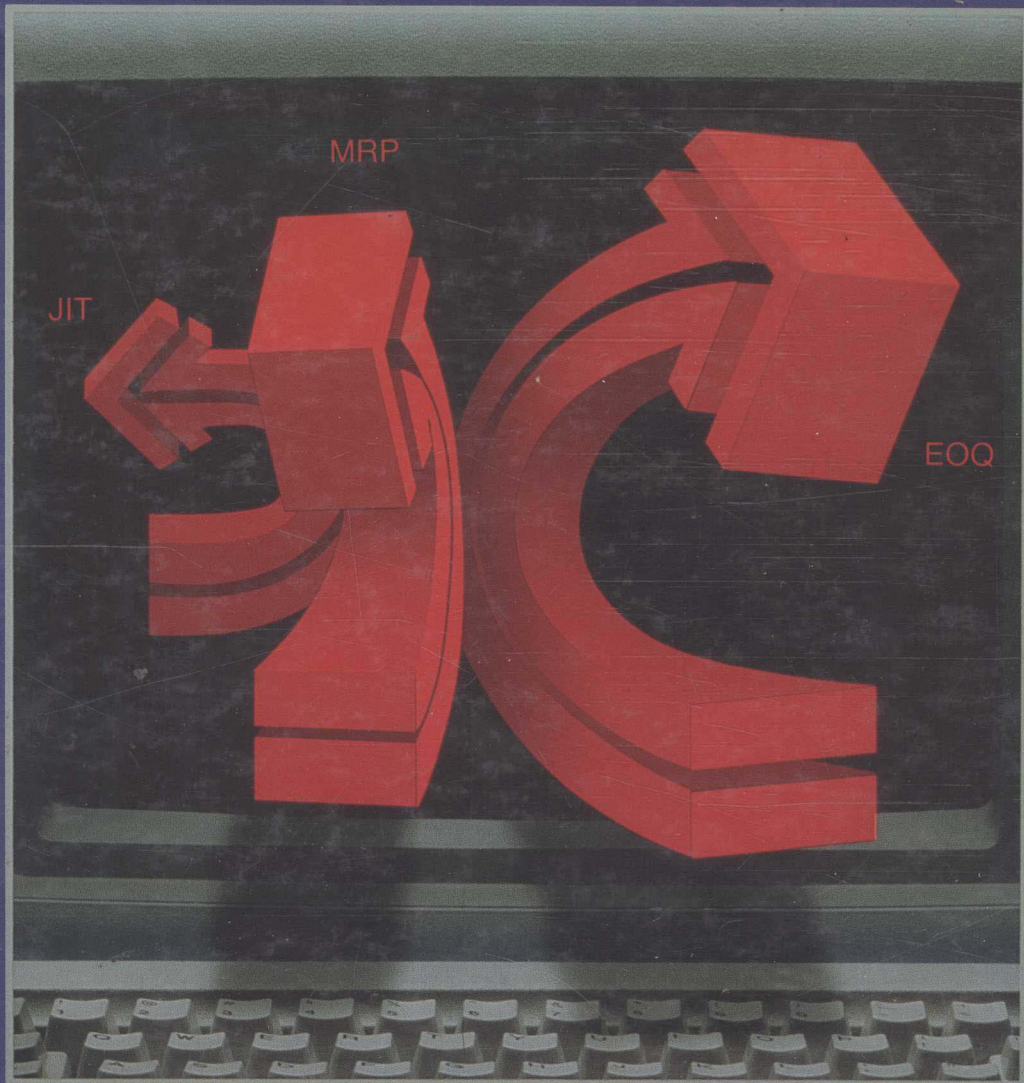


Principles of Cost Accounting

Using
A Cost Management
Approach



Fourth Edition

L. Gayle Rayburn

Principles of Cost Accounting **Using** **A Cost Management** **Approach**

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To Beverly, Doug, and Mike

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About the Author

Letricia Gayle Rayburn's recent 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 suggested reference for studying for the CMA, CPA, and CIA examinations. Problems prepared by Rayburn have appeared both on the CPA and CMA examination.

Rayburn received a Ph.D. in accounting from Louisiana State University, where she was recently named to their universitywide Alumni Hall of Distinction. She has had both public and industrial accounting experience. She is the author of over 100 published professional articles.

Rayburn has served in various capacities in numerous professional accounting organizations, including Southeast Regional Director, Management Accounting Section, American Accounting Association, and is a member of the Personnel Testing Subcommittee, American Institute of Certified Public Accountants. Currently, Dr. Rayburn is a member of the Committee on Research, National Association of Accountants, and National Program Director, Management Accounting Section of the American Accounting Association. She is also a member of Beta Alpha Psi and Beta Gamma Sigma.

In addition to this book, which is translated and published in Spanish, by diciones Centrum Tecnicas y Cientificas of Madrid, Spain, as *The Contabilidad de Costos. 1 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). Rayburn is also co-author (with Roger Hermanson and Don Edwards) of *Financial Accounting*, 4th edition, published by BPI/Irwin, 1989.

The Robert N. Anthony / Willard J. Graham Series in Accounting

Preface

Organization of Book

The book emphasizes the cost management approach and recognizes that product costing for inventory valuation and income determination is only one of many purposes of cost accounting—certainly not the primary purpose of cost accounting. This book identifies concepts and principles of cost accounting in a clear, concise, and straightforward manner. Discussions are supported by extensive examples.

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 management accounting by skipping chapters or changing the sequence. Any end-of-chapter material that covers topics from more than one chapter is clearly labeled to allow flexibility.

The first chapters discuss cost accounting principles and 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 grasp cost-volume-profit analysis, budgeting, and short-run decision making more easily *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 to financial reporting systems is a helpful prerequisite. It is not necessary for students to have completed a course in management or cost accounting before using this book.

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

An appendix at the end of text annotates the Cost Accounting Standards Board pronouncements.

The mix of assignment material includes questions that review concepts and procedures, exercises that review the direct applications of 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 fourth edition contains additional material dealing with service industries, recognizing the need to accurately determine the cost of providing services in an expanding service-oriented environment. End-of-chapter material includes a total of 499 discussion questions, 338 CPA/CMA/CIA multiple choice questions, 265 exercises, 462 problems, and 92 cases—most new or revised and all thoroughly tested. This reflects a substantial increase in the number from previous editions.

The chapter sequence does not preclude 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 One Basic 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 the deficiencies of traditional cost accounting. An historical overview of cost accounting gives the reasons for the rise in cost accounting. The dangers of integrating cost data with the financial accounting system are presented. A clear distinction is made between cost accounting as needed for financial reporting and cost accounting for supporting decision making. The code of ethics of management accountants is also presented so students can gain better understanding of the important, complex role cost accountants assume. Cases involving ethical conduct are introduced in Chapter 1 to expose students to the “real world environment” of cost accounting.

Chapter 2—Cost Concepts, Cost Behavior, and Manufacturing Statements—Presents the basic cost concepts, emphasizing the flow of costs through inventory accounts until they are disposed of as expenses on the income statement. Computer-integrated manufacturing’s impact on economies of scale and cost behavior are also discussed.

Chapter 3—Job Order Costing—Illustrates job order costing and compares it to process costing and operation costing. Appendixes illustrate

factory ledger and home office ledger accounts and inventory costing for students with an inadequate foundation in these concepts.

Chapter 4—Cost Estimation—Discusses the concept of cost drivers and cost pools. Students are encouraged to learn to use regression analysis technology rather than mastering and memorizing the mathematical foundations of the technology. The regression analysis discussion includes criteria for regression analysis, effect of outlier observations, relevant range and linearity, and cost functions and linearity. This chapter ends with a discussion of flexible budgets, illustrating the application of cost estimation equations in preparing the budget.

Chapter 5—Allocating Overhead Costs and Variance Analysis—Begins with a discussion of the various capacity definitions, since many students have trouble understanding how capacity relates to application rates for overhead. The chapter discusses how transactions are cost drivers and concludes with illustrations of the direct, step, and linear algebra method of allocating service costs.

Part Two Product Cost Allocation and Accumulation Procedures

Chapter 6—Process Costing—Weighted-Average and FIFO Costing—First introduces the cost flows and equivalent units without worrying about the beginning inventory. This chapter also introduces process costing in a 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 here because it is difficult to cover this topic before the student has seen how product costing works.

Chapter 7—Processing Costing—Addition of Material 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—Logically belong in this part because the topic is clearly related to product costing. The management use of cost information with regard to processing further is included along with allocating joint costs for financial accounting inventory valuation.

Part Three Cost Data for Performance Evaluation

Chapter 9—Standard Costs for Material and Labor and Chapter 10—Standard Costs for Factory Overhead and Variance Analysis—First presents the calculations for material, labor, and overhead variances and

then emphasizes finding the responsible factor for the variance and taking corrective action. By placing standard costing later in the textbook, students have had prior exposure to product costing and can understand that standard costs can be used for both job order and process systems.

Chapter 11—The Budgeting Process—Introduces the production budget; by dividing the budgeting process into two chapters, there is time to discuss some of the organizational and practical budgeting issues.

Chapter 12—Marketing, Administrative, and Cash Budgets, and Forecasted Statements—Illustrates how ratio analysis is a major benefit of the budgeting process and budgeted financial statements. The appendix includes zero-base budgeting, allowing flexibility for professors who want to go into depth on this issue.

Chapter 13—Cost-Volume-Profit Analysis—Discusses the contribution margin concept and breakeven point 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 an instructor prefers to introduce cost-volume-profit analysis earlier, Chapter 13 and/or Chapter 14 can be presented before Chapters 4 and 5.

Chapter 14—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.

Chapter 15—Measuring and Evaluating Segment Performance—Illustrates ROI, residual income, and other short-run measures of evaluating performance. The dangers of evaluating only short-term results is illustrated; use of multiple performance measures is emphasized.

Chapter 16—Transfer Pricing in Multidivisional Companies—Presents the objective of alternative transfer pricing models. The related behavioral implications of transfer pricing (i.e., internal competition, suboptimization, and other dysfunctional behavior) are discussed.

Part Four Cost Accounting/Cost Management for Decision Making

Chapter 17—Adapting Cost Accounting to a Cost Management Approach—Discusses global markets and their impact on cost management. The role of cost accounting in the new automated environment of manufacturing is presented with related discussions on economies of scale, zero defect programs, JIT, MRP, and pull rather than push production systems.

Chapter 18—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 investigation variances in a two-state environment are compared to the present value of the extra costs of not investigating.

Chapter 19—Capital Budgeting—Outlines discounted cash flow methods 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 20—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 21—Marketing Cost Analysis—Uniquely presents units of variability that are used for setting standards for distribution functions. Variance analysis for nonproduction expenses is illustrated. This chapter demonstrates the diversity of contexts in which basic cost accounting concepts and decision-making techniques apply.

Chapter 22—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.

Part Five Selected Topics for Further Study

Chapter 23—Inventory Management, Product Waste, and EOQ—Discusses the impact of JIT, decreased setup times, and shorter lead times on the validity of EOQ.

Chapter 24—Payroll Accounting and Incentive Plans—Demonstrates the basic entries for labor distribution, payroll tax, and indirect or fringe benefits. Incentive compensation plans are illustrated and the impact of JIT on these plans is discussed.

Chapter 25—Revenue, Mix and Yield Production Variances—Studies price, volume, quantity, and mix variances for revenue and production.

Chapter 26—Behavioral Factors in Accounting Control—Illustrates potential suboptimization which is likely to occur when managers are re-

warded with a bonus for meeting profit objectives. The relationship between Theory X, Theory Y, and Theory Z to the accounting controls employed is presented.

Part Six Quantitative Models for Planning and Control

Chapter 27—Gantt Charts, PERT, and Decision Tree Analysis—Explains quantitative concepts in a straightforward manner with good examples. PERT-Cost analysis is illustrated in choosing when to crash. Variance analysis and PERT-Cost are demonstrated. The roll-back concept is used in decision-tree analysis.

Chapter 28—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.

Strengths of Third Edition Retained

The strengths of the third edition, which were cited by reviewers, have been retained. The chapter sequence continues to allow instructors flexibility in selecting the chapter material they use. 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.

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 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.

Cost concepts and cost accumulation topics are covered first, which is most appropriate since with robotics and automated manufacturing causing such a change in cost mix and behavior, contribution margin will have less significance. The idea that accounting exists to provide useful information is reinforced as 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 that virtually ignore marketing and distribution costs, this book contends that evaluating product cost and profitability only on production costs provides inaccurate estimates of relative profitability. The chapter on distribution and marketing costs, which has been included since the textbook's first edition, has been retained

due to the increasing importance of this topic and the related dollars companies spend on marketing activities.

Quantitative elements continue to be integrated into the text rather than included in supplements or appendixes. This helps students understand quantitative applications more easily and see how they can be used effectively. In addition, Chapters 27 and 28 present quantitative models including PERT analysis, decision-tree analysis, and linear programming. Variance analysis is included in the PERT/Cost discussion so students understand that the objective of the PERT planning tool is to minimize cost, which requires a comparison of actual results against preestablished controls. By incorporating variance analysis with PERT discussion, students realize that concepts and applications are not learned in isolation and that they must be applied with other tools in the decision-making process.

Changes in Content and Pedagogy of Fourth Edition

Many changes have been made to the content of the fourth 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 fourth edition are:

1. Discussions of various concepts have been extended and strengthened so that there are now 28 chapters which represents ample text and assignment material for a two-term semester course (or three-quarter course).
2. While the clear, concise writing structure has been retained, the writing style has been enriched to reflect the exciting, changing nature of cost accounting.
3. 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.
4. Chapter 17 is a brand new chapter discussing the benefits of cost management, zero defect programs, comparison of JIT and MRP with EOQ and other inventory management systems, capital budgeting in the automated environment, and cost accounting for tomorrow's factory including flexible manufacturing, change in cost behavior and mix caused by pull rather than push manufacturing systems. The impact of computerized manufacturing on the body of cost accounting theory is presented. Zero defect and quality-control programs are also presented.
5. Each chapter contains a list of references for further reading and study. This list offers an excellent starting point for student term papers.

6. Revenue and production variances for multiproduct firms have been moved to a new chapter, Chapter 25, so that more attention can be focused on analyzing mix and yield variances for each product line, each material ingredient, and labor class. A diagram approach is presented for ease of preparing and proofing the production variances.
7. Inventory management and EOQ, accounting for scrap, defective units, and spoilage have been moved to a separate chapter (Chapter 23) to allow flexibility for those professors wishing to emphasize this material.
8. Also to better meet the varying needs of cost accounting students, labor accounting, including incentive compensation plans and the impact of JIT on these plans, has been moved to Chapter 24 so that those students unfamiliar with this subject are given an opportunity to better grasp these concepts.
9. Job order costing is moved to a separate chapter (Chapter 3) so more attention can be devoted to comparing job order costing with process costing and operation costing. With job order costing removed, Chapter 2 focuses entirely on cost concepts and behavior. The impact of computer-integrated manufacturing on economies of scale and cost behavior are added into Chapter 2's discussion.
10. CPA/CMA/CIA multiple choice questions have been added to all relevant chapters as end-of-chapter material.
11. The diagram approach for computing standard cost variances is illustrated as an alternative to the equation, short-cut approach for variance analysis so students have the opportunity of selecting which approach they find easier.
12. The concepts of capital budgeting have been extended and divided into two chapters so such deficiencies of traditional capital budgeting models as emphasizing too high a hurdle rate, relying only on easily quantified savings, and justifying projects rather than strategies can be discussed. A new addition also is the total-cost and differential-cost approach to equipment replacement with a related sketch of relevant cost flows in Chapter 19. Chapter 20 presents additional capital budgeting issues and the role of sensitivity analysis.
13. Important terms and concepts are cross-referenced to the exact page in which the term is first defined. This facilitates learning and applying the correct definition of new terms presented.
14. The discussion of behavioral factors has been expanded to include Theory Z, a comparison between Japanese and American organizations, and how these features affect the cost accounting system.
15. Importance of nonfinancial measures of performance and multiple measures of performance are given increased coverage. Divisional performance measurement and transfer pricing have been moved to *earlier coverage in the book as Chapter 15 and 16 because of the increased significance of this topic.*

16. Learning curve theory is incorporated with the discussion of cost behavior, cost drivers, and cost estimation methods (Chapter 4).
17. The outline at the beginning of each chapter has been expanded to help students keep a proper orientation of major and minor points.
18. Learning objectives at the front of each chapter have been refined to better define what the student will be able to do after studying the chapter.
19. The more liberal use of graphics and flowcharts helps students step from a procedural level of thinking to higher levels of thought in developing more refined abstract reasoning skills.
20. Discussion of the high-low method has been expanded to illustrate how the two points are selected from a group of 8–10 observations; also Chapter 4 includes the ledger account method along with regression analysis in separating costs into their fixed and variable components.

Supplements to the Fourth Edition

Supplements for students

Student Guide by Rayburn 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. Answer 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.

Cost Accounting Problem Solver Software by Mansuetti, Sprenger, Hultman, Weidkamp, and Burns. Software designed for each chapter of this book has been developed by these authors. This software, called Problem Solver, has been expanded from its version for the third edition of this book to include additional problems. This computer-based package helps students work selected problems from the text and gives an introduction to spreadsheets. It can be used with Lotus 1-2-3, Appleworks, or on a stand-alone basis.

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 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. Computerized and manual testbanks available.

Free Lotus 1-2-3 Template by Ronald H. Eaton, Memphis State University, contains 71 textbook problems that are designed to test students' ability to use a spreadsheet in working problems. Textbook problems contained on this template are indicated by a computer symbol in the text. This diskette, which is free to adopters, is contained in volume 2 of the solution manual.

Acknowledgments

My first and most important acknowledgment goes to my husband, Mike, and children, Douglass and Beverly, who have supported my commitment to writing this book and its accompanying materials. Also I acknowledge the encouragement given by my parents, Harold and Myrtle Douglass.

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In addition, many students have worked the problems to ensure that they are as error-free as possible, and they have contributed ideas for presenting the concepts more effectively.

Appreciation also goes to the American Institute of Certified Public Accountants, the Institute of Certified Management Accountants of the National Association of Accountants, and the Institute of Internal Auditors, Inc., for their permission to use questions and/or unofficial answers from their past professional examinations. Problems from the Uniform CPA Examination are designated (AICPA), problems from the Certificate in Management Accounting examinations are designated (CMA), and problems from the Certified Internal Auditing Examination are designated (CIA).

More than any other objective, I want this textbook to motivate students to learn and develop problem-solving techniques; further I want them to view cost/management accounting as exciting and valuable. To achieve this, my goal is to make this textbook the best possible teaching tool for cost accounting instructors. Suggestions and comments regarding the textbook and related materials are encouraged and welcome.

L. Gayle Rayburn

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