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# **COST ACCOUNTING**

USING A COST  
MANAGEMENT APPROACH

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L. GAYLE RAYBURN

# COST ACCOUNTING

## Using a Cost Management Approach

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Fifth Edition

**IRWIN**

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# About the Author

L. Gayle Rayburn is currently president of the Management Accounting Section of the American Accounting Association, which is an international organization of over 1,800 professors interested in teaching and research in the field of management accounting. Rayburn has served in other capacities in numerous professional accounting organizations, including Secretary-Treasurer, National Program Representative, and Southeast Regional Director, Management Accounting Section. She has also served on the Personal Testing Subcommittee, American Institute of Certified Public Accountants and the Committee on Research, National Association of Accountants. She is also a member of Beta Alpha Psi and Beta Gamma Sigma. She is an academic associate of the Goldratt Institute and a Certified Jonah in the theory of constraint.

L. Gayle Rayburn's tenure on the Board of Regents of the Institute of Certified Management Accountants, which has responsibility for the CMA examination, gives her insight into the trends experienced in professional examinations as well as the knowledge and problem solving techniques a student needs for successful completion of certification examinations. Not only is the author a CMA, she is also a CPA, CIA, and Certified Cost Analyst. This book is listed as a suggested reference for studying for the CMA, CPA, and CIA examinations. Problems prepared by Rayburn have appeared on CPA and CMA examinations.

Rayburn received a Ph.D. in Accounting from Louisiana State University, where she was named to their university-wide Alumni Hall of Distinction. She has both public and industrial accounting experience. She is the author of over 120 published professional articles in leading accounting and business journals.

In addition to this book, which is translated and published in Spanish, by Ediciones Centrum Tecnicas y Cientificas of Madrid, Spain, as *The Contabilidad de costos. I Biblioteca Master Centrum*, Rayburn is the author of *Financial Tools for Effective Marketing Administration* (1976) published by American Management Association and reprinted as part of AMACOM's Executive Books series (1981).

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*To  
Doug, Beverly, and Mike*





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# Preface

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## Organization of Book

Cost accounting shapes the future of companies as well as nations. Efficient cost management systems provide superior information for improved decision making. Managers are then able to more efficiently allocate resources and measure and control operations. With a superior cost management system, a company can dominate world commerce, becoming more profitable.

This book tries to take account of the needs of its customers—the students, the teachers, and the employers. It is designed to develop critical thinking and communication skills by encouraging professors to teach students how to think. Its emphasis on the cost management approach recognizes that product costing for inventory valuation and income determination is only one of cost accounting's many purposes—certainly not its primary purpose. It further emphasizes that methods of determining product cost must reflect the current manufacturing and service environment. This book's discussion and illustrations of activity-based management and costing emphasize continuous improvement.

Because the text is adaptable, it can be used by instructors with different teaching objectives and instructional methods. The book's organization allows instructors a great deal of flexibility in selecting chapters to meet the objectives of their course. Instructors can skip chapters or rearrange the sequence of chapters because each chapter is self-contained. Adopters of previous editions reported using this book after a first course in managerial accounting by skipping chapters or changing the sequence. End-of-the-chapter materials covering topics from more than one chapter are clearly labeled to allow flexibility.

This book identifies concepts and principles of cost accounting in a clear, concise, and straightforward manner. Discussions are supported by extensive examples.

The first chapters discuss cost accounting concepts concerned with cost collection—factors that influence such managerial decisions as sales price determination. Product costing concepts are covered first because the author believes students can more easily grasp and appreciate cost-volume-profit analysis, budgeting, and short-run decision making *after* they study product costing. Students who have completed a management accounting course prior to enrolling in cost accounting are able to obtain a higher conceptual understanding *after* a detailed study of product costing. The last part of the book emphasizes the application of cost principles in cost management analysis and quantitative tools for decision making.

This book can be used in a cost or management accounting course in which students have had a minimum of one course in accounting principles or financial accounting. An orientation to accounting terminology and the financial reporting systems is a helpful prerequisite. It is not necessary for students to have completed a course in managerial or cost accounting before using this book.

To aid the student, each chapter begins with measurable objectives that focus on important areas of coverage. Each chapter also includes a list of important terms and concepts.

The mix of assignment material includes questions that review concepts and procedures, exercises that review the direct applications of the basic concepts, problems of varying difficulty that enhance the learning process and cover the concepts in greater depth, and relevant cases that illustrate the practical problems associated with concept implementation. The cases are thought-provoking and designed to stimulate class discussion.

This book contains such a variety of problems and cases that there is sufficient material to challenge students who have had previous courses in management accounting or an extensive background in accounting and related fields. The fifth edition contains extensive material concerned with activity-based management and costing for both manufacturing and marketing activities. Its discussion on service industry costing recognizes the need to accurately determine the cost of providing services in an expanding service-oriented environment.

The chapter sequence does not undermine the mix and match possibilities for selecting course content. Chapters in the book are grouped into six major topic modules which include the following features.

## Part I Cost Accounting Concepts

**Chapter 1 Cost Accounting in the New Automated Manufacturing Environment—Today and Tomorrow** discusses the impact of automation on cost accounting and growth of Activity-Based Management, Life-Cycle Costing, and Target Costing. The danger of integrating cost data with the financial accounting system is presented. A clear distinction is made between cost accounting as needed for financial reporting and cost accounting for supporting decision making and performance evaluation.

**Chapter 2 Production, Marketing, and Administrative Cost Flows** presents the basic concepts, emphasizing the flow of costs through inventory accounts until they are disposed of as expenses on the income statement. The discussion uses volume-related cost drivers to apply overhead. Cost of goods manufacturing statements using actual and applied overhead trace the manufacturing inventory flow. The chapter further discusses the impact of computer-integrated manufacturing on cost mix, labor-based application rates, and quality control. An appendix illustrates inventory costing for students with an inadequate foundation in these concepts.

**Chapter 3 Cost Behavior and Cost Estimation** discusses the relationship of fixed and variable behavior patterns, unit and total costs, and relevant range. Students are encouraged to learn to apply regression analysis technology and understand the criteria for its analysis rather than memorizing its mathematical foundations. The regression analysis discussion includes criteria for regression analysis, effect of outlier observations, relevant range and linearity, and cost functions and linearity. An appendix contains learning curve theory.

**Chapter 4 Activity-Based Costing and Volume-Based Cost Assignments** first compares various capacity levels since many students have trouble understanding how capacity relates to application rates for overhead. Illustrations of the direct, step, and linear algebra methods of allocating service costs reflect volume-related cost drivers. The impact of product diversity and volume diver-



sity emphasize the importance of activity-based management. The concluding illustrations apply materials acquisition and handling costs on nonvolume-related cost drivers.

## Part 2 Product Cost Allocation and Accumulation Procedures

**Chapter 5 Job Order Costing** illustrates job order costing and compares it to process costing and operation costing. Internal control surrounding basic documents such as material requisitions and job order sheets prevents miscosting. An appendix illustrates factory ledger and home office ledger accounts.

**Chapter 6 Process Costing: Weighted-Average and FIFO** introduces process costing in a rather unique way as students are encouraged to think of a snowball gathering snow (cost) as it travels from one department to another. This analogy communicates the essence of how costs accumulate in a process system. Process costing is placed in this chapter sequence because it is difficult to cover this topic before the student has seen how product costing works. A discussion of the impact of flexible manufacturing and Just-in-time process costing questions the future use of equivalent units. An appendix illustrates completed and not transferred inventory.

**Chapter 7 Process Costing: Addition of Materials and Lost Units** presents additional complexities encountered in process costing systems when concentrated mixtures are diluted and units lost.

**Chapter 8 Joint Product and By-Product Costing** discusses the necessity of allocating joint costs on physical or market bases for financial reporting. A different cost analysis results when managers are deciding whether to process further.

## Part 3 Cost Data for Performance Evaluation

**Chapter 9 Flexible Budgeting and the Budgeting Process** compares a fixed (static) and a flexible (variable) budget. Discussions emphasize determining the cost of acquired resources not utilized. The information flow outlines the interrelationships between production-related budgets.

**Chapter 10 Nonmanufacturing Budgets, Forecasted Statements, and Behavioral Issues** discuss the role of cash budgets in cash management. The chapter exposes students to the use of budgets for performance evaluation and the resulting behavioral implications.

**Chapter 11 Standard Costs for Materials and Labor and Chapter 12 Standard Costs and Variances for Factory Overhead** first present the calculations for material, labor, and overhead variances and then emphasize finding the responsible factor for the variance and taking corrective action. The chapter emphasizes the importance of managers monitoring efficiency and volume variances to prevent excess inventory. By placing standard costing later in the textbook, students have prior exposure to product costing and can understand that standard costs can be used for both job order and process systems.

## Part 4 Cost Accounting/Cost Management for Decision Making

**Chapter 13 Cost-Volume-Profit Analysis** discusses the contribution margin concept and breakeven analysis with emphasis on the manipulation of the cost-volume-profit formula. This helps the student understand the usefulness of differentiating between fixed and variable costs and see how the pieces fit together. However, if instructors prefer to introduce cost-volume-profit analysis earlier, they can present Chapter 13 before Chapter 3.

**Chapter 14 Performance Evaluation and Segment Analysis** illustrates ROI, residual income, and other short-run measures of evaluating performance. The chapter illustrates the dangers of evaluating only short-term results and emphasizes the use of multiple performance measures, including throughput and non-financial evaluations.

**Chapter 15 Transfer Pricing in Multidivisional Companies** presents the objective of alternative transfer pricing models. The chapter discusses the related behavioral implications of transfer pricing (i.e., internal competition, sub-optimization, and other dysfunctional behavior).

**Chapter 16 Decision Models and Cost Analysis under Uncertainty** presents decision models, including differential analysis and cost studies under uncertainty. Payoff tables are introduced using probabilities in deciding whether to investigate variances from standards or budgets. The expected value of investigating variances in a two-state environment are compared to the present value of the extra costs of not investigating.

**Chapter 17 Capital Budgeting** outlines discounted cash flow models as well as the payback and unadjusted return on investment alternative models. Aftertax analysis of equipment replacement is demonstrated through use of the total-cost and differential-cost approaches.

**Chapter 18 Capital Budgeting—Additional Topics** illustrates sensitivity analysis in cash flow and economic life estimates and inflation in the capital budgeting process. The impact of automation on traditional capital budgeting models and the improvements needed in these models are discussed.

**Chapter 19 Activity-Based Management for Marketing Cost Standards** uniquely presents setting marketing standards on activity-based costing drivers. The chapter outlines the steps to implementing ABC for marketing activities. This chapter demonstrates the diversity of contexts in which cost accounting concepts and decision making techniques apply.

**Chapter 20 Variable Costing** illustrates the use of variable (direct) costing for internal use and includes a numerical example of how variable (direct) costing can lead to poor pricing practices. The chapter presents the dangers of an absorption costing system showing phantom profits.

## Part 5 Selected Topics for Further Study

**Chapter 21 Product Quality and Inventory Management in a JIT Environment** discusses the impact of JIT, decreased setup times, and shorter

lead times on the validity of EOQ. The chapter presents various methods of recording material waste and the importance of selecting inventory controls that match the value of inventory.

**Chapter 22 Payroll Accounting and Incentive Plans** demonstrates the basic entries for labor distribution, payroll tax, and indirect or fringe benefits. The chapter illustrates incentive compensation plans and the impact of JIT on these plans.

**Chapter 23 The Use of Costs in Pricing Decisions** provides a sound economic foundation for the product pricing discussion and follows that foundation with an integrated discussion of cost influences on product price. The chapter discusses the role of social responsibility in pricing.

**Chapter 24 Revenue Variances, Material Mix and Yield Variances, and Labor Mix and Yield Variances** presents price, volume, quantity, and mix variances for revenue and production. The chapter illustrates market size and market share variances as a breakdown of the sales quantity variance.

**Chapter 25 Behavioral and Ethical Factors in Accounting Control** illustrates potential suboptimization which is likely to occur when managers are rewarded with a bonus for meeting profit objectives. The relationship between Theory X, Theory Y, and Theory Z to the accounting controls employed is presented. An appendix presents the code of ethics of management accountants to give students a better understanding of the important, complex role cost accountants assume. The discussion includes cases involving misconduct to expose students to the “real world environment” of cost accounting.

## Part 6 Quantitative Models for Planning and Control

**Chapter 26 Gantt Charts, PERT, and Decision Tree Analysis** explains quantitative concepts in a straightforward manner with relevant examples. PERT-cost analysis is illustrated in choosing when to crash. Variance analysis and PERT-cost is demonstrated. The roll-back concept is used in decision tree analysis.

**Chapter 27 Linear Programming and the Cost Accountant** defines the role of the cost accountant in applying linear programming with emphasis on understanding the effect of constraints and developing the objective function.

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### Strengths of Fourth Edition Retained

The chapter sequence continues to allow instructors flexibility in their chapter material; however, chapters do not exist in isolation. The topics flow evenly through the chapters. Using different costs for different purposes remains a strong emphasis. This focus helps students understand the importance of professional judgment in choosing the most appropriate cost concept for specific situations.

Cost concepts and cost accumulation topics are covered first. This is most appropriate since with robotics and automated manufacturing causing such a

change in cost mix and behavior, contribution margin will have lessened significance. The idea that accounting exists to provide useful information is reinforced and an integral part of each chapter. Not only do readers learn how information is produced in cost accounting systems, but they are encouraged to examine how it can be used by management.

Unlike many other cost accounting texts which virtually ignore marketing and distribution costs, this book contends that evaluating segment performance only on production costs provides inaccurate estimates of relative profitability. The fifth edition expands the chapter on distribution and marketing costs, which has been included since the textbook's first edition, to demonstrate the role of activity-based cost drivers to evaluate marketing performance.

Deficiencies of traditional capital budgeting models and performance measures continue to be emphasized. Quantitative elements continue to be integrated into the text rather than included in supplements or appendices. This helps students understand quantitative applications more easily and see how they can be used effectively.

A detailed outline in Chapter 12 shows the relationships between the two-, three-, and four-variance methods for overhead variances so that students quickly realize that they aren't learning complete different variance sets. This understanding of relationships allows students to evaluate which method they prefer and to better understand why the four-variance method is generally preferred.

The book includes many well written exercises, problems, and cases designed to improve the students' writing and critical thinking skills. The book's numerous decision-making cases encourage students to understand the interrelationship of other disciplines with cost accounting. The textbook is also designed to increase students' thinking power by including several capstone cases which test the students' understanding and knowledge of cost accounting systems. Several of these do this by asking students to evaluate a present system, some of which managers have failed to update when they automated their factories. Rayburn wrote and tested them in class so she can see first hand what areas are not clear enough in their first draft form before they appear revised in the text.

The end of chapter material continues to be representative of the text coverage and gives sufficient practice in applications. There are no distractions in the problem material which undermine successful completion in this student-oriented text. The cases are very interesting and provide an opportunity for the professor to discuss some of the ideas presented in the cases in more detail and from a different perspective. CPA/CMA/CIA multiple choice questions have been retained in all relevant chapters.

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## **Changes in Content and Pedagogy of Fifth Edition**

Many changes have been made to the content of the fifth edition to reflect the changing nature of cost accounting and the impact of automation, JIT, quality control, and other new manufacturing techniques on the needs for cost management information.

Major changes to the content of the fifth edition are:

1. Extensive discussion and illustration of activity-based costing encourages students to use non-volume based cost drivers when product and volume

diversity exist. Steps to implementing activity-based management to marketing activities also emphasize the appropriateness of non-volume based cost drivers for nonmanufacturing activities.

2. While the clear, concise writing structure has been retained, most of the materials have been revised to a more active writing style to reflect the exciting, changing nature of cost accounting. By removing some of the nice but not needed prose, the readability is enhanced without losing content.
3. Rather than have a separate chapter discussing the benefits of new cost management tools, these topics are integrated in relevant chapters. This better reflects the impact of these changes.
4. Importance of nonfinancial measures of performance and multiple measures of performance are given increased coverage. The book presents alternative measures of performance evaluation.
5. Coverage of the text has been broadened to include more of the conceptual framework and decision-making analysis underlying the treatment of cost accounting procedures.
6. Various concepts have been revised and reorganized so that there are now 27 chapters which represents ample text and assignment material for a two-term semester course (or three-quarter course).
7. Includes Market Size and Market Share Variances as a breakdown of the Sales Quantity Variance, which recognizes the various types of variable analyses available.
8. Code of ethical conduct for management accountants moved to a chapter appendix later in the chapter sequence so professors can insert where they deem most appropriate in their courses.
9. Job order costing is introduced later in the chapter sequence so students have a better grasp of cost concepts. This enables them better to compare job order and process costing.
10. Learning curve theory is placed in an appendix to cost behavior (Chapter 3) which allows professors more flexibility in course content.
11. The more liberal use of graphics and flowcharts is useful in helping students step from a procedural level of thinking to higher levels of thought in developing more refined abstract reasoning skills.

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## Supplements to the Fifth Edition

### Supplements for Students

**Student Guide** by Rayburn which is keyed to each chapter of the book. This workbook provides a detailed outline of each chapter, a review of the important new terms and concepts, matching questions containing true-false questions, completion questions, and exercises. Answers to all questions are included in the Study Guide, which provides verification of responses as well as explanation as to why the statement is true or false. Since the student workbook is prepared by the textbook author there is a strong carryover to the textbook material.

**List of Key Figures** prepared by the textbook author provides check figures for each exercise, problem, and case; these lists are provided in quantity to the instructors for distribution.

**Videos** The Richard D. Irwin Managerial/Cost Accounting video series contains six 15-minute segments covering capital budgeting, the design of a cost accounting system, process and job order costing, and service and activity based costing. Prepared by Pacific Lutheran University in Seattle, Washington, the videos are free upon adoption.

## Supplements for Instructors

**Solutions Manual** by Rayburn. Detailed solutions to all questions, exercises, problems, and cases in the textbook. Comments on alternative teaching approaches and solutions are included.

**Solution Transparencies** Overhead transparencies of solutions are designed for easy viewing in the classroom.

**Test Bank** by Rayburn. Supplementary test material including true or false and multiple-choice questions, short-answer problems, and more comprehensive problems. Outlines for each chapter indicate the relationship of test material to specific problems and exercises in the textbook.

**Irwin's Computerized Testing Software** This improved microcomputer version of the Test Bank allows editing of questions; provides up to 99 different versions of each test; and allows question selection based on type of question, level of difficulty, or learning objective. This software is available on 5.25" and 3.5" disks.

**Solution Transparencies** Overhead transparencies of solutions are designed for easy viewing in the classroom and are available for every exercise and problem in the text.



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