brings a petition to court for bankruptcy
3. *Technical insolvency*, which occurs when a firm is unable to meet its financial obligations
4. *Accounting insolvency*, which occurs when a firm’s total book liabilities exceed the book value of the total assets
5. Bankruptcy is a legal proceeding for liquidating or reorganizing a business. Liquidation is the termination of the firm as a going concern. Reorganization is the financial restructuring of a failing firm to attempt to continue operations.

After you’ve carefully read pages 508–545 in the Fundamentals of Corporate Finance textbook, complete Self-Check 14. Check your answers with those provided at the back of this study guide. When you’re sure you understand the material from these two assignments, complete the examination for Lesson 5.

Self-Check 14

Indicate whether each of the following statements is True or False.

_____ 1. Financial managers will attempt to maximize the value of a firm by varying the amount of debt and equity financing to minimize the firm’s weighted average cost of capital (WACC).

_____ 2. Financial leverage refers to the extent to which a firm relies on debt.

_____ 3. When a firm has a high level of debt, the interest expense associated with the debt will reduce both EPS and ROE.

_____ 4. The cost of equity can be viewed as the combination of business risk and financial risk.

_____ 5. An increase in financial leverage reduces the level of risk (and default risk) associated with a firm’s capital structure.

_____ 6. Bankruptcy proceedings can take the form of either liquidation or reorganization.

In the “Questions and Problems” section on pages 541–544 of the Fundamentals of Corporate Finance textbook, answer questions 2, 6, 10, 12, and 16.

Check your answers with those on page 147.
1. Which of the following is the minimum return a company needs to earn to satisfy all its investors?
   A. NPV
   B. $R_E$
   C. BASF 2015
   D. WACC

2. The equation $R_p = D/P_0$ is used to determine the
   A. cost of a bond.
   B. cost of preferred stock.
   C. cost of common stock.
   D. dividend resulting from one share of stock.

3. The cost of equity can be viewed as the combination of
   A. the financial leverage and the cost of capital.
   B. corporate taxes and shareholder claims.
   C. business risk and financial risk.
   D. the weighted average cost of capital and the capital structure.
4. The return that lenders require on a firm’s new borrowing is known as the
   A. financial leverage.   C. warrant.
   B. cost of debt.        D. cost of equity.

5. The legal proceeding for liquidating or reorganizing a business is called
   A. internal financing.  C. flotation.
   B. financial leveraging. D. bankruptcy.

6. When a firm places projects into one of several risk classes and adds or subtracts adjustment factors to or from the WACC, the firm is using the _______ approach.
   A. basic
   B. subjective
   C. objective
   D. pure play

7. The dividend growth model approach is one approach to estimating a firm’s
   A. cost of equity.
   B. financial leverage.
   C. conversion value.
   D. beta coefficient.

8. A firm that pays few or no dividends and instead provides shareholders with capital gains through an increase in stock values is called a
   A. business failure.
   B. pure play.
   C. leveraged firm.
   D. growth firm.

9. If a firm has publicly held debt and measures it cost as the yield to maturity on the outstanding debt, the company rate is
   A. critical.
   B. \((E/V) \times R_E\).
   C. low.
   D. irrelevant.

10. The cost of capital for a firm that has no debt is called the
    A. weighted average cost of capital.
    B. financial leverage.
    C. interest tax shield.
    D. unlevered cost of capital.

11. A procedure in which a failing firm is financially restructured in an attempt to continue operations is called
    A. liquidation.
    B. tax shielding.
    C. reorganization.
    D. capital structuring.

12. Issuing stock and using the money to pay off debt is one way a firm
    A. restructures.
    B. refines.
    C. prepares for bankruptcy.
    D. prepares for its IPO.
13. In Wall Street language, a company that focuses on only one line of business is called a(n)
   A. pure play.  
   B. unlevered company.  
   C. growth firm.  
   D. internally financed firm.

14. The overall return that a company must earn on its existing assets to maintain the value of its stock and to satisfy its owners, creditors, and providers of capital is called the
   A. reorganization value.  
   B. flotation cost.  
   C. weighted average cost of capital.  
   D. capital structure.

15. During most cases, when a company files for bankruptcy,
   A. the court assigns an unbiased individual to run the company in the interim.  
   B. the judge prepares a reorganization plan the company must follow.  
   C. payments to creditors and shareholders are suspended.  
   D. the “debtor in possession” runs the business.

16. The return that equity investors require on their investment in a firm is called the
   A. cost of equity.  
   B. weighted average cost of capital.  
   C. capital structure weight.  
   D. project cost of capital.

17. When a firm raises money by issuing new stocks or bonds, the costs associated with the new stock or bond issues are called the
   A. intrinsic value.  
   B. floor value.  
   C. strike costs.  
   D. flotation costs.

18. The run establishing priority of claims during a liquidation is called the
   A. reorganization priority list.  
   B. bankruptcy proceeding rule.  
   C. absolute priority rule.  
   D. prepack claims petition.

19. The separate cost of capital in each section of a corporation is called the
   A. floor value.  
   B. divisional cost of capital.  
   C. capital appreciation.  
   D. option cost.

20. The situation in which a firm is unable to meet its financial obligations is called
   A. technical insolvency.  
   B. liquidation.  
   C. reorganization.  
   D. accounting insolvency.
OVERVIEW

This project integrates quite a few components of your course. The most important thing to keep in mind, as you progress through this project, is to take one step at a time.

Do not rush through this project. After completing each step, pause, take a break, and give some thought to the task you’ve just completed. If necessary, refer back to the relevant lesson, assignments, and textbook chapters each step refers to. This will reinforce the learning process.

INSTRUCTIONS

In this project, you’ll create a loan amortization schedule for an example mortgage loan. Imagine the mortgage is for a nonresidential real property your company has purchased. The property includes land and a building. Once you’ve created the amortization schedule, you can use it to prepare other financial documents. Your project is divided into several steps for you to follow. Each step includes figures that illustrate the concepts.

Step 1: Create a Loan Amortization Schedule

In this first step of your project, you’ll need to create a loan amortization schedule. The following table illustrates the payments and interest amounts for a fixed-rate, 30-year mortgage loan. The total amount of the mortgage is $300,000, and the interest rate is 6 percent. This mortgage requires monthly payments of $1,798.65, with a final payment of $1,800.23. The table was created in Excel.

The following is an explanation of the columns in the table:

- The first column in the table, with the heading “Payment Number,” shows the 360 payments required to pay off the mortgage loan (30 years, with 12 monthly payments per year).
The second column, with the heading “Payment Amount,” shows the monthly payment amount.

The third and fourth columns show the portion of the monthly payment paid for interest, and the portion paid towards the principal.

The fifth column, headed “Balance,” shows the starting balance of $300,000, and the remaining balance each month after the principal is subtracted.

The sixth column, headed “Current,” reflects the current portion of the principal (12 months).

The amounts in the “Non-Current” column are calculated by subtracting the current portion of the principal from the total balance.

The “Annual Interest Expense” column provides a running total of the interest expense on the mortgage for the entire 12-month period.

The “Totals” under the “6% Interest Expense” and “Principal” columns show the final totals for the 30-year life of the mortgage.

<table>
<thead>
<tr>
<th>Payment Number</th>
<th>Payment Amount</th>
<th>6% Interest Expense</th>
<th>Principal</th>
<th>Balance</th>
<th>Current</th>
<th>Non-Current</th>
<th>Annual Interest Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>$300,000.00</td>
<td>$3,684.02</td>
<td>$296,315.98</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>$1,798.65</td>
<td>$1,500.00</td>
<td>$298.65</td>
<td>$299,701.35</td>
<td>$3,702.44</td>
<td>$295,998.91</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>$1,798.65</td>
<td>$1,498.51</td>
<td>$300.14</td>
<td>$299,401.21</td>
<td>$3,720.95</td>
<td>$295,680.26</td>
<td></td>
</tr>
<tr>
<td>359</td>
<td>$1,798.65</td>
<td>$17.86</td>
<td>$1,780.79</td>
<td>$1,791.28</td>
<td>$1,791.27</td>
<td>$0</td>
<td></td>
</tr>
<tr>
<td>360</td>
<td>$1,800.23</td>
<td>$8.96</td>
<td>$1,791.27</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$685.50</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td></td>
<td>$347,515.58</td>
<td>$300,000.00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Once you’ve determined how each of the amounts in the table are obtained, you can calculate them and fill them in for all 360 payments.

Note that the table shows only the figures for the first two payments and the last two payments; you’ll need to calculate the amounts for the remaining payments and fill them in.

Once this loan amortization schedule is completely filled in, it can be printed out and used to prepare other financial statements. For example, when the first payment of $1,798.65 is made, the following accounting journal entry would be made:

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortgage Payable</td>
<td>$298.65</td>
</tr>
<tr>
<td>Interest Expense</td>
<td>$1,500.00</td>
</tr>
<tr>
<td>Cash</td>
<td>$1,798.65</td>
</tr>
</tbody>
</table>

Notice that the amounts of principal and interest in this journal entry would change for each and every payment.

When originated, the journal for the loan was created as shown here:

<table>
<thead>
<tr>
<th>Debit</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed Asset–Real Property</td>
<td>$300,000</td>
</tr>
<tr>
<td>Mortgage Payable</td>
<td>$300,000</td>
</tr>
</tbody>
</table>
The balance of this mortgage, after the first payment, is $299,701.35. If a classified balance sheet were prepared on this date, the current portion of the mortgage would be $3,702.44, and the noncurrent portion of the mortgage would be $295,998.91.

If you were to create a chart of the interest and principal components of each mortgage payment, over the life of the mortgage, it would look like the following illustration:

Once you’ve completed the amortization schedule for this loan, you’ll be able to create loan amortization schedules for your own home mortgage, automobile loan, personal loans, and so on. You can even create a pro forma report that shows the effects of additional principal payments on the life of your loan (this assumes you don’t have a prepayment penalty, which is typically the case). You may be surprised at the effects a modest additional principal payment has on the life of a loan.
Once the monthly schedule is completed, generate an annualized version, using the following preferred format:

<table>
<thead>
<tr>
<th>Year</th>
<th>Payment Number</th>
<th>Balance</th>
<th>Current</th>
<th>Non-Current</th>
<th>Annual Interest Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>$300,000.00</td>
<td>$3,684.02</td>
<td>$296,315.98</td>
<td>$0</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>$296,315.98</td>
<td>$3,911.24</td>
<td>$292,404.75</td>
<td>$17,899.78</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>$292,404.75</td>
<td>$4,152.47</td>
<td>$288,252.27</td>
<td>$17,672.56</td>
</tr>
</tbody>
</table>

---------------------Break in Sequence---------------------

| 28   | 336           | $40,584.10 | $19,684.22 | $20,899.88 | $3,043.13               |
| 29   | 348           | $20,899.88 | $20,899.88 | $0         | $1,899.58               |
| 30   | 360           | $0         | $0         | $0         | $685.50                 |
| Total|               |            |            |            | $347,515.58             |

**Step 2: Create a Depreciation Schedule**

The next step in your project is to create a depreciation schedule for the (fictional) property purchased with this loan. When the property was purchased, an appraisal was performed. The property included separate components of land and improvements (the building), and also included some fixtures (appliances, such as a refrigerator). You paid a slightly higher appraisal fee than usual, and instructed the appraiser to provide you with the following breakdown of values:

<table>
<thead>
<tr>
<th>Appraised Values</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land</td>
<td>$45,000</td>
</tr>
<tr>
<td>Improvements</td>
<td>$260,000</td>
</tr>
<tr>
<td>Fixtures</td>
<td>$10,000</td>
</tr>
<tr>
<td>Total</td>
<td>$315,000</td>
</tr>
</tbody>
</table>
Your mortgage loan cost of $300,000 must be allocated between these different asset classes, so you can use the appropriate depreciable life to prepare a depreciation schedule, as shown in the following illustration:

<table>
<thead>
<tr>
<th>Appraised Values</th>
<th>Percentage</th>
<th>Cost Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land $45,000</td>
<td>14.29%</td>
<td>$42,857</td>
</tr>
<tr>
<td>Improvements $260,000</td>
<td>82.54%</td>
<td>$247,619</td>
</tr>
<tr>
<td>Fixtures $10,000</td>
<td>3.17%</td>
<td>$9,524</td>
</tr>
<tr>
<td>Total $315,000</td>
<td>100.00%</td>
<td>$300,000</td>
</tr>
</tbody>
</table>

Now, you’ll need to use the MACRS tables to determine the amount of depreciation expense. Assume that the “improvements” represent 39-year, nonresidential rental property and the “fixtures” represent 7-year property. Create a depreciation schedule using the MACRS tables on pages 308–309 of your textbook. Create annual measures and a source document for annual financial statement preparation. Your textbook didn’t provide a depreciation schedule for the 39-year, nonresidential real property, so we’ve provided one below. The measures in the table represent the percentage by which the improvements to the real property may be depreciated, per year, based on the month placed in service, which in this case was January:

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.461</td>
<td>2.247</td>
<td>2.033</td>
<td>1.819</td>
<td>1.695</td>
<td>1.391</td>
<td>1.177</td>
<td>0.963</td>
<td>0.749</td>
<td>0.535</td>
<td>0.321</td>
<td>0.107</td>
</tr>
<tr>
<td>2 thru 39</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
<td>2.564</td>
</tr>
</tbody>
</table>

The amounts in this table are carried out to the third decimal place, so some rounding errors will prevent the improvements from being fully depreciated through year 39. You should prepare the depreciation schedule only through year 30, to match the loan amortization schedule you prepared in Step 1 of the project. To check your work, you can use the following figure, which shows part of the completed depreciation schedule:
Step 3: Create a Schedule Combining Interest Expenses and Depreciation Expenses

In this step, you’ll need to create a schedule that combines interest expenses and depreciation expenses, but only for the first 10 years of the life of the asset. Here is how the completed schedule should appear:

<table>
<thead>
<tr>
<th>Year</th>
<th>Land</th>
<th>Improvements</th>
<th>Fixtures</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$0</td>
<td>$6,094</td>
<td>$1,361</td>
<td>$7,455</td>
</tr>
<tr>
<td>2</td>
<td>$0</td>
<td>$6,349</td>
<td>$2,332</td>
<td>$8,681</td>
</tr>
</tbody>
</table>

Step 4: Convert the Interest Expense and Depreciation Expense

In this step of your project, you’ll need to convert the interest expense and depreciation expense from pretax to aftertax dollars. Assume the firm is subject to a 34 percent marginal tax rate, and convert the 10-year schedule of interest expense and depreciation expense to aftertax terms. Review Lesson 3, Assignment 9, to obtain the applicable formulas.
Remember from your lessons that operating and interest expense results in a cash outflow, and depreciation expense results in a cash inflow, from the depreciation tax shield. Therefore, in this step, you’re computing a net cash outflow.

The following illustration shows how the completed schedule should appear, with the combined annual interest expense and depreciation expense, both converted to aftertax terms.

```
<table>
<thead>
<tr>
<th>Year</th>
<th>Pretax Annual Interest Expense</th>
<th>Pretax Annual Depreciation Expense</th>
<th>(a) AT CF or Posttax (1 – T) Interest Expense</th>
<th>(b) AT CF or Posttax (T) Depreciation Expense</th>
<th>(a) – (b) AT CF or Posttax Combined Interest &amp; Depreciation Expense</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$17,900</td>
<td>$7,455</td>
<td>$11,814</td>
<td>$2,535</td>
<td>$9,279</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>$15,271</td>
<td>$6,349</td>
<td>$10,079</td>
<td>$2,159</td>
<td>$7,920</td>
</tr>
</tbody>
</table>
```

**Step 5: Calculate the Aftertax Cash Outflows**

In this step of your project, you’ll need to calculate the present values and net present values of the aftertax cash flows or expenses for the project. In this case, this is the present value, aftertax cash outflow.

You’ve calculated the aftertax cash flows for the interest expense and the depreciation expense associated with the purchase of this piece of non-residential real property. Now, the final step requires you to calculate the present value of these ATCFs for each year, and the NPV for these expenses, in aggregate.

Using a discount rate of 10 percent, extend the table completed in Step 4 by adding a column for the present value of ATCFs. You’ll find a “present value of $1” table on pages A-4 and A-5 of your textbook (near the back of the book). The following illustration shows how the completed table should appear.
### Evaluation Criteria

Your instructor will use the following criteria to evaluate your project:

**Step 1:** Create the loan amortization schedule for the property. (20 points)

**Step 2:** Create the depreciation schedule. (20 points)

**Step 3:** Create the schedule that combines interest expenses and depreciation expenses. (20 points)

**Step 4:** Create a schedule that converts the interest expense and depreciation expense to aftertax dollars. (20 points)

**Step 5:** Create a schedule that shows the aftertax cash outflows. (20 points)
SUBMITTING YOUR FILES

Your documents should be created using a computer program such as Excel, and using a standard font in 12-point size. To submit your project, make sure you include the following:

- Your completed amortization schedule
- Depreciation schedule
- Interest and depreciation schedule
- Aftertax interest and depreciation schedule
- Aftertax cash outflow schedule

You’ll submit your project online. To send the files via an e-mail attachment,

2. Go to student portal.
3. Click on Take Exam next to the graded project number 06058901.
4. Enter your e-mail address in the box provided. (Note: This information is required for online submission.)
5. Attach your file or files as follows:
   a. Click on the Browse box.
   b. Locate the file you wish to attach.
   c. Double-click on the file.
   d. Click on Upload File.
6. Click on Submit Files.
**Self-Check 1**

1. False  
2. True  
3. True  
4. False  
5. True  
6. False  

**Answers to Textbook Problems**

1. $17,200; $800  
2. $171,600  
6. $75,290  
7. Average rate = 31.90%  
   Marginal rate = 39%  
10. –$180

**Self-Check 2**

1. True  
2. False  
3. True  
4. True  
5. True  
6. False  

**Answers to Textbook Problems**

1. Current ratio = 0.89 times  
   Quick ratio = 0.156 times  
2. Net income = $2.32 million  
   ROA = 13.26%  
   ROE = 20.71%
26. a. 1.44 times; 1.40 times
   b. 0.85 times; 0.83 times
   c. 0.56 times; 0.51 times
   d. 0.95 times
   e. 8.56 times
   f. 22.08 times
   g. 0.39; 0.40
   h. 0.65; 0.66
   i. 1.65; 1.66
   j. 5.70 times
   k. 7.95 times
   l. 11.93%
   m. 11.36%
   n. 18.91%

**Self-Check 3**

1. True
2. False
3. True
4. False
5. False
6. True

**Answers to Textbook Problems**

2. a. $53; anything greater than $0
   b. 833,333; 4.92
   c. $52.16; $0.84
6. 3,186,813
8. no change; declines by $0.69; declines by $1.55
14. $38,467.41

**Self-Check 4**

1. False
2. True
3. True
4. True
5. True
6. True

**Answers to Textbook Problems**

1. $1,795
2. $6,419.51
   - $14,999.39
   - $687,764.17
   - $315,795.75
3. $10,300.67
   - $21,939.15
   - $43,520.28
   - $116,560.17

**Self-Check 5**

1. True
2. False
3. True
4. False
5. False
6. True

**Answers to Textbook Problems**

2. At 5%: $PV_x = 45,646.93$  
   $PV_y = 40,605.54$
   At 15%: $PV_x = 28,629.50$
   $PV_y = 30,275.86$
6. $411,660.36$

22. EAR = 313,916,515.69%  
   APR = 1,733.33%
42. $386,936.54$
Self-Check 6

1. True
2. False
3. True
4. False
5. False
6. True

Answers to Textbook Problems

4. 10.15%
8. 5.97%
12. 6.30%
26. a. 30,000 coupon bonds; 315,589 zeroes
   b. $32,400,000; $315,588,822
28. $7,367.76

Self-Check 7

1. False
2. True
3. False
4. False
5. True
6. False

Answers to Textbook Problems

2. 9.38%
6. $2.45
10. $63.47
14. $48.70
18. $96.15
20. $69.55
**Self-Check 8**

1. False
2. True
3. False
4. True
5. True
6. False

**Answers to Textbook Problems**

4. 1.81 years; 2.54 years; 3.26 years

8. At 11%: NPV = $5,991.49
   At 30%: NPV = –$4,213.93

12. a. \( \text{IRR}_A = 20.44\% \)
    b. \( \text{IRR}_B = 18.84\% \)
    c. Crossover rate = 15.30%

16. a. \( \text{PI}_I = 1.267 \)
    \( \text{PI}_{II} = 1.414 \)
    b. \( \text{NPV}_I = $14,145.00 \)
    \( \text{NPV}_{II} = $6,630.35 \)

22. a. \( C = I/N \)
    b. \( C > I/PVIFA_{R\%,N} \)
    c. \( C > 2.0 * I/PVIFA_{R\%,N} \)

**Self-Check 9**

1. False
2. True
3. True
4. False
5. True
6. True
Answers to Textbook Problems

2. $403,600,000
8. $1,387,792
12. \( CF_0 = -\$4,200,000 \)
   \( CF_1 = \$1,631,455 \)
   \( CF_2 = \$1,738,243 \)
   \( CF_3 = \$1,916,303 \)
   \( NPV = \$42,232.43 \)
16. $-117,803.98
22. $0.03163

Self-Check 10

1. True
2. True
3. True
4. False
5. True
6. False

Answers to Textbook Problems

2. Total costs = $6,222,800
   Marginal cost = $38.94
   Average cost = $51.86
   Minimum revenue = $194,700
8. \( D = \$420,800 \)
   \( P = \$69.36 \)
   \( VC = \$37.57 \)
12. \( OCF = \$34,333 \)
    \( DOL = 4.786 \)
18. \( DOL = 1.2480 \)
    \( DOL_A = 2.7143 \)
22. \( \Delta NPV/\Delta P = \$148,973.62 \)
    \( \Delta NPV/\Delta Q = \$1,226.84 \)
30. \( DOL = 1.0381 \)
    \( \Delta OCF = 2.97\% \)
**Self-Check 11**

1. True
2. True
3. False
4. True
5. False
6. False (The total stock price was $700.)

**Answers to Textbook Problems**

2. \( R_d = 2.64\% \)
   \( R_c = 12.09\% \)
6. 2.62\%; 3.01\%
16. \( R_A = 11.83\% \)
   \( R_G = 10.58\% \)
20. 14.95\%; 14.52\%; 13.64\%

**Self-Check 12**

1. True
2. True
3. True
4. False
5. False
6. False

**Answers to Textbook Problems**

2. 13.23\%
6. 12.50\%
10. a. 7.64\%
   b. \( \sigma^2_p = 0.02436 \)
   \( \sigma_p = 15.61\% \)
14. 0.67
18. 0.0792
24. \( C = $324,074.07 \)
   \( R_F = $145,925.93 \)

26. \( \beta_I = 2.06 \)
   \( \sigma_I = 8.53\% \)
   \( \beta_{II} = 0.63 \)
   \( \sigma_{II} = 33.96\% \)

**Self-Check 13**

1. True
2. True
3. False
4. True
5. False
6. False

**Answers to Textbook Problems**

2. 12.34\%
4. \( R_A = 11.47\% \)
   \( R_G = 11.46\% \)
8. Book value = $115,000,000
   Market value = $97,350,000
   Aftertax cost = 5.34\%
12. a. \( \frac{E}{V} = 0.3455 \)
    \( \frac{D}{V} = 0.6545 \)
    b. \( \frac{E}{V} = 0.8595 \)
    \( \frac{D}{V} = 0.1405 \)
16. a. \( \frac{D}{V} = 0.2290 \)
    \( \frac{P}{V} = 0.0534 \)
    \( \frac{E}{V} = 0.7176 \)
    b. 12.80\%
20. Break-even cost = $37,943,787
Self-Check 14

1. True
2. True
3. True
4. True
5. False
6. True

Answers to Textbook Problems

2. a. $1.82; $3.64; $4.73
   b. $1.56; $4.41; $6.11

6. a. $3.29; $3.00; $3.55
   b. $44,000
   c. $44,000
   d. $44,000

10. $2,070,000

12. a. 18.18%
    b. 12.66%
    c. 20.01%; 16.34%; 12.66%

16. $310,583.33