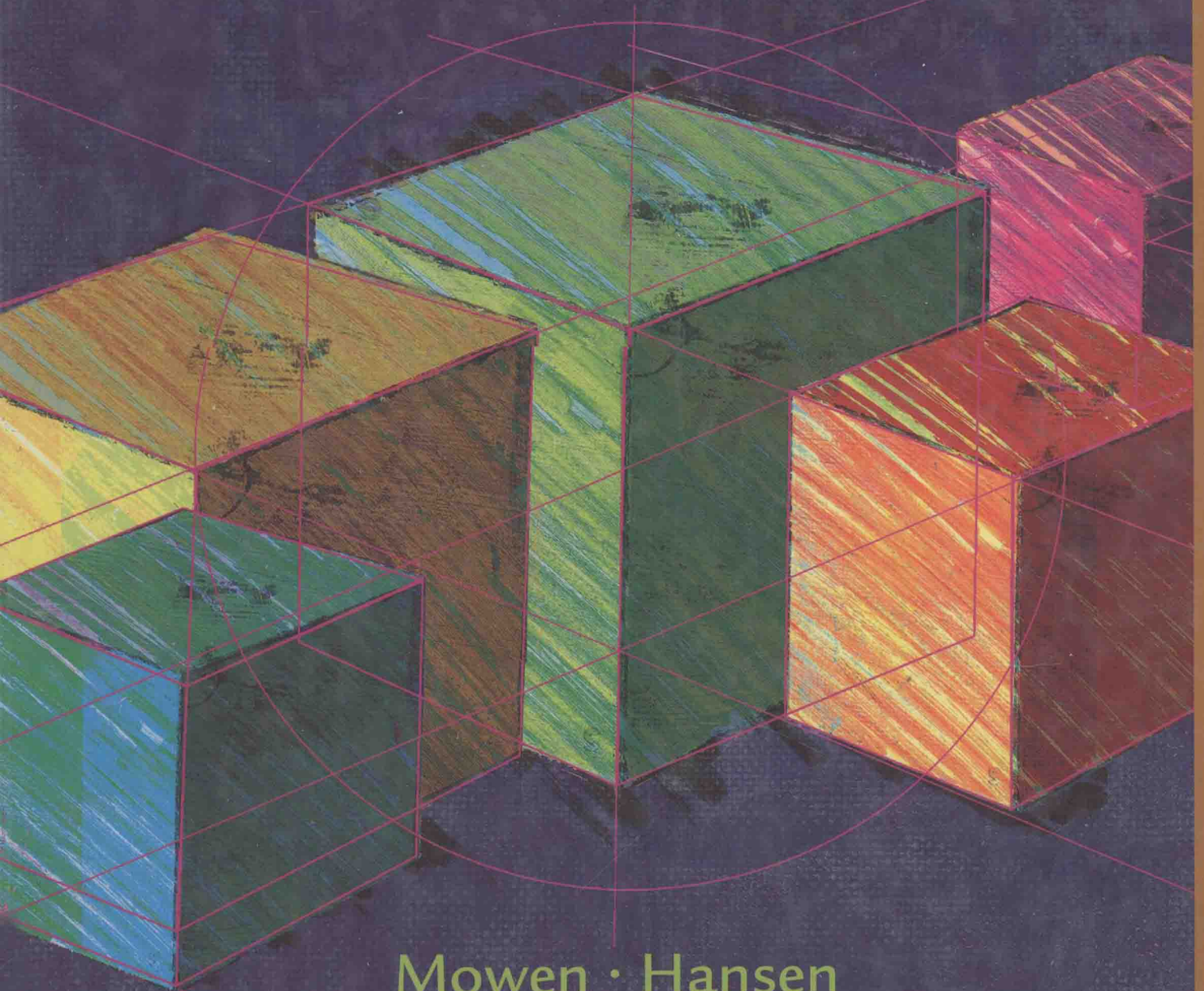


# MANAGEMENT ACCOUNTING

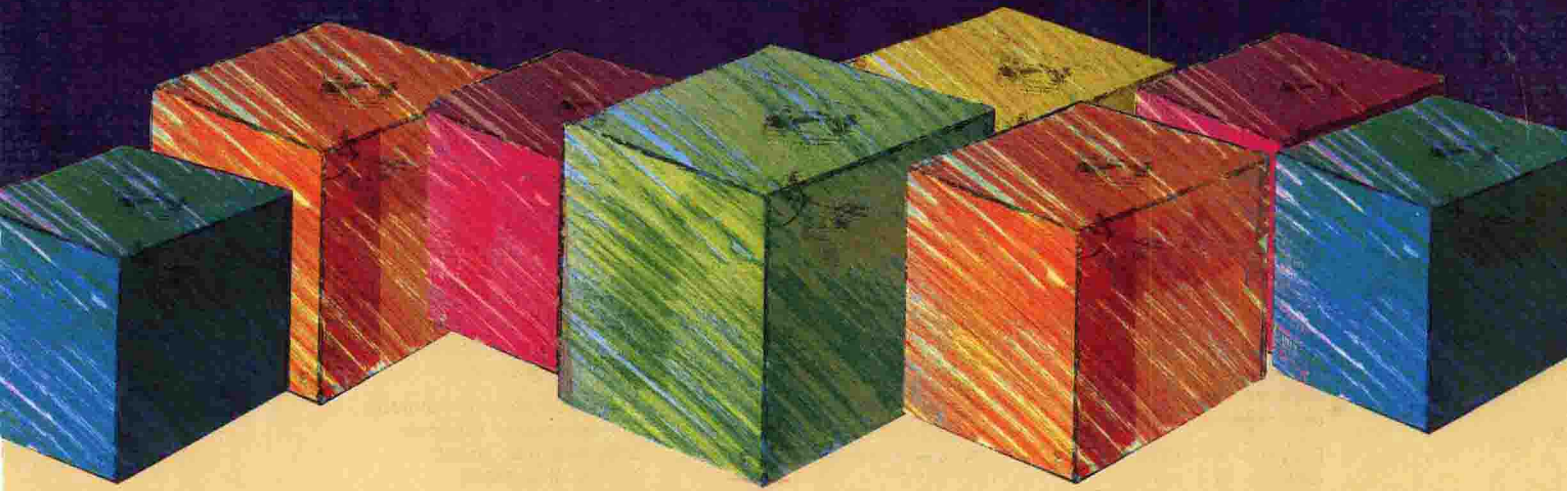
*The Cornerstone for Business Decisions*



Mowen • Hansen

# MANAGEMENT ACCOUNTING

*The Cornerstone for Business Decisions*



Maryanne M. Mowen • *Oklahoma State University*

Don R. Hansen • *Oklahoma State University*

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***Management Accounting: The Cornerstone for Business Decisions***

Maryanne M. Mowen and Don R. Hansen

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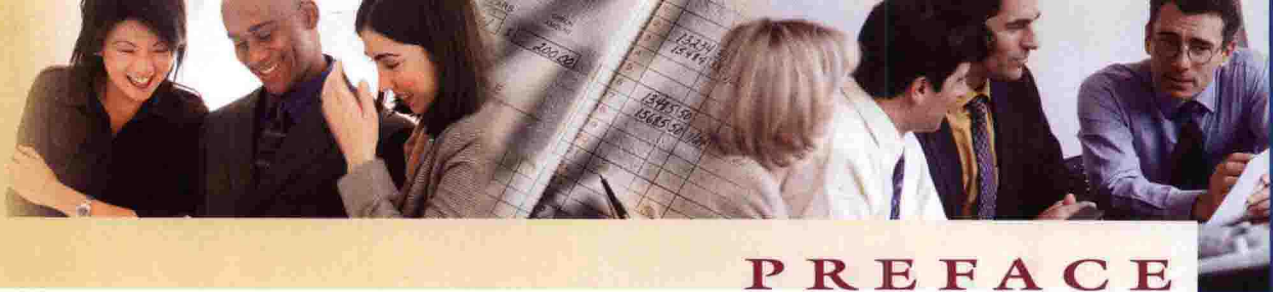
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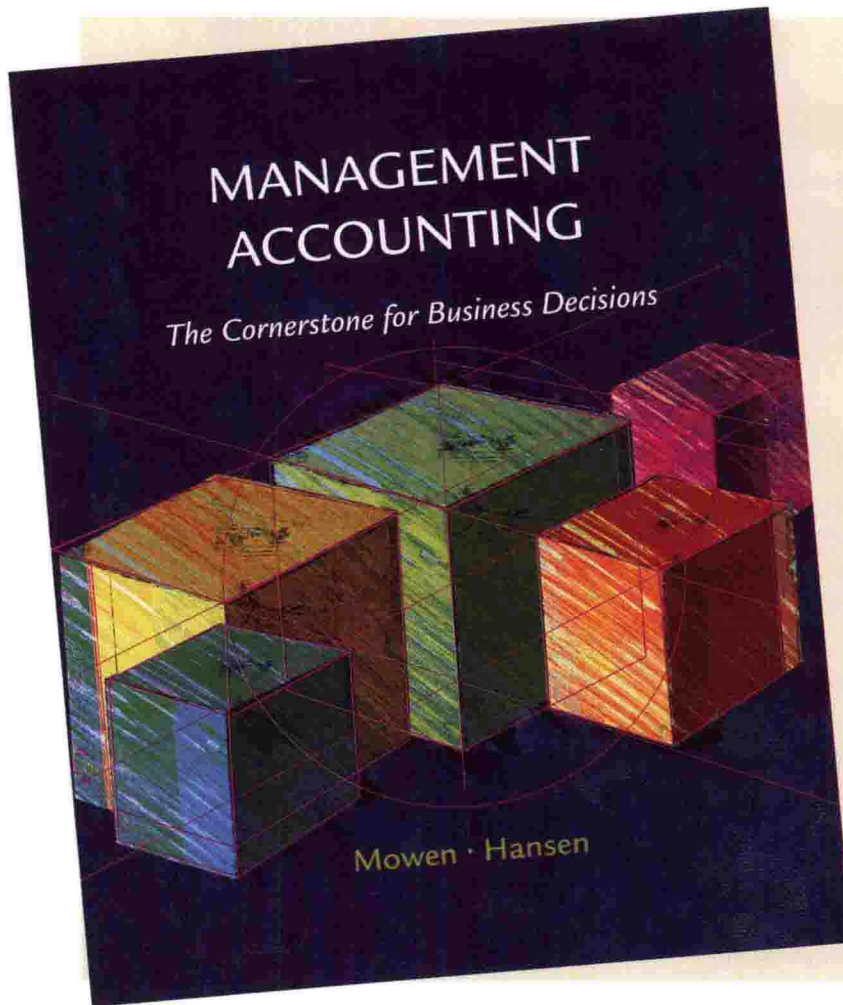
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## P R E F A C E

cor•ner•stone \-stōn\ *n* a basic element: FOUNDATION



### Introducing the new cornerstone in management accounting

Management accounting is one of the most important courses in the business curriculum. From manufacturing to service, and every industry in between, management accounting information is used to help managers identify important issues, solve problems, and evaluate performance.

**Management Accounting: The Cornerstone for Business Decisions** was crafted to help today's students use accounting information to understand the *real issues* at hand in *real companies*. Traditional coverage blends with innovative pedagogy—**Cornerstones**—to illustrate how concepts play out in managerial decision making. The text's step-by-step format, combined with its engaging and consistent use of **Cornerstones**, makes it easy for any student to tackle managerial accounting problems.

Explore this preview and discover why **Management Accounting: The Cornerstone for Business Decisions** has been hailed by students and instructors as a text that gives students a better understanding of managerial accounting concepts and calculations. You'll also find a wealth of powerful teaching and learning tools that make it easy to put management accounting concepts and theories into action.

**THOMSON**  
—★—  
**SOUTH-WESTERN**

*A tour of management accounting's new cornerstone begins on the next page*



# PREFACE

## Table of Contents

For a detailed  
table of contents,  
see pages iii-viii.

### CHAPTER 2

*To underscore the usefulness of management accounting in the workplace, coverage of cost behavior and cost-volume-profit analysis appears early in the text. Because these topics are intrinsically linked, organizing the text in this way helps students with little business experience or accounting background quickly understand the link between management accounting and sound managerial decisions.*

### CHAPTER 4

*Cornerstones are prevalent in every chapter—providing an easy way to identify, review, and reference key applications of concepts. As an example, here are the Cornerstones you'll find in Chapter 4:*

- 4-1: How to Prepare a Contribution Margin Income Statement*
- 4-2: How to Solve for the Break-Even Point in Units*
- 4-3: How to Calculate the Variable Cost Ratio and the Contribution Margin Ratio*
- 4-4: How to Solve for the Break-Even Point in Sales Dollars*
- 4-5: How to Solve for the Number of Units to Be Sold to Earn a Target Operating Income*
- 4-6: How to Solve for the Sales Needed to Earn a Target Operating Income*
- 4-7: How to Calculate the Break-Even Units for a Multiple-Product Firm*
- 4-8: How to Calculate the Break-Even Sales Dollars for a Multiple-Product Firm*
- 4-9: How to Compute the Margin of Safety*
- 4-10: How to Compute the Degree of Operating Leverage*
- 4-11: How to Compute the Impact of Increased Sales on Operating Income Using the Degree of Operating Leverage*

### CHAPTER 7

*Thoughtful explanations of topics like activity-based costing, activity-based management, process-value analysis, quality costing, and environmental costing help reinforce the critical importance of accounting information to sound business decisions.*

- 1. Introduction to Management Accounting**
- 2. Basic Management Accounting Concepts**
- 3. Cost Behavior**
- 4. Cost-Volume-Profit Analysis: A Managerial Planning Tool**
- 5. Job-Order Costing**
- 6. Process Costing**
- 7. Activity-Based Costing and Management**
- 8. Profit Planning**





## PREFACE

*"The strengths of the chapters are organization, readable style, and clear analysis of the subject matter. The scenarios at the beginning of the chapters are very helpful and help bring real-world perspective to the subject matter."*

Marvin Williams, University of Houston, Downtown

### CHAPTER 9

From price and usage to materials and direct labor, this chapter covers every major key variance topic. An appendix to this chapter covers both Target and Kaizen costing—enhancing the authors' discussion of traditional standard costs by showing costing tools currently used by today's managers.

#### 9. Standard Costing: A Managerial Control Tool

### CHAPTER 11

Variable and absorption costing are covered in Chapter 11 as part of a larger discussion about performance evaluation in the firm. This section provides a concise treatment of the subject that clearly demonstrates the different impacts of variable and absorption costing on both income and inventory. The result is a manageable treatment of the subject that provides just the right level of detail.

In addition, Chapter 11 refers readers to an appendix where the authors cover the ways in which the Balanced Scorecard concept helps organizations translate their mission into operational objectives and performance measures. This placement allows instructors to tailor their course to the needs and interest of their students.

#### 10. Flexible Budgets and Overhead Analysis

#### 11. Performance Evaluation, Variable Costing, and Decentralization

#### 12. Short-Run Decision Making; Relevant Costing and Inventory Management

#### 13. Capital Investment Decisions

#### 14. Support Department Cost Allocation

### CHAPTERS 15 AND 16

Two financial accounting chapters conclude the text, presented in a way that gives instructors the flexibility to cover these topics at any point in their course. The Cornerstones pedagogy continues through these chapters, making it easier for students to reference key concepts related to cash flows and financial statement analysis.

#### 15. Statement of Cash Flows

#### 16. Financial Statement Analysis



# PREFACE

## Cornerstones— the foundation for successful learning

Carefully crafted from the ground up and extensively class tested, this text's Cornerstones help students easily set up and solve fundamental managerial accounting calculations.

Cornerstone



HOW TO Solve for  
the Break-Even Point  
in Units

Cornerstones are divided into three sections: *Information*, *Required*, and *Calculation*. At each step along the way students can see the concepts and theories at work behind the numbers.

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Chapter 4

Cost-Volume-Profit Analysis: A Managerial Planning Tool

Cornerstone



HOW TO Solve for  
the Break-Even Point  
in Units

**Information:** Whittier Company plans to sell 1,000 mowers at \$400 each in the coming year. Product costs include:

Direct materials per mower	\$ 180
Direct labor per mower	100
Variable overhead per mower	25
Total fixed factory overhead	15,000

Variable selling expense is a commission of \$20 per mower; fixed selling and administrative expense totals \$30,000.

**Required:**

1. Calculate the total variable cost per unit.
2. Calculate the total fixed expense for the year.
3. Calculate the number of mowers that Whittier Company must sell to break even.
4. Check your answer by preparing a contribution margin income statement based on the break-even point.

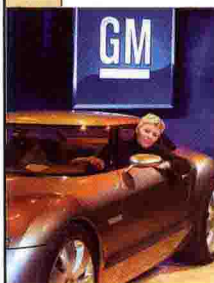
**Calculation:**

1. Variable cost per unit =  $\$180 + \$100 + \$25 + \$20 = \$325$
2. Total fixed expense =  $\$15,000 + \$30,000 = \$45,000$
3. Break-even number of mowers =  $\$45,000 / (\$400 - \$325) = 600$
4. Contribution margin income statement based on 600 mowers.

Sales ( $\$400 \times 600$ mowers)	\$240,000
Total variable expense ( $\$325 \times 600$ )	195,000
Total contribution margin	\$ 45,000
Total fixed expense	45,000
Operating income	\$ 0

Indeed, selling 600 units does yield a zero profit.

## APPLICATIONS IN BUSINESS



© AP/WIDE WORLD PHOTOS

CVP analysis can be a valuable tool to identify the extent and magnitude of the economic trouble a company is facing and to help pinpoint the necessary solution. For example, SAAB was on the brink of collapse in 1990 when GM bought a 50-percent share in the company. Within five years, SAAB had cut costs dramatically and lowered its break-even point from 130,000 cars to 80,000 cars. By 2002, SAAB turned a

modest profit. GM learned many lessons from this experience. In the late 1990s, GM restructured all of its operations to eliminate many fixed costs and decrease variable costs, thereby lowering the break-even point. Why would the company do that when 1997 profits were at record levels? As auto analyst Stephen Girsky pointed out to GM executives, "Volume distorts everything." When volume decreases, profits turn down in a hurry. GM needs to aggressively contain costs to compete with rivals like Toyota and DaimlerChrysler.

Source: James Benner, "Eurocars: On the Road Again," *New York Times* (August 20, 1995): Sec. 3, pp. 1, 10. Paul A. Eisenstein, "Saab Making Big Plans: New 9-3 Is Key to Expansion—and Profitability," *The Car Connection* (July 7, 2002), <http://www.thecarconnection.com/index.asp?article=5108>. Gregory White, "For GM, Hard Line on Stryke Has Become a Matter of Necessity," *The Wall Street Journal* (June 12, 1998): A1 and A4.



# PREFACE

End-of-chapter *Exercises* are linked to one or more specific *Cornerstone* features, giving students a chance to try a problem on their own that is similar to the in-chapter example.

**OBJECTIVE 1**

**Cornerstone 4-1**

**Cornerstone 4-2**

Chapter 4 Cost-Volume-Profit Analysis: A Managerial Planning Tool 143

**Exercise 4-2 Break-Even in Units**

The controller of Greenbrough Company prepared the following projected income statement:

Sales (5,000 units @ \$12)	\$60,000
Less: Variable cost	45,000
Contribution margin	\$15,000
Less: Fixed cost	6,900
Operating income	\$8,100

**Required:**

1. Calculate the unit variable cost. Calculate the break-even number of units.
2. Prepare an income statement for Greenbrough at break-even.

**Exercise 4-3 Contribution Margin Ratio, Variable Cost Ratio, Break-Even in Sales Revenue**

Refer to Exercise 4-2 for data.

**Required:**

1. What is the contribution margin per unit for Greenbrough Company? What is the contribution margin ratio?
2. What is the variable cost ratio for Greenbrough Company?
3. Calculate the break-even revenue.

**Exercise 4-4 Units Needed to Earn Target Income**

Refer to Exercise 4-2 for data.

**Required:**

1. How many units must Greenbrough sell to earn income equal to \$9,900?
2. How much sales revenue must Greenbrough make to earn income equal to \$9,900?
3. Prepare an income statement based on the number of units you calculated in Requirement 1 (or the revenue you calculated in Requirement 2) to prove your answer.

*"The Cornerstone sections are OUTSTANDING. I think students would find this very helpful. This is truly an advantage of the text."*

Kelly Richmond, University of North Carolina, Greensboro







## PREFACE

# "Here's the Real Kicker"— Real management accounting in the real world

The importance of management accounting in planning, decision making, and day-to-day operations is brought to the forefront through a running example of a real company.

4

Chapter 1

Introduction to Management Accounting

In writing this textbook, we wanted to show our readers the importance and relevance of management accounting in planning, decision making, and day-to-day operations of companies and not-for-profit organizations. We teamed up with a real company, Kicker, and interviewed their top management extensively for stories about their firm and their use of accounting information. You will see boxes in each chapter called "Here's the Real Kicker," which detail how the company has used management accounting information in its operations. In addition, each chapter includes an exercise or problem based on an actual Kicker experience. Without further ado, let's get better acquainted with Kicker.

A division of Stillwater Designs and Audio, Inc., Kicker makes car stereo systems. Their signature logo, "Livin' Loud," gives you a hint as to the capabilities of the system. As the company Web site says, "Livin' Loud has always been the KICKER way—staying one step ahead of the pack—driven to create components that consistently raise the world's expectations for car stereo performance."

Twenty-five years ago, car stereos were underpowered tinny affairs. They could power a radio or an 8-track tape deck. But the in-home listening experience coveted by audio buffs eluded the automobile market. In 1980, Stillwater Designs virtually invented the high-performance car audio enclosure market when company founder and president Steve Irby developed the Original Kicker®. It was the first full-range speaker enclosure designed specifically for automotive use.

Stillwater Designs began in 1973 as a two-person operation, custom designing and building professional sound and musical instrument speaker systems for churches, auditoriums, and entertainers. Building upon the success of the Original Kicker, the company concentrated on the car audio market, applying the same research and design skills that made its first product so successful to the development of a complete line of high-performance components for car audio. What was once a company with two employees in a single-car garage is now a corporation with more than 200 employees in facilities totaling more than 500,000 square feet. Its world headquarters is in Stillwater, Oklahoma.

The Kicker brand includes a variety of high-performance car stereo products, including subwoofers, midrange and midbass drivers, tweeters, crossovers, matched component systems, speakers, and power amplifiers. Kicker is proud to have won the prestigious AudioVideo International Auto Sound Grand Prix Award, sponsored annually by AudioVideo International magazine. Winners are selected by retailers based on fidelity of sound reproduction, design engineering, reliability, craftsmanship and product integrity, and cost/performance ratio. In 2003, seven Kicker products earned Grand Prix awards. Awards emphasizing the performance of the company include the Governor's Award for Excellence in Exporting (2000) and the 1996 Oklahoma City International Trade Association designation as its International Business of the Year.

While Stillwater Designs originally handled research and design, manufacturing, and sales, it now concentrates primarily on R&D and sales. The bulk of manufacturing has been outsourced (performed by outside firms on a contract basis), although the company still builds some product and plans to build even more as it moves into its new facility for factory-installed audio systems. Engineering and audio research is Kicker President and CEO Steve Irby's first love, and he still heads its design team. The day-to-day involvement of top management, coupled with an energetic workforce of talented individuals in all areas of the company's operations and an innate ability to create truly musical components, has been the reason for the company's remarkable success.

### THE MEANING OF MANAGEMENT ACCOUNTING

What do we mean by management accounting? Quite simply, management accounting is the provision of accounting information for a company's internal users. It is the firm's internal accounting system and is designed to support the information needs of



HERE'S  
THE REAL  
KICKER

The authors teamed up with a real company, Stillwater Designs, the maker of Kicker car stereos, and interviewed their top management for relevant and revealing stories about their firm and their use of accounting information. This information is incorporated into each chapter with **Here's the Real Kicker** sections. The first Kicker scenario gives a comprehensive overview of the company, which is a highly successful maker of high-quality car audio systems.

Kicker separates cost into fixed and variable components by using judgment. Because the bulk of manufacturing is outsourced, the cost of the speakers starts with the purchase price from the manufacturer. This is a strictly variable cost. Also variable are the cost of duty (ranging from 9–30 percent—electronics are at the high end) and freight, as all units are shipped to Stillwater, Oklahoma, for distribution to customers. In-house labor may be needed at Kicker's Stillwater facilities, and that cost has both fixed (salaried workers) and variable (temporary workers) components.

The entire salaried staff in Stillwater, research and development, depreciation on property, plant and equipment, utilities, and so on, are all fixed.

These fixed and variable costs are used in cost-volume-profit analysis (done monthly) and in management decision making. For example, the monthly cost-volume-profit figures can be used to monitor the effect of changing volume on profit and spotlight increases in fixed and variable costs. If costs are going up, management finds out about the problem early and can make adjustments.



HERE'S  
THE REAL  
KICKER

Subsequent **Here's the Real Kicker** sections delve into specific facets of the company's operations. These sections directly tie in to what's being discussed in each chapter, from job-order costing and process costing to profit planning and capital investment decisions.

OBJECTIVE 1  
Explain the  
meaning of  
management  
accounting.

*"Excellent use of examples to convey each of the topics.  
[The authors] provide context that makes it  
easier to teach and learn."*

Dwight Sneathen, Jr., Mississippi State University



# PREFACE

*"The definitions of planning and control are by far the best I have seen. Nice and simple."*

Janice Pitera, Broome Community College

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Chapter 4

Cost-Volume-Profit Analysis: A Managerial Planning Tool

## BREAK-EVEN POINT IN UNITS AND IN SALES DOLLARS

Cost-volume-profit analysis (CVP analysis) is a powerful tool for planning and decision making. Managers become very interested in CVP analysis during times of economic trouble. You may have heard or read of various companies trying to break even. CVP analysis can help managers pinpoint problems and fix on the necessary solution.

CVP analysis can address many other issues as well, such as the number of units that must be sold to break even, the impact of a given reduction in fixed costs on the break-even point, and the impact of an increase in price on profit. Additionally, CVP analysis allows managers to do sensitivity analysis by examining the impact of various price or cost levels on profit.

Since CVP analysis shows how revenues, expenses, and profits behave as volume changes, it is natural to begin by finding the firm's break-even point in units sold. The **break-even point** is the point where total revenue equals total cost, the point of zero profit.

Kicker separates cost into fixed and variable components by using judgment. Because the bulk of manufacturing is outsourced, the cost of the speakers starts with the purchase price from the manufacturer. This is a strictly variable cost. Also variable are the cost of duty (ranging from 9–30 percent—electronics are at the high end) and freight, as all units are shipped to Stillwater, Oklahoma, for distribution to customers. In-house labor may be needed at Kicker's Stillwater facilities, and that cost has both fixed (salaried workers) and variable (temporary workers) components.

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### OBJECTIVE 1

Determine the break-even point in number of units and in total sales dollars.



HERE'S THE REAL KICKER

Each chapter also includes an exercise or problem based on an actual Kicker experience. Found at the end of the chapter, these activities reinforce the key concepts of the chapter and tie in to the chapter *Objectives*. The combination of these Kicker scenarios and problems allows students to reach a new understanding of the importance of management accounting in the workplace.

## Using Operating Income

Remember from Chapter 2 that for the income statement, manufacturing (or service) production function. For CVP analysis, costs are divided into fixed and variable components. Fixed costs refer to all costs of the company that do not change with the level of production. Variable costs are all costs that increase or decrease in direct proportion to the level of production. Fixed cost includes fixed overhead costs that are not included in the contribution margin statement format that is used in CVP analysis.

The contribution margin is called the **contribution margin**. Contribution margin is the amount left over after variable costs are subtracted from sales. It can be used to contribute to fixed costs and to profit. Let's use Whittier Company's example. Whittier's controller has the following data for the current year:

### OBJECTIVES 1, 2



## Problem 4-16

Suppose that Kicker had the following sales and cost experience (in thousands of dollars) for May of the current year and for May of the prior year:

	May, Current Year	May, Prior Year
Total sales	\$43,560	\$41,700
Less:		
Purchase price paid	(17,000)	(16,000)
Additional labor and supplies	(1,400)	(1,200)
Commissions	(1,250)	(1,100)
Contribution margin	\$23,910	\$23,400
Less:		
Fixed warehouse cost	(680)	(500)
Fixed administrative cost	(4,300)	(4,300)
Fixed selling cost	(5,600)	(5,000)
Research and development	(9,750)	(4,000)
Operating income	\$ 3,580	\$ 9,600

In August of the prior year, Kicker started an intensive quality program designed to enable it to build original equipment manufacture (OEM) speaker systems for a major automobile company. The program was housed in research and development. In the beginning of the current year, Kicker's accounting department exercised tighter control over sales commissions, ensuring that no dubious (e.g., double) payments were made. The increased sales in the current year required additional warehouse space that Kicker rented in town.

### Required:

1. Calculate the contribution margin ratio for May of both years.
2. Calculate the break-even point in sales dollars for both years.
3. Calculate the margin of safety in sales dollars for both years.
4. Analyze the differences shown by your calculations in Requirements 1, 2, and 3.

Chapter 4

Cost-Volume-Profit Analysis: A Managerial Planning Tool

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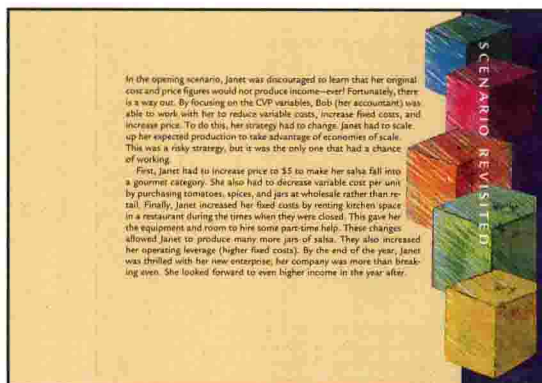
## PREFACE

# A strong foundation structures each chapter

From chapter beginning to chapter end, **Cornerstone's** approach includes straight-forward learning tools that give students a consistent and organized framework for understanding and applying management accounting theories.

Each chapter begins with an engaging *Scenario* that presents a dialogue between two or more fictional business people. Their situation provides a realistic introduction to the material that will be covered in the chapter. In this example, the owner of a health-supplements company wonders if *all* of her products are profitable. She contacts a business accountant for help in costing out the various products she produces.

➤ *Scenario Revisited* sections are found at the end of every chapter. These sections provide the solution to the dilemma faced in the chapter-opening scenario, effectively tying the chapter together as one cohesive concept.



For years, Janet McFarland's friends and family raved about her homemade jellies and salsas. Janet traditionally canned several gallons of salsa, ladled it into decorative pint jars, wrapped them, and sent them as gifts. Her friends said, "You ought to sell this stuff—you'd make a fortune!" So, Janet decided to give it a try.

First, she decided to concentrate on one product, a green cactus salsa that had gotten rave reviews. She scouted sources of jars, lids, and labels. In addition, Janet got in touch with her local agricultural extension office and learned a considerable amount about laws regulating food sales. One source of surprise was that she was required to obtain an expert confirmation of the ingredients in her salsa. Usually, Janet added a little of this and a little of that until it tasted right. She found out that this casual approach would not work. Foods were required to be labeled with the name of each ingredient in order of amount. Suddenly, it mattered whether ancho or poblano chilis were used and in what proportion. Janet needed a standardized recipe. She located a professional food chemist to analyze the recipe and certify the proportion of ingredients.

Janet traveled to a number of grocery stores and gift shops in the area. Several were willing to stock her product on consignment, placing a few jars by the cash register; others guaranteed shelf space but required a shelf charge for it. She figured that traveling to the stores, checking on sales and stock, and visiting prospective customers would take about one day a week.

Before starting production, Janet consulted with her family accountant, Bob Ryan.

**Janet:** Bob, I'm really excited about this opportunity; it all seems to be falling into place.

**Bob:** I'm happy for you, too, Janet. But first, let's do some planning. I need to take a look at the costs and selling price you anticipate.

**Janet:** I think I can charge \$3.50 per jar. It's a new product, and I want to build a market for it. The costs I've come up with are on this sheet. They aren't as high as they could be since I'm going to start slowly and cook small batches at a time in our kitchen.

**Bob:** (After a couple of minutes of figuring) Janet, do you realize that at a price of \$3.50 and with the variable costs that you described, you'll lose money! You can't do that.

**Janet:** What if I sell more jars? Will that help?

**Bob:** No, since the price is less than the variable cost, selling more jars will just make it worse. Let's go back to the drawing board and see if there's a way to decrease those variable costs. If that isn't possible, you will need to see if there is a market for your product at a higher price. Otherwise, you would be better off never getting involved with this business.

*"I think the opening and closing scenarios are excellent. [They show] the student the purpose of studying the information covered in the chapter."*

Cathy Lumbattis, Southern Illinois University, Carbondale

*"Each of the opening scenarios was highly effective. Each introduced a common and interesting management problem that required information input from the management accounting system. They were skillfully written so as to motivate student interest but not to be so unstructured as to preclude solution."*

David Marcinko, University of Albany, SUNY



# PREFACE

Key objectives are clearly stated and highlighted throughout each chapter. Chapter openers begin with a set of objectives.

These are then highlighted within the body of the chapter with colorful margin notes. A *Summary of Learning Objectives* concludes each chapter, reinforcing these important points.

End-of-chapter Exercises and Problems also tie in to the objectives and are clearly marked.

## CHAPTER

# 4

### COST-VOLUME-PROFIT ANALYSIS: A MANAGERIAL PLANNING TOOL



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After studying Chapter 4, you should be able to:

1. Determine the break-even point in number of units and in total sales dollars.
2. Determine the number of units that must be sold, and the amount of revenue required, to earn a targeted profit.
3. Prepare a profit-volume graph and a cost-volume-profit graph and explain the meaning of each.
4. Apply cost-volume-profit analysis in a multiple-product setting.
5. Explain the impact of risk, uncertainty, and changing

### SUMMARY OF LEARNING OBJECTIVES

In a single-product setting, the break-even point can be computed in units by dividing the total fixed costs by the contribution margin per unit. In essence, sufficient units must be sold to just cover all fixed and variable costs of the firm.

Break-even revenue is computed by dividing the total fixed costs by the contribution margin ratio. Targeted profit is added to fixed costs in determining the amount of revenue needed to yield the targeted profit.

Multiple-product analysis requires that an assumption be made concerning the expected sales mix. Given a particular sales mix, a multiple-product problem can be converted into a single-product analysis. However, it should be remembered that the answers change as the sales mix changes. If the sales mix changes in a multiple-product firm, then the break-even point will also change. In general, increases in the sales of high contribution margin products will decrease the break-even point, while increases in the sales of low contribution margin products will increase the break-even point.

CVP is based on several assumptions that must be considered in applying it to business problems. The analysis assumes linear revenue and cost functions, no finished goods ending inventories, and a constant sales mix. CVP analysis also assumes that selling prices and fixed and variable costs are known with certainty. These assumptions form the basis for simple graphical analysis using the profit-volume graph and the cost-volume-profit graph.

*"I did like the variety of assignment materials, particularly the multiple-choice questions at the end of each chapter, the concept questions and answers in each chapter, and the ethics question in each chapter. The brief exercises will work well in my classes. These are very good for review of the material."*

Susan Minke, Indiana University, Purdue University at Fort Wayne

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#### CONNECTION



Required:

1. What is Reiter's expected margin of safety?
2. What is Reiter's margin of safety if sales revenue is \$280,000?

#### Exercise 4-11 Multiple-Product Break-Even

Switzer Company produces and sells yoga-training products: knee-to-video tapes and a basic equipment set (blocks, strap, and small pillows). Last year, Switzer sold 10,000 videos and 5,000 equipment sets. Information on the two products is as follows:

	Video	Equipment Set
Price	\$12	\$15
Variable cost per unit	4	6
Total fixed costs are \$70,000.		

#### Required:

1. What is the sales mix of videotapes and equipment sets?
2. Compute the break-even quantity of each product.

#### Exercise 4-12 Contribution Margin Ratio, Break-Even Sales Revenue, and Margin of Safety for Multiple-Product Firm

Refer to Exercise 4-11 for data.

#### Required:

1. Prepare an income statement for Switzer for last year. What is the overall contribution margin ratio? The overall break-even sales revenue?
2. Compute the margin of safety for last year.

#### Exercise 4-13 Multiple-Product Break-Even, Break-Even Sales Revenue

Refer to Exercise 4-11. Suppose that in the coming year, Switzer plans to produce an extra thick yoga mat for sale to health clubs. The company estimates that 20,000 mats can be sold at a price of \$18 and variable cost per unit of \$4.2. Fixed costs must be increased by \$48,350 (making total fixed cost of \$118,350). Assume that anticipated sales of the other products, as well as their prices and variable costs, remain the same.





## PREFACE

# Well developed pedagogy serves as a powerful touchstone for learning

Mowen and Hansen's text implements a number of unique pedagogical features to show students how concepts play out in managerial decision making.

*Applications in Business* boxes illustrate how real companies have encountered and dealt with situations that required the use and understanding of accounting information. Each brief but interesting section serves as another reminder that the concepts being addressed do really apply to everyday operations. Contemporary topics treated throughout the text and in the *Applications in Business* boxes include quality and environmental costing, productivity analysis, the Balanced Scorecard, the theory of constraints, Just In Time (JIT) inventory applications, and more.

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### APPLICATIONS IN BUSINESS

A good margin of safety can provide a comfortable cushion for a company in a volatile industry. The restaurant business is considered to be relatively risky. About 27 percent of restaurants fail within one year; about 60 percent fail within five years. "One mistake here or there can cost you your whole profit," according to the founder of a restaurant consulting firm. Typically, the margin of safety is razor thin. Savvy restaurateurs learn to increase it by cutting back on costs. For example, the owners of Don-

ley's Old West Steakhouse and Buffet in Union, Illinois, saved unused kale from the salad bar at the end of each day to decorate the buffet the next day. They also made the desserts in-house rather than buying them from a bakery, a move that saved \$500 per week. As a result, both fixed and variable costs decreased, and the margin of safety increased. This cushions Donley's in the event of economic downturns or increases in other costs such as beef.

Source: Stephanie N. Mehta, "Restaurants Novices Learn to Turn Popularity into Profit," *The Wall Street Journal* (August 9, 1996): B1 and B2.

### APPLICATIONS IN BUSINESS



CVP analysis can be a valuable tool to identify the extent and magnitude of the economic trouble a company is facing and to help pinpoint the necessary solution. For example, SAAB was on the brink of collapse in 1990 when GM bought a 50-percent share in the company. Within five years, SAAB had cut costs dramatically and lowered its break-even point from 130,000 cars to 80,000 cars. By 2002, SAAB turned a

modest profit. GM learned many lessons from this experience. In the late 1990s, GM restructured all of its operations to eliminate many fixed costs and decrease variable costs, thereby lowering the break-even point. Why would the company do that when 1997 profits were at record levels? As auto analyst Stephen Girskey pointed out to GM executives, "Volume distorts everything." When volume decreases, profits turn down in a hurry. GM needs to aggressively contain costs to compete with rivals like Toyota and DaimlerChrysler.

Source: James Bennett, "Europeans: On the Road Again," *New York Times* (August 20, 1995) Sec. 3, pp. 1, 10. Paul A. Eisenstein, "Saab: Making Big Plans: New 9-3 Is Key to Expansion—and Profitability," *The Car Connection* (July 7, 2002), <http://www.thecarconnection.com/index.asp?article=3108>. Gregory White, "For GM, Hard Line on Strike Has Become a Matter of Necessity," *The Wall Street Journal* (June 12, 1998): A1 and A4.

*"As you would expect from these authors, the material in the chapter is solid and the concepts are presented in a straightforward manner."*

Jim Groff, University of Texas, San Antonio



## PREFACE

*"Its approach is wonderful. I thought it was great that the exhibits were labeled clearly and the process was easy to follow and understand. The supporting examples, exhibits and illustrations complement the text and make it easy to follow."*

Richard Filler, Franklin University

### Concept Q & A

Suppose that Macy's department store sells two brands of suits: designer suits with a contribution margin of \$600 each and regular suits with a contribution margin of \$500 each. At break-even, the store must sell a total of 100 suits a month. Last month, the store sold 100 suits in total but incurred an operating loss. There was no change in fixed cost, variable cost, or price. What happened?

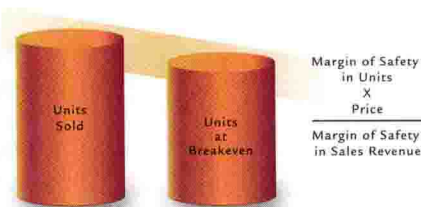
#### Answer:

In all probability, the sales mix shifted toward the low contribution margin suits. That is, relatively more of the low contribution margin suits (the regulars) were sold than the high contribution margin suits. Suppose that the break-even point for regular suits was 80 and the break-even point for designer suits was 20. If the mix shifted to 90 regular and 10 designer, it is easy to see that less total contribution margin (and, hence, operating income) would be realized.

♦ Analytical Q&A and Concept Q&A sections are spread throughout each chapter, giving readers an opportunity to assess their understanding of the topic being discussed. All Q&As provide an ideal way for students to stop and review at key points throughout the text.

Because many people are visual learners, Mowen and Hansen incorporate a wealth of colorful and clarifying graphics throughout the text. From flowcharts and graphs to screen captures and more, each *Exhibit* serves as powerful reinforcement of the concepts being discussed.

The Margin of Safety



4-8

EXHIBIT



# PREFACE

## With each chapter ending, new understanding begins

Beginning with **Key Terms**, the chapter-ending review materials then move on to **Discussion Questions** and **Multiple-Choice Exercises**. These questions and exercises prompt students to do a quick self-assessment before working the more in-depth **Exercises and Problems**.

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**EXERCISES**

**Required:**

1. What is Reiter's expected margin of safety?
2. What is Reiter's margin of safety if sales revenue is \$280,000?

**Exercise 4-11 Multiple-Product Break-Even**

Switzer Company produces and sells yoga-training products: how-to videotapes and a basic equipment set (blocks, strap, and small pillows). Last year, Switzer sold 10,000 videotapes and 5,000 equipment sets. Information on the two products is as follows:

	Videotape	Equipment set
Price	\$12	\$15
Variable cost per unit	4	6

Total fixed costs are \$70,000.

**Required:**

1. What is the sales mix of videotapes and equipment sets?
2. Compute the break-even quantity of each product.

**Exercise 4-12 Contribution Margin Ratio, Break-Even Sales Revenue, and Margin of Safety for Multiple-Product Firm**

Refer to Exercise 4-11 for data.

**Required:**

1. Prepare an income statement for Switzer for last year. What is the overall contribution margin ratio? The overall break-even sales revenue?
2. Compute the margin of safety for last year.

**Exercise 4-13 Multiple-Product Break-Even, Break-Even Sales Revenue**

Refer to Exercise 4-11. Suppose that in the coming year, Switzer plans to produce an extra thick yoga mat for sale to health clubs. The company estimates that 20,000 mats can be sold at a price of \$18 and variable cost per unit of \$13. Fixed cost must be increased by \$48,350 (making total fixed cost of \$118,350). Assume that anticipated sales of the other products, as well as their prices and variable costs, remain the same.

**Required:**

1. What is the sales mix of videotapes, equipment sets, and yoga mats?
2. Compute the break-even quantity of each product.
3. Prepare an income statement for Switzer for the coming year. What is the overall contribution margin ratio? The overall break-even sales revenue?
4. Compute the margin of safety for the coming year in sales dollars. (Round the contribution margin ratio to three significant digits; round the break-even sales revenue to the nearest dollar.)

**Exercise 4-14 CVP Graphs**

Leto Company produces and sells one product. The selling price is \$10, and the unit variable cost is \$6. Total fixed costs are \$10,000.

**Required:**

1. Prepare a CVP graph with "Units Sold" as the horizontal axis and "\$ Profit" as the vertical axis. Label the break-even point on the horizontal axis.

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Chapter 4

Cost-Volume-Profit Analysis: A Managerial Planning Tool

### KEY TERMS

Break-even point, 112	Cost-volume-profit graph, 123	Operating leverage, 134
Common fixed expenses, 126	Degree of operating leverage (DOL), 134	Profit-volume graph, 122
Contribution margin, 112	Direct fixed expenses, 126	Sales mix, 127
Contribution margin income statement, 112	Margin of safety, 133	Sensitivity analysis, 137
Contribution margin ratio, 117		Variable cost ratio, 117

### DISCUSSION QUESTIONS

1. Explain how CVP analysis can be used for managerial planning.
2. Describe the difference between the units sold approach to CVP analysis and the sales revenue approach.
3. Define the term *break-even point*.
4. Explain why contribution margin per unit becomes profit per unit above the break-even point.
5. What is the variable cost ratio? The contribution margin ratio? How are the two ratios related?
6. Suppose a firm with a contribution margin ratio of 0.3 increased its advertising expenses by \$10,000 and found that sales increased by \$30,000. Was it a good decision to increase advertising expenses? Suppose that the contribution margin ratio is now 0.4. Would it be a good decision to increase advertising expenses?
7. Define the term *sales mix* and give an example to support your definition.
8. Explain how CVP analysis developed for single products can be used in a multiple-product setting.
9. Since break-even analysis focuses on making zero profit, it is of no value in determining the units a firm must sell to earn a targeted profit. Do you agree or disagree with this statement? Why?
10. How does target profit enter into the break-even units equation?
11. Explain how a change in sales mix can change a company's break-even point.
12. Define the term *margin of safety*. Explain how it can be used as a crude measure of operating risk.
13. Explain what is meant by the term *operating leverage*. What impact does increased leverage have on risk?
14. How can sensitivity analysis be used in conjunction with CVP analysis?
15. Why is a declining margin of safety over a period of time an issue of concern to managers?

### MULTIPLE-CHOICE EXERCISES

4-1 If the variable cost per unit goes up,

Contribution margin	Break-even point
a. increases	increases
b. increases	decreases
c. decreases	increases
d. decreases	remains unchanged

Exercises, with an average of 17 in each chapter, are linked to a specific **Objective**—and many are linked to a **Cornerstone**, giving students a chance to try a problem on their own that is similar to the in-chapter example. Students can easily reference back to the associated **Cornerstone** if extra help is needed.

# PREFACE

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Chapter 4

Cost-Volume-Profit Analysis: A Managerial Planning Tool

- Suppose that Candyland, Inc., raises the price to \$6.20 per box but anticipated sales drop to 31,500 boxes. What will the new break-even point in units be? Should Candyland raise the price? Explain.

## Problem 4-14 Break-Even Sales, Operating Leverage, Change in Income

Income statements for two different companies in the same industry are as follows:

	Company A	Company B
Sales	\$500,000	\$500,000
Less: Variable costs	400,000	200,000
Contribution margin	\$100,000	\$300,000
Less: Fixed costs	\$0	\$250,000
Operating income	\$50,000	\$50,000

### Required:

- Compute the degree of operating leverage for each company.
- Compute the break-even point for each company. Explain why the break-even point for Company B is higher.
- Suppose that both companies experience a 50-percent increase in revenues. Compute the percentage change in profits for each company. Explain why the percentage increase in Company B's profits is so much larger than that of Company A.

## Problem 4-15 Ethics and a CVP Application

Danna Lumus, the marketing manager for a division that produces a variety of paper products, was considering the divisional manager's request for a sales forecast for a new line of paper napkins. The divisional manager was gathering data so that he could choose between two different production processes. The first process would have a variable cost of \$10 per case produced and fixed costs of \$100,000. The second process would have a variable cost of \$6 per case and fixed costs of \$200,000. The selling price would be \$30 per case. Danna had just completed a marketing analysis that projected annual sales of 30,000 cases.

Danna was reluctant to report the 30,000 forecast to the divisional manager. She knew that the first process was labor-intensive, whereas the second was largely automated with little labor and no requirement for an additional production supervisor. If the first process were chosen, Jerry Johnson, a good friend, would be appointed as the line supervisor. If the second process were chosen, Jerry and an entire line of laborers would be laid off. After some consideration, Danna revised the projected sales downward to 22,000 cases.

She believed that the revision downward was justified. Since it would lead the divisional manager to choose the manual system, it showed a sensitivity to the needs of current employees—a sensitivity that she was afraid her divisional manager did not possess. He was too focused on quantitative factors in his decision making and usually ignored the qualitative aspects.

### Required:

- Compute the break-even point for each process.
- Compute the sales volume for which the two processes are equally profitable. Identify the range of sales for which the manual process is more profitable than the automated process. Identify the range of sales for which the automated process is more profitable than the manual process. Why did the divisional manager want the sales forecast?
- Discuss Danna's decision to alter the sales forecast. Do you agree with it? Did she act ethically? Was her decision justified since it helped a number of employees?

**Problems** are also linked to a specific learning objective but are more in-depth than the *Exercises*, often requiring multiple answers. Chapters feature an average of 15 *Problems*. Associated *Cornerstones* are identified in the Instructor's Manual, allowing instructors the option of providing this information to their students.

**Additional end-of-chapter "building on a Cornerstone" problems** are identified with a special icon. These problems challenge students' analytical skills by taking them beyond the basics and building upon proficiencies learned from a particular *Cornerstone*. These *Cornerstone* problems usually entail expanded exploration, such as group work, analytical reasoning, Internet research, decision making, and/or the use of written communication skills.



**Kicker company logos** identify *Problems* that incorporate the ideas presented in that chapter's *Here's the Real Kicker* scenario. **Spreadsheet icons** identify *Problems* and *Exercises* that require the preparation of a cost report with the aid of the *Student Spreadsheet Templates*.

Chapter 6

Cost-Volume-Profit Analysis: A Managerial Planning Tool

## PROBLEMS

(Note: Whenever you see a next to a requirement, it signals a "building on a Cornerstone" requirement. Answering this requirement will usually entail additional work, such as a group project, analytical reasoning, Internet research, decision making, and the use of written communication skills.)

### Problem 4-1 Break-Even Units, Contribution Margin Ratio, Margin of Safety

Curtas Company's projected profits for the coming year is as follows:

	Total	Per Unit
Sales	\$200,000	\$20
Less: Variable expenses	120,000	12
Contribution margin	\$80,000	\$8
Less: Fixed expenses	\$60,000	
Operating income	\$20,000	

#### Required:

- Compute the break-even point in units.
- How many units must be sold to earn a profit of \$50,000?
- Compute the contribution margin ratio. Using that ratio, compute the additional profit that Curtas would earn if sales were \$25,000 more than expected.
- For the projected level of sales, compute the margin of safety in units.

### Problem 4-2 Break-Even Units, Operating Income, Margin of Safety

Dairy Manufacturing Company produces T-shirts screen-printed with the logo of various sports teams. Each shirt is priced at \$10 and has a unit variable cost of \$5. Total fixed costs are \$96,000.

#### Required:

- Compute the break-even point in units.
- Suppose that Dairy could reduce its fixed costs by \$15,500 by reducing the amount of setup and engineering time needed. How many units must be sold to break even in this case?
- How does the reduction in fixed costs affect the break-even point? Operating income? The margin of safety?

### Problem 4-3 Contribution Margin, Break-Even Units, Break-Even Sales, Margin of Safety, Degree of Operating Leverage

Schulz Company produces a variety of chemicals. One division makes reagents for laboratories. The division's projected income statement for the coming year is:

Sales (128,000 units @ \$50)	\$6,400,000
Less: Variable expenses	4,480,000
Contribution margin	\$1,920,000
Less: Fixed expenses	1,000,000
Operating income	\$920,000

#### Required:

- Compute the contribution margin per unit and calculate the break-even point in units (round to the nearest unit). Calculate the contribution margin ratio and the break-even sales revenue.

(continued)



## PREFACE

# Personal Trainer 3.0

Specially designed to enhance *Management Accounting: The Cornerstone for Business Decisions*, **Personal Trainer 3.0** is an ideal teaching and learning companion! Interactive and powerful, **Personal Trainer 3.0** features all of the end-of-chapter problems and exercises. This makes it easy for students to complete their assigned homework online—or even to sharpen their skills on unassigned homework.

With Microsoft Excel spreadsheets and full-featured gradebook functionality, **Personal Trainer 3.0** provides an unprecedented real-time, guided, self-correcting, learning reinforcement system outside of the classroom—making it ideal for either a distance learning or traditional course. For instructors, this powerful technology program eases the time-consuming task of grading homework.



### Highlights of Personal Trainer 3.0

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**Personal Trainer 3.0** includes all exercises and problems from the text. Students can get help entering their answers in the proper format and run a spell check on their answers. On selected questions, students can call up additional, similar questions for extra practice.

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The flexible gradebook can display and download any combination of student work, chapters, or activities. Capture grades on demand or set a particular time for grades to be automatically captured. Tag questions as “required” or “excluded,” so students only access the questions instructors want them to complete.

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Students can receive up to three hints per activity. These hints can be Microsoft® PowerPoint® slides, video clips, images from the text, or references to specific Cornerstones within the text. And instructors have the option of adding a hint of their own!

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**Personal Trainer** is included in **WebTutor™ Advantage** (see page xxiv), or it can be purchased separately online. Visit <http://personaltrainer.swlearning.com> for more information and a comprehensive tour of **Personal Trainer 3.0**, or contact your sales representative to order.

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