MANAGERIAL ACCOUNTING

FIFTH EDITION

JAMES JIAMBALVO

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A Note to Students...

Dear Students of Managerial Accounting,

Managerial Accounting is concerned with using information to effectively plan and control operations and make good business decisions. And the overall objective of this book is to provide you with the concepts and tools needed in planning, control, and decision making. I've taught Managerial Accounting for many years and my former students, many of whom are in senior executive positions, tell me that they've used these concepts and tools throughout their business careers. So trust me, work hard in this course and you will reap major benefits!

In approaching the course, realize that you need to take personal responsibility for your success. Of course your instructor will help you understand the material, but you're the one who must make time to read the material before class and complete all assigned problems and cases. I recommend that you take a three-step approach to the study of each chapter in *Managerial Accounting*:

- First, skim the chapter for a quick overview.
- Second, read the chapter carefully and pay particular attention to the illustrations. When you're finished, make sure you understand each of the learning objectives.
- Third, enhance and test your knowledge using the materials on the companion Web site for the book.

If at all possible, you should also form a study group with one or two of your classmates. You'll learn a lot from each other, and going over the homework together may actually be fun!

With my best wishes for success,

Jim Jiambalvo

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MANAGERIAL ACCOUNTING

JAMES JIAMBALVO

University of Washington

WILEY

To my wife, Cheryl

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JAMES JIAMBALVO, Dean of the Michael G. Foster School of Business at the University of Washington and Kirby L. Cramer Chair in Business Administration, joined the accounting faculty at Foster after receiving a Ph.D. in accounting from the Ohio State University. A CPA, he has audit experience with the firm of Haskins and Sells (now Deloitte & Touche), and has served on the national academic advisory board of Deloitte & Touche LLP. Dean Jiambalvo has served as chairman of the UW Accounting Department and previously held the PricewaterhouseCoopers and Alumni Endowed Professorship.

Dean Jiambalvo's research has been published in the top accounting journals including *The Accounting Review*, *Contemporary Accounting Research*, the *Journal of Accounting and Economics*, and the *Journal of Accounting Research*. He is past associate editor of *The Accounting Review* and has served on the editorial boards of *The Accounting Review*, *Contemporary Accounting Research*, and the *Journal of Management Accounting Research*.

Dean Jiambalvo has received the Notable Contribution to the Auditing Literature Award, the Burlington Northern Foundation Faculty Achievement Award, the Andrew V. Smith Faculty Development Award, and the Lex N. Gamble Award for Excellence in the Field of E-Commerce; he has been recognized for his teaching of managerial accounting with the MBA Professor of the Year and Professor of the Quarter Awards. He has taught numerous executive education courses including courses for Alcoa, Boeing, Microsoft, Tyson, and other major firms. He serves on the board of Saltchuk Resources.

Preface

This book is intended to drive home the fundamental ideas of managerial accounting and motivate students to actually *want* to study the subject. As you will see, the text has a number of unique features that help accomplish these goals. Based on my teaching experience and from what we have heard from professors using the previous editions, we believe students and professors want a textbook that:

- Recognizes that most students will become managers, not accountants
- Focuses attention on decision making
- Stresses the fact that "You Get What You Measure"
- Motivates students to learn managerial accounting by connecting concepts and techniques to the real world
- Recognizes the growing importance of service businesses
- Is clear, concise (can be covered in one semester), and current
- Provides students with ample opportunities to test their knowledge.

Here's how the fifth edition of *Managerial Accounting* reflects these desires.

Recognizes that most students will become managers, not accountants. Most students of introductory managerial accounting will pursue careers as managers, not accountants. Future managers most likely will not need to know the FIFO approach to process costing or how to calculate four overhead variances—so these and other less essential topics are not covered.

Focuses more attention on decision making. Instructors want their students to be able to solve the types of problems that real managers face. This requires that more emphasis be placed on decision making skills. Accordingly, three of the chapters (Chapters 7, 8, and 10) focus specifically on decision making. Additionally, decision making, and the use of incremental analysis, are discussed in the first chapter and integrated throughout the book. By the time students get to Chapter 7 (The Use of Cost Information in Management Decision Making), they will already have a good understanding of costs that are relevant in making a decision. And after reading Chapter 7, working homework problems and discussing the material in class, they will have, we hope, a great understanding of decision making!

Stresses the fact that "You Get What You Measure" Senior managers know that performance measures greatly affect how subordinates focus their time and attention. Thus, the subject of performance measurement is of great practical importance. In this book, every chapter makes reference to the critical idea that *you get what you measure*, and Chapter 12 has an extensive discussion of performance measures.

Motivates students to learn managerial accounting by connecting concepts and techniques to the real world. Business people often say that they wish they had known how important managerial accounting would be to their success on the job—they would have studied the subject harder in school! Here, every effort is made to convince students that managerial accounting is of critical importance in the real world. *Link to Practice* boxes relate the text material to real companies. Additionally, each chapter has cases developed with feedback from managers who attested to their realism and relevance. An often-heard comment: "We had that exact situation at my company!"

Recognizes the growing importance of service businesses. In the last twenty years, employment has shifted from manufacturing to the service sector. Now, more than 75% of all jobs are in the service economy. With this in mind, numerous examples of service companies are in the chapter and end-of-chapter materials.

Clear, concise (can be covered in one semester), and current. According to students and faculty who used the previous editions, a major and much appreciated strength of the text is the clear and concise writing style. Discussions are to the point, ideas are illustrated, and examples are presented to make the ideas concrete. The entire text can be comfortably covered in one semester. Coverage is also up-to-date including: Theory of Constraints, Economic Value Added, The Balanced Scorecard, Strategy Maps, Activity-Based Costing and Activity-Based Management, Why Budget-Based Compensation Can Encourage Padding and Income-Shifting, etc.

Provides students with ample oppourtunities to test their knowledge. In each chapter, students are presented with a feature called *Test Your Knowledge*. And, at the end of each chapter there are two comprehensive review problems as well as several multiple choice problems with solutions. These features allow students to assess their understading of the material as they read through the chapter as well as after they have finished reading the entire chapter. The features also set students up for success in completing end-of-chapter assignments.

NEW IN THE FIFTH EDITION

- Every paragraph has been reconsidered to ensure utmost clarity.
- The end-of-chapter material has been revised and correlated to the learning objectives of each chapter.
- There are numerous new **Links to Practice** showig the real-word relevance of the material.
- A feature called ***Test your Knowledge*** has been incorporated throughout each chapter. This feature presents students with multiple choice problems allowing them to test their understanding as they read through the chapter.
- Chapters on the Statement of Cash Flows (Chapter 13) and Financial Statement Analysis (Chapter 14), which are typically covered in Financial Accounting, have been removed from the text. However, for users who wish to cover these topics, both chapters are still available on the wiley.com book companion site (www. wiley.com/college/jiambalvo).

CHAPTER ORGANIZATION AND CONTENT

Chapter 1: Managerial Accounting in the Information Age

This chapter describes how managerial accounting is used in planning, control, and decision making, and discusses two key ideas in managerial accounting: (1) decision making relies on incremental analysis and (2) you get what you measure! These two key ideas are integrated throughout the text and receive special attention in Chapter 7 (which covers decision making) and Chapter 12 (which covers performance evaluation). Because the book emphasizes the use of information in decision making, a number of cost terms are introduced in the first chapter (e.g., fixed, variable, sunk, and opportunity cost). That way, students can begin discussing various decisions using the appropriate vocabulary right from the start. Later in Chapters 4 and 7, these cost terms are reinforced.

In addition, Chapter 1 discusses how information technology facilitates information flows up and down the value chain. There is also a discussion of Sarbanes-Oxley and business ethics, including a framework for ethical decision making.

Chapter 2: Job-Order Costing for Manufacturing and Service Companies

Using an example of a small custom boat builder, this chapter discusses cost classifications for manufacturing firms and how costs of manufactured products are reflected in a company's financial statements. Job-order costing for service companies is also covered using an example of a consulting firm. The chapter ends with a discussion of modern manufacturing practices and how they help companies succeed in a competitive global economy. One of the Links to Practice raises the intriguing question, "Considering that you get what you measure, can there be too much emphasis on quality?"

Chapter 3: Process Costing

This chapter presents a relatively simple, straightforward treatment of process costing using the weighted-average approach. Students learn how to calculate the cost per equivalent unit and how to prepare a production cost report. They do not learn the more complex FIFO approach to process costing. The *Tech-Tonic Sports Drink* case at the end of the chapter confronts students with two ways to treat the cost of lost units: (1) include the entire cost of the lost units in cost of goods sold, or (2) assign part of the cost to cost of goods sold and part to ending inventory. The case can be used to discuss alternative accounting treatments, earnings management, and ethical issues in accounting.

Chapter 4: Cost-Volume-Profit Analysis

This chapter presents the tools needed to analyze cost-volume-profit relationships and how they are used in planning, control, and decision making. Students learn how to use account analysis and the high-low method to estimate cost behavior. Regression analysis using Excel is presented in an appendix, and end-of-chapter material is available for instructors who wish to cover regression analysis. The chapter includes a discussion of operating leverage, shows how operating leverage affects the percentage change in profit for a given change in sales, and relates operating leverage to risk.

Chapter 5: Variable Costing

This chapter explains the difference between variable and full costing and how, under full costing, excess production can be used to "bury" fixed production costs in ending inventory. There is also a discussion of the impact of just-in-time production on the difference between full and variable costing income.

Chapter 6: Cost Allocation and Activity-Based Costing

The chapter explains *why* costs are allocated, then discusses the allocation process and problems related to allocation. This rather extensive background sets the stage for a thorough discussion of activity-based costing, since ABC addresses problems arising from using too few cost pools and only volume-related allocation bases. At this point in the book, students have a reasonable understanding of fixed and variable costs and the need for incremental analysis. This lets them grasp a major drawback with ABC in practice—namely, in practice, ABC is generally used to develop the *full cost* of products and services, and this information isn't consistent with the incremental analysis used in decision making. The chapter also notes a major benefit of ABC: namely, ABC may lead to improvements in cost control. This follows because with ABC, managers see costs broken out by a number of activities rather than buried in one or two overhead cost pools. The discussion of ABC's use in cost control naturally leads to a discussion of a related approach, activity-based management (ABM). ABM is discussed in more detail in an appendix to the chapter.

Chapter 7: The Use of Cost Information in Management Decision Making

By the time students get to Chapter 7, they already have a *fair* understanding of incremental analysis. After reading Chapter 7, they should have an *excellent* understanding. The chapter stresses the importance of qualitative considerations in management decisions. An appendix on the Theory of Constraints (TOC) applies TOC logic to analyze decisions related to inspections, batch sizes, and across-the-board cuts.

Chapter 8: Pricing Decisions, Analyzing Customer Profitability, and Activity-Based Pricing

Pricing decisions are extremely important for most companies. This chapter covers the economic approach to determining the profit-maximizing price, incremental analysis related to pricing special orders, and the cost-plus approach to pricing. Target costing is also discussed. Two topics related to activity-based costing (which is discussed in Chapter 6) are also covered: customer profitability analysis and activity-based pricing.

Chapter 9: Capital Budgeting and Other Long-Run Decisions

This chapter shows how to take the time value of money into account when evaluating capital investment opportunities and when making other long-run decisions. Consistent with the idea that most users of the book will become managers rather than accountants, the treatment of taxes is simplified. Students learn that taxes play an important role in investment decisions, but are not required to learn complex tax rules (which may change before they have a chance to apply their knowledge). The chapter notes that managers may concentrate erroneously on the short-run profitability of investments rather than their net present values. This follows because you get what you measure! In other words, performance measures may drive managers to have a short-run focus. An appendix covers the use of Excel to calculate net present value and the internal rate of return.

Chapter 10: Budgetary Planning and Control

The role of budgets in planning and control is presented in this chapter, and students learn how to prepare the various budget schedules that make up the master budget. Students also learn why flexible budgets are needed for performance evaluation. Importantly, there is a discussion on why budget-based compensation schemes can lead to budget padding and income shifting across periods. The Abruzzi Olive Oil Company case clearly conveys to students that budgets should be prepared using spreadsheets (exploring various budget assumptions is easy using a spreadsheet and very tedious using a hand-held calculator).

Chapter 11: Standard Costs and Variance Analysis

In this chapter, students learn how to compute and interpret variances for direct material, direct labor, and manufacturing overhead. Consistent with our focus on future managers rather than future accountants, only two (rather than four) overhead variances are discussed: the controllable overhead variance and the overhead volume variance. To provide flexibility to instructors, recording of standard costs and variances in accounts is discussed in an appendix.

Chapter 12: Decentralization and Performance Evaluation

This chapter discusses the pros and cons of decentralization and explains why companies evaluate the performance of subunits and subunit managers, really emphasizing the idea that *you get what you measure*. In particular, it focuses on why evaluation in terms of profit can lead to overinvestment (investing in projects with an expected return that is less than the cost of capital) while evaluation in terms of ROI can lead to underinvestment (failure to invest in projects with an expected return that is greater than the cost of capital). Residual income (and the related measure, economic value added or EVA) solves, to some extent, the problems of over- and underinvestment. The chapter ends with a discussion of the Balanced Scorecard.

The following chapters are available on the wiley.com book companion site (www.wiley.com/college/jiambalvo).

Chapter 13: Statement of Cash Flows

In this chapter students learn the direct method for preparing the statement of cash flow but *emphasis* is on the indirect method which is more common in practice. The chapter clearly shows that even a company that has substantial net income may have a cash flow problem that can be identified if one understands the statement of cash flows.

Chapter 14: Analyzing Financial Statements: A Managerial Perspective

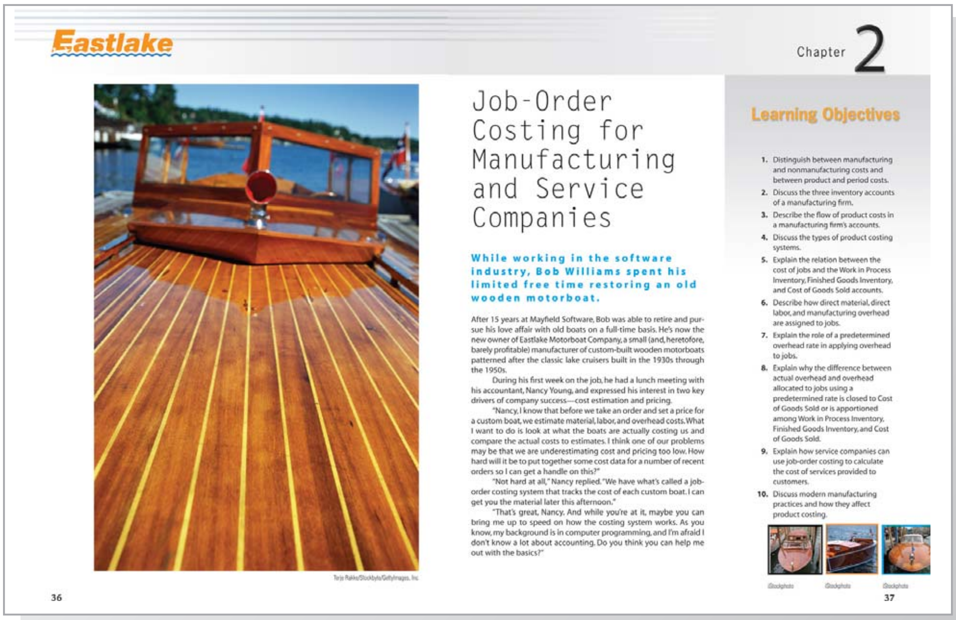
This chapter reviews the three primary financial statements and explains that managers analyze them to control operations, to assess the financial stability of vendors, customers, and other business partners, and to assess how their companies appear to investors and creditors. In terms of analysis, the chapter covers horizontal, vertical, and ratio analysis. A discussion of earnings management indicates why it is important to compare cash flow from operations to net income. There is also a discussion of how the MD&A section of an annual report, credit reports, and news articles can be used to gain insight into a company's current and future financial performance.

Chapter Features

Here are the special features that are appreciated by instructors and students and contribute to a deep understanding of managerial accounting.

■ CHAPTER OPENERS

Each chapter opens with an example from a hypothetical company posing an issue that a real manager might encounter, such as, "Is my costing system distorting product cost?" That issue is revisited later in the chapter after students have gained an understanding of the concepts and techniques needed to address it.



Eastlake

Chapter 2

Job-Order Costing for Manufacturing and Service Companies

While working in the software industry, Bob Williams spent his limited free time restoring an old wooden motorboat.

After 15 years at Mayfield Software, Bob was able to retire and pursue his love affair with old boats on a full-time basis. He's now the new owner of Eastlake Motorboat Company, a small (and, heretofore, barely profitable) manufacturer of custom-built wooden motorboats patterned after the classic lake cruisers built in the 1930s through the 1950s.

During his first week on the job, he had a lunch meeting with his accountant, Nancy Young, and expressed his interest in two key drivers of company success—cost estimation and pricing.

"Nancy, I know that before we take an order and set a price for a custom boat, we estimate material, labor, and overhead costs. What I want to do is look at what the boats are actually costing us and compare the actual costs to estimates. I think one of our problems may be that we are underestimating cost and pricing too low. How hard will it be to put together some cost data for a number of recent orders so I can get a handle on this?"

"Not hard at all," Nancy replied. "We have what's called a job-order costing system that tracks the cost of each custom boat. I can get you the material later this afternoon."

"That's great, Nancy. And while you're at it, maybe you can bring me up to speed on how the costing system works. As you know, my background is in computer programming, and I'm afraid I don't know a lot about accounting. Do you think you can help me out with the basics?"

Learning Objectives

1. Distinguish between manufacturing and nonmanufacturing costs and between product and period costs.
2. Discuss the three inventory accounts of a manufacturing firm.
3. Describe the flow of product costs in a manufacturing firm's accounts.
4. Discuss the types of product costing systems.
5. Explain the relation between the cost of jobs and the Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold accounts.
6. Describe how direct material, direct labor, and manufacturing overhead are assigned to jobs.
7. Explain the role of a predetermined overhead rate in applying overhead to jobs.
8. Explain why the difference between actual overhead and overhead allocated to jobs using a predetermined rate is closed to Cost of Goods Sold or is apportioned among Work in Process Inventory, Finished Goods Inventory, and Cost of Goods Sold.
9. Explain how service companies can use job-order costing to calculate the cost of services provided to customers.
10. Discuss modern manufacturing practices and how they affect product costing.

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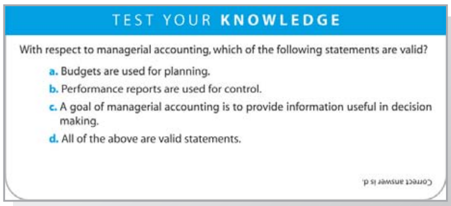
■ TEST YOUR KNOWLEDGE

This feature presents students with multiple choice problems allowing them to test their understanding as they read through the chapter.



TEST YOUR **KNOWLEDGE**

With respect to managerial accounting, which of the following statements are valid?

a. Budgets are used for planning.
b. Performance reports are used for control.
c. A goal of managerial accounting is to provide information useful in decision making.
d. All of the above are valid statements.

Correct answer is d.

LINK TO **PRACTICE**

People Problems in Budgeting

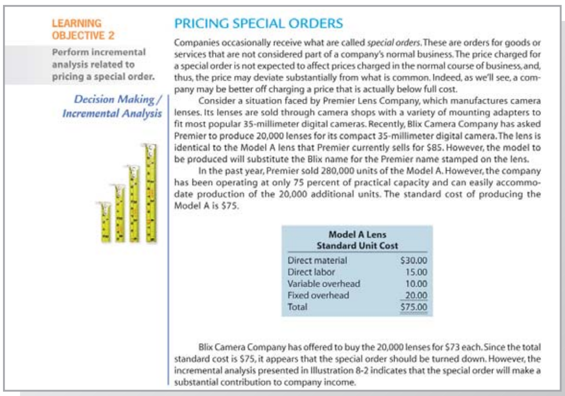
In spring 2007, Centage and the Institute of Management and Administration conducted a survey of chief financial officers (CFOs) from more than 20 industries regarding their budgeting practices. According to the respondents, the number-one budgeting pain point was dealing with managers. In particular, the CFOs faulted managers for:

- Not taking ownership or being accountable.
- Lack of cooperation and/or participation.
- Lack of understanding of the process or what's required.
- Not meeting deadlines.
- Padding their budgets/providing unrealistic numbers.

Source: Centage/IOMA, *Budgeting Survey: Benchmarks & Issues*, 2008.

■ LINKS TO PRACTICE

This feature relates the material to real-world companies and the issues they face.



LEARNING OBJECTIVE 2

Perform incremental analysis related to pricing a special order.

Decision Making / Incremental Analysis

PRICING SPECIAL ORDERS

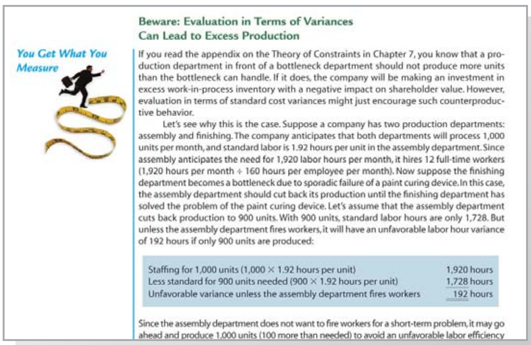
Companies occasionally receive what are called *special orders*. These are orders for goods or services that are not considered part of a company's normal business. The price charged for a special order is not expected to affect prices charged in the normal course of business, and, thus, the price may deviate substantially from what is common. Indeed, as we'll see, a company may be better off charging a price that is actually below full cost.

Consider a situation faced by Premier Lens Company, which manufactures camera lenses. Its lenses are sold through camera shops with a variety of mounting adapters to fit most popular 35-millimeter digital cameras. Recently, Blix Camera Company has asked Premier to produce 20,000 lenses for its compact 35-millimeter digital camera. The lens is identical to the Model A lens that Premier currently sells for $85. However, the model to be produced will substitute the Blix name for the Premier name stamped on the lens.

In the past year, Premier sold 280,000 units of the Model A. However, the company has been operating at only 75 percent of practical capacity and can easily accommodate production of the 20,000 additional units. The standard cost of producing the Model A is $75.

Model A Lens Standard Unit Cost	
Direct material	$30.00
Direct labor	15.00
Variable overhead	10.00
Fixed overhead	20.00
Total	$75.00

Blix Camera Company has offered to buy the 20,000 lenses for $73 each. Since the total standard cost is $75, it appears that the special order should be turned down. However, the incremental analysis presented in Illustration 8-2 indicates that the special order will make a substantial contribution to company income.



You Get What You Measure

Beware: Evaluation in Terms of Variances Can Lead to Excess Production

If you read the appendix on the Theory of Constraints in Chapter 7, you know that a production department in front of a bottleneck department should not produce more units than the bottleneck can handle. If it does, the company will be making an investment in excess work-in-process inventory with a negative impact on shareholder value. However, evaluation in terms of standard cost variances might just encourage such counterproductive behavior.

Let's see why this is the case. Suppose a company has two production departments: assembly and finishing. The company anticipates that both departments will process 1,000 units per month, and standard labor is 1.92 hours per unit in the assembly department. Since assembly anticipates the need for 1,920 labor hours per month, it hires 12 full-time workers (1,920 hours per month ÷ 160 hours per employee per month). Now suppose the finishing department becomes a bottleneck due to sporadic failure of a paint curing device. In this case, the assembly department should cut back its production until the finishing department has solved the problem of the paint curing device. Let's assume that the assembly department cuts back production to 900 units. With 900 units, standard labor hours are only 1,728. But unless the assembly department fires workers, it will have an unfavorable labor hour variance of 192 hours if only 900 units are produced:

Staffing for 1,000 units (1,000 × 1.92 hours per unit)	1,920 hours
Less standard for 900 units needed (900 × 1.92 hours per unit)	1,728 hours
Unfavorable variance unless the assembly department fires workers	192 hours

Since the assembly department does not want to fire workers for a short-term problem, it may go ahead and produce 1,000 units (100 more than needed) to avoid an unfavorable labor efficiency

■ TWO KEY IDEAS

The text stresses two key ideas: (1) "Decision Making/Incremental Analysis," and (2) "You Get What You Measure." Both of these ideas are referred to in every chapter. Icons are used to call attention to discussions related to them.

Decision Making Insight

Managers need to assure their subordinates that they recognize that an unfavorable variance does not necessarily imply poor performance. Otherwise, subordinates may make decisions that hurt shareholder value. Let's see why this is the case. Suppose a manager unfairly criticizes a subordinate for having an unfavorable material price variance when, beyond the control of the subordinate, suppliers increase prices. What will happen the next time prices increase? The subordinate may turn to a lower-quality (and lower-price) supplier in an effort to avoid an unfavorable material price variance. That decision, however, could have a major negative impact on shareholder value.

■ DECISION MAKING INSIGHT

At the end of each chapter a section called Decision Making Insight explicitly links the chapter material to decision making.

■ CHAPTER SUMMARY BY LEARNING OBJECTIVES

There is a list of learning objectives at the start of each chapter and they are repeated next to the text where they are addressed. Importantly, at the end of each chapter there is a summary organized by learning objective so that students can efficiently review and assess whether they have mastered the material.

Summary of Learning Objectives

LEARNING OBJECTIVE 1 Identify common cost behavior patterns.

Common cost behavior patterns include those involving variable, fixed, mixed, and step costs. Variable costs are costs that change in proportion to changes in volume or activity. Fixed costs are constant across activity levels. Mixed costs contain both a variable cost component and a fixed cost component. Step costs are fixed for a range of volume but increase to a higher level when the upper bound of the range is exceeded.

LEARNING OBJECTIVE 2 Estimate the relation between cost and activity using account analysis and the high-low method.

Managers use account analysis, the high-low method, and regression analysis to estimate the relation between cost and activity. Account analysis requires that the manager use his or her judgment to classify costs as either fixed or variable. The high-low method fits a straight line to the costs at the highest and the lowest activity levels. Regression analysis provides the best straight-line fit to prior cost/activity data.

LEARNING OBJECTIVE 3 Perform cost-volume-profit analysis for single products.

Once fixed and variable costs have been estimated, cost-volume-profit analysis can be performed. CVP analysis makes use of the profit equation:

$$\text{Profit} = SP(x) - VC(x) - TFC$$

to perform "what if" analysis. The effect of changing various components of the equation can be explored by solving the equation for the variable affected by the change. units that must be sold or the sales dollars needed to achieve a specified profit level can be determined using the following formulas:

$$\text{Number of units} = \frac{\text{Fixed cost} + \text{Profit}}{\text{Contribution margin}}$$

$$\text{Sales dollars} = \frac{\text{Fixed cost} + \text{Profit}}{\text{Contribution margin ratio}}$$

LEARNING OBJECTIVE 4 Perform cost-volume-profit analysis for multiple products.

The case of multiple products is easily addressed by using the weighted average contribution margin per unit or the weighted average contribution margin ratio.

LEARNING OBJECTIVE 5 Discuss the effect of operating leverage.

Operating leverage relates to the level of fixed versus variable costs in a company's cost structure. The higher the level of fixed costs, the greater the operating leverage. Also, the higher the operating leverage, the greater the percentage change in profit for a given percentage change in sales. Firms with high operating leverage are generally considered to be more risky than firms with low operating leverage.

LEARNING OBJECTIVE 6 Use the contribution margin per unit of the constraint to analyze situations involving a resource constraint.

When there is a constraint, the focus shifts from the contribution margin per unit to the contribution margin per unit of the constraint. The product that has the highest contri-

Review Problem 1

Potter Janitorial Services provides cleaning services to both homes and offices. In the past year, income before taxes was $4,250, as follows:

	Home	Office	Total
Revenue	$250,000	$425,000	$675,000
Less variable costs:			
Cleaning staff salaries	175,000	276,250	451,250
Supplies	30,000	42,500	72,500
Contribution margin	$ 45,000	$106,250	151,250
Less common fixed costs:			
Billing and accounting			25,000
Owner salary			90,000
Other miscellaneous			
Common fixed costs			32,000
Income before taxes			$ 4,250

For the coming year, Janice Potter, the company owner, would like to perform CVP analysis. She has asked you to help her address the following independent questions.

Required

a. What are the contribution margin ratios of the Home and Office segments, and what is the overall contribution margin ratio?

b. Assuming that the mix of home and office services does not change, what amount of revenue will be needed for Janice to earn a salary of $125,000 and have income before taxes of $4,000?

c. Suppose staff salaries increase by 20 percent. In this case, how will break-even sales in the coming year compare to the prior year?

■ SOLVED REVIEW PROBLEMS AND SELF-TESTING MULTIPLE CHOICE QUESTIONS

End of chapter materials include two solved review problems and self-testing multiple-choice questions. Wiley's online resources have additional self-testing material.

SPREADSHEET EXERCISES AND PROBLEMS

Instructors can go to the instructor Web site for a list of exercises and problems that are well suited to spreadsheet analysis. For students who are not familiar with spreadsheets, each chapter identifies three to five exercises and problems with a spreadsheet icon; templates are available for these exercises and problems along with instructional material on how to approach their solution using a spreadsheet.

Problems

PROBLEM 3-1. Comprehensive Problem, One Department [LO 3, 4] Regal Polish manufactures a single product in one department and uses a process costing system. At the start of May, there were 11,000 units in process that were 100 percent complete with respect to direct material and 60 percent complete with respect to conversion costs (labor and overhead). During the month, the company began production of 105,000 units. Ending Work in Process inventory consisted of 5,100 units that were 100 percent complete with respect to material and 70 percent complete with respect to conversion costs.

Cost Information	Beginning Work in Process	Costs Added in May
Direct material	$4,000	$76,500
Direct labor	200	8,880
Manufacturing overhead	300	9,915
Total	$4,500	$95,295

Required

a. Calculate the cost per equivalent unit for each of the three cost items and in total. Round to 3 decimal places.

b. Calculate the cost of items completed in May and the cost of ending Work in Process. Round to 2 decimal places.

c. Reconcile the sum of the two costs in part b to the sum of beginning Work in Process and costs added in May.

Exercises

EXERCISE 2-1. You Get What You Measure! [LO 6] Consider three very similar companies. Company A allocates manufacturing overhead to jobs using labor hours as the allocation base; Company B allocates manufacturing overhead to jobs using machine hours as the allocation base; and Company C allocates manufacturing overhead to jobs using material cost as the allocation base.

Required

Explain why, in spite of the fact that the companies are very similar, supervisors at Company A are very focused on controlling labor, whereas supervisors at Company B are very focused on controlling machine run time, and supervisors at Company C are very focused on controlling material costs. Use the concept of "You get what you measure!" in your answer.

EXERCISE 2-2. Just-in-Time Manufacturing and Assigning Over- or Underapplied Overhead [LO 8, 10] At Star Plastics, the balance in manufacturing overhead (which represents over- or underapplied overhead) is always closed to Cost of Goods Sold. This is done even when the balance is relatively large. Suzette Barger, the controller, explains that this makes sense because Star uses a just-in-time (JIT) manufacturing system and jobs are shipped to customers within hours of being completed.

GROUP WORK, WRITING ASSIGNMENTS, AND WEB RESEARCH

The first three exercises in each chapter address group work, writing, and Web research. Look for the following icons:


group icon


writing icon

internet icon

ETHICS

CASE

1-1 LOCAL 635 [LO 5, 8]

Local 635 represents kitchen workers at hotels in several southern cities. Part of their labor agreement states that workers "shall receive one free meal per shift up to a cost of $12, with any cost over $12 being deducted from wages paid to said employee."

A labor dispute arose at the Riverside Hotel shortly after it was opened in June. Kitchen workers who ate dinner on the late shift found that their wages were reduced by $10 for each meal they consumed at the hotel during their dinner break. Josh Parker, a line cook, stated the widely held belief of the workers. "There's no way these dinners cost the Riverside Hotel $12 to make, let alone $22. This is just another case of management trying to rip us off. Take last night. I had the prime rib dinner. The piece of meat cost about $7 and the salad less than $1. That's only $8 in total. Really, there aren't any other costs to speak of. The cook, well, he's going to be working in the kitchen and getting paid for eight hours whether he makes my meal or not. This claim that my meal cost $22 is baloney!"

Management of the Riverside Hotel sees the situation differently. Take the case of Josh's dinner. In presenting the hotel's case to a labor arbitration board, Sandy Ross, manager of the hotel, explained, "Look, that dinner goes for $32 on the menu so assigning a cost of $22 represents a very good value to the kitchen workers. The contention that the meal only costs $8 is nonsense. True, the meat costs $7 and the salad ingredients cost $1, but there's also the labor costs related to preparing the meal and the numerous overhead costs, like the cost of the oven that the prime rib is cooked in. That oven cost more than $20,000. And there's heat, light, power, etc. Each meal we prepare should be assigned part of these overhead costs. And don't forget that when the worker finishes his or her meal, someone has to clean up. That costs money too. When you add up all of these items, a prime rib dinner easily adds up to $22!"

Required

a. List examples of costs at the Riverside Hotel that are variable, fixed, and sunk. Provide an example of an opportunity cost.

b. What is the source of conflict between labor and management? What changes would you recommend in the wording of the labor agreement?

CASES

Each chapter has one to three cases and "solving" them develops critical thinking skills. The cases also provide additional opportunities for group work and/or written communication work. Several integrate other business disciplines such as management, finance, and marketing.

TEACHING AND LEARNING COMPONENTS

A full range of supplements for both students and instructors is available:

ONLINE RESOURCES

Web Site

For instructors, the instructor companion site provides access to the Solutions Manual, Instructor's Manual, Computerized Test Bank, PowerPoint Presentations, text illustrations, and more. **For Students,** access to PowerPoint illustrations, Excel templates, a Checklist of Key Figures, Web quizzing, and more. The Web site can be accessed at *http://www.wiley.com/college/jiambalvo.*

WileyPLUS

WileyPLUS is an innovative, research-based online environment for effective teaching and learning.

WP builds students' confidence because it takes the guesswork out of studying by providing students with a clear roadmap: what to do, how to do it, if they did it right. Students will take more initiative so you'll have greater impact on their achievement in the classroom and beyond.

Instructors' Resources

Solutions Manual
The Solutions Manual provides detailed solutions for all end-of-chapter questions, exercises, problems, and cases. Solutions are heavily reviewed for accuracy and classified by learning objectives.

Test Bank
With the addition of new exercises, the revised test bank consists of over 2,000 examination questions and exercises accompanied by solutions. Question types include true-false, multiple choice, completion, exercises, and short-answer. Solutions are heavily reviewed for accuracy and classified by learning objectives.

Computerized Test Bank
The computerized test bank allows instructors to create multiple versions of the same test by randomizing question order and the order of answers within multiple-choice questions. Instructors can also edit existing questions as well as add new content. Test bank questions are classified with learning outcomes including AACSB and IMA standards.

Instructor's Manual
The Instructor's Manual is a comprehensive resource guide designed to assist professors in preparing lectures and assignments. The manual includes chapter reviews, lecture outlines, assignment classification tables, teaching illustrations, and quizzing exercises.

PowerPoint
This lecture aid presents key concepts and images from the textbook in a concise and structured manner. Organized by textbook learning objectives, they enhance classroom discussion with review questions and visually reinforce managerial accounting concepts.

Checklist of Key Figures
The Checklist of Key Figures is a listing benchmark figures within each solution to end-of-chapter textbook exercises and problems. They allow students to verify the accuracy of their answers as they work through assignments.

STUDENT RESOURCES

Study Guide

The Study Guide is comprised of a chapter review with true-false question, multiple-choice exercises, and problems. Solutions to questions in the study guide are provided.

Online Excel Workbook and Templates

The Excel Workbook teaches students to apply Excel functionality in accounting. Accompanying online templates identified with an icon in the textbook end-of-chapter material allow students to practice the Excel skills discussed in the online Excel Workbook.

Web Quizzing

Self-assessment questions at the end of each chapter in the text can also be solved in an interactive environment on the student web site.

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Chapters 13 and 14 are now available on the Jiambalvo/Managerial Accounting, 5e book companion site. Please go to www.wiley.com/college/jiambalvo to access these and other resources for the 5th edition.

List of Cases

Each chapter of *Managerial Accounting* includes one or more cases that:

- Promote critical thinking and decision making skills.
- Provide an opportunity for group work and/or written communication work.
- Integrate information from other business disciplines.

CHAPTER 1

1–1: LOCAL 635
A union is disputing "cost of meal" charges to hotel employees.

1–2: BOSWELL PLUMBING PRODUCTS
A senior manager wants to know a product's cost. But the "cost" information needed depends on the decision the senior manager is facing.

CHAPTER 2

2–1: ETHICS CASE: BRIXTON SURGICAL DEVICES
To meet an aggressive earnings target, two senior executives are planning to increase production to "bury" fixed overhead costs in inventory.

2–2: YSL MARKETING RESEARCH
A marketing research firm is considering various costs when bidding on a job.

2–3: DUPAGE POWDER COATING
A company's product costs are being distorted by its approach to overhead allocation.

CHAPTER 3

3–1: TECH-TONIC SPORTS DRINK
A producer of a sports drink is considering alternative treatments for the cost of lost units.

3–2: JENSEN PVC, INC.
A company is considering lowering prices to increase sales and reduce unit costs by making better use of excess capacity.

CHAPTER 4

4–1: ROTHMUELLER MUSEUM
A curator at a museum is trying to estimate the financial impact of a planned exhibit.

4–2: MAYFIELD SOFTWARE, CUSTOMER TRAINING
The customer training facility of a software company is showing a loss. The manager needs to determine the number of classes that must be offered to break even.

4–3: KROG'S METALFAB, INC.
A company is estimating the lost profit related to fire damage so it can submit an insurance claim.

CHAPTER 5

5–1: MICROIMAGE TECHNOLOGY, INC.
A start-up company has a negative gross margin and it appears that "the more it sells, the more it loses." Use of variable costing reveals that this is not the case.

5–2: RAINRULER STAINS
A variable-costing income statement is used to show the financial impact of sales related to a new customer category.

CHAPTER 6

6–1: EASTSIDE MEDICAL TESTING
This case presents a service company example of ABC.

6–2: QuantumTM
This case shows how ABC affects product costs and considers the use of ABC information in decision making.

CHAPTER 7

7–1: PRIMUS CONSULTING GROUP
A consulting firm is considering a client offer of a fee that is less than standard rates.

7–2: FIVE STAR TOOLS
A tool manufacturer is faced with a production constraint, and needs to consider the financial impact of a plan to deal with the situation.

CHAPTER 8

8–1: PRESTON CONCRETE
The company is considering moving away from its cost-plus pricing approach when an increase in interest rates reduces housing starts and the demand for concrete.

8–2: GALLOWAY UNIVERSITY MEDICAL CENTER PHARMACY
A university hospital pharmacy is considering the profit implications of alternative approaches to encouraging prescription renewals from "out-of-area" patients.

CHAPTER 9

9–1: ETHICS CASE: JUNIPER PACKAGING SOLUTIONS, INC.
A plant manager is considering a plan to circumvent a freeze on capital expenditures.

9–2: SERGO GAMES
A game company is considering outsourcing manufacturing of CDs.

CHAPTER 10

10–1: ETHICS CASE: COLUMBUS PARK—WASTE TREATMENT FACILITY
The manager of a waste-treatment facility is planning to pad costs in her budget because the city controller is likely to cut whatever budget is submitted.

10–2: ABRUZZI OLIVE OIL COMPANY
A small producer of olive oil is preparing production budgets to consider the impact of various sales levels. (Note that this case is best "solved" using a spreadsheet.)

CHAPTER 11

11–1: JACKSON SOUND
Work in process inventory is building up at Jackson Sound even though the company has a JIT system.

11–2: CHAMPION INDUSTRIES
A purchasing manager is considering a material that has a price higher than standard, but also a number of desirable properties.

CHAPTER 12

12–1: HOME VALUE STORES
A company that operates membership warehouse stores is evaluating using EVA.

12–2: WIN TECH MOTORS
Owners of a sports and luxury auto dealership are faced with negative EVA and must cut their investment in inventory.

For Cases in Chapters 13 and 14 go to www.wiley.com/college/jiambalvo

CHAPTER 13

13–1: WELLCOMP COMPUTERS
A computer company is considering the impact of a price reduction on cash flow.

CHAPTER 14

14–1: JORDAN-WILLIAMS, INCORPORATED
A publisher of college textbooks is evaluating the financial condition of a potential business partner.

MANAGERIAL ACCOUNTING

Abel Mitja Varela/the Agency Collection/Getty Images, Inc.

Chapter 1

Managerial Accounting in the Information Age

What type of job will you hold in the future?

You may be a marketing manager for a consumer electronics firm, you may be the director of human resources for a biotech firm, or you may be the president of your own company. In these and other managerial positions you will have to plan operations, evaluate subordinates, and make a variety of decisions using accounting information. In some cases, you will find information from your firm's balance sheet, income statement, statement of retained earnings, and statement of cash flows to be useful. However, much of the information in these statements is more relevant to *external* users of accounting information, such as stockholders and creditors. In addition, you will need information prepared specifically for firm managers, the *internal* users of accounting information. This type of information is referred to as managerial accounting information.

If you are like most users of this book, you have already studied financial accounting. Financial accounting stresses accounting concepts and procedures that relate to preparing reports for external users of accounting information. In comparison, **managerial accounting** stresses accounting concepts and procedures that are relevant to preparing reports for internal users of accounting information. This book is devoted to the subject of managerial accounting, and this first chapter provides an overview of the role of managerial accounting in planning, control, and decision making. The chapter also defines important cost concepts and introduces key ideas that will be emphasized throughout the text. The chapter ends with a discussion of the information age and the impact of information technology on business, a framework for ethical decision making, and the role of the controller as the top management accountant. Note that you can enhance and test your knowledge of the chapter using Wiley's online resources and the self-assessment quiz at the end of the chapter. The end-of-chapter material also includes two solved review problems.

Learning Objectives

1. State the primary goal of managerial accounting.
2. Describe how budgets are used in planning.
3. Describe how performance reports are used in the control process.
4. Distinguish between financial and managerial accounting.
5. Define cost terms used in planning, control, and decision making.
6. Explain the two key ideas in managerial accounting.
7. Discuss the impact of information technology on competition, business processes, and the interactions companies have with suppliers and customers.
8. Describe a framework for ethical decision making.
9. Discuss the duties of the controller, the treasurer, the chief information officer, and the chief financial officer.


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GOAL OF MANAGERIAL ACCOUNTING

LEARNING OBJECTIVE 1

State the primary goal of managerial accounting.

Virtually all managers need to plan and control their operations and make a variety of decisions. The goal of managerial accounting is to provide the information they need for *planning, control,* and *decision making*. If *your* goal is to be an effective manager, a thorough understanding of managerial accounting is essential.

Planning

LEARNING OBJECTIVE 2

Describe how budgets are used in planning.

Planning is a key activity for all companies. A plan communicates a company's goals to employees aiding coordination of various functions, such as sales and production. A plan also specifies the resources needed to achieve company goals.

Budgets for Planning. The financial plans prepared by managerial accountants are referred to as **budgets**. A wide variety of budgets may be prepared. For example, a *profit budget* indicates planned income, a *cash-flow budget* indicates planned cash inflows and outflows, and a *production budget* indicates the planned quantity of production and the expected costs.

Consider the production cost budget for Surge Performance Beverage Company. In the coming year, the company plans to produce 5,000,000 12-ounce bottles. This amount is based on forecasted sales. To produce this volume, the company estimates it will spend $1,500,000 on bottles, $400,000 on ingredients, $150,000 on water, and pay workers at its bottling plant $300,000. It also expects to pay $60,000 for rent, incur $80,000 of depreciation of equipment, and pay $100,000 for other costs. The production cost budget presented in Illustration 1-1 summarizes this information. This budget informs the managers of Surge about how many bottles the company intends to produce and what the necessary resources will cost.

Control

LEARNING OBJECTIVE 3

Describe how performance reports are used in the control process.

Control of organizations is achieved by evaluating the performance of *managers* and the *operations* for which they are responsible. The distinction between evaluating managers and evaluating the operations they control is important. Managers are evaluated to determine how their performance should be rewarded or punished, which in turn motivates them to perform at a high level. Based on an evaluation indicating good performance, a manager might receive a substantial bonus. An evaluation indicating a manager performed poorly might lead to the manager being fired. In part because evaluations of managers are typically tied to compensation and promotion opportunities, managers work hard to ensure that they will receive favorable evaluations. (Of course, managers may also work hard because they love their jobs, receive respect from coworkers, or value the sense of accomplishment from a job well done!)

Illustration 1-1
Production cost budget

SURGE PERFORMANCE BEVERAGE COMPANY

Budgeted Production Costs
For the Year Ended December 31, 2014

Budgeted Production	**5,000,000 Bottles**
Cost of bottles	$1,500,000
Ingredient cost	400,000
Water	150,000
Labor cost	300,000
Rent	60,000
Depreciation	80,000
Other	100,000
Total budgeted production cost	$2,590,000

Elle Wagner/Copyright John Wiley & Sons, Inc.

Managerial accounting information is used to plan and control operations and make decisions at Surge Performance Beverage Company.

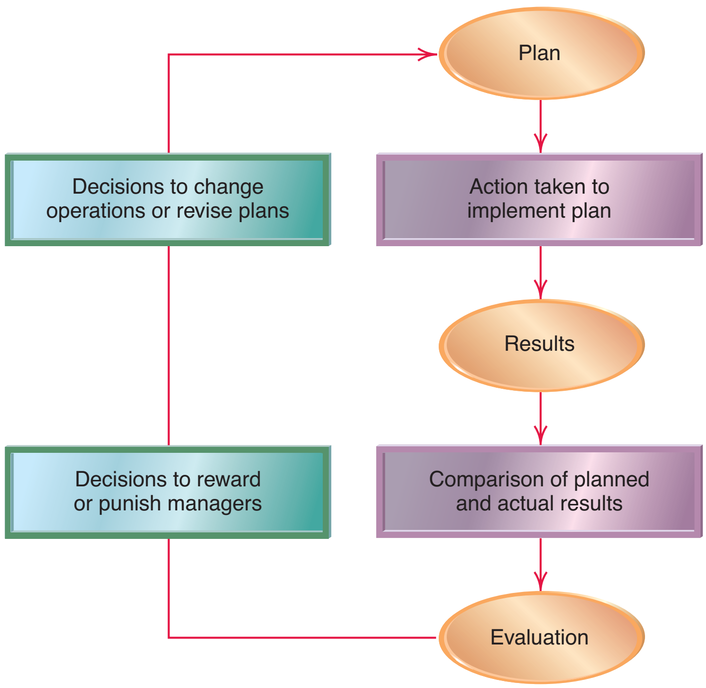
Operations are evaluated to provide information as to whether they should be changed or not (i.e., expanded, contracted, or modified in some way). An evaluation of an operation can be negative even when the evaluation of the manager responsible for the operation is basically positive. For example, the manager of one of the two bottling plants at Surge Performance Beverage Company may do a good job of controlling costs and meeting deadlines, given that the plant is old and out of date. Still, senior management may decide to close the plant because, given the outdated equipment in the plant, it is not an efficient operation. In this scenario, the manager receives a positive evaluation whereas the operation receives a negative evaluation.

Company plans often play an important role in the control process. Managers can compare actual results with planned results and decide whether corrective action is necessary. If actual results differ from the plan, the plan may not have been followed properly; the plan may have not have been well thought out; or changing circumstances may have made the plan out of date.

Illustration 1-2 presents the major steps in the planning and control process. Once a plan has been made, actions are taken to implement it. These actions lead to results that are compared with the original plan. Based on this evaluation, managers are rewarded (e.g., given substantial bonuses or promoted if performance is judged to be good) or punished (e.g., given only a small bonus, given no bonus, or even fired if performance is judged to be poor). Also, based on the evaluation process, operations may be changed. Changes may consist of expanding (e.g., adding a second shift), contracting (e.g., closing a production plant), or improving operations (e.g., training employees to do a better job answering customer product inquiries). Changes may also consist of revising an unrealistic plan.

Performance Reports for Control. The reports used to evaluate the performance of managers and the operations they control are referred to as **performance reports**. Although there is no generally accepted method of preparing a performance report, such reports frequently involve a comparison of current-period performance with performance in a prior period or with planned (budgeted) performance.

Illustration 1-2
Planning and control process



Suppose, for example, that during 2014, Surge Performance Beverage Company actually produced 5,000,000 bottles and incurred these costs:

Cost of bottles	$1,650,000
Ingredient cost	450,000
Water	152,000
Labor cost	295,000
Rent	60,000
Depreciation	80,000
Other	101,000
Total actual production cost	$2,788,000

A performance report comparing these actual costs to the budgeted costs is presented in Illustration 1-3.

Typically, performance reports only suggest areas that should be investigated; they do not provide definitive information on performance. For example, the performance report presented in Illustration 1-3 indicates that something may be amiss in the control of bottle and ingredient cost. Actual costs are $150,000 more than planned for bottles and $50,000 more than planned for ingredients. There are many possible reasons why these costs are greater than the amounts budgeted. Perhaps the price of bottles or key ingredients increased, or perhaps bottles were damaged in the production process. Management must investigate these possibilities before taking appropriate corrective action.

Although performance reports may not provide definitive answers, they are still extremely useful. Managers can use them to flag areas that need closer attention and to avoid areas that are under control. It would not seem necessary, for example, to investigate labor, rent, depreciation, or other costs, because these costs are either equal to or relatively close to the planned level of cost. Typically, managers follow the principle of **management by exception** when using performance reports. This means that managers investigate departures from the plan that appear to be exceptional; they do not investigate minor departures from the plan.

Decision Making

As indicated in Illustration 1-2, decision making is an integral part of the planning and control process—decisions are made to reward or punish managers, and decisions are made to change operations or revise plans. Should a firm add a new product? Should it drop an existing product? Should it manufacture a component used in assembling its major product or contract with another company to produce the component? What price should a firm charge for a new

Illustration 1-3
Performance report

SURGE PERFORMANCE BEVERAGE COMPANY

Performance Report, Production Costs
For the Year December 31, 2014

	Actual	**Budget**	**Difference (Actual Minus Budget)**
Production (number of bottles)	5,000,000	5,000,000	-0-
Cost of bottles	$1,650,000	$1,500,000	$150,000*
Ingredient cost	450,000	400,000	50,000*
Water	152,000	150,000	2,000
Labor cost	295,000	300,000	(5,000)
Rent	60,000	60,000	-0-
Depreciation	80,000	80,000	-0-
Other	101,000	100,000	1,000
Total production cost	$2,788,000	$2,590,000	$198,000

*Red numbers indicate differences deemed deserving of investigation.

product? These questions indicate just a few of the key decisions that confront companies. How well they make these decisions will determine future profitability and, possibly, the survival of the company. Recognizing the importance of making good decisions, we devote all of Chapters 7, 8, and 9 to the topic. Below you'll see that one of the two key ideas of managerial accounting relates to decision making and its focus on so-called incremental analysis. Finally, at the end of each chapter, there is a feature called Making Business Decisions. This feature will remind you of how the chapter material is linked to decision making, and it will summarize the knowledge and skills presented in the chapter that will help you make good decisions as a manager.

TEST YOUR **KNOWLEDGE**

With respect to managerial accounting, which of the following statements are valid?

a. Budgets are used for planning.

b. Performance reports are used for control.

c. A goal of managerial accounting is to provide information useful in decision making.

d. All of the above are valid statements.

Correct answer is d.

LEARNING OBJECTIVE 4

Distinguish between financial and managerial accounting.

A Comparison of Managerial and Financial Accounting

As suggested in the opening of this chapter, there are important differences between managerial and financial accounting:

1. Managerial accounting is directed at internal rather than external users of accounting information.
2. Managerial accounting may deviate from generally accepted accounting principles (GAAP).
3. Managerial accounting may present more detailed information.
4. Managerial accounting may present more nonmonetary information.
5. Managerial accounting places more emphasis on the future.

Internal versus External Users. Financial accounting is aimed primarily at external users of accounting information, whereas managerial accounting is aimed primarily at internal users (i.e., company managers). External users include investors, creditors, and government agencies, which need information to make investment, lending, and regulatory decisions. Their information needs differ from those of internal users, who need information for planning, control, and decision making.

Need to Use GAAP. Much of financial accounting information is required. The Securities and Exchange Commission (SEC) requires large, publicly traded companies to prepare reports in accordance with generally accepted accounting principles (GAAP). Even companies that are not under the jurisdiction of the SEC prepare financial accounting information in accordance with GAAP to satisfy creditors. Managerial accounting, however, is completely optional. It stresses information that is *useful* to internal managers for planning, control, and decision making. If a company believes that deviating from GAAP will provide more useful information to managers, GAAP need not be followed.

Detail of Information. Financial accounting presents information in a highly summarized form. Net income, for example, is presented for the company as a whole. To run a company, however, managers need more detailed information; for example, information about the cost of operating individual departments versus the cost of operating the company as a whole or sales broken out by product versus total company sales.

Emphasis on Nonmonetary Information. Both managerial and financial accounting reports generally contain monetary information (information expressed in dollars, such as revenue and expense). But managerial accounting reports often contain a substantial amount of additional nonmonetary information. The quantity of material consumed in production, the number of hours worked by the office staff, and the number of product defects are examples of important nonmonetary data that appear in managerial accounting reports.

Emphasis on the Future. Financial accounting is primarily concerned with presenting the results of past transactions. Managerial accounting, however, places considerable emphasis on the future. As indicated previously, one of the primary purposes of managerial accounting is planning. Thus, managerial accounting information often involves estimates of the costs and benefits of future transactions.

Similarities between Financial and Managerial Accounting

We should not overstate the differences between financial accounting and managerial accounting in terms of their respective user groups. Financial accounting reports are aimed *primarily* at external users, and managerial accounting reports are aimed *primarily* at internal users. However, managers also make significant use of financial accounting reports, and external users occasionally request financial information that is generally considered appropriate for internal users. For example, creditors may ask management to provide them with detailed cash-flow projections.

LEARNING OBJECTIVE 5

Define cost terms used in planning, control, and decision making.

COST TERMS USED IN DISCUSSING PLANNING, CONTROL, AND DECISION MAKING

When managers discuss planning, control, and decision making, they frequently use the word *cost*. Unfortunately, what they mean by this word is often ambiguous. This section defines key cost terms so that you will have the accounting vocabulary necessary to begin discussing issues related to planning, control, and decision making. The treatment will be brief because we will return to these cost terms and examine them in detail in later chapters.

Variable and Fixed Costs

The classification of a cost as variable or fixed depends on how the cost changes in relation to changes in the level of business activity.

Variable Costs. Costs that increase or decrease in proportion to increases or decreases in the level of business activity are **variable costs**. Material and direct labor are generally considered to be variable costs because in many situations, they fluctuate in proportion to changes in production (business activity). Suppose that for Surge Performance Beverage Company, the cost of bottles, ingredients, water, and labor are variable costs and in the prior month, when production was 400,000 bottles, costs were $120,000 for bottles, $32,000 for ingredients, $12,000 for water, and $24,000 for labor. How much variable cost should the company plan on for the current month if production is expected to increase by 20 percent, to 480,000 bottles? Since the variable costs change in proportion to changes in activity, if production increases by 20 percent, these costs should also increase by 20 percent. Thus, the cost of bottles should increase to $144,000, the cost of ingredients should increase to $38,400, the cost of water to $14,400, and the cost of labor to $28,800.

	Prior Month		Current Month	
Production	400,000 Bottles	Per Unit	480,000 Bottles	Per Unit
Variable costs:				
Cost of bottles	$120,000	$0.30	$144,000	$0.30
Ingredient cost	32,000	0.08	38,400	0.08
Water	12,000	0.03	14,400	0.03
Labor cost	24,000	0.06	28,800	0.06
Total variable cost	$188,000	$0.47	$225,600	$0.47

Note that although the *total variable cost* increases from $188,000 to $225,600 when production changes from 400,000 to 480,000 units, the *variable cost per unit* does not change. It remains $0.47 per bottle. With variable cost of $0.47 per bottle, variable cost increases by $37,600 (i.e., $0.47 × 80,000) when production increases by 80,000 bottles.

Fixed Costs. Costs that remain constant when there are changes in the level of business activity are **fixed costs**. Depreciation and rent are costs that typically do not change with changes in business activity. Suppose that in the prior month, Surge Performance Beverage Company incurred $20,000 of fixed costs including $5,000 of rent, $6,667 of depreciation, and $8,333 of other miscellaneous fixed costs. If the company increases production to 480,000 bottles in the current month, the levels of rent, depreciation, and other fixed costs incurred should remain the same as when production was only 400,000 bottles. However, with fixed costs, the cost per unit does change when there are changes in production. When production increases, the constant amount of fixed cost is spread over a larger number of units. This drives down the fixed cost per unit. With an increase in production from 400,000 to 480,000 units, *total fixed costs* remains at $20,000. Note, however, that *fixed cost per unit* decreases from $0.0500 per unit to $0.0417 per unit.

	Prior Month		Current Month	
Production	400,000 Bottles	Per Unit	480,000 Bottles	Per Unit
Fixed costs:				
Rent	$ 5,000	$0.0125	$ 5,000	$0.0104
Depreciation	6,667	0.0167	6,667	0.0139
Other	8,333	0.0208	8,333	0.0174
Total fixed cost	$20,000	$0.0500	$20,000	$0.0417

Sunk Costs

Costs incurred in the past are referred to as **sunk costs**. These costs are not relevant for decision making because they do not change when decisions are made. For example, suppose you buy a ticket to a play for $30. Before the play, you run into a friend who invites you to a party. If you go to the party, you won't be able to attend the play. The cost of the ticket is irrelevant to the decision as to whether you should go to the party. What matters is how much you will enjoy the party versus the play and how much you can *sell* the ticket for (not how much you *paid* for it). Whether you go to the play or go to the party, you are out $30 (the price of the ticket to the play, which is sunk).