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UNDERSTANDING HEALTHCARE FINANCIAL MANAGEMENT

Fifth Edition

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Fifth Edition

Louis C. Gapenski

In Collaboration with George H. Pink

Health Administration Press, Chicago, Illinois
AUPHA, Washington, DC

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BRIEF CONTENTS

Preface xiii

PART I The Healthcare Environment

- 1** Introduction to Healthcare Financial Management 3
- 2** The Third-Party-Payer System 41

PART II Basic Financial Management Concepts

- 3** Time Value Analysis 79
- 4** Financial Risk and Required Return 115

PART III Capital Acquisition

- 5** Debt Financing 153
- 6** Equity Financing and Investment Banking 191
- 7** Securities Valuation, Market Efficiency, and Debt Refunding . . 221
- 8** Lease Financing 261

PART IV Cost of Capital and Capital Structure

- 9** Cost of Capital 293
- 10** Capital Structure Decisions 333

PART V Capital Allocation

11 The Basics of Capital Budgeting 377
12 Project Risk Analysis..... 423

PART VI Financial Condition Analysis and Forecasting

13 Financial Condition Analysis 463
14 Financial Forecasting 501

PART VII Other Topics

15 Working Capital Management 539
16 Business Valuation, Mergers, and Acquisitions 575
17 Capitation, Rate Setting, and Risk Sharing 613
18 Financial Risk Management 647

Glossary 679

Index 697

About the Authors 715

DETAILED CONTENTS

Preface xiii

PART I The Healthcare Environment

1 Introduction to Healthcare Financial Management 3

The Role of Financial Management in the Health Services Industry, 6;
Current Challenges, 8; Alternative Forms of Business Organization, 8;
Hybrid Forms of Organization, 11; Alternative Forms of
Ownership, 13; Organizational Structures, 17; Organizational
Goals, 20; Tax Laws, 24; Depreciation, 32

2 The Third-Party-Payer System 41

Insurance Concepts, 42; Generic Reimbursement Methods, 49; Major
Health Insurers (Third-Party Payers), 56; Other Issues, 69

PART II Basic Financial Management Concepts

3 Time Value Analysis 79

Time Lines, 80; Future Value of a Lump Sum (Compounding), 81;
Present Value of a Lump Sum (Discounting), 87; Opportunity
Costs, 90; Solving for Interest Rate and Time, 92; Annuities, 94;
Perpetuities, 99; Uneven Cash Flow Streams, 100; Using Time Value
Analysis to Measure ROI, 102; Semiannual and Other Compounding
Periods, 105; A Review of Interest Rate Types, 110

4 Financial Risk and Required Return 115

The Many Faces of Financial Risk, 115; Introduction to Financial
Risk, 116; Portfolio Risk and Return, 124; Portfolio Risk of Business

Investments, 133; Portfolio Risk of Stocks (Entire Businesses), 139;
Portfolio Betas, 140; Relevance of the Risk Measures, 141;
Interpretation of the Risk Measures, 143; The Relationship Between
Risk and Return, 143; Some Thoughts About Beta and the CAPM, 147

PART III Capital Acquisition

5 Debt Financing 153

The Cost of Money, 153; Interest Rate Levels, 155; Long-Term
Debt, 156; Term Loans, 157; Bonds, 158; Short-Term Debt, 163;
Debt Contracts, 169; Credit Ratings, 171; Credit Enhancement, 174;
Interest Rate Components, 175; The Term Structure of Interest
Rates, 180; Economic Factors That Influence Interest Rate Levels, 182;
Advantages and Disadvantages of Debt Financing, 184

6 Equity Financing and Investment Banking 191

Preferred Stock, 191; Rights and Privileges of Common
Stockholders, 194; Classified Stock, 197; Selling New Common
Stock, 198; The Decision to Go Public, 203; The Decision to List, 205;
Advantages and Disadvantages of Common Stock Financing, 206;
Securities Regulation and the Investment Banking Process, 207; Equity
in Not-for-Profit Firms, 214

7 Securities Valuation, Market Efficiency, and Debt Refunding . . 221

The General Valuation Model, 222; Debt Valuation, 223; Preferred
Stock Valuation, 236; Common Stock Valuation, 237; Security Market
Equilibrium, 247; Informational Efficiency, 248; The Risk/Return
Trade-off, 251; Debt Refunding, 252

8 Lease Financing 261

Lease Parties and Types, 261; Tax Effects, 264; Financial Statement
Effects, 266; Evaluation by the Lessee, 269; Evaluation by the
Lessor, 277; Lease Analysis Symmetry, 279; Setting the Lease
Payment, 280; Leveraged Leases, 280; Motivations for Leasing, 282;
Additional Issues, 285

PART IV Cost of Capital and Capital Structure

9 Cost of Capital 293

Overview of the Cost of Capital Estimation Process, 293; Estimating
the Cost of Debt, 295; Estimating the Cost of Equity to Large

Investor-Owned Businesses, 298; Estimating the Cost of Equity to Not-for-Profit Businesses, 311; Estimating the Corporate Cost of Capital, 316; An Economic Interpretation of the Corporate Cost of Capital, 318; Flotation Costs, 321; Divisional Costs of Capital, 322; Warning! Warning! Warning!, 323; Cost of Capital Estimation for Small Businesses, 324; Factors That Influence a Business's Cost of Capital, 327

10 Capital Structure Decisions 333

Impact of Debt Financing on Risk and Return, 334; Business and Financial Risk, 337; Capital Structure Theory, 341; Criticisms of the MM and Miller Models, 350; Financial Distress Costs, 351; Trade-off Models, 352; Asymmetric Information Model of Capital Structure, 355; A Summary of the Capital Structure Models, 357; Application of Capital Structure Theory to Not-for-Profit Firms, 359; Making the Capital Structure Decision, 361; Capital Structure Decisions for Small Investor-Owned Businesses, 364; The Debt Maturity Decision, 365

PART V Capital Allocation

11 The Basics of Capital Budgeting 377

Project Classifications, 378; The Role of Financial Analysis in Health Services Capital Budgeting, 379; Overview of Capital Budgeting Financial Analysis, 380; Cash Flow Estimation, 381; Cash Flow Estimation Example, 389; Breakeven Analysis, 397; Return on Investment Analysis, 399; Some Final Thoughts on Breakeven and Profitability Analysis, 405; Evaluating Projects with Unequal Lives, 406; Economic Life Versus Physical Life (Abandonment Value), 410; Capital Budgeting in Not-for-Profit Businesses, 412; The Post-Audit, 416; Using Capital Budgeting Techniques in Other Contexts, 416

12 Project Risk Analysis 423

Types of Project Risk, 424; Relationships Among Stand-Alone, Corporate, and Market Risks, 425; Risk Analysis Illustration, 427; Sensitivity Analysis, 429; Scenario Analysis, 432; Monte Carlo Simulation, 435; Qualitative Risk Assessment, 438; Incorporating Risk into the Decision Process, 439; Final Risk Assessment and Incorporation for the MRI Project, 442; Incorporating Debt Capacity into the Decision Process, 443; Adjusting Cash Outflows for Risk, 444; Real (Managerial) Options, 446; The Real Option of Abandonment, 449; An Overview of the Capital Budgeting Decision Process, 453; Capital Rationing, 455

PART VI Financial Condition Analysis and Forecasting

13 Financial Condition Analysis 463

Financial Reporting in the Health Services Industry, 464; Financial Statement Analysis, 470; Ratio Analysis, 470; Tying the Ratios Together: Du Pont Analysis, 481; Common Size Analysis, 483; Percentage Change Analysis, 484; Operating Indicator Analysis, 485; Limitations of Financial Statement and Operating Indicator Analyses, 489; Economic Value Added, 491; Benchmarking, 492; Key Performance Indicators and Dashboards, 494

14 Financial Forecasting 501

Strategic Planning, 501; Operational Planning, 504; Financial Planning, 504; Revenue Forecasts, 507; Creating Forecasted Financial Statements, 510; Constant Growth Forecasting, 511; Factors That Influence the External Financing Requirement, 517; Problems with the Constant Growth Approach, 520; Real-World Forecasting, 521; Computerized Financial Forecasting Models, 525; Financial Controls, 526; The Cash Budget, 527

PART VII Other Topics

15 Working Capital Management 539

Cash Management, 540; Marketable Securities Management, 544; Long-Term Securities Management, 546; Receivables Management, 547; Credit Policy, 553; Supply Chain Management, 556; The Economic Ordering Quantity Model, 559; Accruals, 563; Accounts Payable (Trade Credit), 564

16 Business Valuation, Mergers, and Acquisitions 575

Level of Merger Activity, 575; Motives for Mergers: The Good, the Bad, and the Ugly, 578; Types of Mergers, 582; Hostile Versus Friendly Takeovers, 583; Merger Regulation, 584; Mergers Involving Not-for-Profit Businesses, 588; Business Valuation, 590; Unique Problems in Valuing Small Businesses, 596; Setting the Bid Price, 598; Structuring the Takeover Bid, 600; Due Diligence Analysis, 602; The Role of Investment Bankers, 602; Who Wins? The Empirical Evidence, 604; Corporate Alliances, 606; Goodwill, 607

17 Capitation, Rate Setting, and Risk Sharing 613

An Overview of Capitation, 614; Provider Incentives Under Capitation, 615; Financial Risk Under Capitation, 617; Development of Premium Rates, 626; Risk-Sharing Arrangements, 634

18 Financial Risk Management 647

Fundamentals of Financial Risk Management, 648; Risk Management of Capitated Contracts, 651; Debt Portfolio Immunization, 657; An Overview of Derivatives, 661; Options, 663; Futures, 668; Swaps, 671; The Use and Misuse of Derivatives, 673

Glossary 679

Index 697

About the Authors 715

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PREFACE

After years of teaching corporate finance and writing related textbooks and casebooks, I began teaching the healthcare financial management course in the University of Florida's Graduate Program in Health and Hospital Administration. The first thing that struck me was that no textbook was available that truly focused on healthcare financial management. To me, financial management primarily involves analysis and decision making, yet the textbooks available at the time mostly covered accounting and institutional detail, with only a very limited number of pages devoted to financial management.

Thus, I set about creating a textbook that emphasized (1) financial management rather than accounting and (2) analysis and decision making rather than institutional detail. In creating this textbook, I set out to do two things. First, I adopted a very broad definition of the health services industry that included medical practices, managed care organizations, nursing homes, and home health care providers, in addition to hospitals. Today, more and more health services administration students are electing careers outside the hospital industry, and it is important that a textbook on healthcare financial management presents a broad range of provider settings. Second, I identified the environmental factors that are unique to the health services industry and hence make healthcare financial management different from corporate finance. Then, I made sure that these factors played an important role in the textbook discussions.

Concept of the Textbook

My goals in writing the first edition were to create a textbook that provided health services administration students with (1) an operational knowledge of financial management theory and concepts, (2) the opportunity to apply these ideas to real-world healthcare business settings, and (3) the opportunity to use spreadsheet analyses to help make better financial decisions. Additionally, I wanted to create a textbook that could be used as a reference during internships and residencies as well as after graduation. Finally, I wanted a textbook that students would find user friendly, meaning one that they would enjoy

reading and could learn from on their own. If students don't find a textbook interesting, understandable, and useful, they won't read it!

This fifth edition of the textbook continues to meet those goals. It begins with basic concepts about both the health services industry and financial management. The textbook then progresses to show how financial management theory and concepts can be applied to healthcare businesses to help managers make better decisions, where "better" is defined as promoting the financial well-being of the organization.

Intended Market and Use

The textbook is targeted for the healthcare financial management course required in graduate programs in health services administration. Students typically have some background in basic business topics such as financial and managerial accounting, probability and statistics, spreadsheet analysis, and perhaps even corporate finance. However, the textbook contains a great deal of background information in these areas, and it can be used in programs where students have not had prior exposure to business topics. The textbook is useful also to healthcare professionals, including both those holding general management positions and those working as members of financial staffs.

Alternative Course Formats

There is no single best approach to teaching a healthcare financial management course. The optimal approach varies with students' backgrounds, instructors' interests, class contact hours, and the role of the course in the overall curriculum. Because these factors change, most instructors vary their approaches over time. Still, it may be useful to adopters to learn how the textbook has been used at the University of Florida.

In the Florida program, students first take an introductory healthcare finance course that covers both accounting and financial management. The healthcare financial management course is the second, and final, finance course in the curriculum unless a student elects to take an advanced independent study course. The second financial management course in any curriculum generally is taught either as a theoretically based lecture course, as a pragmatically based pure case course, or as a blend of theory and practice where lectures are combined with some cases. Over time, I have used all three approaches, but the one that I have found best is a blend of theory and practice, but with a strong bias toward practice. Thus, I lecture occasionally but use a large number of cases to provide insights into the complex financial decisions faced by practicing healthcare managers.

Understanding Healthcare Financial Management provides both the theory and concepts behind financial decision making in the health services industry and the "nuts and bolts" tools required to implement the theory

and concepts. Students learn the theory and concepts of healthcare financial management from the textbook and periodic lectures and then implement the material by working cases. In the first two editions, the cases were contained in the textbook. However, the editorial and production burden of having both textbook and casebook in a single edition created constraints that became too confining. The publisher and I agreed that the optimal solution to this problem was to separate the cases from the textbook, which we implemented in the third edition. I will have much more to say about this decision later in the preface.

I cover most of the textbook, along with 12 cases (one per week, after some introductory material), in a one-semester course. In addition, I typically include a few accounting-oriented cases from the casebook as a refresher. However, the dominant theme is financial management because a well-grounded understanding of financial decision making is more important for most students than a better understanding of accounting. Also, our students are studying to be general managers, not financial staff specialists, and hence I am willing to sacrifice depth to expose students to a large range of topics. The course runs fast and furious, but this tends to keep students, and instructors, on their toes and in high gear.

Although the textbook is designed for use in the second course in financial management, a great deal of introductory material has been included. In spite of the fact that the Florida students have already had one finance course, I have found that many of them still do not have a good grasp of the basic fundamentals of financial management. Thus, they appreciate the fact that *Understanding Healthcare Financial Management* reviews basic concepts in addition to presenting new material. After all, repetition is the key to learning.

Because the textbook contains so much introductory material, it is also suitable for use in courses in which students have not had an introductory finance course, including two-course sequences. In this situation, I would tend to go slower to give students more time to digest the material, and the lectures would be more frequent and extensive to ensure that students really know the fundamentals before working the cases, which would be fewer in number. In a two-course sequence, instructors can easily supplement the textbook with outside readings and/or additional cases.

Changes in the Fifth Edition

Since the fourth edition of the textbook was published, I have used the textbook several times in courses I have taught and have received many comments from users at other universities. Furthermore, Health Administration Press has solicited and received a number of thoughtful reviews. The reaction of students, other professors, and the market in general has been overwhelmingly positive—every comment indicates that the basic concept of the textbook is

sound. Even so, nothing is perfect, and the health services industry is evolving at a dizzying pace. These circumstances have led to a number of changes to the textbook; the most important of which are listed below:

- First and foremost, this edition was written in collaboration with George H. Pink, a well-known healthcare finance professor at the University of North Carolina at Chapel Hill. George brings new insights to the book that, over time, will have a profound and positive impact.
- Time value calculations, particularly in Chapter 3, now focus exclusively on spreadsheets, with pictorials used to illustrate solution techniques. Students overwhelmingly state that because they do not use financial calculators for time value problems, the inclusion of calculator solutions was a distraction. Note, however, that a calculator tutorial is available as an ancillary to the text.
- Many students, as well as instructors, have asked that a glossary be added to the book. This edition has one.
- A new chapter, Chapter 19: Distributions to Owners: Bonuses, Dividends, and Repurchases, has been added as an ancillary. It is available online.
- Short introductions have been added to each part page to introduce the topics contained in the chapters of that part.
- All aspects of the text discussion as well as references have been updated and clarified as needed. Particular care was taken to include the most recent reimbursement changes and to update the real-world examples.
- New sections have been added or existing sections have been expanded for the following topics: municipal bond pools, cost of capital for not-for-profit and small businesses, modified IRR, subjective risk assessment, supply chain management, stop-loss insurance, current challenges for healthcare managers, and health savings accounts.

Ancillary Materials

Several ancillary materials have been designed to enhance the learning experience associated with this text.

Materials for Instructors

Two very useful ancillaries are available to instructors who adopt this text:


1. **Slideshow.** A set of PowerPoint® slides that cover the essential topics contained in each chapter is available. Concepts, graphs, tables, lists, and calculations are presented in about 40 slides per chapter, much as an instructor might do on a blackboard. However, the slides are more crisp, clear, and colorful and can be displayed on a screen almost instantaneously. Furthermore, hard copies of the slides can be provided to students for use as lecture notes, which I have found that students truly appreciate. Many

instructors will find these slides useful, either as is or as customized to best meet unique course and student requirements.

2. **End-of-chapter problem solutions.** As indicated below, a set of problems in spreadsheet format is available for most chapters. These problem sets, which focus on key concepts, can be assigned as graded homework or used in any way that the instructor desires. A section at the end of each chapter indicates when problems are available.

Materials for Students and Instructors

Four useful ancillaries are available to students (and instructors) who use this text:

1. **Text models.** Most of the chapters in the text have accompanying Excel® models that illustrate the text calculations as well as additional calculations that are relevant to the chapter material. The purpose of these spreadsheet models is twofold. First, students can learn the material better because they can more easily visualize how various input factors influence a particular calculation. For example, the spreadsheet model for capital budgeting allows students to change input values, such as volume and average reimbursement, and immediately see the effects on profitability. Second, the spreadsheets permit students to learn the mechanics of spreadsheet analysis in a less challenging context than the cases (discussed below) because these models typically are not part of a graded assignment. Note that sections of the text that have accompanying models are designated by a web icon: . Also, a section at the end of each chapter indicates when text models are available.
2. **End-of-chapter problems.** A set of problems in spreadsheet format is available for most chapters. The problems may be assigned by the instructor as homework or worked by students on their own to gain an additional understanding of the topics in the chapter. A section at the end of each chapter indicates when problems are available.
3. **Calculator tutorial.** A short tutorial is available for those students who use financial calculators to solve time value problems.
4. **Chapter 19.** This chapter, Distributions to Owners: Bonuses, Dividends, and Repurchases, is available online either to instructors for coverage in class or to students for independent learning.

Obtaining the Ancillary Materials

All student ancillary materials can be accessed on this book's companion website: ache.org/UnderstandingFinancialManagement5. Instructor ancillaries, which are contained in a secure area, are available only to adopters of this text. For access information, e-mail hap1@ache.org.

The Casebook

In addition to the free ancillaries, many adopters pair this textbook with its accompanying casebook, *Cases in Healthcare Finance*. Of course, the most realistic application of healthcare finance occurs within health services organizations, and there is no substitute for on-the-job experience. The next best thing, and the only real option for the classroom, is to use cases to simulate, to the extent possible, the environment in which finance decisions are actually made. Cases provide students with the opportunity to bridge the gap between learning concepts in a lecture setting and actually applying them on the job. By using cases, students can be better prepared to deal with the multitude of problems that arise in the practice of healthcare financial management.

Cases in Healthcare Finance, 3rd edition, contains 30 cases that focus on the practice of healthcare finance, including accounting, within provider organizations. In general, each case addresses a single financial issue, such as a capital investment decision; but the uncertainty of the input data, along with the presence of relevant nonfinancial factors, makes each case interesting and challenging. The case settings include a wide variety of provider organizations, including integrated delivery systems and managed care organizations. In addition to cases that focus purely on financial decisions, the casebook contains eight mini-cases on ethics. The mini-cases are not quantitative in nature but rather are designed to promote discussion about a finance situation that has potential ethical implications.

In general, cases may be classified as directed or nondirected. *Directed* cases include a specific set of questions that students must answer to complete the case, while *nondirected* cases (as I use the term) contain only general guidance to point students in the right direction. Most of the cases in the casebook are nondirected. The primary advantage of nondirected cases is that they closely resemble how real-world managers confront financial decision making because they require students to develop their own solution approach. The disadvantage is that students who stray from the key issues of the case often do not obtain full value from their effort.

I have found that students with more advanced finance skills gain the most from nondirected cases, while students that have had less finance exposure gain most from directed cases. The online *Instructor's Manual* for the casebook contains a set of case questions that can be used to convert each nondirected case to a directed case. Thus, instructors have the option of using the nondirected cases in either way, depending on the experience of the students, the objectives of the course, and the extent to which cases will be used.

Spreadsheet analysis has become extremely important in all aspects of healthcare finance. Students must be given the opportunity to develop computer skills and be allowed, or required, to use spreadsheet programs to assist in case analyses. If students have not previously learned about spreadsheets,

they must be exposed to them because functional literacy in any area of management today means at least some knowledge of spreadsheet modeling. Furthermore, spreadsheet models can reduce the amount of “busywork” required to perform the required calculations and hence leave students with more time to focus on financial management issues.

Because of these factors, I developed well-structured, user-friendly spreadsheet models for those cases where models would help to create a more efficient analysis. Most of the cases can, of course, be done with a calculator, but the spreadsheet models are far more efficient and hence big time-savers, especially when conducting risk assessment using techniques such as sensitivity and scenario analyses. In addition, spreadsheet models allow students to easily create graphics and other computer outputs that enhance the quality of both the analyses and any required presentations.

The student versions of the case models are complete in the sense that no modeling is required to obtain a base case solution. However, zeros have been entered for all input data, and hence students must identify and then enter the appropriate input values. When this is done, the model automatically calculates the base case solution. However, the models do not contain risk analyses or other extensions such as graphics, so students must modify the models as necessary to make them most useful in completing the cases.

The instructor versions of the case models are similar to the student versions, except that the input values are intact. Thus, instructors can view the base case solution without entering any data. In addition, some instructor version models have additional modeling, such as risk analyses, included. The instructor versions of the case models are distributed with the online *Instructor’s Manual* to the casebook.

Health Administration Press is keenly aware of the increasing financial burden that students face as course materials escalate in both quantity and price. The casebook is discounted 20 percent when purchased with this text. For more information, call Health Administration Press at (301) 362-6905 or e-mail hap@pmds.com.

Acknowledgments

This book reflects the efforts of many people. First, I would like to welcome George Pink as a collaborator. His work on the text and ancillaries has been invaluable. Furthermore, my thanks go to the following individuals, who reviewed previous editions of the textbook and provided many valuable comments and suggestions for improving it:

Doug Conrad of the University of Washington

Tom Getzen of Temple University

Mike McCue of Virginia Commonwealth University

Dean Smith of the University of Michigan

Jack Wheeler of the University of Michigan

Also, special thanks are due to Mike McCue and Jack Wheeler, who coauthored some sections.

Colleagues, students, and staff at the University of Florida provided inspirational support, as well as more tangible support, during the development and class testing of each edition of the textbook. And last, but certainly not least, I would like to thank the Health Administration Press staff, who were instrumental in ensuring the quality and usefulness of the textbook.

Errors in the Textbook

In spite of the significant effort that has been expended on this edition, it is safe to say that some errors exist. In an attempt to create the most error-free and useful textbook possible, we strongly encourage both instructors and students to write me at the address below with comments and suggestions for improving the textbook. We welcome and value your input!

Conclusion

Good financial management is vital to the economic well-being of the health services industry. Because of its importance, financial management theory and concepts should be thoroughly understood, but this is easier said than done. We hope that *Understanding Healthcare Financial Management* will help you better appreciate the financial management problems faced by the health services industry today and that it will provide guidance on how best to solve them.

Louis C. Gapenski, Ph.D.

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The Healthcare Environment

Two factors make the provision of health services different from other services. First, many providers are organized as not-for-profit corporations as opposed to investor owned. Second, payment for services typically is made by third parties rather than by patients, who receive the services. By focusing on these differences, Part I of the text provides students with unique background information that creates the framework for financial decision making within healthcare organizations.

Chapter 1 discusses the institutional setting for the delivery of healthcare services. Topics covered include the role of financial management, alternative forms of organization and ownership, organizational goals, and tax laws. In essence, this chapter creates the organizational background for the provision of health services.

Chapter 2 focuses on insurance concepts and the third-party-payer system. It is essential that healthcare managers understand who the payers are and the payment methods used because these external factors have a profound influence on financial decision making.

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INTRODUCTION TO HEALTHCARE FINANCIAL MANAGEMENT

Learning Objectives

After studying this chapter, readers should be able to:

- Explain the difference between accounting and financial management.
- Discuss the role of financial management in health services organizations.
- Describe the basic forms of business organization along with their advantages and disadvantages.
- Discuss the two basic types of ownership and explain why ownership type is so important when making financial management decisions.
- Explain how the goals of investor-owned and not-for-profit businesses differ.
- Describe, in general terms, the tax laws that apply both to individuals and to healthcare businesses.

Introduction

The study of healthcare financial management is both fascinating and rewarding. It is fascinating because so many of the concepts involved have implications for both professional and personal behavior. It is rewarding because, rightly or wrongly, the healthcare environment today, and into the foreseeable future, is forcing managers to place an increasing emphasis on financial implications when making operating decisions.

First and foremost, financial management is a *decision science*. Whereas accounting provides decision makers with a rational means by which to budget for and measure a business's financial performance, financial management provides the theory, concepts, and tools necessary to make better decisions. Thus, the primary purpose of this textbook is to help healthcare managers and students become better decision makers. The text is designed primarily for nonfinancial managers, although financial specialists—especially those with accounting rather than finance backgrounds or those who are moving into the health services industry from other industries—will also find the text useful.

The major difference between this text and corporate finance texts is that this text focuses on factors that are unique to the health services industry. For example, the provision of health services is dominated by *not-for-profit* organizations (both private and governmental), which are inherently different from *investor-owned* businesses.¹ Also, the majority of payments for services made to healthcare providers are not made by patients—the consumers of the service—but rather by some *third-party payer* (for example, a commercial insurance company or a government program). Indeed, even the purchase of health insurance is dominated by employers rather than by the individuals who will receive the services. Throughout this text, we emphasize ways in which the unique features of the health services industry affect financial management decisions.

Although this text contains some theory, and a great number of financial management concepts, its primary emphasis is on how managers can apply the theory and concepts; thus, it does not contain the traditional end-of-chapter questions and problems. (Note, however, that end-of-chapter problems in spreadsheet format are available as ancillary materials.) Rather, the text is designed to be used with the casebook *Cases in Healthcare Finance*, which contains cases that are based on real-life decisions faced by practicing healthcare managers. The cases are designed to enable students to apply the skills learned in this text's chapters in a realistic context, where judgment is just as critical to good decision making as numerical analysis. Furthermore, the cases are semidirected, which means that although students receive some guidance, they must formulate their own approach to the analyses, just as real-world decision makers must do.²

Also, personal computers are changing the way managers think about structuring and performing financial analyses. Managers, and students, must recognize that computers are capable of providing answers to questions that were not even asked a few years ago. Thus, both this text and the casebook are oriented toward using spreadsheets to help make better decisions. This text has accompanying spreadsheet models that illustrate the key concepts presented in many of the chapters. The casebook has spreadsheet models that make the quantitative portion of the case analyses both easier to do and more complete.


Note, however, that it is impossible to create a text that includes everything that a manager needs to know about healthcare financial management. Indeed, it would be foolish even to try because the industry is so vast and is changing so rapidly that many of the details needed to become completely knowledgeable in the field can only be learned through contemporary experience. Thus, we do not expect readers to fully understand every nuance of every financial management theory and concept that pertains to the industry, nor do we expect readers to become experts in quantitative analysis. Nevertheless, this text will provide the core competencies required to enable readers to (1) judge the validity of analyses performed by others, usually financial staff

specialists or consultants, and (2) incorporate sound financial management theory and concepts in their own managerial and personal decision making.

How to Use This Book

The overriding goal in creating this text is to provide an easy-to-read, content-filled text on healthcare financial management. The text contains several features designed to assist in learning the material.

First, pay particular attention to the LEARNING OBJECTIVES listed at the beginning of each chapter. These objectives provide a feel for the most important topics in each chapter and what readers should set as learning goals for that chapter. After each major section, except the Introduction, one or more SELF-TEST QUESTIONS are listed. As you finish reading each major section, try to provide reasonable answers to these questions. Your responses do not have to be perfect, but if you are not satisfied with your answer, it would be best to reread that section before proceeding. Answers to the self-test questions are not provided, so a review of the section is indicated if you are in doubt about the adequacy and correctness of your answer.

Within the book, italics and boldface are used to indicate special terms. *Italics* are used whenever a key term is introduced; thus, italics alert readers that a new and important concept is being presented. **Boldface** is solely used for emphasis; thus, the meaning of a boldface word or phrase has unusual significance to the point being discussed. As indicated in the Preface, the book has accompanying spreadsheet models that match, and sometimes expand on, selected calculations within text. The sections of the text that have accompanying models are indicated by a web icon: .

In addition to in-chapter learning aids, materials designed to help readers learn healthcare financial management are included at the end of each chapter. First, each chapter ends with a summary section titled KEY CONCEPTS that very briefly reviews the most important topics covered in the chapter. If the meaning of a key concept is not apparent, you may find it useful to review the applicable section. Immediately after the KEY CONCEPT section, a paragraph is included that indicates if spreadsheet models and problems sets are available for that chapter. (See the Preface for more information on these ancillaries.)

Finally, each chapter ends with SELECTED WEBSITES and REFERENCES. The websites are designed to just “scratch the surface” of relevant material available on the World Wide Web. The books and articles cited as references can provide a more in-depth understanding of the material covered in the chapter.

Taken together, the pedagogic structure of the book is designed to make the learning of healthcare financial management as easy and efficient as possible.

Self-Test Question

1. Briefly describe the key features of the text designed to enhance the learning experience.

The Role of Financial Management in the Health Services Industry

Until the 1960s, *financial management* in all industries was generally viewed as descriptive in nature, with its primary role being to secure the financing needed to meet a business's operating objectives. A business's marketing, or planning, department would project demand for the firm's goods or services; facilities managers would estimate the assets needed to meet the projected demand; and the finance department would raise the money needed to purchase the required plant, equipment, and supplies. The study of financial management concentrated on business securities and the markets in which they are sold and on how businesses could access the financial markets to raise capital. Consequently, financial management textbooks of that era were almost totally descriptive in nature.

Today, financial management plays a much larger role in the overall management of a business. Now, the primary role of financial management is to plan for, acquire, and utilize funds (capital) to maximize the efficiency and value of the enterprise. Because of this role, financial management is known also as *capital finance*. The specific goals of financial management depend on the nature of the business, so we must postpone that discussion until later. In larger organizations, financial management and accounting are separate functions, although the accounting function typically is carried out under the direction of the organization's *chief financial officer (CFO)* and hence falls under the overall category of "finance."

In general, the financial management function includes the following activities:

- **Evaluation and planning.** First and foremost, financial management involves evaluating the financial effectiveness of current operations and planning for the future.
- **Long-term investment decisions.** Although more important to senior management, managers at all levels must be concerned with the capital investment decision process. Such decisions, which focus on the acquisition of new facilities and equipment (fixed assets), are the primary means by which businesses implement strategic plans, and hence they play a key role in a business's financial future.
- **Financing decisions.** All organizations must raise funds to buy the assets necessary to support operations. Such decisions involve the choice between internal and external funds, the use of debt versus equity capital, and the use of long-term versus short-term debt. Although senior

managers typically make financing decisions, these decisions have ramifications for managers at all levels.

- **Working capital management.** An organization's current, or short-term, assets, such as cash, marketable securities, receivables, and inventories, must be properly managed both to ensure operational effectiveness and to reduce costs. Generally, managers at all levels are involved, to some extent, in short-term asset management, which is often called *working capital management*.
- **Contract management.** In today's healthcare environment, health services organizations must negotiate, sign, and monitor contracts with managed care organizations and third-party payers. The financial staff typically has primary responsibility for these tasks, but managers at all levels are involved in these activities and must be aware of their effect on operating decisions.
- **Financial risk management.** Many financial transactions that take place to support the operations of a business can, themselves, increase a business's risk. Thus, an important financial management activity is to control financial risk.

In times of high profitability and abundant financial resources, the finance function tends to decline in importance. Thus, when most healthcare providers were reimbursed on the basis of costs incurred, the role of finance was minimal. At that time, the most critical finance function was cost accounting because it was more important to account for costs than it was to control them. Today, however, healthcare providers are facing an increasingly hostile environment, and any business that ignores the finance function runs the risk of financial deterioration, which ultimately can lead to bankruptcy and closure.

In recent years, providers have been redesigning their finance functions to recognize the changes that have been occurring in the health services industry. Historically, the practice of finance had been driven by the Medicare program, which demanded that providers (primarily hospitals) churn out a multitude of reports both to comply with regulations and to maximize Medicare revenues. Third-party reimbursement complexities meant that a large amount of time had to be spent on cumbersome accounting, billing, and collection procedures. Thus, instead of focusing on value-adding activities, most finance work focused on bureaucratic functions. Today, to be of maximum value to the enterprise, the finance function must support cost-containment efforts, managed care and other payer contract negotiations, joint venture decisions, and integrated delivery system participation. In essence, finance must help lead organizations into the future, rather than merely record what has happened in the past.

In this text, the emphasis is on financial management, but there are no unimportant functions in health services organizations. Managers must understand a multitude of functions such as marketing, accounting, and human

resource management in addition to financial management. Still, all business decisions have financial implications, so all managers—whether in operations, marketing, personnel, or facilities—must know enough about financial management to incorporate financial implications in decisions made within their own specialized areas. Thus, all managers must understand the theory and principles of financial management because this knowledge will make them even more effective at their own specialized work.

Self-Test Questions

1. What is the role of financial management in today's health services organizations?
2. How has this role changed over time?

Current Challenges

In 2006, two articles were published that listed the current concerns of healthcare managers.³ The first article focused on issues of concern among hospital chief executive officers (CEOs) surveyed by the American College of Healthcare Executives (ACHE). The top concern was financial challenges, by almost a two-to-one margin over the next highest concern (personnel shortages). In fact, financial concerns have headed the list of challenges on every survey conducted since the survey began in 2002. Tom Dolan, ACHE's president and CEO, said: "This year's survey results are a continuation of previous concerns. First and foremost is finance." When asked to rank their specific financial concerns, CEOs put reimbursement at the forefront, with concerns over Medicaid, Medicare, and bad debt losses topping the list. (Reimbursement will be discussed in Chapter 2.) Clearly, the ability of government payers to adequately reimburse providers leads the list of concerns.

The second article focused on issues of concern to CFOs. The most pressing issue was balancing clinical and financial issues. In essence, how can financial performance be improved without having a negative impact on clinical performance? Other issues of concern include improving the revenue cycle (billing and collecting on a timely basis) and developing different ways to access (raise) capital.

Taken together, these articles confirm the fact that financial issues are of primary importance to today's healthcare managers. The remainder of this book is dedicated to helping you confront and solve these issues.

Self-Test Question

1. What are some important issues facing healthcare managers today?

Alternative Forms of Business Organization

Throughout the text, the focus is on business finance—that is, the practice of financial management within business organizations. There are three primary

forms of *business organization*: (1) proprietorship, (2) partnership, and (3) corporation. Because most healthcare managers work for corporations and because not-for-profit businesses are organized as corporations, this form of organization is emphasized. However, many individual physician practices are organized as proprietorships, and partnerships are common in group practices and joint ventures. Healthcare managers must, therefore, be familiar with all forms of business organization.

Proprietorship

A *proprietorship*, sometimes called a *sole proprietorship*, is a business owned by one individual. Going into business as a proprietor is easy—the owner merely begins business operations. However, most cities require even the smallest businesses to be licensed, and state licensure is required for most healthcare professionals.

The proprietorship form of organization is easily and inexpensively formed, is subject to few governmental regulations, and pays no corporate income taxes. All earnings of the business, whether reinvested in the business or withdrawn by the owner, are taxed as personal income to the proprietor. In general, a sole proprietorship will pay lower total taxes than a comparable, taxable corporation because corporate profits are taxed twice—once at the corporate level and once by stockholders at the personal level when profits are distributed as dividends or when capital gains are realized.

Partnership

A *partnership* is formed when two or more individuals associate to conduct a nonincorporated business. Partnerships may operate under different degrees of formality, ranging from informal, verbal understandings to formal agreements filed with the state in which the partnership does business. Like a proprietorship, the major advantage of the partnership form of organization is its low cost and ease of formation. In addition, the tax treatment of a partnership is similar to that of a proprietorship; the partnership's earnings are allocated to the partners and taxed as personal income regardless of whether the earnings are actually paid out to the partners or retained in the business.⁴

Proprietorships and partnerships have three important limitations:

1. It typically is difficult for owners to sell, or transfer, their interest in the business.
2. The owners have unlimited personal liability for the debts of the business, which can result in losses greater than the amount invested in the business. In a proprietorship, unlimited liability means that the owner is personally responsible for the debts of the business. In a partnership, it means that if any partner is unable to meet his or her pro rata obligation in the event of bankruptcy, the remaining partners are responsible for the unsatisfied claims and must draw on their personal assets if necessary.
3. The life of the business is limited to the life of the owners.

These three disadvantages—difficulty in transferring ownership, unlimited liability, and impermanence of the business—lead to the fourth and perhaps the most important disadvantage from a finance perspective: It is difficult for proprietors and partners to attract substantial amounts of capital (raise money for the business). This difficulty is not a particular problem for a slow-growing business or when the owners are very wealthy, but for most businesses, it becomes a real handicap if the business needs to expand rapidly to take advantage of market opportunities. For this reason, proprietorships and most partnerships are restricted primarily to small businesses.⁵ However, almost all businesses start out as sole proprietorships or partnerships and then ultimately convert to the corporate form of organization.

Corporation

A *corporation* is a legal entity that is separate and distinct from its owners and managers. Although corporations can be either investor owned or not for profit, this section focuses on investor-owned corporations. The unique features of not-for-profit corporations will be discussed in later sections. The creation of a separate business entity gives the corporation three main advantages:

1. A corporation has unlimited life and can continue in existence after its original owners and managers have died or left the firm.
2. It is easy to transfer ownership in a corporation because ownership is divided into shares of stock that can be easily sold.
3. Owners of a corporation have limited liability.

To illustrate limited liability, suppose that one person made an investment of \$10,000 in a partnership that subsequently went bankrupt and owed \$100,000. Because the partners are liable for the debts of the partnership, that partner can be assessed for a share of the partnership's debt in addition to the initial \$10,000 contribution. In fact, if the other partners were unable to pay their shares of the indebtedness, one partner would be held liable for the entire \$100,000. However, if the \$10,000 had been invested in a corporation that went bankrupt, the potential loss for the investor would be limited to the \$10,000 investment. (However, in the case of small, financially weak corporations, the limited liability feature of ownership is often fictitious because bankers and other lenders will require personal guarantees from the stockholders.) With these three factors—unlimited life, ease of ownership transfer, and limited liability—corporations can more easily raise money in the financial markets than sole proprietorships or partnerships can.⁶

The corporate form of organization has two primary disadvantages. First, corporate earnings of taxable entities are subject to double taxation—once at the corporate level and once at the personal level when dividends are paid to stockholders or capital gains are realized. Second, setting up a corpo-

ration, and then filing the required periodic state and federal reports, is more costly and time consuming than what is required to establish a proprietorship or partnership.

Although a proprietorship or partnership can begin operations without much legal paperwork, setting up a corporation requires that the founders, or their attorney, prepare a charter and a set of bylaws. Today, attorneys have standard forms for charters and bylaws on their computers, so they can set up a “no-frills” corporation with much less work than what would have been required in the past. However, setting up a corporation remains relatively difficult when compared to a proprietorship or partnership, and it is still more difficult if the corporation has nonstandard features.

The *charter* includes the name of the corporation, its proposed activities, the amount of stock to be issued (if investor owned), and the number and names of the initial set of directors. The charter is filed with the appropriate official of the state in which the business will be incorporated, and, when approved, the corporation is officially in existence.⁷ After the corporation has been officially formed, it must file quarterly and annual financial and tax reports with state and federal agencies.

The *bylaws* are a set of rules drawn up by the founders to provide guidance for the governing and internal management of the corporation. Bylaws include information about how directors are to be elected, whether the existing shareholders have the first right to buy any new shares that the firm issues, and the procedures for changing the charter or bylaws.

The value of any investor-owned business, other than a very small one, generally will be maximized if it is organized as a corporation for the following three reasons:

1. Limited liability reduces the risks borne by equity investors (the owners); with all else the same, the lower the risk, the higher the value of the investment.
2. A business’s value is dependent on growth opportunities, which in turn are dependent on the business’s ability to attract capital. Because corporations can obtain capital more easily than other forms of business can, they are better able to take advantage of growth opportunities.
3. The value of any investment depends on its *liquidity*, which means the ease at which the investment can be sold for a fair price. Because an equity investment in a corporation is much more liquid than a similar investment in a proprietorship or partnership, the corporate form of organization creates more value for its owners.

Hybrid Forms of Organization

Although the three basic forms of organization—proprietorship, partnership, and corporation—dominate the overall business scene, several hybrid forms

of organization also are used by businesses. Some of these forms are found in the health services industry.

Several specialized types of partnerships have characteristics somewhat different than a standard form of partnership. First, limiting some of the partners' liabilities is possible by establishing a *limited partnership*, wherein certain partners are designated *general partners* and others *limited partners*. The limited partners, like the owners of a corporation, are liable only for the amount of their investment in the partnership, while the general partners have unlimited liability. However, the limited partners typically have no control, which rests solely with the general partners. Limited partnerships are quite common in real estate and mineral investments. They are not as common in the health services industry, however, because in this setting it is difficult to find one partner that is willing to accept all of the business's risk and a second partner that is willing to relinquish control.

The *limited liability partnership (LLP)* is a relatively new type of partnership that is available in many states. In an LLP, the partners have joint liability for all actions of the partnership, including personal injuries and indebtedness. However, all partners enjoy limited liability regarding professional malpractice because partners are only liable for their own individual malpractice actions, not those of the other partners. In spite of limited malpractice liability, the partners are jointly liable for the partnership's debts. Menomonee Falls Ambulatory Surgery Center in Wisconsin is an example of a LLP.

The *limited liability company (LLC)* is another new type of business organization. It has some characteristics of both a partnership and a corporation. The owners of an LLC are called *members*, and they are taxed as if they were partners in a partnership. However, a member's liability is like that of a stockholder of a corporation because liability is limited to the member's initial contribution in the business. Personal assets are only at risk if the member assumes specific liability, such as by signing a personal loan guarantee. Ardent Health Services, an organization with 28 facilities nationwide, is an example of an LLC. Both the LLP and LLC are new and complex forms of organizations, so setting them up can be time consuming and costly.

The *professional corporation (PC)*, which is called a *professional association (PA)* in some states, is a form of organization that is common among physicians and other individual and group practice healthcare professionals. All 50 states have statutes that prescribe the requirements for such corporations, which provide the usual benefits of incorporation but do not relieve the participants of professional liability. Indeed, the primary motivation behind the PC, which is a relatively old business form compared to the LLP and LLC, was to provide a way for professionals to incorporate yet still be held liable for professional malpractice.

PCs have tight restrictions, however. First, one or more owners must be licensed in the profession of the PC. Second, PCs are taxed as corporations; they cannot be designated as an S corporation for tax purposes (see the fol-

lowing paragraph). The Atlanta Cardiology Group, comprising 20 physicians who provide a full range of cardiac services at multiple sites, typifies a PC.

For tax purposes, standard for-profit corporations are called *C corporations*. If certain requirements are met, either one or a few individuals can incorporate but, for tax purposes only, elect to be treated as if the business were a proprietorship or partnership. Such corporations, which differ only in how the owners are taxed, are called *S corporations*. Although S corporations are similar to LLPs and LLCs regarding taxes, LLPs and LLCs provide more flexibility and benefits to owners. Many businesses, especially group practices, are, therefore, converting to the newer forms.

1. What are the three major forms of business organization, and how do they differ?
2. What are some different types of partnerships?
3. What are some different types of corporations?

Self-Test Questions

Alternative Forms of Ownership

Unlike other sectors in the economy, not-for-profit corporations play a major role in the healthcare sector, especially among providers. For example, only 20 percent of nongovernmental hospitals are investor owned; the remaining 80 percent are not for profit. Furthermore, not-for-profit ownership is common in the nursing home, home health care, and managed care industries.

Investor-Owned Corporations

As discussed in the previous section, for-profit businesses can be organized in a variety of ways. However, because of their size, corporations are by far the largest employers of healthcare professionals. When the average person thinks of a corporation, he or she probably thinks of an *investor-owned*, or *for-profit, corporation*. Virtually all large businesses (e.g., Ford, Microsoft, IBM, and General Electric) are investor-owned corporations.

Investors become owners of such businesses by buying shares of *common stock* in the firm. Investors may buy common stock when it is first sold by the firm. Such sales are called *primary market transactions*. In a primary market transaction, the funds raised from the sale generally go to the corporation.⁸ After the shares have been initially sold by the corporation, they are traded in the *secondary market*. These sales may take place on *exchanges* such as the New York Stock Exchange (NYSE) and the American Stock Exchange (AMEX). They may also take place in the *over-the-counter (OTC) market*, which is composed of a large number of dealers/brokers connected by a sophisticated electronic trading system. When shares are bought and sold in the secondary market, the corporations whose stocks are traded receive no funds

from the trades; corporations receive funds only when shares are first sold to investors.

Investor-owned corporations may be either publicly held or privately held. The shares of *publicly held* firms are owned by a large number of investors and are widely traded. For example, HCA, which currently (in 2006) owns and operates about 180 hospitals and has over 400 million shares outstanding, is owned by some 50,000 individual and institutional stockholders. Another example is Manor Care, which owns and operates over 300 long-term care facilities and has about 80 million shares outstanding owned by some 8,000 stockholders. Drug manufacturers, such as Merck and Pfizer; medical equipment manufacturers, such as St. Jude Medical, which makes heart valves; and U.S. Surgical, which makes surgical stapling instruments, are all publicly held corporations.

Conversely, the shares of *privately held*, also called *closely held*, firms are owned by just a handful of investors and are not publicly traded. In general, the managers of privately held firms are major stockholders. In regards to ownership and control, therefore, privately held firms are more similar to partnerships than to publicly held firms. Often, the privately held corporation is a transitional form of organization that exists for a short time between a proprietorship or partnership and a publicly owned corporation in which the motivation to go public is driven by capital needs. Wellsprings Healthcare, a Texas firm that helps employers control healthcare costs, is an example of a closely held firm in the health services industry.

The *stockholders*, also called *shareholders*, are the owners of investor-owned firms. As owners, they have three basic rights:

1. **The right of control.** Common stockholders have the right to vote for the corporation's board of directors, which oversees the management of the firm. Each year, a firm's stockholders receive a *proxy* ballot, which they use to vote for directors and to vote on other issues that are proposed by management or stockholders. In this way, stockholders exercise control. In the voting process, stockholders cast one vote for each common share held.
2. **A claim on the residual earnings of the firm.** A corporation sells products or services and realizes revenues from the sales. To produce these revenues, the corporation must incur expenses for materials, labor, insurance, debt capital, and so on. Any excess of revenues over expenses—the residual earnings—belongs to the shareholders of the business. Often, a portion of these earnings are paid out in the form of *dividends*, which are merely cash payments to stockholders, or *stock repurchases*, in which the firm buys back shares held by stockholders. However, management typically elects to reinvest some, or all, of the residual earnings in the business, which presumably will produce even higher payouts to stockholders in the future.

3. **A claim on liquidation proceeds.** In the event of bankruptcy and liquidation, shareholders are entitled to any proceeds that remain after all other claimants have been satisfied.

In summary, there are three key features of investor-owned corporations. First, the owners (the stockholders) of the business are well defined and exercise control of the firm by voting for directors. Second, the residual earnings of the business belong to the owners, so management is responsible only to the stockholders for the profitability of the firm. Finally, investor-owned corporations are subject to taxation at the local, state, and federal levels.

Not-for-Profit Corporations

If an organization meets a set of stringent requirements, it can qualify for incorporation as a *tax-exempt*, or *not-for-profit, corporation*. Tax-exempt corporations are sometimes called *nonprofit corporations*. Because nonprofit **businesses** (as opposed to pure charities) need profits to sustain operations, and because it is hard to explain why nonprofit corporations should earn profits, the term “not-for-profit” is more descriptive of such health services corporations.

Tax-exempt status is granted to businesses that meet the tax definition of a charitable corporation, as defined by Internal Revenue Service (IRS) Tax Code Section 501(c)(3) or (4). Hence, such corporations are also known as *501(c)(3) or (4) corporations*. The tax code defines a charitable organization as, “any corporation, community chest, fund, or foundation that is organized and operated exclusively for religious, charitable, scientific, public safety, literary, or educational purposes.” Because the promotion of health is commonly considered a charitable activity, a corporation that provides healthcare services can qualify for tax-exempt status, provided that it meets other requirements.⁹

In addition to the charitable purpose, a not-for-profit corporation must be organized and operated so that it operates exclusively for the public, rather than private, interest. Thus, no profits can be used for private gain and no political activity can be conducted. Also, if the corporation is liquidated or sold to an investor-owned firm, the proceeds from the liquidation or sale must be used for a charitable purpose. Because individuals cannot benefit from the profits of not-for-profit corporations, such organizations cannot pay dividends. However, prohibition of private gain from profits does not prevent parties of not-for-profit corporations, such as managers and physicians, from benefiting through salaries, perquisites, contracts, and so on.

Not-for-profit corporations differ significantly from investor-owned corporations. Because not-for-profit firms have no shareholders, no single body of individuals has ownership rights to the firm’s residual earnings or exercises control of the firm. Rather, control is exercised by a *board of trustees*, which is not constrained by outside oversight. Also, not-for-profit corporations are generally exempt from taxation, including both property and income

taxes, and have the right to issue tax-exempt debt (municipal bonds). Finally, individual contributions to not-for-profit organizations can be deducted from taxable income by the donor, so not-for-profit firms have access to tax-subsidized contribution capital. (The tax benefits enjoyed by not-for-profit corporations are reviewed in a later section on tax laws.)

The financial problems facing most federal, state, and local governments have caused politicians to take a closer look at the tax subsidies provided to not-for-profit hospitals. For example, several bills that require hospitals to meet minimum levels of care to the indigent to retain tax-exempt status have been introduced in Congress. Such efforts by Congress prompted the American Hospital Association in 2006 to propose guidelines for charity care that include (1) giving discounts to uninsured patients of “limited means”; (2) establishing a common definition for “community benefits,” which encompass the full range of services provided to the population served; and (3) improving “transparency,” or the ability of outsiders to understand a business’s governance structure and policies, including executive compensation.

In addition to Congressional action, officials in 20 states have recently proposed legislation that mandates the amount of charity care provided by not-for-profit hospitals and the billing and collections procedures applied to the uninsured. For example, Texas has established minimum requirements for charity care, which in effect hold not-for-profit hospitals accountable to the public for the tax exemptions they receive. The Texas law specifies four tests, and each hospital must meet at least one of them. The test that most hospitals use to comply with the law requires that at least 4 percent of net patient service revenue be spent on charity care. Under a proposed Illinois law, not-for-profit hospitals would be required to devote at least 8 percent of their operating costs on charity care and to establish discounts to the uninsured on the basis of income level.

Finally, money-starved municipalities in several states have attacked the property tax exemption of not-for-profit hospitals that have “neglected” their charitable missions. For example, tax assessors are fighting to remove property tax exemptions from not-for-profit hospitals in several Pennsylvania cities after a recent appellate court ruling supported the Erie school district’s authority to tax a local hospital that had strayed too far from its charitable purpose. According to one estimate, if all not-for-profit hospitals had to pay taxes comparable to their investor-owned counterparts, local, state, and federal governments would garner an additional \$3.5 billion in tax revenues. This estimate explains why tax authorities in some jurisdictions are pursuing not-for-profit hospitals as a source of revenue.

The inherent differences between investor-owned and not-for-profit organizations have profound implications for many elements of healthcare financial management, including organizational goals, financing decisions (i.e., the choice between debt and equity financing and the specific types of securities issued), and capital investment decisions. How ownership affects the

application of healthcare financial management theory and concepts will be addressed throughout the text.

1. What are the major differences between investor-owned and not-for-profit corporations?
2. What pressures have been placed on not-for-profit hospitals to ensure that they meet their charitable mission?

Self-Test Questions

Organizational Structures

Whether investor owned or not for profit, the number of ways of organizing a health services organization is almost unlimited. At the most basic level, a healthcare provider can be a single entity with one operating unit. In this situation, all of the financial management decisions for the organization are made by a single set of managers. Alternatively, corporations can be set up with separate operating divisions or as holding companies with wholly or partially owned subsidiary corporations, in which different management layers have different financial management responsibilities.

Holding Companies

Today, many organizations, both investor owned and not for profit, have adopted *holding company* structures to take advantage of economies of scale, or scope, in operations and financing or to gain favorable legal or tax treatment. Holding companies date from 1889, when New Jersey became the first state to pass a law permitting corporations to be formed for the sole purpose of owning the stocks of other firms. Many of the advantages and disadvantages of holding companies are identical to those inherent in a large firm with several divisions. Whether a firm is organized on a divisional basis or as a holding company with several subsidiary corporations does not affect the basic reasons for conducting large-scale, multiproduct or multiservice, multifacility operations. However, the holding company structure has some distinct advantages and disadvantages over the divisional structure.

There are several advantages to holding companies:

- **Control with fractional ownership.** A holding company may buy 5, 10, or 50 percent of the stock of another corporation. Such fractional ownership may be sufficient in giving the acquiring firm effective working control, or at least substantial influence, over the operations of the firm in which it has acquired stock ownership. Working control is often considered to entail more than 25 percent of the common stock, but it can be as low as 10 percent if the stock is widely held.
- **Isolation of risks.** Because the various operating firms in a holding company system are separate legal entities, the obligations of one unit are separate from those of the other units. Therefore, catastrophic losses

incurred by one unit of the system are not transferable into claims against the other units. This separation can be especially beneficial when the operating units carry the potential for large losses from malpractice or other liability lawsuits. Note, though, that the parent firm often voluntarily steps in to aid a subsidiary with large losses, either to protect the good name of the firm or to protect its investment in the subsidiary.

- **Separation of for-profit and not-for-profit subsidiaries.** Holding company organization facilitates expansion into both tax-exempt and taxable activities well beyond patient care. However, a tax-exempt holding company must ensure that all transactions with the taxable subsidiaries are conducted at arm's length, otherwise the tax-exempt status of the parent holding company can be challenged. Investor-owned multihospital systems are organized similarly, except that all of the entities are taxable, for-profit organizations.

Holding companies have the following disadvantages:

- **Partial multiple taxation.** Investor-owned holding companies that own at least 80 percent of a subsidiary's common stock can file a consolidated return for federal income tax purposes. In effect, the holding company and the subsidiary are treated as a single entity, with all of the revenues and costs aggregated. However, when less than 80 percent of the stock is owned, the only way that the subsidiary can transfer funds to the holding company is by paying dividends, and such dividends face partial multiple taxation. For example, holding companies that own more than 20 percent but less than 80 percent of the stock of another corporation must pay tax on 20 percent of the dividends received (80 percent are nontaxable), and companies that own less than 20 percent must pay tax on 30 percent of the dividends (70 percent are nontaxable). Because the subsidiary must pay taxes on the earnings prior to making the dividend payment, the funds transferred to the parent are taxed twice.
- **Ease of forced divestiture.** In the event of antitrust action, it is relatively easy for a holding company to relinquish ownership in a subsidiary by selling the stock to another party. This transfer is considered a disadvantage because it increases the likelihood that government agencies will demand divestiture if antitrust concerns arise.

Multihospital Systems

Multihospital systems, including both tax-exempt and for-profit organizations, have grown much faster than freestanding hospitals over the past 30 years. Several advantages of multihospital systems have been hypothesized, including the following:

- better access to capital markets, which results in lower capital costs;

- elimination of duplicated services, which increases the volume of services at the remaining sites and results in lower unit costs and increased quality;
- economies of scale;
- access to specialized managerial skills within the system;
- ability to recruit and retain better personnel because of superior training programs, advancement opportunities, and transfer opportunities; and
- increased political power to deal with governmental issues such as property taxes, certificates of need, and government reimbursement systems.

In recent years, the largest systems have tended to shed some hospitals, although there continues to be some consolidation within local markets. It appears that hospital systems have more economies of scale within local markets than they do regionally or nationally.

Corporate Alliances

Corporate alliances potentially can provide some of the benefits of multi-institutional systems without requiring common ownership. Perhaps the least binding alliances are industry trade groups, which tend to operate at both state and national levels. To illustrate the concept, note that the American Hospital Association and its state organizations—for example, the Florida Hospital Association—constitute one major hospital trade association. Also, the American Association of Equipment Lessors is the trade group for firms that lease equipment to the health services industry.

Other types of alliances can be more binding but provide more benefits to their members. For example, several hospital alliances exist primarily to provide purchasing clout for their members. One of the largest of such alliances is VHA (formerly Voluntary Hospitals of America), which is a for-profit firm whose shareholders are the member hospitals, all not-for-profit institutions, and their physicians. VHA's firms and subsidiaries provide members and affiliates with management services in such areas as procurement, data management, marketing, and even capital acquisition. VHA's members and affiliates retain local control and autonomy yet gain many of the advantages of a large system.

In addition to alliances among similar organizations, alliances are also being formed among dissimilar providers to offer a more complete range of services. Such vertical alliances are discussed in the next section.

Integrated Delivery Systems

Perhaps the most dynamic recent changes in organizational structures in health services have centered on the *integrated delivery system*.¹⁰ In the 1970s, horizontal integration, such as the combining of hospitals, was the dominant trend in organization evolution. In the 1980s and well into the 1990s, the dominant organizational movement was toward vertically integrated systems. In an integrated delivery system, a single organization, or a closely aligned

group of organizations, offers a broad range of patient care and support services operated in a unified manner. The range of services offered by an integrated delivery system may focus on a particular area, such as long-term care or mental health, or more commonly it may offer a full range of subacute, acute, and postacute services.

An integrated delivery system may have a single owner, or it may have multiple owners joined together by contracts and agreements. The driving force behind these systems is the motivation to offer a full line of coordinated services and hence to increase the overall effectiveness and lower the overall cost of the services provided. Cost reduction is obtained by providing only necessary services and ensuring that the services are provided at the most cost-effective clinical level. Integrated delivery systems may be formed by managed care plans or even directly by employers, but more often they are formed by providers to facilitate contracting with plans or employers.

Perhaps the key feature of integrated delivery systems is that, to be successful, the primary focus must be the clinical effectiveness and profitability of the system as a whole, as opposed to each individual element. This requires a much higher level of administrative and clinical integration than is seen in most organizations and, more importantly, it requires that managers of the individual elements of the system place their own interests second to that of the overall system. In addition, it requires a management information system that seamlessly passes both managerial and patient data among all of the components of the integrated system. Although it would appear that single-owner systems would have advantages over systems that are contractually created, such advantages, if they do exist, have proven to be difficult to realize in practice.

Although the advantages of integrated delivery systems are easy to hypothesize, the reality has been that these advantages have been very difficult to realize in practice. In fact, much of the enthusiasm generated for such systems in the 1990s has waned, and now the emphasis appears to be on creating smaller, more focused businesses that are easier to manage.

Self-Test Questions

1. What are the advantages and disadvantages of the holding company form of organization?
2. What is the difference between horizontal and vertical integration?
3. What are integrated delivery systems, how are they created, and what is the driving force behind them? What are the challenges faced by integrated delivery systems?

Organizational Goals

Financial decisions are not made in a vacuum but with an objective in mind. Financial management goals within an organization clearly must be consistent

with and in support of the overall goals of the business. Thus, by discussing organizational goals, a framework for financial decision making within health services organizations is provided.

In a proprietorship, partnership, or small privately owned corporation, the owners of the business generally are also its managers. In theory, the business can be operated for the exclusive benefit of the owners. If the owners want to work very hard to maximize wealth, they can. On the other hand, if every Wednesday is devoted to golf, no one is hurt by such actions. (Of course, the business still has to cater to its customers or else it will not survive.) It is in large publicly owned corporations, in which owners and managers are separate parties, that organizational goals become most important.

Large, Investor-Owned Corporations

From a financial management perspective, the primary goal of investor-owned corporations is generally assumed to be *shareholder wealth maximization*, which translates to stock price maximization. Investor-owned corporations do, of course, have other goals. Managers, who make the actual decisions, are interested in their own personal welfare, in their employees' welfare, and in the good of the community and of society at large. Still, the goal of stock price maximization is a reasonable operating objective on which to build financial decision rules.

The primary obstacle to shareholder wealth maximization as the goal of investor-owned corporations is the *agency problem*. An agency problem exists when one or more individuals (the *principals*) hire another individual or group of individuals (the *agents*) to perform a service on their behalf and then delegate a decision-making authority to those agents. Within a healthcare financial management framework, the agency problem exists between stockholders and managers, and between debtholders and stockholders.

The agency problem between stockholders and managers occurs because the managers of large, investor-owned corporations hold only a very small proportion of the firm's stock, so they benefit very little from stock price increases. On the other hand, managers benefit substantially from actions often detrimental to shareholders' wealth, such as increasing the size of the firm to justify higher salaries and more fringe benefits; awarding themselves generous retirement plans; and spending too much on office space, personal staff, and travel. Clearly, many situations can arise in which managers are motivated to take actions that are in their best interests, rather than in the best interests of stockholders.

However, shareholders recognize the agency problem and counter it by creating incentives for managers to act in shareholders' interests. Additionally, other factors are at work to keep managers focused on shareholder wealth maximization.

Here are some of the factors that mitigate the agency problem:

- **The creation of managerial incentives.** More and more firms are creating *incentive compensation plans* that tie managers' compensation to the firm's performance. One tool often used is *stock options*, which allows managers to purchase stock at some time in the future at a given price. Because the options are valuable only if the stock price climbs above the *exercise price* (the price that the managers must pay to buy the stock), managers are motivated to take actions to increase stock price. However, because a firm's stock price is a function both of the actions taken by managers and the general state of the economy, a firm's managers could be doing a superlative job for shareholders and the options still prove to be worthless. To overcome the inherent shortcoming of stock options, many firms today now use *performance shares* as the managerial incentive. Performance shares are given to managers on the basis of the firm's performance as indicated by objective measures such as earnings per share, return on equity, and so on. In addition to getting more shares when targets are met, the value of the shares is enhanced if the firm's stock price rises. Finally, many businesses now are using the concept of *economic value added (EVA)* to structure managerial compensation. (EVA is discussed in Chapter 13.) All incentive compensation plans—stock options, performance shares, profit-based bonuses, and so forth—are designed with two purposes in mind. First, they offer managers incentives to act on those factors under their control in a way that will contribute to stock price maximization. Second, the existence of such plans helps firms attract and retain top-quality managers.¹¹
- **The threat of firing.** Until the 1980s, the probability of a large firm's management being ousted by its stockholders was so remote that it posed little threat. This situation existed because ownership of most firms was so widely held, and management's control over the proxy (voting) mechanism was so strong, that it was almost impossible for dissident stockholders to fire a firm's managers. Today, however, about 50 percent of the stock of an average large corporation, such as pension funds and mutual funds, is held by large institutions rather than by individual investors. These institutional money managers have the clout, if they choose to use it, to exercise considerable influence over a firm's managers and, if necessary, to remove the current management team by voting them off the board.
- **The threat of takeover.** *Hostile takeovers*, in which a firm is bought against its management's wishes, are most likely to occur when a firm's stock is undervalued relative to its potential because of poor management. In a hostile takeover, a potential acquirer makes a direct appeal to the shareholders of the target firm to *tender*, or sell, their shares at some stated price. If 51 percent of the shareholders agree to tender their shares, the acquirer gains control. When a hostile takeover occurs, the managers of the acquired firm often lose their jobs, and any managers permitted to stay

on generally lose the autonomy they had prior to the acquisition. Thus, managers have a strong incentive to take actions to maximize stock price. In the words of the president of a major drug manufacturer, “If you want to keep control, don’t let your company’s stock sell at a bargain price.”

In summary, it is clear that managers of investor-owned firms can have motivations that are inconsistent with shareholder wealth maximization. Still, sufficient mechanisms are at work to force managers to view shareholder wealth maximization as an important, if not primary, goal. Thus, shareholder wealth maximization is a reasonable goal for financial management decision making within investor-owned firms.

Not-for-Profit Corporations

Because not-for-profit corporations do not have shareholders, shareholder wealth maximization is not an appropriate goal for such organizations. Not-for-profit firms consist of a number of classes of *stakeholders* who are directly affected by the organization. Stakeholders include all parties that have an interest, usually of a financial nature, in the organization. For example, a not-for-profit hospital’s stakeholders include the board of trustees; managers; employees; physicians; creditors; suppliers; patients; and even potential patients, which may include the entire community. An investor-owned hospital has the same set of stakeholders, plus one additional class—stockholders. While managers of investor-owned firms have to please only one class of stakeholders—the shareholders—to keep their jobs, managers of not-for-profit firms face a different situation. They have to try to please all of the organization’s stakeholders because no single, well-defined group exercises control.

Many people argue that managers of not-for-profit firms do not have to please anyone at all because they tend to dominate the board of trustees who are supposed to exercise oversight. Others argue that managers of not-for-profit firms have to please all of the firm’s stakeholders to a greater or lesser extent because all are necessary to the successful performance of the business. Of course, even managers of investor-owned firms should not attempt to enhance shareholder wealth by treating any of their firm’s other stakeholders unfairly because such actions ultimately will be detrimental to shareholders.

Typically, the goal of not-for-profit firms is stated in terms of a mission. An example is the current mission statement of Bayside Memorial Hospital, a 450-bed, not-for-profit, acute care hospital:

Bayside Memorial Hospital, along with its medical staff, is a recognized, innovative healthcare leader dedicated to meeting the needs of the community. We strive to be the best comprehensive healthcare provider through our commitment to excellence.

Although this mission statement provides Bayside’s managers and employees with a framework for developing specific goals and objectives, it does

not provide much insight into the goal of the hospital's finance function. For Bayside to accomplish its mission, its managers have identified five financial goals:

1. The hospital must maintain its financial viability.
2. The hospital must generate sufficient profits to continue to provide the current range of healthcare services to the community. This goal means that current buildings and equipment must be replaced as they become obsolete.
3. The hospital must generate sufficient profits to invest in new medical technologies and services as they are developed and needed.
4. The hospital should not rely on its philanthropy program or government grants to fund its operations and growth, although it will aggressively seek such funding.
5. The hospital will strive to provide services to the community as inexpensively as possible, given the above financial requirements.

In effect, Bayside's managers are saying that to achieve the hospital's commitment to excellence as contained in its mission statement, the hospital must remain financially strong and profitable. Financially weak organizations cannot continue to accomplish their stated missions over the long run. What is interesting is that Bayside's five financial goals are probably not much different from the finance goals of Jefferson Regional Medical Center (JRMC), a for-profit competitor. Of course, JRMC has to worry about providing a return to its shareholders, and it receives only a very small amount of contributions and grants. However, to maximize shareholder wealth, JRMC also must retain its financial viability and have the financial resources necessary to offer new services and technologies. Furthermore, competition in the market for hospital services will not permit JRMC to charge appreciably more for services than its not-for-profit competitors.

Self-Test Questions

1. What is the difference in goals between investor-owned and not-for-profit firms?
2. What is the agency problem, and how does it apply to investor-owned firms?
3. What factors tend to reduce the agency problem?

Tax Laws

The value of any financial asset, such as a share of stock issued by HCA or a municipal bond issued by the Alachua County Healthcare Financing Authority on behalf of Shands HealthCare, as well as the value of many real assets such as a magnetic resonance imaging (MRI) machine, medical office

building, or hospital, depends on the stream of usable cash flows that the asset is expected to produce. Because taxes reduce the cash flows that are usable to the business, financial management analyses must include the impact of local, state, and federal taxes. Local and state tax laws vary widely, so we will not attempt to cover them in this text. Rather, we will focus on the federal income tax system because these taxes dominate the taxation of business income. Then, in our examples, we will typically increase the tax rate to approximate the effects of state and local taxes.

Tax laws can be changed by Congress, and major changes have occurred every three to four years, on average, since 1913, when the federal tax system was initiated. Furthermore, certain aspects of the Tax Code are tied to inflation, so changes automatically occur each year based on the previous year's inflation rate. Therefore, although this section will give you an understanding of the basic nature of our federal tax system, **it is not intended to be a guide for actual use.** Tax laws are so complicated that many law schools offer a master's degree in taxation, and many of the lawyers who hold this degree are also certified public accountants or CPAs. Managers and investors should and do, therefore, rely on tax experts rather than trust their own limited knowledge. Still, it is important to know the basic elements of the tax system as a starting point for discussions with tax specialists. In a field complicated enough to warrant such detailed study, we can cover only the highlights.

Current (2006) federal income tax rates on personal income go up to 35 percent, and when state and local income taxes are added, the marginal rate can approach 50 percent. Business income is also taxed heavily. The income from partnerships and proprietorships is reported by the individual owners as personal income and, consequently, is taxed at rates going up to 50 percent. Corporate income, in addition to state and local income taxes, is taxed by the federal government at marginal rates as high as 39 percent. Because of the magnitude of the tax bite, taxes play an important role in most financial management decisions made by individuals and by for-profit organizations.

Individual (Personal) Income Taxes

Individuals pay personal taxes on wages and salaries; on investment income such as dividends, interest, and profits from the sale of securities; and on the profits of sole proprietorships, partnerships, and S corporations. For tax purposes, investors received two types of income: (1) ordinary and (2) dividends and capital gains. *Ordinary income* includes wages and salaries and interest income. *Dividend income*, which arises from stock ownership, and *capital gains*, which arise from the sale of assets (including stocks), generally are taxed at lower rates than ordinary income.

Federal income taxes on ordinary income are *progressive*—that is, the higher one's income, the larger the *marginal tax rate*, which is the rate applied to the last dollar of earnings. Marginal rates on ordinary income begin at 10 percent,

Taxes on Wages and Salaries

rise to 15, 25, 28, and 33 percent, and finally top out at 35 percent. Because the levels of income for each bracket are adjusted for inflation annually, and because the brackets are different for single individuals and married couples who file a joint return, we will not provide a complete discussion here. However, to help put things in perspective, it takes a taxable income of roughly \$336,550 to be in the highest (35 percent) bracket, so most people fall into the lower brackets.

Taxes on Interest Income

Individuals can receive *interest income* on savings accounts, certificates of deposit, bonds, and the like. Such income from securities, like wages and salaries, is taxed as ordinary income and hence is taxed at federal rates that go up to 35 percent, in addition to applicable state and local income taxes. Note, however, that under federal tax laws, interest on most state and local government bonds, called *municipals* or “*munis*,” is not subject to federal income taxes. Such bonds include those issued by municipal healthcare authorities on behalf of not-for-profit healthcare providers. Thus, investors get to keep all of the interest received from municipal bonds but only a proportion of the interest received from bonds issued by the federal government or by corporations. This means that a lower interest rate muni bond can provide the same or higher after-tax return as a higher-yielding corporate or Treasury bond. For example, consider an individual in the 35 percent federal tax bracket who can buy a taxable corporate bond that pays a 10 percent interest rate. What rate would a similar-risk muni bond have to offer to make the investor indifferent between the muni and the corporate? Here is a way to think about this problem:

$$\begin{aligned} \text{After-tax rate on corporate bond} &= \text{Pretax rate} - \text{Yield lost to taxes} \\ &= \text{Pretax rate} - (\text{Pretax rate} \times \text{Tax rate}) \\ &= \text{Pretax rate} \times (1 - T) \\ &= 10\% \times (1 - 0.35) = 10\% \times 0.65 = 6.5\%. \end{aligned}$$

Here, T is the investor’s marginal tax rate. Thus, the investor would be indifferent between a corporate bond with a 10 percent interest rate and a municipal bond with a 6.5 percent rate.

If the investor wants to know what yield on a taxable bond is equivalent to, say, a 7.0 percent interest rate on a muni bond, then he or she would follow this procedure:

$$\begin{aligned} \text{Equivalent rate on taxable bond} &= \frac{\text{Rate on municipal bond}}{1 - T} \\ &= \frac{7.0\%}{1 - 0.35} = \frac{7.0\%}{0.65} = 10.77\%. \end{aligned}$$

The exemption of municipal bonds from federal taxes stems from the separation of power between the federal government and state and local governments, and its primary effect is to allow state and local governments,

and not-for-profit healthcare providers, to borrow at lower interest rates than otherwise would be possible.

In addition to interest income on securities, investors can receive dividend income from securities (stocks). Because investor-owned corporations pay dividends out of earnings that have already been taxed, there is double taxation on corporate income. To recognize that taxes have already been paid on these earnings, dividend income is taxed at the same rates as long-term capital gains income, which are less than those on ordinary and interest income. If an individual is in the 25 percent, or higher, tax bracket, dividends are taxed at 15 percent. If in the 10 or 15 percent tax bracket, dividends are taxed at only 5 percent. To illustrate the advantage, consider an individual in the 35 percent tax bracket who receives both \$100 in interest income and \$100 in dividend income. The taxes on the interest income would be $0.35 \times \$100 = \35 , while the taxes on the dividend income would be only $0.15 \times \$100 = \15 , a difference of \$20.¹²

Dividend Income

Assets such as stocks, bonds, real estate, and plant and equipment (land, buildings, x-ray machines, and the like) are defined as *capital assets*. If an individual buys a capital asset and later sells it at a profit—that is, if the individual sells it for more than the purchase price—the profit is called a *capital gain*. If the individual sells it for less than the purchase price, the loss is called a *capital loss*. An asset sold within one year of the time it was purchased produces a *short-term capital gain or loss*, whereas an asset held for more than one year produces a *long-term capital gain or loss*. To illustrate the concept, consider that if you buy 100 shares of Manor Care, a long-term care business, for \$10 per share and sell the stock later for \$15 per share, you will make a capital gain of $100 \times (\$15 - \$10) = 100 \times \$5 = \500 . However, if you sell the stock for \$5 per share, you will incur a capital loss of \$500. If you hold the stock for one year or less, the gain or loss is short term; otherwise, it is a long-term gain or loss. Note that if you sell the stock for \$10 a share, you will make neither a capital gain nor a loss; you will simply get your \$1,000 back and no taxes are due on the transaction.

Capital Gains Income

Short-term capital gains are taxed as ordinary income at the same rates as wages and interest. However, long-term capital gains are taxed at the same rates as dividends, which are lower than ordinary income. To illustrate the effect of this tax benefit on long-term capital gains, consider an investor in the top 35 percent tax bracket who makes a \$500 long-term capital gain on the sale of Manor Care stock. If the \$500 were ordinary income, she would have to pay federal income taxes of $0.35 \times \$500 = \175 . However, as a long-term capital gain, the tax would be only $0.15 \times \$500 = \75 , for a savings of \$100 in taxes. There are many nuances to capital gains taxes, especially regarding how losses can affect taxes. However, our purpose here is merely to introduce the concept.

The purpose of the reduced tax rate on dividends and long-term capital gains is to encourage individuals to invest in those assets that contribute most to economic growth.

Corporate Income Taxes

The corporate tax structure, shown in Table 1.1, has marginal rates as high as 39 percent, which brings the average rate up to 35 percent. To illustrate this concept, consider the following example. If Midwest Home Health Services, an investor-owned home health care business headquartered in Chicago, had \$80,000 of taxable income, its federal income tax bill would be \$15,450:

$$\begin{aligned}\text{Corporate taxes} &= \$13,750 + [0.34 \times (\$80,000 - \$75,000)] \\ &= \$13,750 + (0.34 \times \$5,000) \\ &= \$13,750 + \$1,700 = \$15,450.\end{aligned}$$

Midwest's marginal tax rate would be 34 percent, but its average tax rate would be $\$15,450/\$80,000 = 19.3\%$. Note that the average federal corporate income tax rate is progressive to \$18,333,333 of income, but it is constant thereafter.

Unrelated Business Income

Even though tax-exempt holding companies can be created with both tax-exempt and taxable subsidiaries, it is also possible for tax-exempt corporations to have taxable income, which is usually referred to as *unrelated business income (UBI)*. UBI is created when a tax-exempt corporation has income from a trade or business that (1) is not substantially related to the charitable goal of the organization and (2) is carried on with the frequency and regularity of comparable for-profit commercial businesses.

As an example of UBI, consider Bayside Memorial Hospital's pharmacy sales. In addition to its services to the hospital's patients, the not-for-profit hospital's pharmacy has a second location, adjacent to the parking garage, which sells drugs and supplies to the general public. In general, the IRS views the charitable purpose of a hospital as providing healthcare services to its patients, so the income from Bayside's sale of drugs and supplies to nonpatients, which is done on a regular basis, is taxable. The fact that the profits from the sales are used for charitable purposes is immaterial. Note, however, that if the trade or business engaged in by a not-for-profit entity (1) is run by volunteers, (2) is run for the convenience of employees, or (3) involves the sale of merchandise contributed to the organization, then the income generated remains tax exempt. Thus, the profits on Bayside's sale of drugs and supplies to its employees, as well as the profits on the sale of items in its gift shop run by volunteer "pink ladies," is exempt from taxation.

UBI tax returns must be filed annually with the IRS by not-for-profit organizations if the gross income from unrelated business activity exceeds

TABLE 1.1
Corporate Tax
Rates for 2006

<i>Taxable Income</i>	<i>Tax</i>	<i>Average Tax Rate at Top of Bracket</i>
Up to \$50,000	15% of taxable income	15.0%
\$50,000–\$75,000	\$7,500 + 25% of excess over \$50,000	18.3
\$75,000–\$100,000	\$13,750 + 34% of excess over \$75,000	22.3
\$100,000–\$335,000	\$22,250 + 39% of excess over \$100,000	34.0
\$335,000–\$10,000,000	\$113,900 + 34% of excess over \$335,000	34.0
\$10,000,000–\$15,000,000	\$3,400,000 + 35% of excess over \$10,000,000	34.3
\$15,000,000–\$18,333,333	\$5,150,000 + 38% of excess over \$15,000,000	35.0
Over \$18,333,333	\$6,416,667 + 35% of excess over \$18,333,333	35.0

\$1,000. In determining taxable income, expenses related to UBI income production are deducted from gross income. Then, taxes are calculated as if the income were earned by a taxable corporation.

Interest income received by a taxable corporation is taxed as ordinary income at the regular tax rates contained in Table 1.1. However, a portion of the dividends received by one corporation from another is excluded from taxable income. As we mentioned earlier in our discussion of holding companies, the size of the dividend exclusion actually depends on the degree of ownership. In general, we will assume that corporations that receive dividends have only nominal ownership in the dividend-paying corporations, so 30 percent of the dividends received are taxable. The purpose of the dividend exclusion is to lessen the impact of triple taxation. Triple taxation occurs when the earnings of Firm A are taxed; then dividends are paid to Firm B, which must pay partial taxes on the income; and then Firm B pays out dividends to Individual C, who must pay personal taxes on the income.

Interest and Dividend Income Received by an Investor-Owned Corporation

To illustrate the effect of the dividend exclusion, consider the following example. A corporation that earns \$500,000 and pays a 34 percent marginal tax rate would have an *effective tax rate* of only $0.30 \times 0.34 = 0.102 = 10.2\%$ on its dividend income. If this firm had \$10,000 in pretax dividend income, its after-tax dividend income would be \$8,980:

$$\begin{aligned}\text{After-tax income} &= \text{Pretax income} - \text{Taxes} \\ &= \text{Pretax income} - (\text{Pretax income} \times \text{Effective tax rate}) \\ &= \text{Pretax income} \times (1 - \text{Effective tax rate}) \\ &= \$10,000 \times [1 - (0.30 \times 0.34)] \\ &= \$10,000 \times (1 - 0.102) = \$10,000 \times 0.898 = \$8,980.\end{aligned}$$

If a taxable corporation has surplus funds that can be temporarily invested in securities, the tax laws favor investment in stocks, which pay dividends, rather than in bonds, which pay interest. For example, suppose Midwest Home Health Services has \$100,000 to invest temporarily, and it can buy either bonds that paid interest of \$8,000 per year or preferred stock that paid dividends of \$7,000 per year. Because Midwest is in the 34 percent tax bracket, its tax on the interest if it bought the bonds would be $0.34 \times \$8,000 = \$2,720$, and its after-tax income would be $\$8,000 - \$2,720 = \$5,280$. If it bought the preferred stock, its tax would be $0.34 \times (0.30 \times \$7,000) = \$714$, and its after-tax income would be \$6,286. Other factors might lead Midwest to invest in the bonds, or in other securities, but the tax laws certainly favor stock investments when the investor is a corporation.

Interest and Dividend Income Received by a Not-for-Profit Corporation

Interest and dividend income received from securities purchased by not-for-profit corporations with **temporary surplus cash** is not taxable. However, note that not-for-profit firms are prohibited from issuing tax-exempt bonds for the sole purpose of reinvesting the proceeds in other securities, although such firms can temporarily invest the proceeds from a tax-exempt issue in taxable securities while waiting for the planned expenditures to occur. If not-for-profit firms could engage in such *tax arbitrage* operations, they could, in theory, generate an unlimited amount of income by issuing tax-exempt bonds for the sole purpose of investing in higher-yielding securities that are taxable to most investors. For example, a not-for-profit firm might sell tax-exempt bonds with an interest rate of 5 percent and use the proceeds to invest in U.S. Treasury bonds that yield 6 percent.

Interest and Dividends Paid by an Investor-Owned Corporation

A firm's assets can be financed either with debt or equity capital. If it uses debt financing, it must pay interest on that debt, whereas if an investor-owned firm uses equity financing, normally it will pay dividends to its stockholders. The interest paid by a taxable corporation is deducted from the corporation's operating income to obtain its taxable income, but dividends are not deductible. Put another way, dividends are paid from after-tax income. Therefore, Midwest Home Health Services, which is in the 34 percent tax bracket, needs only \$1 of pretax earnings to pay \$1 of interest expense, but it needs \$1.52 of pretax earnings to pay \$1 in dividends:

$$\begin{aligned}\text{Dollars of pretax income required} &= \frac{\$1}{1 - \text{Tax rate}} \\ &= \frac{\$1}{0.66} = \$1.52.\end{aligned}$$

The fact that interest is a tax-deductible expense, while dividends are not, has a profound impact on the way taxable businesses are financed. The U.S. tax system favors debt financing over equity financing. This point will be discussed in detail in Chapter 10.

At one time, corporate long-term capital gains were taxed at lower rates than ordinary income. However, under current law, corporate capital gains are taxed at the same rate as operating income.

*Corporate
Capital Gains*

Corporate operating losses that occur in any year can be used to offset taxable income in other years. Such losses can be carried back to each of the preceding three years and forward for the next 15 years. For example, an operating loss by Midwest Home Health Services in 2006 would be applied first to 2003. If Midwest had taxable income in 2003, and hence paid taxes, the loss would be used to reduce 2003's taxable income, so the firm would receive a refund on taxes paid for that year. If the 2006 loss exceeded the taxable income for 2003, the remainder would be applied to reduce taxable income for 2004, then 2005. If Midwest had losses in the previous three years, the cumulative losses, including the loss for 2006, would be carried forward to 2007, then 2008, and so on—up to year 2021. Note that losses that are carried back provide immediate tax benefits, but the tax benefits of losses that are carried forward are delayed until some time in the future. The tax benefits of losses that cannot be used to offset taxable income in 15 years or less are lost to the firm. The purpose of this provision in the tax laws is to avoid penalizing corporations whose incomes fluctuate substantially from year to year.

*Corporate Loss
Carry-Back and
Carry-Forward*

As we mentioned earlier, if a corporation owns 80 percent or more of another corporation's stock, it can aggregate income and expenses and file a single consolidated tax return. Thus, the losses of one firm can be used to offset the profits of another. No business wants to incur losses (it can go broke losing \$1 to save 34 cents in taxes), but tax offsets do make it more feasible for large multicompany businesses to undertake risky new ventures that might suffer start-up losses.

*Consolidated
Tax Returns*

1. Briefly, explain the individual (personal) and corporate income tax systems.
2. What is the difference in individual tax treatment between interest and dividend income?

*Self-Test
Questions*

3. What are capital gains and losses, and how are they differentiated from ordinary income?
4. What is unrelated business income?
5. How do federal income taxes treat dividends received by corporations compared to dividends received by individuals?
6. With regards to investor-owned businesses, do tax laws favor financing by debt or by equity? Explain your answer.

Depreciation

Suppose Northside Family Practice buys an x-ray machine for \$100,000 and uses it for ten years, after which time the machine becomes obsolete. The cost of the services provided by the machine must include a charge for the cost of the machine; this charge is called *depreciation*. Because depreciation reduces profit (net income) as calculated by accountants, the higher a business's depreciation charge, the lower its reported profit. However, depreciation is a noncash charge—it is an allocation of previous cash expenditures—so higher depreciation expense does not actually reduce cash flow. In fact, for taxable businesses, higher depreciation increases cash flow because the greater a business's depreciation expense in any year, the lower its tax bill.

To see more clearly how depreciation expense affects cash flow, consider Table 1.2. Here, we examine the impact of depreciation on two investor-owned hospitals that are alike in all regards except for the amount of depreciation expense each hospital has. Hospital A, with \$100,000 of depreciation expense, has \$200,000 of taxable income, pays \$80,000 in taxes, and has \$120,000 of after-tax income. Hospital B, with \$200,000 of depreciation expense, has only \$100,000 of taxable income, pays \$40,000 in taxes, and has an after-tax income of \$60,000.

However, depreciation is a noncash expense, whereas we assume that all other entries in Table 1.2 represent actual cash flows. To determine each

TABLE 1.2
The Effect of
Depreciation on
Cash Flow

	<i>Hospital A</i>	<i>Hospital B</i>
Revenue	\$1,000,000	\$1,000,000
Costs except depreciation	700,000	700,000
Depreciation	100,000	200,000
Taxable income	\$ 200,000	\$ 100,000
Federal plus state taxes (assumed to be 40%)	80,000	40,000
After-tax income	\$ 120,000	\$ 60,000
Add back depreciation	100,000	200,000
Net cash flow	\$ 220,000	\$ 260,000

hospital's cash flow, depreciation must be added back to after-tax income. When this is done, Hospital B, with the larger depreciation expense, has the larger cash flow. In fact, Hospital B's cash flow is larger by $\$260,000 - \$220,000 = \$40,000$, which represents the tax savings, or *tax shield*, on its additional $\$100,000$ in depreciation expense:

$$\begin{aligned}\text{Tax shield} &= \text{Tax rate} \times \text{Depreciation expense} \\ &= 0.40 \times \$100,000 = \$40,000.\end{aligned}$$

Because a business's financial condition depends on the actual amount of cash that it earns, as opposed to some arbitrarily determined accounting profit, owners and managers should be more concerned with cash flow than reported profit. Note that if the hospitals in Table 1.2 were **not-for-profit hospitals**, taxes would be zero for both hospitals, and both hospitals would have $\$300,000$ in net cash flow. However, Hospital A would report $\$200,000$ in earnings, while Hospital B would report only $\$100,000$ in earnings.

For-profit businesses generally calculate depreciation one way for tax returns and another way when reporting income on their financial statements. For *tax depreciation*, businesses must follow the depreciation guidelines laid down by tax laws, but for other purposes, businesses usually use *accounting*, or *book*, *depreciation* guidelines.

To determine **book depreciation**, the most common method is the *straight-line* method. To apply the straight-line method, (1) start with the *capitalized cost* of the asset (generally, price plus shipping plus installation); then (2) subtract the asset's *salvage value*, which, for book purposes, is the estimated value of the asset at the end of its useful life; and finally (3) divide the net amount by the asset's useful life. For example, consider Northside's x-ray machine that costs $\$100,000$ and has a ten-year useful life. Furthermore, assume that it costs $\$10,000$ to deliver and install the machine and that its estimated salvage value after ten years of use is $\$5,000$. In this case, the capitalized cost, or *basis*, of the machine is $\$100,000 + \$10,000 = \$110,000$, and the annual depreciation expense is $(\$110,000 - \$5,000)/10 = \$10,500$. Thus, the depreciation expense reported on Northside's income statement would include a $\$10,500$ charge for "wear and tear" on the x-ray machine. The name "straight line" comes from the fact that the annual depreciation under this method is constant. The *book value* of the asset, which is the cost minus the accumulated depreciation to date, declines evenly (follows a straight line) over time.

For **tax purposes**, depreciation is calculated according to the *Modified Accelerated Cost Recovery System (MACRS)*. MACRS actually spells out two procedures for calculating tax depreciation: (1) the *standard (accelerated) method*, which is faster than the straight-line method because it allows businesses to depreciate assets on an accelerated basis, and (2) an *alternative straight-line method*, which is optional for some assets but mandatory for

others. Because taxable businesses want to gain the tax shields from depreciation as quickly as possible, they will normally use the standard (accelerated) MACRS method when it is allowed.

The calculation of MACRS depreciation uses three components: (1) the depreciable basis of the asset, which is the total amount to be depreciated; (2) a recovery period that defines the length of time over which the asset is depreciated; and (3) a set of allowance percentages for each recovery period that when multiplied by the basis gives each year's depreciation expense.

Depreciable Basis

The *depreciable basis* is a critical element of the depreciation calculation because each year's recovery allowance depends jointly on the asset's depreciable basis and its recovery period. The depreciable basis under MACRS generally is equal to the purchase price of the asset plus any transportation and installation costs. Unlike the calculation of book depreciation, the basis for MACRS depreciation is **not** adjusted for salvage value regardless of whether the standard accelerated or alternate straight-line method is used.

MACRS Recovery Periods

Table 1.3 describes the general types of property that fit into each *recovery period*. Property in the 27.5- and 39-year classes (real estate) must be depreciated using the alternate straight-line method, but 3-, 5-, 7-, and 10-year property (personal property) can be depreciated either by the accelerated method or by the alternate straight-line method.

MACRS Recovery Allowances

Once the property is placed in the correct recovery period, the yearly recovery allowance, or depreciation expense, is determined by multiplying the asset's depreciable basis by the appropriate recovery percentage shown in Table 1.4. The specific calculation is discussed in the following sections.

TABLE 1.3
MACRS
Recovery
Periods

<i>Period</i>	<i>Type of Property</i>
3-year	Tractor units and certain equipment used in research
5-year	Automobiles, trucks, computers, and certain special manufacturing tools
7-year	Most equipment, office furniture, and fixtures
10-year	Certain longer-lived types of equipment
27.5-year	Residential rental property such as apartment buildings
39-year	All nonresidential property such as commercial and industrial buildings

Note: Land cannot be depreciated.

Ownership Year	Recovery Period			
	3-Year	5-Year	7-Year	10-Year
1	33%	20%	14%	10%
2	45	32	25	18
3	15	19	17	14
4	7	12	13	12
5		11	9	9
6		6	9	7
7			9	7
8			4	7
9				7
10				6
11				3
	100%	100%	100%	100%

TABLE 1.4
 MACRS
 Recovery
 Allowances

Note: The tax tables carry the recovery allowances out to two decimal places, but for ease of illustration, we will use the rounded allowances shown in this table throughout this text.

Under MACRS, the assumption is generally made that an asset is placed in service in the middle of the first year. Thus, for three-year recovery period property, depreciation begins in the middle of the year the asset is placed in service and ends three years later. The effect of the *half-year convention* is to extend the recovery period out one more year, so three-year property is depreciated over four calendar years, five-year property is depreciated over six calendar years, and so on. This convention is incorporated in the values listed in Table 1.4.

MACRS Depreciation Illustration

Assume that the \$100,000 x-ray machine is purchased by Northside Family Practice and placed in service in 2006. Furthermore, assume that Northside paid another \$10,000 to ship and install the machine, and that the machine falls into the MACRS five-year class. Because salvage value does not play a part in tax depreciation, and because delivery and installation charges are included (are capitalized) in the basis rather than expensed in the year incurred, the machine's depreciable basis is \$110,000.

Each year's recovery allowance (tax depreciation expense) is determined by multiplying the depreciable basis by the applicable recovery percentage. Thus, the depreciation expense for 2006 is $0.20 \times \$110,000 = \$22,000$, and for 2007 it is $0.32 \times \$110,000 = \$35,200$. Similarly, the depreciation expense is \$20,900 for 2008, \$13,200 for 2009, \$12,100 for 2010, and \$6,600 for 2011. The total depreciation expense over the six-year recovery period is \$110,000, which equals the depreciable basis of the x-ray machine. Note that the depreciation expense reported for tax purposes each year is different

from the book depreciation reported on Northside's income statement that we calculated earlier.

The *book value* of a depreciable asset at any point in time is its depreciable basis minus the depreciation accumulated to date. Thus, at the end of 2006, the x-ray machine's tax book value is $\$110,000 - \$22,000 = \$88,000$; at the end of 2007, the machine's tax book value is $\$110,000 - \$22,000 - \$35,200 = \$52,800$ (or $\$88,000 - \$35,200 = \$52,800$); and so on. Again, note that the book value for accounting purposes is different from the book value for tax purposes.

According to the IRS, the value of a depreciable asset at any point in time is its tax book value. If a business sells an asset for more than its tax book value, the implication is that the firm took too much depreciation, and the IRS will want to recover the excess tax benefit. Similarly, if an asset is sold for less than its book value, the implication is that the firm did not take sufficient depreciation, and it can take additional depreciation on the sale of the asset. For example, suppose Northside sells the x-ray machine in early 2008 for \$60,000. Because the machine's tax book value is \$52,800 at the time, $\$60,000 - \$52,800 = \$7,200$ is added to the Northside's operating income and taxed. Conversely, if Northside received only \$40,000 for the machine, it would be able to deduct $\$52,800 - \$40,000 = \$12,800$ from taxable income and hence reduce its taxes in 2008.

Self-Test Questions

1. Briefly, describe the MACRS tax depreciation system.
2. What is the effect of the sale of a depreciable asset on the firm's taxes?

Key Concepts

This chapter presented some background information on business organization, ownership, goals, and taxes. Here are its key concepts:

- Financial management is a *decision science*, so the primary objective of this text is to provide students and practicing healthcare managers with the theory, concepts, and tools necessary to make effective decisions. The text is structured to support this goal.
- The *primary role of financial management* is to plan for, acquire, and utilize funds to maximize the efficiency and value of the enterprise.
- Specific financial management functions include (1) *evaluation and planning*, (2) *long-term investment decisions*, (3) *financing decisions*, (4) *working capital management*, (5) *contract management*, and (6) *financial risk management*.
- The three main forms of business organization are the *sole proprietorship*, the *partnership*, and the *corporation*.
- Although each form of organization has its own unique advantages and

disadvantages, most large organizations and all not-for-profit entities are organized as *corporations*.

- *Investor-owned corporations* have *shareholders* who are the owners of the firm. Shareholders exercise control through the *proxy* process, in which they elect the firm's board of directors and vote on matters of major consequence to the firm. As owners, the shareholders have a claim on the residual earnings of the firm. Investor-owned firms are fully taxable.
- Organizations that serve a charitable purpose and meet certain criteria can be organized as *not-for-profit corporations*. Rather than have a well-defined set of owners, such organizations have a large number of *stakeholders* who have an interest in the organization. Not-for-profit firms do not pay taxes, they can accept tax-deductible contributions, and they can issue tax-exempt (municipal) debt.
- From a financial management perspective, the goal of investor-owned firms is *shareholder wealth maximization*, which translates to stock price maximization. For not-for-profit firms, a reasonable goal for financial management is to *ensure the organization can fulfill its mission*, which translates to *maintaining the organization's financial viability*.
- An *agency problem* is a potential conflict of interests that can arise between principals and agents. One type of agency problem that can arise in financial management is the conflict between the owners and managers of a for-profit corporation.
- The value of any income stream depends on the amount of *usable, or after-tax, income*. Thus, tax laws play an important role in financial management decisions.
- Separate tax laws apply to *personal* income and *corporate* income.
- Fixed assets are *depreciated* over time to reflect the decline in their values. Depreciation is a deductible, but noncash, expense. Thus, for a taxable entity, the higher its depreciation, the lower its taxes and hence the higher its cash flow, with other things held constant.
- Current laws specify that the *Modified Accelerated Cost Recovery System (MACRS)* be used to depreciate assets for tax purposes.

Although this chapter provides a great deal of background information relevant to healthcare financial management, it is necessary to have a more thorough understanding of the reimbursement system. This important topic is covered in Chapter 2.

Chapter Models and Problems

This chapter does not have an accompanying spreadsheet model. However, the chapter has two problems in spreadsheet format that focus on tax issues.

The problem spreadsheets can be accessed on this book's companion website: ache.org/UnderstandingFinancialManagement5.

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Selected Websites

There are a multitude of websites that pertain to this chapter:

- For more information on taxes, see the Tax Guide for Investors at www.fairmark.com.

- To get some feel for the services offered by a corporate alliance, see the VHA site at www.vha.com.
- Two of the largest integrated health systems in the United States are Kaiser Permanente and the Henry Ford Health System. To gain a better idea of what constitutes such systems, see www.kaiserpermanente.org or www.henryfordhealth.org.

Notes

1. Not-for-profit organizations are also called *nonprofit*, but the former designation is becoming dominant within the health services industry. Also, investor-owned businesses are sometimes called *proprietary*, or *for profit*. We will discuss the differences in these forms of ownership in detail later in the chapter.
2. There is a set of questions for each case in the online Instructor's Manual to the casebook. Instructors who want to provide more guidance to students than given in the case itself can distribute these questions to their students.
3. See Melanie Evans, "What Really Matters Most," *Modern Healthcare*, January 9, 2006, and Margaret S. Veach, "What's On Your Plate? Ten Top Issues for 2006," *Healthcare Financial Management*, January 2006
4. Note that a tax-exempt corporation, which is discussed later in this chapter, can be one partner of a partnership. In this situation, profits allocated to the tax-exempt partner are not taxed, but those allocated to taxable partners are subject to taxation.
5. Although most partnerships are small, there are some very large firms that are organized as partnerships or as hybrid organizations, which will be discussed in a later section. Examples include the major public accounting firms and many large law firms.
6. *Financial markets* bring together individuals and businesses that need money with other individuals and businesses that have excess funds to invest. In a developed economy, such as in the United States, there are a great many financial markets. Some markets deal with debt capital, while some deal with equity capital; some deal with short-term capital and others deal with long-term capital, and so on. How financial markets operate and their benefits to healthcare businesses will be discussed throughout the text.
7. Over 60 percent of corporations in the United States are chartered in Delaware, which over the years has provided a favorable governmental and legal environment for business activities. A firm does not have to be headquartered or even conduct business in its state of incorporation.
8. In rare situations, shares can be sold to the public for the first time by the corporation's original owners or by a foundation established by the owners, rather than directly by the firm. In such situations, the proceeds from the sale go to the original owners or foundation and not to the firm. Stock sales are discussed in more detail in Chapter 6.
9. An entire chapter can easily be filled with the details of obtaining and maintaining tax-exempt status, but our focus is on the impact of such status on financial management decision making.

10. For a more thorough discussion of integrated delivery systems, see Douglas A. Conrad and William L. Dowling, “Vertical Integration in Health Services: Theory and Managerial Implications,” *Health Care Management Review*, Fall 1990.
11. Incentive compensation plans are also used by not-for-profit organizations. For more information, see the Winter 1989 issue of *Topics in Health Care Financing*, “Incentive Compensation”; and William O. Cleverley and Roger K. Harvey, “Economic Value Added—A Framework for Health Care Executive Compensation,” *Hospital & Health Services Administration*, Summer 1993.
12. Note that current legislation calls for some tax rates to be further reduced over time, while other reductions already in effect, including the reduced rates on dividend income, will be phased out if not made permanent by future legislation. As you can see, tax rates are constantly changing, so it is very important to ensure that the tax rates used for real-world financial decision making are current.

THE THIRD-PARTY-PAYER SYSTEM

Learning Objectives

After studying this chapter, readers should be able to:

- Describe the key features of insurance.
- Discuss, in general terms, the reimbursement methods used by third-party payers and the incentives and risks that they create for providers.
- Describe the major types of third-party payers.
- Discuss the specific reimbursement methods used by Medicare.

Introduction

In general, businesses in the healthcare sector that do not provide products or services directly to patients have the same operating environment as businesses in any other industry. For example, Cincinnati Milicron, a machine tool manufacturer, and GE Medical Systems sell their products in roughly the same way. Cincinnati sells its machines directly to manufacturers that use the machines to produce other goods, and GE Medical sells its diagnostic equipment directly to hospitals, medical practices, and other organizations that use the equipment for diagnostic testing. The prices that the two firms charge for their products are set in the competitive marketplace, and it is relatively easy for buyers to distinguish among competing products. In general, the more expensive the product, the better the performance, where performance can be judged on the basis of a set of more or less objective measures. Thus, in some industries in the healthcare sector, and in most other sectors of the economy, the consumer of the product or service (1) has a choice among many suppliers, (2) can distinguish the quality of competing goods or services, (3) makes a (presumably) rational decision regarding the purchase on the basis of quality and price, and (4) pays for the full cost of the purchase.

However, for the most part, the provision of healthcare services takes place in a unique way. First, often there are few providers of a particular service close at hand. Next, it is very difficult, if not impossible, to judge the quality of competing services. Then, the decision about which services to purchase is usually not made by the consumer of those services but rather by a physician or some other clinician. Also, payment to the provider is not normally made by

the user of the services but by a *third-party payer*. Finally, for most individuals, the purchase of health insurance from third-party payers is totally paid for or heavily subsidized by employers or government agencies, so patients are mostly insulated from the costs of healthcare.

This highly unusual marketplace for healthcare services has a profound effect on the supply of, and demand for, such services. We will leave most of the discussion concerning the market for healthcare services to economics courses, but to get a better understanding of the unique payment mechanisms involved, we must examine the third-party-payment system in more detail. Thus, in this chapter, we discuss those elements of the payer system that directly affect financial management decisions in health services organizations.

Insurance Concepts

To begin our discussion, note that the third-party-payer system is really an insurance system with a wide variety of insurers that come in all types and sizes. Some are investor owned, while others are not for profit or government sponsored. Furthermore, some insurers require their policyholders, who may or may not be the beneficiaries of the insurance, to make the policy payments, while other insurers collect partially or totally from society at large. Because insurance is the cornerstone of the third-party-payer system, an appreciation of the nature of insurance will help you better understand the marketplace for healthcare services.¹

A Simple Illustration

To better understand insurance concepts, consider a simple example. Assume that no health insurance exists and that you face only two medical outcomes in the coming year:

<u>Outcome</u>	<u>Probability</u>	<u>Cost</u>
Stay healthy	0.99	\$ 0
Get sick	0.01	20,000
	<u>1.00</u>	

Furthermore, assume that every other individual faces the same medical outcomes and hence “sees” the same odds and costs associated with healthcare. Then, what is your expected healthcare cost, $E(\text{Cost})$, for the coming year? To find the answer, we must multiply the cost of each outcome by its probability of occurrence, and then sum the products:

$$\begin{aligned} E(\text{Cost}) &= (\text{Probability of outcome 1} \times \text{Cost of outcome 1}) \\ &\quad + (\text{Probability of outcome 2} \times \text{Cost of outcome 2}) \\ &= (0.99 \times \$0) + (0.01 \times \$20,000) \\ &= \$0 + \$200 = \$200. \end{aligned}$$

Now, assume that you, and everyone else, make \$20,000 a year. With this salary, you can easily afford the \$200 “expected” healthcare cost. The problem is, however, that no one’s actual bill will be \$200. If you stay healthy, your bill will be zero. But if you are unlucky and get sick, your bill will be \$20,000, and this cost will force you, and most people who get sick, into personal bankruptcy, which is a ruinous event.

Now, suppose an insurance policy that pays all of your healthcare costs for the coming year is available for \$250. Would you take the policy, even though it costs \$50 more than your “expected” healthcare costs? Most people would. Because individuals are risk averse, they would be willing to pay a \$50 premium over their expected benefit to eliminate the risk of financial ruin. In effect, policyholders are passing the costs associated with the risk of getting sick to the insurer.

Would an insurer be willing to offer the policy for \$250? If the insurer can sell enough policies, it can take advantage of the *law of large numbers*. We know that it is impossible to predict the healthcare costs for the coming year for any one individual with any certainty because the cost will either be \$0 or \$20,000, and we will not know for sure until the year is over. For any individual, the expected cost of healthcare is \$200, but the standard deviation is a whopping \$1,990, so there is significant uncertainty about each individual’s required expenditure.

However, if an insurance company sells a million policies, its expected total policy payout is one million times the expected payout for each policy, or $1,000,000 \times \$200 = \200 million. Furthermore, the law of large numbers tells us that the standard deviation of costs to an insurer with a large number of policyholders is σ/\sqrt{n} , where σ is the standard deviation for one individual and n is the number of individuals insured. Thus, payout uncertainty for the insurer, as measured by standard deviation, is only $\$1,990 / \sqrt{1,000,000} = \1.99 per subscriber, or \$1.99 million in total. Given these data, we see that if there were no uncertainty in the \$20,000 estimated medical cost per claim, the insurer could forecast its total claims quite precisely. It would collect $1,000,000 \times \$250 = \250 million in health insurance premiums, pay out roughly \$200 million in claims, and hence have about \$50 million to cover administrative costs, provide a reserve in case realized claims are greater than predicted by its actuaries, and make a profit. Clearly, with a standard deviation of claims of about \$2 million, the \$50 million “cushion” should be sufficient to carry out a successful business. The problem for real-world insurers is their inability to forecast the cost of each claim.

Basic Characteristics of Insurance

The simple example of health insurance described above illustrates why individuals would seek health insurance, and why insurance companies would be formed to provide such insurance. Needless to say, the concept of insur-

ance becomes much more complicated in the real world. Insurance is typically defined as having four distinct characteristics:

1. **Pooling of losses.** The *pooling, or sharing, of losses* is the heart of insurance. *Pooling* means that losses are spread over a large group of individuals so that each individual realizes the average loss of the pool (plus administrative expenses) rather than the actual loss incurred. In addition, pooling involves the grouping of a large number of homogeneous *exposure units* (people or things having the same risk characteristics) so that the law of large numbers can apply. Thus, pooling implies (1) the sharing of losses by the entire group and (2) the prediction of future losses with some accuracy based on the law of large numbers.
2. **Payment only for random losses.** A *random loss* is one that is unforeseen and unexpected and occurs as a result of chance. Insurance is based on the premise that payments are made only for losses that are random. We will discuss the moral hazard problem, in which losses are not random, in a later section.
3. **Risk transfer.** An insurance plan almost always involves *risk transfer*. The sole exception to the element of risk transfer is *self-insurance*, which occurs when a business (or individual) assumes a risk itself rather than insures the risk through an insurance company. (Self-insurance is discussed in a later section.) Risk transfer means that the risk is transferred from the insured to the insurer, which typically is in a better financial position to pay the loss than the insured because of the premiums collected.
4. **Indemnification.** The final characteristic of insurance is *indemnification* for losses—that is, the reimbursement of the insured if a loss occurs. Within the context of health insurance, indemnification occurs when the insurer pays the insured, or the provider, in whole or in part for the expenses related to an insured illness or injury.

Adverse Selection

One of the major problems facing insurers is *adverse selection*. Adverse selection occurs because those individuals and businesses that are more likely to have claims are more inclined to purchase insurance than those that are less likely to have claims. For example, an otherwise healthy individual without insurance who needs a costly surgical procedure will likely seek health insurance if he or she can afford it, whereas an identical individual without the threat of surgery is much less likely to purchase insurance. Similarly, consider the likelihood of a 20-year-old to seek health insurance versus the likelihood of a 60-year-old. All else the same, the older individual, with much greater health risk due to age, is more likely to seek insurance.

If this tendency toward adverse selection goes unchecked, a disproportionate number of sick people, or those most likely to become sick, will seek health insurance, and the insurer will experience higher-than-expected

claims. This increase in claims will trigger a premium increase, which only worsens the problem, because the healthier members of the plan will seek insurance from other firms at a lower cost or may totally forgo insurance. The adverse-selection problem exists because of *asymmetric information*, which occurs when individual buyers of health insurance know more about their health status than do insurers.

Insurance companies attempt to control the adverse selection problem by underwriting provisions. *Underwriting* refers to the selection and classification of candidates for insurance. From a health insurance perspective, there are two extreme positions that can be taken by insurers regarding underwriting. First, assuming that insurers offer insurance in all 50 states, but not elsewhere, insurers can base premiums on national average statistics without regard to individual characteristics. Thus, each individual (or employer) would pay the same health insurance premium regardless of age, gender, geographic location, line of work, smoking habits, genetic disposition, and so on. The premium charged for each individual would be sufficient in the aggregate to cover all expected outlays, plus administrative expenses, and earn a profit for the insurer. In this situation, *cross-subsidies* clearly exist because young, healthy nonsmokers in relatively safe jobs would pay the same premiums as older, sickly smokers in relatively hazardous jobs. Thus, after taking administrative costs out of the insurance premium, healthy individuals would pay premiums that exceed their expected healthcare costs, while the sicker individuals would pay premiums that are less than their expected costs.

At the other extreme, if no information asymmetries existed and perfect information were available, insurers can charge a premium to each subscriber on the basis of that subscriber's expected healthcare costs, as was done in the illustration presented previously. Individuals who are expected to have higher costs would be charged higher premiums, and those with lower expected costs would be charged lower premiums. Of course, neither individuals nor insurers have perfect foresight, so the extreme of charging an insured individual on the basis of his or her expected healthcare costs is not actually attainable. However, insurers can take into account all factors that are proven to affect health status (and hence costs)—such as smoking habits, weight, cholesterol level, and hereditary factors—when fixing insurance rates.

What approach do health insurers take in practice? When health insurance first became popular following World War II, most insurers used *community ratings*. Here, a single set of premiums, or rates, is offered to all members of a community without regard to age, gender, health status, and so on. Thus, rates reflected geographical differences and potentially even ethnic and cultural differences if the community was dominated by a single ethnic or cultural group. However, within the community, rates represented an average of high- and low-risk individuals. However, over time some insurers (particularly commercial insurers) started to offer *experience ratings*, whereby rates are set based on the claims experience of the specific group being insured.

For example, the Boeing Company might contract with a health insurer to insure all of Boeing's employees in the Seattle area. If Boeing's employees—who as a group tends to be younger and more educated—have lower health-care costs than the community in general, then insurers competing for the contract that use experience ratings can offer Boeing lower rates than can competitors that use community ratings. As more and more employers with low-risk employees seek health insurance based on experience ratings, the least costly groups are skimmed from the insurance pool, and those that remain have higher-than-average costs. Because the healthcare costs for those remaining are above the average for the community, insurers serving that population have no choice but to apply experience ratings, so higher premiums can be charged to the remaining groups. The trend, then, has been toward experience ratings and away from community ratings, although community ratings are still used.

Another way that health insurers protect themselves against adverse selection is by including *preexisting conditions* clauses in contracts. A preexisting condition is a physical or mental condition of the insured individual that existed prior to the issuance of the policy. A typical clause states that preexisting conditions are not covered until the policy has been in force for some period of time—say, one or two years. Preexisting conditions present a true problem for the health insurance industry. As we discussed previously, one of the key elements of insurance is randomness—that is, payouts on a policy should be in response to random events. If an individual has a preexisting condition, this key feature of insurance is violated. In regards to the preexisting condition, the insurer no longer bears random risk but rather assumes the role of payer for the treatment of a known condition.

Because of the tendency of insurers to shy away from large predictable claims, Congress passed the *Health Insurance Portability and Accountability Act (HIPAA)* in 1996. Among other things, the HIPAA sets national standards, which can be modified within limits by the states, regarding what provisions can be included in health insurance policies. For example, under a group health policy, coverage to individuals cannot be denied or limited, nor can individuals be required to pay more, because of health status. Although preexisting condition clauses are not banned, there are limits to what counts as a preexisting condition and how long it takes for coverage to begin. Also, time credit for preexisting conditions under one plan can be credited toward the exclusion period in a second plan, provided there is no break in coverage. Furthermore, health insurance cannot be canceled because the policyholder becomes sick, and individuals have the right to purchase individual insurance from the insurer that provided group insurance when they leave a firm. All in all, the provisions of the HIPAA give consumers of health insurance protection against arbitrary actions by insurers when health status changes for the worse.

Moral Hazard

The fact that insurance is based on the premise that payments are made only for random losses creates the problem of *moral hazard*. The most common illustration of moral hazard in a casualty insurance setting is the owner who deliberately sets a failing business on fire to collect the insurance. Moral hazard is also present in health insurance, but its form typically is not so dramatic—not too many people are willing to voluntarily sustain injury or illness for the purpose of collecting health insurance. However, undoubtedly there are people who purposely use healthcare services that are not medically required. For example, some people might visit a physician or a walk-in clinic for the social value of human companionship rather than to address a medical necessity. Also, some hospital discharges might be delayed for the convenience of the patient rather than for medical purposes. Finally, when the full cost, or most of the cost, is covered by insurance, individuals often are quick to agree to a \$1,000 MRI scan or other high-cost procedure that may not be necessary. If the same test required total out-of-pocket payment, individuals would think twice before agreeing to such an expensive procedure unless the medical necessity was clearly understood. All in all, the fact that “somebody else” is paying the costs leads to a greater consumption of healthcare services than would occur if patients bore the costs.

Even more insidious is the impact of insurance on individual behavior. Individuals are less likely to take preventive actions when the costs of not taking those actions will be borne by insurers. Why worry about getting a flu shot if the monetary costs associated with the treatment are borne by the insurer, or why stop smoking if others will pay for the likely adverse health consequences? Clearly, the very fact that insurance exists causes individuals to forgo preventive actions and embrace unhealthy behaviors, both of which might be approached differently in the absence of insurance.

Insurers generally attempt to protect themselves from moral hazard claims by paying less than the full amount of healthcare costs borne by the insured. By making insured individuals bear some of the cost, there will be less of a tendency to consume unneeded services or engage in unhealthy behaviors. One way of doing this is to require a *deductible*. Medical policies usually contain some dollar amount that must be satisfied before benefits are paid. Although deductibles have some positive effect on the moral hazard problem, their primary purpose is to eliminate the payment of small claims, wherein the administrative cost of processing the claim may be larger than the claim itself. Although there are several types of deductibles, the most common form is the *calendar-year deductible*. Here, the first \$250 (or \$500 or more) of medical expenses incurred each year is paid by the individual insured. Once the deductible is met, the insurer will pay all eligible medical expenses (less any copayments) for the remainder of the year.

The primary weapon that insurers have against the moral hazard problem is the *copayment*, which requires insured individuals to pay a certain percentage of eligible medical expenses—say, 20 percent—in excess of the deductible amount. For example, assume that George Maynard, who has employer-provided medical insurance that pays 80 percent of eligible expenses after the \$100 deductible is satisfied, incurs \$10,000 in medical expenses during the year. The insurer will pay $0.80 \times (\$10,000 - \$100) = 0.80 \times \$9,900 = \$7,920$, so George's responsibility is $\$10,000 - \$7,920 = \$2,080$.

The purposes of copayments are to reduce premiums and to prevent overutilization of healthcare services. Because insured individuals pay part of the cost, premiums can be reduced. Additionally, by being forced to pay some of the costs, insured individuals will presumably seek fewer and more cost-effective treatments and embrace a healthier lifestyle.

Some health insurance policies contain *stop-loss limits*, also called *out-of-pocket maximums*, whereby the insurer pays all covered costs, including the copayment, after the insured individual pays a certain amount of copayment costs—say, \$2,000. Thus, if George had \$50,000 of covered expenses above the deductible amount, his coinsurance share would be \$10,000 if there were no stop-loss provision. If his policy contained a stop-loss amount of \$2,000, George would only have to pay \$2,000 and his insurer would pay the remaining \$48,000 of costs. Of course, health insurance policies with stop-loss provisions are more costly than those without such features.

Finally, most insurance policies have *policy limits*—for example, \$1 million in total lifetime coverage, or \$1,500 per year for mental health benefits, or \$100 per year for eyeglasses. These limits are designed to control excessive use of certain services and to protect the insurer against catastrophic losses. Of course, a lifetime coverage limit means that subscribers must bear the risk of catastrophic losses.

Health savings accounts (HSAs), which were authorized by Congress in 2003, constitute a new approach to paying for health services. HSAs are accounts that individuals establish with a trustee (custodian) that can only be used to pay for healthcare expenses. Such accounts must be used in conjunction with qualified *high-deductible health plans (HDHPs)*, which in 2006 required a minimum deductible of \$1,050 for individuals and \$2,100 for families. The details of HDHPs, and their costs, vary widely by specific plan. To illustrate, one insurer offers two different HDHP alternatives for individual coverage: Plan A, with a \$1,050 deductible, a 20 percent copay, and a \$5,000 out-of-pocket maximum; and Plan B with a \$2,500 deductible, no copays, and a \$3,300 maximum. Premiums for HDHPs, as well as funding for HSAs, may be paid for by the employer, employee, or both. However, most employers pay some (or all) of the premium but require the employee to fund the HSA.

In 2006, contributions to HSAs, which are deductible for federal income taxes, were limited to \$2,700 for individual coverage and \$5,450 for family coverage. HSAs are sponsored by financial institutions and health in-

surers who pay interest on the accounts. Money in HSAs can be used to pay for any “qualified medical expense,” including those for dental and vision care and over-the-counter drugs. Both interest paid on these accounts and all amounts used to pay for healthcare services are tax free. In addition, the account can be “rolled over” from year to year with no tax consequences until the account is closed, at which time withdrawals are taxable.

HSAs are part of a new trend toward *consumer-driven healthcare*. The idea is that if patients take more responsibility for paying for healthcare services, they will be more responsible consumers, and hence overall costs will be reduced in the long run. Many pundits see this as the wave of the future, and both financial services companies and health insurers have launched HSAs to “help employers reduce health benefit costs while empowering employees to better control healthcare costs today and save for future expenses in retirement.”

1. Briefly, explain the following characteristics of insurance:
 - a. Pooling of losses
 - b. Payment only for random losses
 - c. Risk transfer
 - d. Indemnification
2. What is adverse selection, and how do insurers deal with the problem?
3. What is the moral hazard problem?
4. Explain both the mechanics and rationale of a health savings account (HSA).

Self-Test Questions

Generic Reimbursement Methods

Regardless of the payer for a particular healthcare service, only a limited number of payment methods are used to reimburse providers. Payment methods fall into two broad classifications: (1) fee-for-service and (2) capitation. In *fee-for-service* payment methods, of which many variations exist, the greater the amount of services provided, the higher the amount of reimbursement. Under *capitation*, a fixed payment is made to providers for each covered life, regardless of the amount of services provided. In this section, the mechanics of alternative payment methods are first considered. The incentives created for providers under the alternative methods are then discussed. Finally, the risk implications of the alternative reimbursement methods are analyzed.

Fee-for-Service Methods

The three primary fee-for-service methods are (1) cost based, (2) charge based, and (3) prospective payment.

Under *cost-based reimbursement*, the payer agrees to reimburse the provider for the costs incurred in providing services to the insured population. Reim-

Cost-Based Reimbursement

bursement is limited to *allowable costs*, usually defined as those costs directly related to the provision of healthcare services. Nevertheless, for all practical purposes, cost-based reimbursement guarantees that a provider's total costs will be covered by payments from payers. Typically, the payer makes *periodic interim payments (PIPs)* to the provider, and a final reconciliation is made after the contract period expires and all costs have been processed through the provider's accounting system. During the early years (1966–1983), Medicare reimbursed providers on the basis of costs incurred.

Charge-Based Reimbursement

When payers pay *billed charges*, they pay according to the schedule of charge rates established by the provider in its charge description master file, or *charge-master*, which contains the service code and “list price” for all services provided. To a certain extent, this reimbursement system places payers at the mercy of providers in regards to the cost of healthcare services, especially in markets where competition is limited. In the very early days of health insurance, all payers reimbursed providers on the basis of billed charges. Some insurers still reimburse providers according to billed charges, but the trend for payers is toward other, less generous reimbursement methods. As this trend continues, the only payers that will be expected to pay billed charges are self-pay, or private-pay, patients.

Many payers that historically have reimbursed providers on the basis of billed charges now pay by *negotiated*, or *discounted*, charges. This payment method is frequently used by insurers that have established managed care plans such as health maintenance organizations (HMOs) and preferred provider organizations (PPOs). Because HMOs and PPOs, as well as some conventional insurers, have bargaining power because of the large number of patients that they bring to a provider, they can negotiate discounts from billed charges. Such discounts generally range from 20 to 40 percent, or more, of billed charges. Sometimes, *sliding-scale discounts* are used, whereby the amount of discount is tied to the amount of volume generated by the payer—the greater the volume, the higher the discount.

Prospective Payment

In a *prospective payment system*, the rates paid by payers are determined before the services are provided. Furthermore, payments are not directly related to either reimbursable costs or billed charges. Four common units of payment are included in the category of prospective payment:

1. **Per procedure.** Under *per procedure* reimbursement, a separate payment is made for each procedure performed on a patient. Because of the high administrative costs associated with this method when applied to complex diagnoses, per procedure reimbursement is more commonly used in outpatient than in inpatient settings.
2. **Per diagnosis.** In the *per diagnosis* reimbursement method, the provider is paid a rate that depends on the patient's diagnosis. Diagnoses that require higher resource utilization, and hence are more costly to treat,

have higher reimbursement rates. Medicare pioneered this basis of payment in its *diagnosis-related group (DRG)* system, which it first used for hospital reimbursement in 1983. (Reimbursement on the basis of DRG is discussed in detail in the section on Medicare.)

3. **Per diem (per day).** If reimbursement is based on a *per diem* rate, the provider is paid a fixed amount for each day that service is provided, regardless of the nature of the services. This type of reimbursement is applicable only to inpatient settings. Note that per diem rates can be *stratified*. For example, a hospital may be paid one rate for a medical/surgical day, a higher rate for a critical care unit day, and yet a different rate for an obstetric day. Stratified per diems recognize that providers incur widely different daily costs for providing different types of care.
4. **Global pricing.** Under *global pricing*, payers pay a single prospective payment that covers all services delivered in a single episode, whether the services are rendered by a single or by multiple providers. For example, a global fee may be set for all obstetric services associated with a pregnancy, including all prenatal and postnatal visits as well as the delivery, provided by a single physician. For another example, a global price may be paid for all physician and hospital services associated with a cardiac bypass operation.

Capitation

Up to this point, all the reimbursement methods presented have been fee-for-service methods—that is, providers are reimbursed on the basis of the amount of services provided. The service may be defined as a visit, a diagnosis, a hospital day, or in some other manner, but the key feature is that the more services that are performed, the greater the reimbursement amount. *Capitation*, although a form of prospective payment, is an entirely different approach to reimbursement and hence deserves to be treated as a separate category. Under capitated reimbursement, the provider is paid a fixed amount per covered life per period (usually a month) regardless of the amount of services provided.

Because the payment is tied only indirectly to the amount of services provided, capitation dramatically changes the financial landscape of healthcare providers and hence has profound implications for financial decision making. In fact, we devote a full chapter (Chapter 17) to capitation and its implications.

Nonpayment

Before we close this section, we think it worthwhile to address briefly the issue of nonpayment. If a user of healthcare services does not have insurance, then the responsibility for payment of total billed charges falls on the patient or the patient's family. Because people without health insurance tend to be poor, many of them find it difficult, if not impossible, to pay for healthcare

services that can quickly amount to tens of thousands of dollars. Nonpaying patients fall into two categories. First, those who have the capacity, but are unwilling, to pay. The lost revenues attributable to this class of nonpayer are called *bad debt losses*. The second group is made up of patients who are not able to pay. The lost revenues attributable to the second class of nonpayer are called *charity*, or *indigent, care losses*.

These classifications are important for two reasons. First, the two types of nonpayment are handled differently on the income statement. Second, it is important that not-for-profit providers be able to document their contributions to society, and one of the most important contributions is willingness to treat indigent patients.

Provider Incentives

Providers, like individuals and other businesses, react to the incentives created by the financial environment. For example, individuals can deduct mortgage interest from income for tax purposes, but they cannot deduct interest payments on personal loans. Loan companies have responded by offering home equity loans that are a type of second mortgage. The tax laws assumed that these loans would be used to make home ownership more accessible, but in reality they are generally used for other purposes, including financing vacations, cars, and appliances. In this situation, tax laws created incentives for consumers to have mortgage debt rather than personal debt, and the mortgage loan industry responded accordingly.

In the same vein, it is interesting to briefly examine the incentives that alternative reimbursement methods have on provider behavior. Under cost-based reimbursement, providers are given a “blank check” to be used in acquiring assets and incurring operating costs. If payers reimburse providers for all costs, the incentive is to incur costs. Facilities will be lavish and conveniently located, and staff will be available to ensure that patients are given “deluxe” treatment. Furthermore, as in billed-charges reimbursement, services that may not truly be required will be provided because more services lead to higher costs, which translate to higher revenues.

Under charge-based reimbursement, providers have the incentive to set high chargemaster rates, which leads to high revenues. However, in competitive markets, there will be a constraint on how high providers can go, and insurers with negotiating power will demand discounts. Because billed charges is a fee-for-service type of reimbursement, in which more services result in higher revenue, a strong incentive exists to provide the highest possible amount of services. In essence, providers can increase volume, and hence revenues, by *churning*—creating more visits, ordering more tests, extending inpatient stays, and so on. Although charge-based reimbursement does encourage providers to contain costs, the incentive is weak because typically charges can be more easily increased than costs can be reduced. Note, however, that discounted charge reimbursement places additional pressure

on profitability and hence creates increased incentive for providers to lower costs.

Under prospective payment reimbursement, provider incentives are altered. First, under per procedure reimbursement, the profitability of individual procedures will vary depending on the relationship between the actual costs incurred and the payment for that procedure. Providers, usually physicians, have the incentive to perform procedures that have the highest profit potential. Furthermore, the more procedures the better because each procedure typically generates additional profit. The incentives under per diagnosis reimbursement are similar. Providers, usually hospitals, will seek patients with diagnoses that have the greatest profit potential and discourage (even discontinue) services that have the least profit potential. Furthermore, to the extent that providers have some flexibility in assigning diagnoses to patients, an incentive exists to *upcode* diagnoses from the actual one to another that provides greater reimbursement.

In all prospective payment methods, providers have the incentive to reduce costs because the amount of reimbursement is fixed and independent of the costs actually incurred. When per diem reimbursement is used, particularly with hospitals, providers have an incentive to increase length of stay. Because the early days of a hospitalization are typically more costly to the provider than the later days, the later days are more profitable. However, as mentioned previously, hospitals have the incentive to reduce costs during each day of a patient's stay.

Under global pricing, providers do not have the opportunity to be reimbursed for a series of separate services, which is called *unbundling*. For example, a physician's treatment of a fracture can be bundled, and hence billed as one episode, or it can be unbundled with separate bills submitted for diagnosis, x-rays, setting the fracture, removing the cast, and so on. The rationale for unbundling is usually to provide more detailed records of treatments rendered, but often the result is higher total charges for the parts than would be charged for the entire "package" of services. Also, global pricing, when applied to multiple providers for a single episode of care, forces involved providers (e.g., physicians and a hospital) to jointly offer the most cost-effective treatment. Such a joint view of cost containment may be more effective than each provider separately attempting to minimize its treatment costs because lowering costs in one phase of treatment can increase costs in another.

Finally, capitation reimbursement totally changes the playing field by completely reversing the actions that providers must take to ensure financial success. Under all prospective payment methods, the key to provider success is to work harder, increase utilization, and hence increase profits. Under capitation, the key to profitability is to work smarter and decrease utilization. As with prospective payment, capitated providers have the incentive to reduce costs, but now they also have the incentive to reduce utilization. Thus, only those procedures that are truly medically necessary should be performed,

and treatment should take place in the lowest cost setting that can provide the appropriate quality of care. Furthermore, providers have the incentive to promote health, rather than just treat illness and injury, because a healthier population consumes fewer healthcare services.

Financial Risks to Providers

A key issue facing providers is the impact of various reimbursement methods on financial risk, which is a concept that is explained in detail in Chapters 4, 12, and 17. For now, think of financial risk in terms of the effect that the reimbursement methods have on profit uncertainty—the greater the chances of losing money, the higher the risk. Cost- and charge-based reimbursements are the least risky for providers because payers more or less ensure that costs will be covered and hence profits will be earned. In cost-based systems, costs are automatically covered. In charge-based systems, providers typically can set charges high enough to ensure that costs are covered, although discounts introduce uncertainty into the reimbursement process.

Regardless of the reimbursement method (except cost based), providers bear the cost-of-service risk in that costs can exceed revenues. However, a primary difference among the reimbursement types is the ability of the provider to influence the revenue/cost ratio. If providers set charge rates for each type of service provided, they can most easily ensure that revenues exceed costs. Furthermore, if providers have the power to set rates above those that would exist in a truly competitive market, charge-based reimbursement can result in higher profits than cost-based reimbursement.

Prospective payment adds a second dimension of risk to reimbursement contracts because the bundle of services needed to treat a particular patient may be more extensive than that assumed in the payment amount. However, when the prospective payment is made on a per procedure basis, risk is minimal because each procedure will produce its own revenue. When prospective payment is made on a per diagnosis basis, provider risk is increased. If, on average, patients require more intensive treatments, and for inpatients a longer length of stay (LOS) than assumed in the prospective payment amount, the provider must bear the added costs.

When prospective payment is made on a per diem basis, even when stratified, one daily rate usually covers a large number of diagnoses. Because the nature of the services provided can vary widely, both because of varying diagnoses as well as intensity differences within a single diagnosis, the provider bears the risk that costs associated with the services provided on any day exceed the per diem rate. However, patients with complex diagnoses and greater intensity tend to remain hospitalized longer, and per diem reimbursement does differentiate among different LOSs. Still, the additional days of stay may be insufficient to make up for the increased resources consumed. In addition, providers bear the risk that the payer, through its utilization review process, will constrain LOS and hence increase intensity during the days that a patient

is hospitalized. Thus, under per diem, compression of services and shortened LOS can put significant pressure on providers' profitability.

Under global pricing, a more inclusive set of procedures, or providers, are included in one fixed payment. Clearly, the more services that must be rendered for a single payment or the more providers that have to share a single payment, the more providers are at risk for intensity of services.

Finally, under capitation, providers assume all utilization and actuarial risks along with the risks assumed under the other reimbursement methods. The assumption of utilization risk has traditionally been an insurance function rather than a provider function. In the traditional fee-for-service system, the financial risk of providing healthcare is shared between purchasers and insurers. Hospitals, physicians, and other providers bear negligible risk because they are paid on the basis of the amount of services provided. Insurers bear short-term risk in that payments to providers in any year can exceed the amount of premiums collected. However, poor profitability by insurers in one year usually can be offset by premium increases to purchasers the next year, so the long-term risk of financing the healthcare system is borne by purchasers. Capitation, however, places the burden of short-term utilization risk on providers.

When provider risk under different reimbursement methods is discussed in this descriptive fashion, an easy conclusion to make is that capitation is by far the riskiest to providers, while cost- and charge-based reimbursements are by far the least risky. Although this conclusion is not a bad starting point for analysis, financial risk is a complex subject and its surface has just been scratched. One of the key issues throughout the remainder of this text is financial risk, so readers will see this topic over and over. For now, keep in mind that different payers use different reimbursement methods. Thus, providers can face conflicting incentives and differing risk, depending on the predominant method of reimbursement.

In closing, note that all prospective payment methods involve a transfer of risk from insurers to providers, which increases as the payment unit moves from per procedure to capitation. The added risk does not mean that providers should avoid such reimbursement methods; indeed, refusing to accept contracts with prospective payment provisions would be tantamount to organizational suicide for most providers. However, providers must understand the risks involved in prospective payment arrangements, especially the effect on profitability, and make every effort to negotiate a level of payment that is consistent with the risks incurred.

1. Briefly, describe the following payment methods:
 - a. Cost based
 - b. Charge based and discounted charges
 - c. Per procedure

Self-Test Questions

- d. Per diagnosis
 - e. Per diem
 - f. Global
 - g. Capitation
2. What is the major difference between fee-for-service reimbursement and capitation?
 3. What provider incentives are created under each of the payment methods previously listed?
 4. Which of these payment methods carry the least risk for providers? The most risk? Explain your answer.

Major Health Insurers (Third-Party Payers)

Up to this point, we have discussed the basic concept of insurance, some key elements of health insurance, and the general types of reimbursement methodologies. Now, we will provide a brief background of the major health insurers (third-party payers) and, more importantly, we will discuss some of the specific reimbursement methods that they use to pay healthcare providers.

Health insurance originated in Europe in the early 1800s, when mutual benefit societies were formed to reduce the financial burden associated with illness or injury. Today, health insurers fall into two broad categories: (1) private insurers and (2) public programs.

Self-Test Question

1. What are the two major classifications of health insurers?

Private Insurers

In the United States, the concept of public, or government, health insurance is relatively new, while private health insurance has been in existence since the turn of the century. In this section, we discuss the major private insurers—Blue Cross and Blue Shield, commercial insurers, and self-insurers.

Blue Cross and Blue Shield

Blue Cross and Blue Shield organizations trace their roots to the Great Depression, when both hospitals and physicians were concerned about their patients' abilities to pay healthcare bills.

Blue Cross originated as a group of separate insurance programs offered by individual hospitals. At the time, many patients were unable to pay their hospital bills, but most individuals, except the poorest, could afford to purchase some type of hospitalization insurance. Thus, the programs initially were designed to benefit hospitals as well as patients. The programs were all similar in structure. Hospitals agreed to provide a certain amount of services to program members who made periodic payments of fixed amounts to the hospitals whether services were used or not. In a short time, these programs

were expanded from single hospital programs to communitywide multihospital plans called *hospital service plans*. The American Hospital Association (AHA) recognized the benefits of such plans to hospitals, so a close relationship was formed between the AHA and the organizations that offered hospital service plans.

In the early years, several states ruled that the sale of hospital services by prepayment did not constitute insurance, so the plans were exempt from regulations that govern the insurance industry. However, it was clear that the legal status of hospital service plans would be subject to future scrutiny unless their status was formalized. So the states, one by one, passed enabling legislation that provided for the founding of not-for-profit hospital service corporations that were exempt both from taxes and from the capital requirements mandated for other insurers. However, state insurance departments had, and continue to have, oversight over most aspects of the plans' operations. The Blue Cross name was officially adopted by most of these plans in 1939.

Blue Shield plans developed in a manner similar to that of the Blue Cross plans, except that the providers were physicians, instead of hospitals, and the professional organization was the American Medical Association (AMA), instead of the AHA. As of 2006, there were 38 Blue Cross and Blue Shield member organizations; some offer only one of the two plans, but most offer both plans. Member organizations are independent corporations that operate locally or statewide under license from a single national association that sets standards that must be met to use the Blue Cross and Blue Shield name. Collectively, the "Blues" provide healthcare coverage for over 94 million people in all 50 states, the District of Columbia, and Puerto Rico.

Historically, the individual state and local organizations have been not-for-profit corporations that enjoyed the full benefits accorded to that status, including freedom from taxes. But in 1986, Congress eliminated the Blues' tax exemption on the grounds that they operated "commercial-type" insurance activities. However, the plans were given some special deductions, which resulted in taxes that are generally less than those paid by commercial insurance companies. In spite of the change in tax status, the national association continued to require all Blues to operate entirely as not-for-profit corporations, although they could establish for-profit subsidiaries. In 1994, however, the national association lifted its traditional ban on member plans becoming investor-owned companies.

Since 1994, four Blues' companies have converted to for-profit status, including WellPoint Health Networks, which runs Blue Cross of California. Although the number of for-profit companies is small, they enroll about one-quarter of all Blue Cross patients. Because state laws require the assets of not-for-profit corporations to be used for charitable purposes **in perpetuity**, the conversion of ownership is a relatively complex endeavor. (We discuss the issues involved in conversion in Chapter 16.) To meet this requirement, plans that convert typically set up a charitable foundation to which they contribute

a sum that is, in theory, equal to the value of the assets being converted. However, critics of conversions claim that the amounts contributed fall far short of the actual value of the tax exemptions that the not for profits received during their existence.

In spite of the conversions thus far, it is unlikely that many more Blues will convert to for-profit status because of the legal problems inherent in conversion and because they already have the ability to create for-profit subsidiaries. The main rationale for converting or creating for-profit subsidiaries is having access to investor-supplied equity capital, which many believe is necessary for insurers to be competitive in today's healthcare market.

Because the Blue Cross and Blue Shield corporations operate independently, no one reimbursement method is universal to all of them. However, over the past few years the tendency has been to move away from cost-based and charge-based methods and toward prospective payment systems. For example, some of the Blues use hospital reimbursement methods that are similar to Medicare's prospective payment system based on DRGs, while other Blues use a two-tier system in which a per diem rate is paid for routine hospitalizations and negotiated charge-based rates are paid for nonroutine services.

Virtually all of the Blues now offer managed care plans along with more traditional indemnity insurance, and many plans are contracting exclusively with integrated delivery systems in certain service areas. In these situations, capitation often is the method of payment to providers.

Commercial Insurers

Commercial health insurance is issued by life insurance companies, by casualty insurance companies, and by businesses formed exclusively to write health insurance. Commercial insurance companies can be organized either as stock or mutual businesses. *Stock* businesses are shareholder owned and can raise equity capital just like any other for-profit business. Furthermore, the stockholders assume the risks and responsibilities of ownership and management. A *mutual* business has no shareholders; its management is controlled by a board of directors elected by the firm's policyholders. Regardless of the form of ownership, commercial insurance businesses are taxable entities.

Commercial insurers moved strongly into health insurance following World War II. At that time, the United Auto Workers negotiated the first contract with employers, where fringe benefits for employees were a major part of the contract. Like the Blues, the majority of individuals with commercial health insurance are covered under *group policies* with employee groups, professional and other associations, and labor unions. Group health coverage has the following advantages over individual coverage:

- Group coverage has low administrative costs because many individuals are insured under a single contract. This type of coverage lowers the costs associated with sales and administration of the contract. The group

contract holder—say, the employer or labor union—usually pays a part of or the entire premium. Note, though, that employers that have costly employee health programs are usually forced by competitive pressures to offset higher healthcare costs with lower wages or reductions in other fringe benefits. Also, the competitive labor market forces employers to offer competitive aggregate benefits, although the benefit mix may differ.

- Generally, eligibility for a group plan does not depend on the insured individual's health status. The insurer bases its premiums on the overall health status of the group. Note, however, that the premiums paid by groups having a small number of members can be adversely affected by the poor health of one individual.
- In general, an individual's coverage cannot be canceled unless the individual leaves the group or the plan itself is terminated.

Commercial insurers have traditionally reimbursed healthcare providers on the basis of billed charges. However, with the dramatic increase in healthcare costs that has occurred over the past 20 years, the traditional providers of health insurance—employers and unions—have seen their healthcare premiums grow to almost unbelievable amounts. Clearly, this trend cannot continue, so the major purchasers of group health insurance have put pressure on the insurance companies to trim costs. This pressure, in turn, has forced commercial insurers to move toward other reimbursement methods and delivery systems, including managed care plans, that presumably have a better chance at controlling costs than does reimbursement on the basis of billed charges.

The third major form of private insurance is *self-insurance*. One can argue that all individuals who do not have any other form of health insurance are self-insurers, but this is not technically correct. Self-insurers make a conscious decision to bear the risks associated with healthcare costs, and then set aside (or have available) funds to pay future costs as they occur. Individuals, except for the very wealthy, are not good candidates for self-insurance because they face too much uncertainty concerning future healthcare expenses. On the other hand, large groups, especially employers, are good candidates for self-insurance. Indeed, most large groups are self-insured today. For example, employees of the State of Florida are covered by health insurance that is administered by Blue Cross and Blue Shield of Florida, but the actual benefits to plan members are paid by the state. Blue Cross and Blue Shield is paid for administering the plan, but the state bears all risks associated with utilization and cost uncertainty.

Self-Insurers

Many firms today are even going one step further in their self-insurance programs by totally bypassing third-party payers. For example, Digital Equipment Corporation (now owned by Compaq), a major computer maker, negotiates discounts directly with hospitals and physicians. Others, such as Deere

& Company, a farm implements manufacturer, have set up health services subsidiaries to provide healthcare services to their employees. For the most part, these firms use the same techniques as managed care organizations, but they try to do things better and cheaper themselves by applying the kind of management attention to healthcare that they do to their core businesses.

Self-Test Questions

1. Briefly, describe some different types of private insurers.
2. What reimbursement methods do private insurers commonly use?

Public Insurers

The government is a major insurer and direct provider of healthcare services. For example, the government provides healthcare services directly to qualifying individuals through the Department of Veterans Affairs (VA), Department of Defense (DOD), and Public Health Service (PHS) medical facilities. In addition, the government either provides or mandates a variety of insurance programs, such as workers compensation and TRICARE, formerly called CHAMPUS (Civilian Health and Medical Program of the Uniformed Services). However, in this section, we focus on the two major government insurance programs: Medicare and Medicaid.

Medicare *Medicare* was established by the federal government in 1966 to provide medical benefits to individuals aged 65 and older. Medicare consists of three separate coverages: (1) *Part A*, which provides hospital and some skilled nursing home coverage; (2) *Part B*, which covers physician services, ambulatory surgical services, outpatient services, and certain other miscellaneous services; and (3) *Part D*, which covers prescription drugs. Part A coverage is free to all individuals eligible for Social Security benefits. Individuals who are not eligible for Social Security benefits can obtain Part A medical benefits by paying premiums of \$393 per month (for 2006). Part B is optional to all individuals who have Part A coverage, and it requires a monthly premium of \$88.50 (for 2006). About 97 percent of Part A participants purchase Part B coverage. Part D, which began on January 1, 2006, offers prescription drug coverage through plans offered by over 70 private companies. Each plan may offer somewhat different coverage, so the cost of Part D coverage varies widely. Medicare expenditures are expected to total over 400 billion in 2006, including the new prescription drug benefit.

Administration of Medicare The Medicare program falls under the *Department of Health and Human Services (DHHS)*, which creates the specific rules of the program on the basis of enabling legislation. Medicare is administered by an agency under DHHS called the *Centers for Medicare and Medicaid Services (CMS)*. CMS has eight regional offices that oversee the Medicare program and ensure that regulations are followed.

Medicare payments to healthcare providers are not made directly by CMS, but rather by contractors at the state or local level called *intermediaries* for Part A payments and *carriers* for Part B payments. Intermediaries and carriers are typically either Blue Cross associations or commercial insurers. For example, Blue Cross and Blue Shield of Florida is the CMS intermediary for Florida, while Nationwide Mutual Insurance Company is the carrier for Ohio.

From its inception in 1966 to 1983, hospital payments were based on a retrospective system that reimbursed hospitals for all reasonable costs. In general, reasonable costs were defined as (1) operating costs for labor and materials; (2) capital costs for depreciation, interest expense, lease payments, and return on equity for investor-owned hospitals; and (3) costs associated with medical education programs. In effect, Medicare provided hospitals with blank checks that they could use to provide “gold-plated” services to Medicare beneficiaries.

**A Short History
of Part A
Reimbursement**

For many providers, Medicare became the “goose that laid the golden egg.” Per beneficiary Medicare spending rose from \$648 in 1967 to over \$6,000 (estimated) in 2006. Unfortunately, in its early years, Medicare provided no incentives whatever for providers to offer cost-effective services. If anything, Medicare encouraged overbuilding, “gold plating,” excessive services, and overly long hospital stays. However, Medicare did lead to many positive results, although at a high price. First, Medicare fueled a hospital boom, which put a hospital nearby for most of the population. In addition, Medicare provided most elderly with access to healthcare services that only a small proportion had had before. Increased access is at least a partial reason why life expectancy has increased dramatically for the elderly—in 1966, a 65-year old could expect to live to about 70; today, he or she can expect to live to about 83. Finally, Medicare was a major factor in the racial desegregation of hospitals because all providers had to desegregate to qualify for federal dollars.

On October 1, 1983, Congress established a new reimbursement system for Medicare Part A providers, called the *inpatient prospective payment system* (*inpatient PPS* or *IPPS*), in an attempt to curb spending. The intent of the IPPS was (1) to reduce the growth in Medicare outlays, (2) to provide cost-containment incentives to providers, and yet (3) to maintain the quality of care achieved under the old cost-based system. The basic concept of the IPPS is to reimburse hospitals with a fixed sum for each admission based on the patient’s diagnosis. If the hospital is able to provide the services for less than the fixed reimbursement amount, it can keep the difference. Conversely, if a Medicare patient costs the hospital more than the reimbursement amount, the hospital must bear the loss. Note that all hospitals are not paid under the IPPS system; for example, some specialty hospitals are still reimbursed on a

**Foundations of
the Inpatient
Prospective
Payment System**

retrospective cost basis. However, the vast majority of hospitals are paid under the system, so that will be the focus of our Medicare Part A reimbursement discussion.

The IPPS was phased in over several years, and the initial fixed reimbursement rates were based on hospital costs at that time. Thus, upon implementation of IPPS, hospitals were able to embark on cost-cutting measures that allowed them to deliver services to Medicare beneficiaries for less than the fixed payments, and many hospitals were able to generate large profits. For example, operating margins on Medicare patients during the first two years of IPPS averaged nearly 14 percent.²

Unfortunately for hospitals, since the system's inception, IPPS payments, on average, have not kept pace with hospital costs. In addition, once the most obvious cost cutting took place, it was difficult for hospitals to generate additional efficiency gains. Furthermore, the Balanced Budget Act of 1997 (BBA) placed significant restrictions on the growth in Medicare spending during the 1998–2002 period. Hospitals, through aggressive lobbying efforts, have been able to somewhat dilute the impact of the BBA. For example, the Balanced Budget Relief Act of 1999 (BBRA) restored some of the reductions in spending growth imposed by the BBA, but recent hospital payment growth rates still have been less than the growth in operating costs. The net result has been that the average hospital's operating margin on Medicare patients has fallen to the point that some hospitals are now losing money on Medicare inpatients.

The IPPS has had a direct influence on hospital's lengths of stay. Prior to IPPS, according to the AHA, the average hospital LOS for Medicare patients was 10.3 days; now it is about 6.5 days. However, no evidence has been found to support the contention that Medicare patients are being discharged "quicker and sicker." Quicker yes, but probably not, at least on average, sicker. While the relationship between length of stay and quality is uncertain, shorter stays do often mean that Medicare patients or their families will have to worry sooner about finding posthospital services when they are needed.

The IPPS also has had a profound impact on the provision of outpatient care. Because outpatient care is paid by Medicare Part B, it continued to be reimbursed on a cost basis after IPPS was instituted for inpatient care. This reimbursement provided an incentive for hospitals to shift healthcare services from inpatient to outpatient. For example, while the inpatient activity at general acute care hospitals has fallen over the past decade, the number of outpatient visits has about doubled. Furthermore, Medicare spending for outpatient services has been growing three times as fast as spending for inpatient services. In effect, some of the cost savings expected from the IPPS were lost because hospitals shifted inpatient services to outpatient services. As we describe in a later section, Medicare has implemented a prospective payment system for outpatient services to create a similar reimbursement system for both inpatient and outpatient care.

Under the IPPS, a single payment for each patient covers the cost of routine inpatient care, special care, and ancillary services. The amount of the prospective payment is based on the patient's DRG as assigned at discharge. (Originally, the attending physician had to attest, in writing, to the principal diagnosis, secondary diagnosis, and procedures performed. However, the requirement for physician certification was dropped in 1996.) The Medicare DRG payment generally covers all costs except medical education costs and bad debt costs, which we will discuss later along with capital costs.

Payments Under the Inpatient Prospective Payment System³

The starting point in determining the amount of reimbursement is the DRG itself. Potential patient diagnoses have been divided into 25 *major diagnostic categories (MDCs)*, which roughly correspond to the major organ systems. Within the 25 MDCs, there are 579 DRGs.⁴ To illustrate the nature of DRGs, consider Table 2.1, which contains illustrative data for ten of the most frequently used DRGs.

The individual DRG *relative weights* represent the average resources consumed in treating that particular diagnosis relative to resources consumed in treating the average diagnosis. Thus, the resources, and hence costs, associated with DRG 209—hip and femur procedure (joint replacement)—are over 1.9 times as much as the resources associated with the average diagnosis, while the resources associated with DRG 140—angina pectoris—are only 75 percent of the average diagnosis. To account for changes in resource consumption, treatment patterns, and technology, the DRG weights are *recalibrated*, or updated, annually.

The Medicare *case mix index* is a useful tool for judging the types of diagnoses that are being treated at a particular hospital. The index represents

<i>DRG Name</i>	<i>DRG Number</i>	<i>MDC Number</i>	<i>Relative Weight</i>	<i>Average Length of Stay</i>
Intracranial hemorrhage	14	1	1.2456	4.5 days
Simple pneumonia, age > 17	89	4	1.0320	4.7
Bronchitis and asthma with complications, age > 17	96	4	0.7303	3.6
Heart failure and shock	127	5	1.0345	4.1
Cardiac arrhythmia with complications	138	5	0.8287	3.0
Angina pectoris	140	5	0.7521	2.7
Esophagitis, age > 17	182	1	0.8413	3.4
Hip and femur procedure	209	8	1.9059	6.1
Nutritional and metabolic disorders with complications, age > 17	296	10	0.8187	3.7
Psychoses	430	19	0.6483	5.8

TABLE 2.1
Illustrative Data for Ten Frequently Used DRGs

Source: CMS, 2006.

the average DRG weight for all Medicare patients treated in a specific period. Of course, the average DRG weight for an average hospital is 1.0. To illustrate the concept, consider that the recent case-mix index for South Forest Medical Center in Fort Lauderdale was 1.775, while that of Ponce De Leon Memorial Hospital in Arcadia, Florida, was 0.840. South Forest is treating much more complex cases that require greater services and longer LOS than is Ponce De Leon.

CMS classifies hospitals into one of two categories based on its area wage-rate index. Each year, CMS publishes standardized national *labor-* and *nonlabor-related* costs per discharge for the two wage-rate categories as illustrated in Table 2.2.

The IPPS rate computation is relatively simple given the standardized labor and nonlabor amounts, the local area wage index, and the DRG relative weight. To illustrate, consider Table 2.3, which displays the Medicare reimbursement computation for DRG 127—heart failure and shock—for a hospital located in Miami, Florida, which has an area wage rate greater than 1.000. The appropriate national standard labor amount, \$3,298, is first adjusted by the local *area wage index*, which is published periodically by CMS and reflects relative labor costs across the United States. This product, \$3,275, which is the labor amount adjusted for area wage rates, is then added to the national nonlabor amount, \$1,434. The result is the adjusted hospital rate, \$4,809, which is the base rate applied to all diagnoses. Finally, the adjusted hospital rate is multiplied by the DRG relative weight to obtain the reimbursement amount. In our illustration, the DRG relative weight is 1.0345, which produces a DRG payment of \$4,975 for a patient discharged from a Miami hospital with a diagnosis of heart failure and shock.

The IPPS payment is based on the costs associated with an average patient for each diagnosis. Of course, for any given DRG in any given hospital, some patients will incur costs that are greater than average, while some will be less costly than average. If the patients select hospitals randomly—that is, if all of the sicker patients in a given DRG do not go a particular hospital—and if a large number of patients are treated by the hospital in each DRG, then the high-cost and low-cost patients will offset one another and the hospital will experience average costs for each DRG. Of course, this does not always happen.

Reimbursement on an arithmetic mean, or average, cost basis, works well if the distribution of patient costs within each DRG is symmetrical, but the distribution is actually skewed to the right—patients with a “mild” case of heart failure and shock may incur a cost of half of the average amount, but patients with a “severe” case may incur a cost of five times the average amount.

Most hospitals paid under IPPS are reimbursed using the national rates as described above; however, some hospitals are subject to additional

Area Wage Rate	Labor Related	Nonlabor Related
Greater than 1.000	\$3,298	\$1,434
1.000 or less	2,934	1,798

Source: CMS, 2006.

TABLE 2.2
Illustrative
National
Average
Standardized
Amounts

Area wage rate	Greater than 1.000
Area wage index for Miami	1.0233
DRG description	127 (Heart failure and shock)
DRG relative weight	1.0345 (From Table 2.1)
Labor amount	\$3,298 (From Table 2.2)
Multiplied by area wage index	× 1.0233
Adjusted labor amount	\$3,375
Plus nonlabor amount	+1,434 (From Table 2.2)
Adjusted hospital rate	\$4,809
Multiplied by DRG relative weight	× 1.0345
Hospital reimbursement for DRG 127	<u>\$4,975</u>

TABLE 2.3
Sample Medicare
DRG Payment

adjustments that effectively increase the reimbursement rates above those shown in Table 2.2. For example, to provide some cushion for the high costs associated with severely ill patients within each diagnosis, the IPPS includes a provision for *outlier payments*. Outliers are classified into two categories: (1) *LOS outliers* and (2) *cost outliers*. Medicare will make additional payments when a patient's LOS or cost exceeds the established LOS or cost cutoff points.

Also, there are additional payments for hospitals that have a medical education role as well as payments for Medicare bad-debt losses that occur when patients do not make their copayments. There are several other types of Medicare payments, such as payments for hospitals that have a disproportionate share of poor Medicare patients who are typically in ill health and hence cost more to treat than average Medicare patients. However, we will leave additional details on IPPS reimbursement to other readings.

Finally, note that CMS plans to change the IPPS to a new system that would better reflect patient acuity, and hence hospitals' true costs of providing care. One possible approach would be to use *all-patient refined*, or *APR*, DRGs, which are designed to more fully capture the differences in severity of illness. To illustrate, the APR DRG system designed by one vendor

uses 1,256 APR DRGs. Clearly, such a system would improve the correlation between DRGs and actual costs, but it would also increase the complexity of the IPPS.

**An Overview of
the Hospital
Outpatient
Prospective
Payment System
(OPPS)**

As we discussed earlier, the transition to a fixed payment system for inpatient care, while continuing to reimburse outpatient services on the basis of costs, created an incentive to increase the amount of outpatient services offered. Although this trend in general is not a bad one, outpatient services offered by hospitals often have higher costs than the same services offered in stand-alone settings. Thus, Medicare's long-run intent was to create a prospective payment system for hospital outpatient services similar to that for inpatient services. The intent was realized on August 1, 2000.

Instead of using DRGs as the basis for payment, hospital outpatient service reimbursement is based on ambulatory payment classifications (APCs). The system consists of about 350 APCs that specify surgical and nonsurgical procedures, visits to clinics and emergency departments, and ancillary services. The payment calculation is very similar to that for DRGs. In essence, each APC has a standard national payment rate (dollar amount) and national Medicare program percentage, which defines the amount paid by Medicare. The difference between the national payment rate and the amount paid by Medicare is the copayment amount. In the payment calculation, the payment is further divided into a labor-related component, which is 60 percent of the national payment rate, and a nonlabor component, which is the remaining 40 percent. The labor component is then adjusted by the specific hospital's IPPS inpatient wage index. The end result is a total payment for the APC broken down into the amount paid by Medicare and the amount paid by the patient.

The actual calculation is not complex, but there are considerable complications within the OPSS that must account for many complexities, such as multiple procedures conducted on a single patient, which is a common occurrence in outpatient settings. The system will undoubtedly be modified as problems are encountered during implementation. Still, the Medicare prospective payment system for hospital outpatient services is here to stay.

**Medicare
Reimbursement
for Nursing
Homes and Home
Health Care**

The BBA mandated that both skilled nursing facility (SNF) care and home health care provided to Medicare patients be reimbursed on a prospective payment basis. While the prospective payment methods were being developed, Medicare payments to these providers were made under an interim system, which resulted in reimbursement amounts that were significantly less than under the old systems. Because, as we discuss later, state Medicaid plans often use the same methodologies as Medicare, the new systems have had a very detrimental effect on the profitability of both long-term care facilities and home health businesses. Many for-profit providers in these industries lost huge amounts of market capitalization when their stock prices plummeted.

Even worse, many providers, both for profit and not for profit, were forced into bankruptcy and closure. Of course, the industry trade organizations are lobbying hard for increased reimbursement rates, but there is no doubt that a lot of damage has been done.

Through 1991, Part B reimbursement to physicians and medical equipment suppliers was based on the concept of *reasonable charges*. In essence, Medicare defined a reasonable charge as the lowest of (1) the actual charge for the service performed, (2) the physician's customary charge, or (3) the prevailing charge for that service in the community. Medicare then paid providers 80 percent of the reasonable charge after the Medicare patient had satisfied his or her deductible amount. The patient was responsible for the 20 percent copayment.

Part B
Reimbursement

However, Medicare changed its physician payment system beginning in 1992 to a *resource-based relative value system (RBRVS)*. Under RBRVS, reimbursement is based on three resource components: (1) physician work, (2) practice expenses, and (3) malpractice insurance. Each of about 7,500 healthcare common procedure codes have assigned relative value units for the three resource components, which are summed to get the total number of units per code. The total units for each code are multiplied by a conversion factor that equals the dollar value of one unit, then adjusted by cost indexes that reflect geographical differences in costs, to get the dollar reimbursement amount.

When the RBRVS payment system was first put into place, it appeared to have had two primary goals: (1) to control Medicare costs for physician services and (2) to close the spread between specialist and primary care compensation by cutting Medicare payments for surgical and diagnostic procedures and increasing payments for office visits. The results, since 1992, indicate that the switch to the RBRVS has been more successful in controlling overall costs than in increasing the relative incomes of primary care physicians. Still, the gap has closed somewhat, and it appears that the increased financial incentive for primary care physicians is causing an increasing proportion of medical school graduates to choose primary care as a career.

An integral part of the Medicare reimbursement system is the *Quality Review Organization (QRO)*. QROs are independent organizations contracted by CMS at the state level to monitor the quality of care, and the resulting reimbursement, provided by hospitals and other providers that treat Medicare patients. For example, the QRO for New York, IPRO, is a not-for-profit corporation that does Medicare review for CMS as well as for New York and several other states.

Quality Review
Organizations

Over time, the role of QROs has evolved, with increasing emphasis on quality improvement and less emphasis on reimbursement. In addition, many

QROs provide contract services to providers other than hospitals and in areas other than Medicare.

**Medicare
Payment
Advisory
Commission**

The *Medicare Payment Advisory Commission (MedPAC)* is an independent organization that advises Congress on issues that affect Medicare. MedPAC was established by federal law in 1997 by the merger of two formerly separate commissions—the Prospective Payment Assessment Commission (ProPAC) and the Physician Payment Review Commission (PPRC). MedPAC has 17 members with a wide range of expertise in the financing and delivery of health services. The primary work of the Commission is to prepare two reports annually—(1) one that focuses on payment policies, including specific reimbursement amounts, and (2) one that addresses other issues. Because MedPAC is the principal “independent” advisor to Congress on Medicare payment issues, its influence over the program is significant.

Medicaid

Medicaid was begun in 1966 as a modest program to be jointly funded and run by the states and the federal government to provide a medical safety net for low-income mothers and children and for elderly, blind, and disabled individuals who receive benefits from the Supplemental Security Income program. Congress mandated that Medicaid cover hospital and physician care, but states were encouraged to expand on the basic package of benefits by either increasing the range of benefits or extending the program to the near poor through optional eligibility. A mandatory nursing home benefit was added in 1972.

States with large tax bases were quick to expand coverage to many of the optional groups, while states with limited abilities to raise funds for Medicaid were forced to construct limited programs. In 2006, total Medicaid spending, including both federal and state expenditures, was expected to total \$320 billion. Of these total expenditures, the federal government picks up about 58 percent of the tab and the states pay for the remainder.

Because Medicaid is administered by the states, each state establishes its own reimbursement system for providers. Although historically Medicaid has reimbursed providers on a cost basis, more and more states are moving to per diem and fixed-fee prospective rates similar to those instituted by Medicare. As Medicaid expenditures continue to rise at alarming rates, policymakers are struggling to find cost-effective ways to improve the program’s access, quality, and reimbursement systems.

Hospitals recently have been very vocal in their claims that Medicaid reimbursement does not cover the costs of service, and some have even sued their state governments for increased payments on the grounds that Medicaid laws call for “fair market” rate reimbursement. Physicians historically have also fared badly under Medicaid because states have tried to cut Medicaid costs by freezing physicians’ fees. Citing excess paperwork, high risks, and low fees, many physicians, particularly obstetricians and pediatricians, have either quit taking Medicaid patients or are limiting the numbers served.

1. Briefly, describe the origins and purpose of Medicare.
2. What is the inpatient prospective payment system (IPPS), and how does it work?
3. What is the outpatient prospective payment system (OPPS), and how does it work?
4. How are physicians reimbursed for providing services to Medicare patients?
5. What are Quality Review Organizations (QROs)?
6. What does MedPAC stand for, and what is its purpose?
7. What is Medicaid, and how is it administered?

Self-Test Questions

Managed Care Plan Reimbursement Methods

Managed care plans use all of the reimbursement techniques used by third-party payers described in this chapter plus capitation. In addition, managed care plans often create financial incentives in their reimbursement systems that encourage minimizing the amount of services provided. Because of the complexities of such reimbursement, and the fact that it completely changes provider incentives, we devote an entire chapter to the topic (see Chapter 17).

1. What reimbursement methodology is unique to managed care plans?

Self-Test Question

Other Issues

Two other issues that relate to reimbursement and the third-party-payer system merit discussion: (1) cost shifting and (2) case mix management.

Cost Shifting

Providers of most services, from auto repair shops to fast-food restaurants to window repair businesses, charge all customers the same rate for similar services. Furthermore, the rates charged are set by supply-and-demand conditions in a competitive marketplace. However, in the provision of healthcare services, there is typically a wide range of reimbursement amounts for a single treatment protocol. For example, assume a hospital treats six different patients for heart failure and shock (DRG 127) in a single week. Table 2.4 contains a hypothetical reimbursement pattern for those six patients.

Reimbursement for this single DRG ranges from a high of \$6,575 for private-pay, or self-pay, patients to a low of \$0 for indigent patients. Assuming one patient from each payer (an even payer mix), the hospital is reimbursed \$4,331, on average, which is only 3.1 percent above the \$4,200 average cost of treatment. Thus, a hospital with this payer mix is barely breaking even on this DRG. Now, assume that this hospital's payer mix changes so that it now

TABLE 2.4

Typical
Reimbursement
Pattern

<i>Payer</i>	<i>Reimbursement Method</i>	<i>Reimbursement Amount</i>
Private pay	Billed charges	\$ 6,575
Commercial insurance	Billed charges less 10%	5,920
HMO/PPO	Billed charges less 20%	5,260
Medicare	Prospective payment	4,451
Medicaid	Cost less 10%	3,780 ^a
Indigent patient	No payment	0
Total reimbursement		<u>\$25,986</u>
Average reimbursement		<u>\$ 4,331</u>

^aAssumes \$4,200 cost of treatment.

has one more Medicare patient, and it loses its commercial insurance patient: its average reimbursement for this DRG now is only \$4,086, which is \$114 below costs.

Clearly, the hospital cannot allow this situation to persist, so it engages in *cost shifting*—that is, it increases its billed charges applicable to this DRG so that private-pay, commercially insured, and HMO/PPO patients pay even more than is indicated in Table 2.4. Thus, costs associated with patients whose reimbursement does not cover those costs are shifted to other payers who, at least temporarily, are willing to absorb, or pass on, the higher billings.

Cost shifting has been the remedy that many healthcare providers have used to maintain profitability in the face of higher indigent care loads and less-generous government reimbursement amounts. However, as the burden of cost shifting falls more and more heavily on just a few classes of payers, it has become more and more difficult to continue the practice. As private-pay rates increase and insurance rates increase for group health insurance, especially for medium and small businesses, these parties are finding it very difficult, if not impossible, to carry the burden of payers that are paying less than costs. Indeed, cost shifting has contributed to the movement to managed care plans, which in turn have adopted reimbursement methodologies, such as discounted fee-for-service and capitation, that make further cost shifting difficult if not impossible.

Case Mix Management

In addition to cost shifting, which is not sustainable in the long run, providers have been using *case mix management* to try to control costs and enhance profitability. Case mix management can be exercised at two levels. First, at the lowest level, it is used to lower the costs associated with a particular diagnosis by changing the mix of procedures applied to the diagnosis.⁵ The provider—say, a hospital—examines the costs associated with treating a large number of

patients with the same diagnosis. Typically, these costs will vary substantially on the basis of severity of illness and the particular treatments prescribed by attending physicians.

Although a complicated and challenging job, it is possible in many situations to identify lower-cost treatment protocols that result in outcomes that are just as good as those from higher-cost protocols. When these are identified, hospital managers and physicians can work together to adopt the lower-cost treatment patterns. Although this might lower revenues from third-party payers that continue to reimburse on a cost basis, more and more payers are moving to prospective payment or capitation, so lower costs translate directly into higher profits.

The second type of case mix management involves changing the provider's overall patient mix by lowering the number of patients with diagnoses that typically result in losses and increasing the number with diagnoses that are highly profitable. For example, many services associated with heart disease have been, and continue to be, highly profitable. Thus, many hospitals have been very aggressive in their advertising campaigns to promote themselves as "your cardiac care center" or "leaders in the fight against heart disease." Conversely, hospitals are not promoting, and even attempt to discontinue, those services that are money losers. By doing so, hospitals are attempting to increase the percentage of high-profit treatments and decrease the percentage of treatments that result in losses.

1. What is cost shifting?
2. Will providers be able to continue to cost shift in the future?
3. What is case mix management?

Self-Test Questions

Key Concepts

This chapter presented information on the insurance function, the third-party-payer system, and the reimbursement methodologies used by payers. Here are its key concepts:

- Health insurance is widely used in the United States because individuals are *risk averse* and insurance firms can take advantage of the *law of large numbers*.
- Insurance is based on four key characteristics: (1) *pooling of losses*, (2) *payment for random losses*, (3) *risk transfer*, and (4) *indemnification*.
- *Adverse selection* occurs when those individuals most likely to have claims purchase insurance, while those least likely to have claims do not.
- *Moral hazard* occurs when an insured individual purposely sustains a loss, as opposed to a random loss. In a health insurance setting, moral

hazard is more subtle, producing such behaviors as seeking more services than needed and engaging in unhealthful behavior because the costs of the potential consequences are borne by the insurer.

- When payers pay *billed charges*, they pay according to the schedule of charge rates established by the provider.
- *Negotiated charges*, which are *discounted* from billed charges, are often used by insurers in conjunction with managed care plans such as HMOs and PPOs.
- Under a *retrospective cost* system, the payer agrees to pay the provider certain allowable costs that are incurred in providing services to the payer's enrollees.
- In a *prospective payment system*, the rates paid by payers are determined in advance and are not tied directly to either reimbursable costs or billed charges. Typically, prospective payments are made on the basis of the following service definitions: (1) *per procedure*, (2) *per diagnosis*, (3) *per diem* (per day), or (4) *global pricing*.
- The major private insurers are *Blue Cross and Blue Shield*, *commercial insurers*, and *self-insurers*.
- The government is a major insurer and direct provider of healthcare services. The two major forms of government health insurance are *Medicare* and *Medicaid*.
- In 1983, the federal government adopted the *inpatient prospective payment system (IPPS)* for Medicare hospital inpatient reimbursement. Under IPPS, the amount of the payment is fixed by the patient's *diagnosis-related group (DRG)*.
- To provide some cushion for the high costs associated with severely ill patients within each diagnosis, the IPPS includes a provision for *outlier payments*.
- In addition, hospitals receive payments for other costs, such as those related to medical education and bad-debt losses.
- In 2000, Medicare reimbursement for hospital-based outpatient care was changed from a cost-based system to the *outpatient prospective payment system (OPPS)*. The payment calculation is similar in nature to that for inpatients. Also, Medicare recently created prospective payment systems for both nursing home and home health care services that are much less generous than the previous cost-based systems.
- Physicians are reimbursed by Medicare using the *resource-based relative value system (RBRVS)*. Under RBRVS, reimbursement is based on three resource components: (1) *physician work*, (2) *practice expenses*, and (3) *malpractice insurance*. Each of these components is given a weighting for each of some 7,500 procedures. The weightings are summed and multiplied by a dollar conversion factor to determine the payment amount.

- *Quality Review Organizations (QROs)* are independent organizations contracted by CMS at the state level to monitor the quality of care, and the resulting reimbursement, provided by hospitals and other healthcare providers that treat Medicare patients.
- The *Medicare Payment Advisory Commission (MedPAC)* is an independent body that advises Congress on Medicare matters, including specific reimbursement amounts.
- *Cost shifting* results when a provider increases its billed charges to one set of payers to compensate for insufficient reimbursement from another set of payers.
- Providers employ *case mix management* to try to control costs and enhance profitability. First, case mix management is used to lower the costs associated with a particular diagnosis by changing the mix of procedures applied to the diagnosis. Second, case mix management involves changing the diagnosis mix by lowering the number of patients with diagnoses that typically result in losses and increasing the number with diagnoses that are highly profitable.

The information in this chapter plays a vital role in financial decision making within health services organizations. Thus, it will be used over and over in future chapters.

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Selected Websites

There are a multitude of websites that pertain to this chapter:

- For an extensive source of information on the Medicare program, including information for both patients and providers, see the Centers for Medicare and Medicaid Services (CMS) website at www.cms.gov.
- The Blue Cross and Blue Shield national organization website contains a great deal of information on their organization and the licensed health plans; see www.bluecares.com.
- The health insurance industry provides generic information on health insurance on its website; see www.ahip.org.
- For more information on Quality Review Organizations (QROs), see the website for the New York IPRO at www.ipro.org.
- To learn more about the Medicare Payment Advisory Commission (MedPAC) as well as see some of the reports that they have prepared for Congress, see www.medpac.gov.

Notes

1. For more information on the basics of insurance, see one of the many excellent insurance textbooks. For example, George E. Rejda, *Principles of Risk Management and Insurance* (Glenview, IL: Addison-Wesley, 2003), or Emmett J. Vaughan and Therese M. Vaughan, *Fundamentals of Risk and Insurance* (New York: Wiley, 2003).
2. An operating margin of 14 percent means that for each dollar of Medicare revenue, operating costs amounted to 86 cents, so the hospital made a 14-cent operating profit. In most industries, operating margins run less than 10 percent, so most managers would be quite happy with a 14 percent margin.
3. Our purpose here is not to make you an expert in Medicare's IPPS. Indeed, most hospitals, other than the smallest, have one or more specialists on the financial staff whose sole responsibility is to keep track of changes in Medicare reimbursement practices. However, some type of DRG-based prospective payment system is being used by many payers with many different types of providers, so some knowledge of the system is necessary for all healthcare managers.
4. The number of DRGs in Medicare's IPPS changes frequently as diagnoses are refined. Originally, there were only 383 DRGs.
5. For a more detailed discussion of case mix management at the treatment level, see Dalton A. Tong and Patricia L. Jones, "Physicians, Financial Managers Join Forces to Control Costs," *Healthcare Financial Management*, January 1990, 21–30.

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Basic Financial Management Concepts

Before we discuss the details of the financial management of healthcare organizations, it is essential that you gain some fundamental knowledge of two very important basic topics.

Chapter 3 focuses on *time value analysis*. Most financial management decisions involve future dollar amounts. For example, when a physician group practice uses debt financing, it is obligated to make a series of future (principal and interest) payments to the lender. Or, when a hospital builds an outpatient surgery center, it expects the investment to provide a series of future cash flows when it is “up and running.” To estimate the financial impact of these transactions, future dollar amounts must be valued. The process of doing this is called time value analysis, and Chapter 3 provides the concepts necessary to perform this analysis.

Chapter 4 discusses *financial risk* and *required return*. Virtually all financial decisions involve risk. To illustrate, there is the risk that the physician group practice that obtained debt financing will not be able to make the required payments. Or, there is the risk that the cash flows expected from the hospital’s new outpatient surgery center will be less than those forecasted when the center was built. Situations like this involve financial risk, and to make good financial decisions, managers must be able to define and measure such risk. Furthermore, risk must be translated into required rates of return. For example, to be financially attractive, the new outpatient surgery center must provide an expected rate of return that is sufficient to compensate the hospital for the riskiness of its investment. Chapter 4 provides the tools required to understand financial risk and how it is translated into required return.

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TIME VALUE ANALYSIS

Learning Objectives

After studying this chapter, readers should be able to:

- Explain why time value analysis is so important to healthcare financial management.
- Find the present and future values for lump sums, annuities, and uneven cash flow streams.
- Explain and apply the opportunity cost principle.
- Measure the return on an investment.
- Create an amortization table.
- Describe and apply stated, periodic, and effective annual interest rates.

Introduction

The financial value of any asset, whether a *financial asset*, such as a stock or a bond, or a *real asset*, such as a piece of diagnostic equipment or an ambulatory surgery center, is based on future cash flows. However, a dollar to be received in the future is worth less than a current dollar because a dollar in hand today can be invested, can earn interest, and hence can be worth more than one dollar in the future. Even if no investment opportunities existed, a dollar in hand would still be worth more than a dollar to be received in the future because a dollar today can be used for immediate consumption, whereas a future dollar cannot. Because current dollars are worth more than future dollars, valuation analyses must account for cash flow timing differences.

The process of assigning appropriate values to cash flows that occur at different points in time is called *time value analysis*. However, the application of time value analysis to valuation situations is often called *discounted cash flow analysis* because, as you will see later in this chapter, finding present values is called *discounting*. Time value analysis is an important part of many healthcare financial management decisions because many financial analyses involve the valuation of future cash flows. In fact, of all the financial analysis techniques discussed in this text, none is more important than time value analysis. The concepts presented in this chapter are the cornerstones of financial analysis, so a thorough understanding of these concepts is essential to good financial decision making.

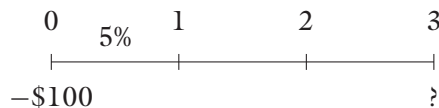
Time Lines

One important tool used in time value analysis is the *time line*. Time lines make it easier to visualize when the cash flows in a particular analysis occur. To illustrate the time-line concept, consider the following five-period time line:



Time 0 is any starting point; Time 1 is one period from the starting point, or the end of Period 1; Time 2 is two periods from the starting point, or the end of Period 2; and so on. Thus, the numbers on top of the tick marks represent ends of periods. Often, the periods are years, but other time intervals—such as quarters, months, or days—are also used when needed to fit the timing of the cash flows being evaluated. If the time periods are years, the interval from 0 to 1 would be Year 1, and the tick mark labeled 1 would represent both the end of Year 1 and the beginning of Year 2. In many time value analyses, Time 0 (the starting point) is considered to be today, although the term “today” usually does not literally mean today’s date.

Cash flows are shown on a time line directly below the tick marks, at the point in time when they are expected to occur. The interest rate that is relevant to the analysis is sometimes shown directly above the time line in the first period. (In rare cases, it may be appropriate to apply more than one interest rate in a time value analysis. In this situation, interest rates may be shown in multiple periods.) Additionally, unknown cash flows—the ones to be determined in the analysis—are sometimes indicated by question marks. To illustrate a completed time line, consider the following example:



Here, the interest rate for each of the three periods is 5 percent, a *lump sum* (single amount) investment of \$100 is made at Time 0, and the Time 3 value is to be determined. The \$100 is an *outflow* because it is shown as a negative cash flow. (Outflows are often designated by parentheses rather than by minus signs.) In simple analyses, it is not really necessary to designate cash flows as inflows and outflows because the analyst is well aware of the economics of the situation. However, more complicated analyses require the correct cash flow designation, and many financial calculators require that signs be attached to cash flows in all analyses, even simple ones. Thus, to ensure that students are familiar with sign conventions, we will use them on most of our illustrations.

Time lines are essential when learning time value concepts, but even experienced analysts use time lines when dealing with complex problems. The time line may be an actual line, as used in this chapter, or it may be a series

of columns, or rows, on a spreadsheet. Time lines will be used extensively in the remainder of this text, so get into the habit of creating time lines when conducting time value analyses.

1. Draw a three-year time line that illustrates the following situation: An investment of \$10,000 at Time 0; inflows of \$5,000 at the end of Years 1, 2, and 3; and an interest rate of 10 percent during the entire three years.

Self-Test Question

Future Value of a Lump Sum (Compounding)



The process of going from today's values, or *present values (PVs)*, to future values is called *compounding*. Although compounding is not used extensively in healthcare financial management, it is the best starting point for learning time value concepts. To illustrate *lump sum* compounding, which deals with a single starting dollar amount, suppose that the manager of Meridian Clinic deposits \$100 of the clinic's excess cash in a bank account that pays 5 percent interest per year. How much would be in the account at the end of one year? To begin, here are some terms used in the solution:

- $PV = \$100$ = present value, or beginning amount, of the account.
- $I = 5\%$ = interest rate the bank pays on the account per year. The interest amount, which is paid at the end of each year, is based on the balance at the beginning of the year. Expressed as a decimal, $I = 0.05$.
- INT = dollars of interest earned during each year, which equals the beginning amount multiplied by the interest rate. Thus, for Year 1, $INT = PV \times I$.
- FV_N = future value, or ending amount, of the account at the end of N years. Whereas PV is the value now, FV_N is the value N years into the *future*, after the interest earned has been added to the account.
- N = number of years (or periods) involved in the analysis.

To start, $N = 1$, so FV_N is calculated as follows:

$$\begin{aligned}FV_N &= FV_1 = PV + INT \\ &= PV + (PV \times I) \\ &= PV \times (1 + I).\end{aligned}$$

The future value at the end of one year, FV_1 , equals the present value multiplied by (1.0 plus the interest rate). This future value relationship can be used to find how much \$100 will be worth at the end of one year if it is invested in an account that pays 5 percent interest:

$$FV_1 = PV \times (1 + I) = \$100 \times (1 + 0.05) = \$100 \times 1.05 = \$105.$$

Now, what would be the value after five years? Here is a time line that shows the amount at the end of each year:

	0	1	2	3	4	5
	5%					
Beginning amount	-\$100					
Interest earned		\$ 5	\$ 5.25	\$ 5.51	\$ 5.79	\$ 6.08
End of year amount		105	110.25	115.76	121.55	127.63

Note the following points:

- The account is opened with a deposit of \$100. This is shown as an outflow at Year 0.
- Meridian earns $\$100 \times 0.05 = \5 of interest during the first year, so the amount in the account at the end of Year 1 is $\$100 + \$5 = \$105$.
- At the start of the second year, the account balance is \$105. Interest of $\$105 \times 0.05 = \5.25 is earned on the now larger amount, and the account balance at the end of the second year is $\$105 + \$5.25 = \$110.25$. The Year 2 interest, \$5.25, is higher than the first year's interest, \$5, because $\$5 \times 0.05 = \0.25 in interest was earned on the first year's interest.
- This process continues, and because the beginning balance is higher in each succeeding year, the interest earned increases in each year.
- The total interest earned, \$27.63, is reflected in the final balance at the end of Year 5, \$127.63.

To better understand the mathematics of compounding, note that the Year 2 value, \$110.25, is equal to:

$$\begin{aligned}
 FV_2 &= FV_1 \times (1 + I) \\
 &= PV \times (1 + I) \times (1 + I) \\
 &= PV \times (1 + I)^2 \\
 &= \$100 \times (1.05)^2 = \$110.25.
 \end{aligned}$$

Furthermore, the balance at the end of Year 3 is:

$$\begin{aligned}
 FV_3 &= FV_2 \times (1 + I) \\
 &= PV \times (1 + I)^3 \\
 &= \$100 \times (1.05)^3 = \$115.76.
 \end{aligned}$$

Continuing the calculation out to the end of Year 5 gives:

$$FV_5 = \$100 \times (1.05)^5 = \$127.63.$$

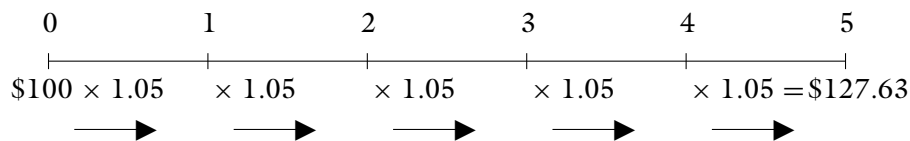
It is clear that a definite pattern exists in these future value calculations. In general, the future value of a lump sum at the end of N years can be found by applying this equation:

$$FV_N = PV \times (1 + I)^N.$$

Future values, as well as most other time value calculations, can be solved three ways: (1) by using a regular calculator, (2) by using a financial calculator, and (3) by using a spreadsheet.¹ Almost all students who use this textbook will be using spreadsheets to handle time value analyses, so our focus will be on this solution technique. However, we will also illustrate the use of regular calculators to help students understand the set up of the problem and the underlying time value calculation. (If you are using a financial calculator for time value analyses, visit this book's companion website at ache.org/UnderstandingFinancialManagement5. The site has a financial calculator tutorial that covers most of the calculations in this chapter.)

Regular calculator solution:

A regular (nonfinancial) calculator can be used, either by multiplying the PV by $(1 + I)$ for N times or by using the exponential function to raise $(1 + I)$ to the N th power and then multiplying the result by the PV. The easiest way to find the future value of \$100 after five years when compounded at 5 percent is to enter \$100, then multiply this amount by 1.05 five times. If the calculator is set to display two decimal places, the answer would be \$127.63:



As denoted by the arrows, compounding involves moving to the **right** along the time line. The word “compounding” means to add to or increase, so values increase when moving to the right along a time line.

Spreadsheet solution:

	A	B	C	D
1				
2	5	Nper	Number of periods	
3	\$ 100.00	Pv	Present value	
4	5.0%	Rate	Interest rate	
5				
6	\$ 127.63	=100*(1.05)^5 (entered into Cell A6)		
7				
8	\$ 127.63	=A3*(1+A4)^A2 (entered into Cell A8)		
9				
10	\$ 127.63	=FV(A4,A2,-A3) (entered into Cell A10)		

Spreadsheet programs, such as Excel, are ideally suited for time value analyses. For simple time value calculations, it is easy to enter the appropriate formula directly into the spreadsheet. For example, you could enter the spreadsheet version of the future value equation into Cell A6: $=100*(1.05)^5$. Here, = tells the spreadsheet that a formula is being entered into the cell; * is the spreadsheet multiplication sign; and ^ is the spreadsheet exponential, or power, sign. When this formula is entered into Cell A6, the value \$127.63 appears in the cell (when formatted with a dollar sign to two decimal places). Note that different spreadsheet programs use slightly different syntax in their time value analyses. The examples presented in this text use Excel syntax.

In most situations, it is more useful to enter a formula that can accommodate changing input values than to embed these values directly into the formula, so it would be better to solve this future value problem with this formula: $=A3*(1+A4)^A2$, as done in Cell A8. Here, the present value (\$100) is contained in Cell A3, the interest rate (0.05, which is displayed as 5.0%) in Cell A4, and the number of periods (5) in Cell A2. With this formula, future values easily can be calculated with different starting amounts, interest rates, or number of years by changing the values in the input cells.

In addition to entering the appropriate time value formulas, most time value solutions are preprogrammed in the spreadsheet software. The preprogrammed time value formulas are called *functions*. Like any formula, a time value function consists of a number of arithmetic calculations combined into one statement. By using functions, spreadsheet users can save the time and tedium of building formulas from scratch.

Each function begins with a unique name that identifies the calculation to be performed, along with one or more *arguments* (the input values for the calculation) enclosed in parentheses. The best way to access the time value functions is to use the spreadsheet's function wizard (also called the paste function). For this future value problem, first move the cursor to Cell A10 (the cell where you want the answer to appear). Then, click on the function wizard, select Financial for the function category and FV (future value) for the function name, and enter A4 for Rate, A2 for Nper (number of periods), and -A3 for Pv. (Note that the Pmt and Type entries are left blank for this problem. Also, note that the cell address entered for Pv has a minus sign. This is necessary for the answer to be displayed as a positive number.) Finally, press OK and the result, \$127.63, appears in Cell A10.

Note that most of the spreadsheet solutions shown in this book follow a similar format. The input values and the output are contained in Column A. If a spreadsheet function is used in the solution, the input value (argument) names are shown in Column B to the right of the input values. In addition, the formula or function used to calculate the output is shown in Column B to the right of the output value. Finally, Column C contains the descriptive input names.

The most efficient way to solve most problems involving time value is to use a spreadsheet.¹ However, the basic mathematics behind the calculations must be understood to set up complex problems before solving them. In addition, the underlying logic must be understood to comprehend stock and bond valuation, lease analysis, capital budgeting analysis, and other important healthcare financial management topics.

To help you better understand time value solution techniques, we will use a more or less constant format in the illustrations presented in this chapter:

- We lay out the situation on a time line and show the equation that must be solved.
- We then present the regular calculator solution, if applicable.
- Finally, we present the spreadsheet formula or function (or both) in a spreadsheet format.

Graphic View of the Compounding (Growth) Process



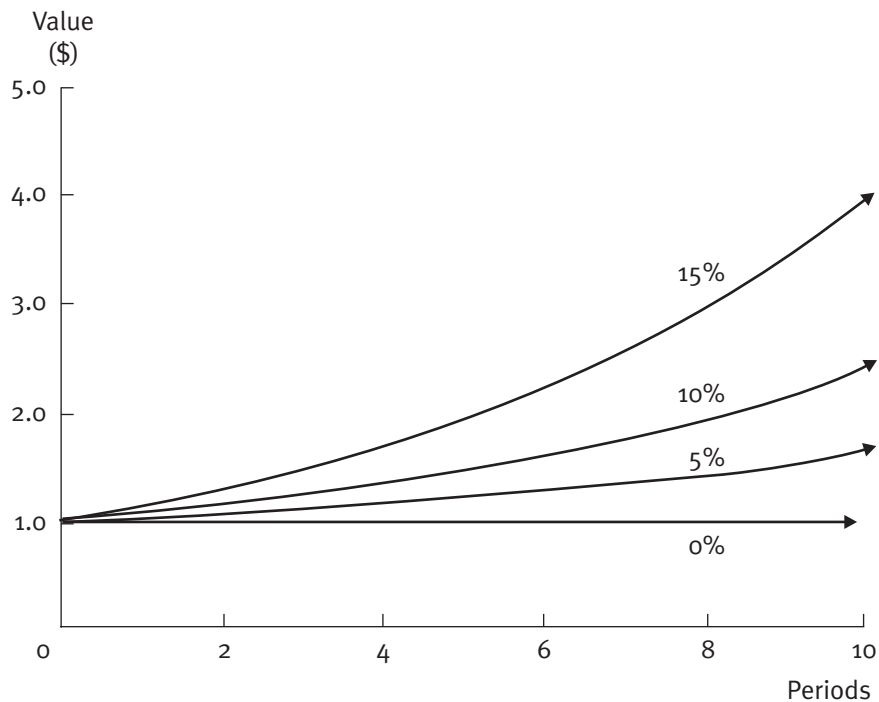
Figure 3.1 shows how \$1, or any other lump sum, grows over time at various rates of interest. The data used to plot the curves can be obtained by using any of the solution techniques described in the previous section. Note that the greater the rate of interest, the faster the growth rate. Thus, \$100 on deposit for ten years at a 5 percent interest rate will grow to \$162.89, but the same amount invested at 10 percent interest will grow to \$259.37. The interest rate is, in fact, a growth rate: If a lump sum is deposited and earns 5 percent interest, the funds on deposit will grow at a rate of 5 percent per period. Note also that future value concepts are not restricted to bank deposits; they can be applied to any growing, or declining, numerical value such as number of clinic visits or earnings per share.

The Power of Compounding

It is very important to understand what is commonly called “the power of compounding.” In essence, this means that a relatively small starting value can grow to a large amount over a long period of time, even when the rate of growth (interest rate) is modest. For example, assume that a new parent places \$1,000 in a mutual fund to help pay the child’s college expenses, which are expected to begin in 18 years. The mutual fund—a common stock fund holding a large number of securities—is assumed to earn a return of 10 percent per year, which is a reasonable estimate by historical standards. After 18 years, the value of the mutual fund account would be \$5,560, which is not an inconsequential sum.

Now, assume that the money was meant to help fund the child’s retirement, which is assumed to occur 65 years into the future. The value of the mutual fund account at that time would be \$490,371, or nearly a **half-million dollars**. Imagine that, \$1,000 grows to nearly half a million all because of the power of compounding. The moral of this story is clear: When saving for retirement, or for any other purpose, start early.

FIGURE 3.1
 Relationships
 Among Future
 Value, Interest
 Rates, and
 Time



Period	Interest Rate Plot Points		
	5%	10%	15%
1	1.0500	1.1000	1.1500
2	1.1025	1.2100	1.3225
3	1.1576	1.3310	1.5209
4	1.2155	1.4641	1.7490
5	1.2763	1.6105	2.0114
6	1.3401	1.7716	2.3131
7	1.4071	1.9487	2.6600
8	1.4775	2.1436	3.0590
9	1.5513	2.3579	3.5179
10	1.6289	2.5937	4.0456

**Self-Test
 Questions**

1. What is compounding? What is interest on interest?
2. What is the basic equation for calculating the future value of a lump sum?
3. What are three solution techniques for solving lump sum compounding problems? Which technique is the most efficient?
4. What is meant by the power of compounding?

Present Value of a Lump Sum (Discounting)

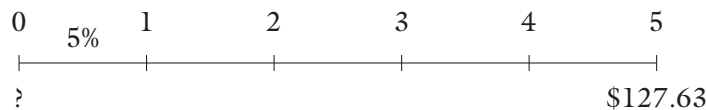


Suppose that GroupWest Health Plans, which has premium income reserves to invest, has the opportunity to purchase a low-risk security that will pay \$127.63 at the end of five years. A local bank is currently offering 5 percent interest on a five-year certificate of deposit (CD), and GroupWest's managers regard the security being offered as being as safe as the bank CD. The 5 percent interest rate available on the bank CD is GroupWest's *opportunity cost rate*. (Opportunity costs are discussed in detail in the next section.) How much would GroupWest be willing to pay for this security?

In the previous section, we learned that an initial amount of \$100 invested at 5 percent per year would be worth \$127.63 at the end of five years. Thus, GroupWest should be indifferent to the choice between \$100 today and \$127.63 to be received after five years. Today's \$100 is defined as the present value, or PV, of \$127.63 due in five years when the opportunity cost rate is 5 percent. If the price of the security being offered is anything less than \$100, GroupWest should buy it. If the price is greater than \$100, GroupWest should turn the offer down. If the price is exactly \$100, GroupWest can buy it or turn it down because that is the security's "fair value." In general, the present value of a cash flow due N years in the future is the amount that, if it were on hand today, would grow to equal the future amount when compounded at the opportunity cost rate.

Finding present values is called *discounting*, and it is simply the reverse of compounding: If the PV is known, compound to find the FV; if the FV is known, discount to find the PV. Here are the solution techniques for this discounting problem.

Time line:



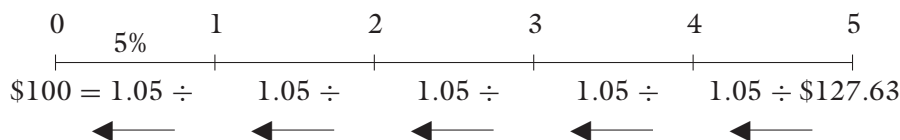
To develop the discounting equation, solve the compounding equation for PV:

$$\text{Compounding: } FV_N = PV \times (1 + I)^N.$$

$$\text{Discounting: } PV = \frac{FV_N}{(1 + I)^N}.$$

Regular calculator solution:

Enter \$127.63 and divide it five times by 1.05:



As shown by the arrows, discounting is moving to the left along a time line. The word “discount” means to reduce or to lessen, so values decrease when moving to the left along a time line.

Spreadsheet solution:

	A	B	C	D
1				
2	5	Nper	Number of periods	
3	\$ 127.63	Fv	Future value	
4	5.0%	Rate	Interest rate	
5				
6	\$ 100.00	=A3/(1+A4)^A2 (entered into Cell A6)		
7				
8	\$ 100.00	=PV(A4,A2,-A3) (entered into Cell A8)		
9				
10				

One solution would be to enter the applicable formula, as shown to the right of Cell A6: =A3/(1+A4)^A2. Here, the future value (\$127.63) is contained in Cell A3, the interest rate (0.05, which is displayed as 5.0%) in Cell A4, and the number of periods (5) in Cell A2. With this formula, present values easily can be calculated with different starting future amounts, interest rates, or number of years.

The function approach is illustrated in Cell A8. First, move the cursor to that cell (the cell where you want the answer to appear). Then, click on the function wizard, select Financial for the function category and PV (present value) for the function name, and enter A4 for Rate, A2 for Nper (number of periods), and -A3 for Fv. (Note that the Pmt and Type entries are left blank for this problem. Also, note that the cell address entered for Fv has a minus sign. This is necessary for the answer to be displayed as a positive number.) Finally, press OK and the result, \$100.00, appears in Cell A8.

Graphic View of the Discounting Process

Figure 3.2 shows how the present value of \$1, or any other sum, to be received in the future diminishes as the years to receipt increase. Again, the data used to plot the curves can be developed by using any of the solution techniques. The graphs show (1) that the present value decreases and approaches zero as the payment date is extended further into the future and (2) that the rate of decrease is greater the higher the interest (discount) rate.

Discounting at Work

At relatively high interest rates, funds due in the future are worth very little today, and even at moderate discount rates, the present value of a sum due in the distant future is small. To illustrate discounting at work, consider 100-year bonds. A bond is a type of debt security in which an investor loans

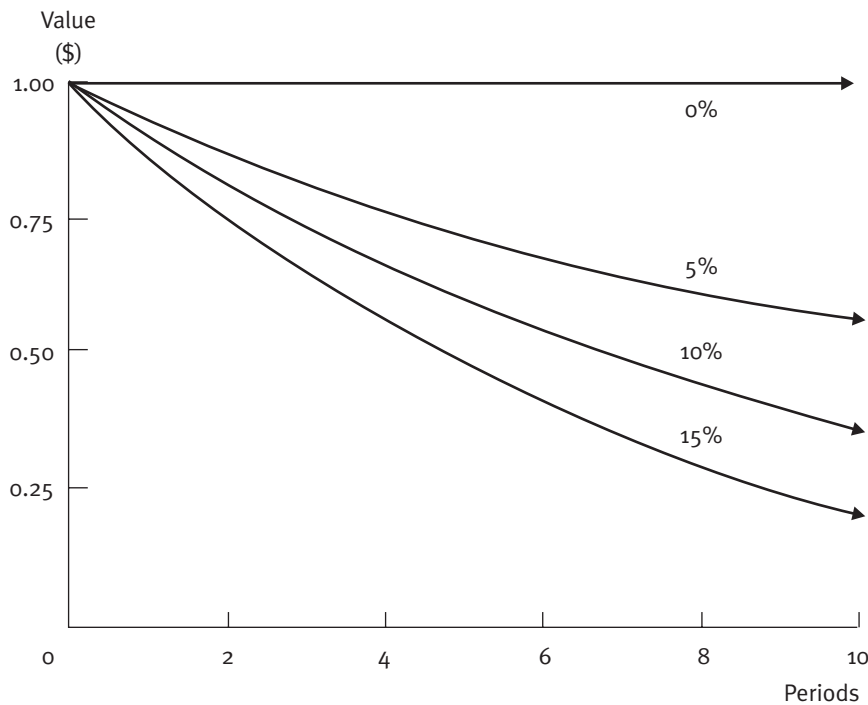


FIGURE 3.2
 Relationships
 Among Present
 Value, Interest
 Rates, and
 Time

Period	Interest Rate Plot Points		
	5%	10%	15%
1	.9524	.9091	.8696
2	.9070	.8254	.7561
3	.8638	.7513	.6575
4	.8227	.6830	.5718
5	.7835	.6209	.4972
6	.7462	.5634	.4323
7	.7107	.5132	.3759
8	.6768	.4665	.3269
9	.6446	.4241	.2843
10	.6139	.3855	.2472

some amount of principal—say, \$1,000—to a borrower who promises to pay interest over the life of the bond and to return the principal amount at maturity. Typically, the longest maturities for bonds are 30 to 40 years, but in the early 1990s, several firms, including Columbia/HCA Healthcare (now HCA), issued 100-year bonds.

At first blush, it might appear that anyone who would buy a 100-year bond must be irrational because there is little assurance that the firm will even

be around in 100 years to repay the amount borrowed. However, consider the present value of \$1,000 to be received in 100 years. If the discount rate is 7.5 percent, which is roughly the interest rate that was set on the bond, the present value is a mere \$0.72. Thus, the time value of money erodes the value of the principal repayment to the point that it is worth less than \$1 when the bond is purchased. This tells us that the value of the bond stems mostly from the interest stream received in the early years of ownership and that the payments expected during the later years of the bond contribute little to the bond's initial \$1,000 value.

Self-Test Questions

1. What is discounting? How is it related to compounding?
2. What are the three techniques for solving lump sum discounting problems?
3. What is the basic equation for calculating the present value of a lump sum?
4. How does the present value of an amount to be received in the future change as the time is extended and as the interest rate increases?

Opportunity Costs

In the last section, the *opportunity cost* concept was used to set the discount rate on GroupWest's investment. This concept plays a very important role in time value analysis. To illustrate the concept, suppose an individual found the winning ticket for the Florida lottery and now has \$1 million to invest. Should the individual assign a "cost" to these funds? At first blush, it might appear that this money has zero cost because its acquisition was purely a matter of luck. However, as soon as the lucky individual thinks about what to do with the \$1 million, he or she has to think in terms of the opportunity costs involved. By using the funds to invest in one alternative—for example, in the stock of HMA—the individual forgoes the opportunity to make some other investment, for example, buying U.S. Treasury bonds. Thus, there is an opportunity cost associated with any investment planned for the \$1 million even though the lottery winnings were "free."

Because one investment decision automatically negates all other possible investments with the same funds, the cash flows expected to be earned from any investment must be discounted at a rate that reflects the return that can be earned on forgone investment opportunities. The problem is that the number of forgone investment opportunities is virtually infinite, so which one should be chosen to establish the opportunity cost rate? The opportunity cost rate to be applied in time value analysis is the rate that can be earned on alternative investments of **similar risk**. It would not be logical to assign a very low opportunity cost rate to a series of very risky cash flows, or vice versa. This concept is one of the cornerstones of financial management, so it is worth

repeating. **The opportunity cost rate (i.e., the discount rate) applied to investment cash flows is the rate that can be earned on alternative investments of similar risk.**

Note that the opportunity cost rate does not depend on the source of the funds to be invested. Rather, the primary determinant of this rate is the riskiness of the cash flows being discounted. Thus, the same opportunity cost rate would be applied to a potential investment in HCA stock whether the funds were won in a lottery, taken out of petty cash, or obtained by selling off some land.

Generally, opportunity cost rates are obtained by looking at rates that can be earned, or more precisely rates that are expected to be earned, on securities such as stocks or bonds. Securities are usually chosen to set opportunity cost rates because their expected returns are more easily estimated than rates of return on real assets such as HMOs, group practices, hospital beds, MRI machines, and the like. Furthermore, as discussed in Chapter 7, securities generally provide the minimum return appropriate for the amount of risk assumed, so securities returns provide a good benchmark for other investments.

To illustrate the opportunity cost concept, assume that Oakdale Community Hospital is considering building a nursing home. The first step in the financial analysis is to forecast the cash flows that the nursing home is expected to produce. These cash flows, then, must be discounted at some opportunity cost rate to determine their present value. Would the hospital's opportunity cost rate be (1) the expected rate of return on Treasury bonds; (2) the expected rate of return on the stock of Manor Care, which operates about 350 nursing homes and assisted living centers; or (3) the expected rate of return on pork belly futures? (Pork belly futures are investments that involve commodity contracts for delivery at some future time.) The answer is the expected rate of return on Manor Care's stock because that is the rate of return available to the hospital on alternative investments of similar risk. Treasury securities are low-risk investments, so they would understate the opportunity cost rate in owning a nursing home. Conversely, pork belly futures are very high-risk investments, so that rate of return is probably too high to apply to Oakdale's nursing home investment.²

The source of the funds used for the nursing home investment is **not relevant** to the time value analysis. Oakdale may obtain the needed funds by issuing tax-exempt debt, or by soliciting contributions, or it may have excess cash accumulated from profit retention. The discount rate applied to the nursing home cash flows depends only on the riskiness of those cash flows and the returns available on alternative investments of similar risk, not on the source of the investment funds.

At this point, you may question the ability of real-world analysts to assess the riskiness of a cash flow stream or to choose an opportunity cost rate with any confidence. Fortunately, the process is not as difficult as it may

appear here because businesses have benchmarks that can be used as starting points. (Chapter 9 contains a discussion of how baseline opportunity cost rates are established for capital investments, while Chapter 12 presents a detailed discussion on how the riskiness of a cash flow stream can be assessed.)

Self-Test Questions

1. Why does an investment have an opportunity cost rate even when the funds employed have no explicit cost?
2. How are opportunity cost rates established?
3. Does the opportunity cost rate depend on the source of the investment funds?

Solving for Interest Rate and Time

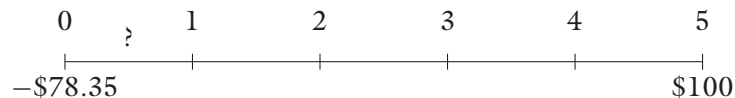
In our examples thus far, four time value analysis variables have been used: PV, FV, I, and N. Specifically, the interest rate, I, and the number of years, N, plus either PV or FV have been initially given. However, if the values of any three of the variables are known, the value of the fourth can be found.

Solving for Interest Rate (I)



Suppose that Family Practice Associates (FPA), a primary care physicians' group practice, can buy a bank certificate of deposit (CD) for \$78.35 that will return \$100 after five years. In this case PV, FV, and N are known, but I, the interest rate that the bank is paying, is not known. Such problems are solved in this way:

Time line:



$$FV_N = PV \times (1 + I)^N$$

$$\$100 = \$78.35 \times (1 + I)^5$$

Spreadsheet solution:

	A	B	C	D
1				
2	5	Nper	Number of periods	
3	\$ (78.35)	Pv	Present value	
4	\$ 100.00	Fv	Future value	
5				
6				
7				
8	5.00%	=RATE(A2,,A3,A4) (entered into Cell A8)		
9				
10				

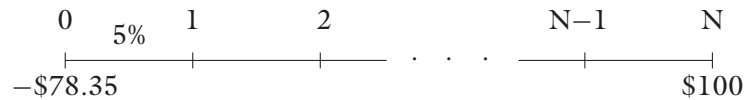
Here, the spreadsheet function named RATE is used to solve for I, as illustrated to the right of Cell A8. First, click on the function wizard; select Financial for the function category and RATE for the function name; and enter A2 for Nper (number of periods), A3 for Pv, and A4 for Fv. (Note that the Pmt and Type entries are left blank for this problem. Also, note that the PV was entered as a negative number, as shown on the time line.) Finally, press OK and the result, 5.00%, appears in Cell A8. (Note that some spreadsheet programs display the answer in decimal form unless the cell is formatted to display in percent.)

Solving for Time (N)



Suppose that the bank told FPA that a CD pays 5 percent interest each year, that it costs \$78.35, and that at maturity the group would receive \$100. How long must the funds be invested in the CD? In this case, PV, FV, and I are known, but N, the number of periods, is not known.

Time line:



$$FV_N = PV \times (1 + I)^N$$

$$\$100 = \$78.35 \times (1.05)^N$$

Spreadsheet solution:

	A	B	C	D
1				
2	5.00%	Rate	Interest rate	
3	\$ (78.35)	Pv	Present value	
4	\$ 100.00	Fv	Future value	
5				
6				
7				
8	5.00	=NPER(A2,,A3,A4) (entered into Cell A8)		
9				
10				

To solve for time, the spreadsheet function named NPER (number of periods) is used. To begin, place the cursor in Cell A8 and click on the function wizard. Then, select Financial for the function category and NPER for the function name, and enter A2 for Rate, A3 for Pv, and A4 for Fv. (Note that the Pmt and Type entries are left blank for this problem. Also, note that the PV was entered as a negative number, as shown on the time line.) Finally, press OK and the result, 5.00, appears in Cell A8. (Note that interest rates usually are entered as decimals in function arguments.)

The Rule of 72

The *Rule of 72* is a simple and quick method for judging the approximate effect of different interest rates on the growth of a lump sum deposit. It tells us that to find the number of years required to double the value of a lump sum, merely divide the number 72 by the interest rate paid. For example, if the interest rate is 10 percent, it would take $72/10 = 7.2$ years for the money in an account to double in value. The spreadsheet solution is 7.27 years, so the Rule of 72 is relatively accurate, at least when reasonable interest rates are applied.

In a similar manner, the Rule of 72 can be used to determine the interest rate required to double the money in an account in a given number of years. To illustrate the concept, we find that an interest rate of $72/5 = 14.4\%$ is required to double the value of an account in five years. The spreadsheet solution here is 14.9 percent, so the Rule of 72 again gives a reasonable approximation of the correct answer.

Self-Test Questions

1. What are some real-world situations that may require you to solve for interest rate or time?
2. What is the Rule of 72, and how is it used?

Annuities

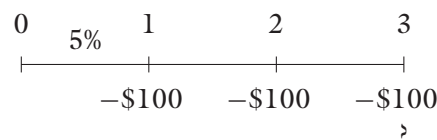
Whereas lump sums are single dollar amounts, an *annuity* is a series of equal amounts at **fixed intervals** for a specified number of periods. Annuity amounts, which often are called *payments* and given the symbol *PMT*, can occur at the beginning or end of each period. If the payments occur at the end of each period as they typically do, the annuity is an *ordinary*, or *deferred*, or *regular annuity*. If payments are made at the beginning of each period, the annuity is an *annuity due*. Because ordinary annuities are by far the most common, the term *annuity* without further description usually means an ordinary annuity.

Ordinary Annuities



A series of equal payments at the end of each period constitute an ordinary annuity. If Meridian Clinic were to deposit \$100 at the end of each year for three years in an account that paid 5 percent interest per year, how much would Meridian accumulate at the end of three years? The answer to this question is the *future value* of the annuity.

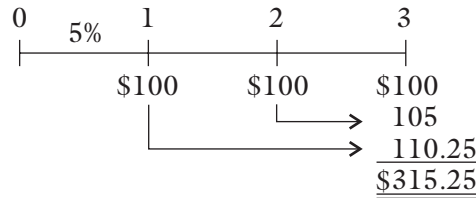
Time line:



The future value of any annuity occurs at the end of the final period. Thus, for regular annuities, the future value coincides with the last payment.

Regular calculator solution:

One approach is to treat each individual cash flow as a lump sum, compound it to Year 3, then sum the future values:



Spreadsheet solution:

	A	B	C	D
1				
2	3	Nper	Number of periods	
3	\$ (100.005)	Pmt	Payment	
4	5.0%	Rate	Interest rate	
5				
6				
7				
8	\$ 315.25	=FV(A4,A2,A3) (entered into Cell A8)		
9				
10				

Here, we again use the FV function, but now we will use the payment (Pmt) entry in the function wizard to recognize that the problem involves annuities. Place the cursor in Cell A8. Then, click on the function wizard; select Financial for the function category and FV for the function name; and enter A4 for Rate, A2 for Nper (number of periods), and A3 for Pmt. (Note that the Pv and Type entries are left blank for this problem.) Finally, press OK and the result, \$315.25, appears in Cell A8.

Suppose that Meridian Clinic was offered the following alternatives: (a) a three-year annuity with payments of \$100 at the end of each year or (b) a lump sum payment today. Meridian has no need for the money during the next three years. If it accepts the annuity, it would deposit the payments in an account that pays 5 percent interest per year. Similarly, the lump sum payment would be deposited into the same account. How large must the lump sum payment be today to make it equivalent to the annuity? In other words, what is the present value of the annuity?

Spreadsheet solution:

	A	B	C	D
1				
2		3	Nper	Number of periods
3	\$	(100.00)	Pmt	Payment
4		5.0%	Rate	Interest rate
5				
6				
7				
8	\$	272.32	=PV(A4,,A2,A3) (entered into Cell A8)	
9				
10				

Here, we use the present value function, but again with a payment entry to recognize that the problem involves annuities. Place the cursor in Cell A8. Then, click on the function wizard; select Financial for the function category and PV for the function name; and enter A4 for Rate, A2 for Nper (number of periods), and A3 for Pmt. (Note that the Fv and Type entries are left blank for this problem.) Finally, press OK and the result, \$272.32, appears in Cell A8.

One especially important application of the annuity concept relates to loans with constant payments such as mortgages, auto loans, and many bank loans to businesses. Such loans are examined in more depth in a later section on amortization.

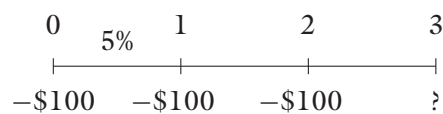
Annuities Due



If the three \$100 payments in the previous example had been made at the beginning of each year, the annuity would have been an *annuity due*. When compared to an ordinary annuity, each payment is shifted to the left one year. Because the payments come in faster, an annuity due is more valuable than an ordinary annuity.

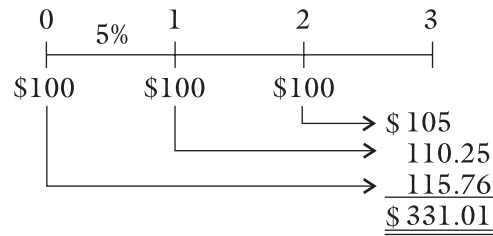
The *future value* of our example, assuming an annuity due, is found as follows:

Time line:



Note that the future value of an annuity due occurs one period after the final payment, while the future value of an ordinary annuity coincides with the final payment.

Regular calculator solution:



In the case of an annuity due, as compared with an ordinary annuity, all the cash flows are compounded for one additional period, and hence the future value of an annuity due is greater than the future value of a similar ordinary annuity by $(1 + I)$. Thus, the future value of an annuity due also can be found as follows:

$$\begin{aligned} \text{FV (Annuity due)} &= \text{FV of a regular annuity} \times (1 + I) \\ &= \$315.25 \times 1.05 = \$331.01. \end{aligned}$$

Spreadsheet solution:

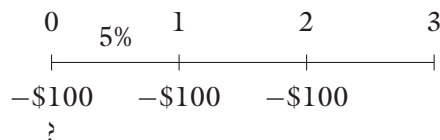
	A	B	C	D
1				
2		3	Nper	Number of periods
3	\$	(100.00)	Pmt	Payment
4		5.0%	Rate	Interest rate
5				
6	\$	331.01	=FV(A4,A2,A3,1) (entered into Cell A6)	
7				
8	\$	331.01	=FV(A4,A2,A3)*(1+A4) (entered into Cell A8)	
9				
10				

One approach (as shown in Cell A6) is to use the spreadsheet FV function, but with a “1” entered for Type (as opposed to a blank). Now, the spreadsheet treats the entries as an annuity due, and \$331.01 is displayed as the answer.

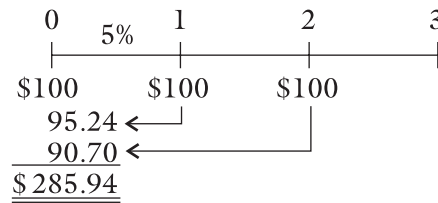
As an alternative, note that the solution is the same as for an ordinary annuity, except the result must be multiplied by $(1 + \text{Rate})$, which is $(1 + A4)$ in this example. This solution approach is given in Cell A8. The result, \$331.01, is the future value of the annuity due.

The present value of an annuity due is found in a similar manner.

Time line:



Regular calculator solution:



The present value of an annuity due can be thought of as the present value of an ordinary annuity that is compounded for one period, so it also can be found as follows:

$$\begin{aligned}
 \text{PV(Annuity due)} &= \text{PV of a regular annuity} \times (1 + I) \\
 &= \$272.32 \times 1.05 = \$285.94.
 \end{aligned}$$

Spreadsheet solution:

	A	B	C	D
1				
2	3	Nper	Number of periods	
3	\$ (100.00)	Pmt	Payment	
4	5.0%	Rate	Interest rate	
5				
6	\$ 285.94	=PV(A4,A2,A3,,1) (entered into Cell A6)		
7				
8	\$ 285.94	=PV(A4,A2,A3)*(1+A4) (entered into Cell A8)		
9				
10				

As with future value, one approach (as shown in Cell A6) is to use the spreadsheet PV function, but with a “1” entered for Type (as opposed to a blank). Now, the spreadsheet treats the entries as an annuity due, and \$285.94 is displayed as the answer.

Note that the solution is the same as for an ordinary annuity, except the function in Cell A8 is multiplied by (1+A4). The result, \$285.94, is the present value of the annuity due.

Self-Test Questions

1. What is an annuity?
2. What is the difference between an ordinary annuity and an annuity due?
3. Which annuity has the greater future value: an ordinary annuity or an annuity due? Why?
4. Which annuity has the greater present value: an ordinary annuity or an annuity due? Why?

Perpetuities



Most annuities call for payments to be made over some finite period of time—for example, \$100 per year for three years. However, some annuities go on indefinitely, or perpetually. Such annuities are called *perpetuities*. The present value of a perpetuity is found as follows:

$$PV (\text{Perpetuity}) = \frac{\text{Payment}}{\text{Interest rate}} = \frac{PMT}{I}.$$

Perpetuities can be illustrated by some securities issued by General Healthcare, Inc. Each security promises to pay \$100 annually in perpetuity (forever). What would each security be worth if the opportunity cost rate, or discount rate, was 10 percent? The answer is \$1,000:

$$PV (\text{Perpetuity}) = \frac{\$100}{0.10} = \$1,000.$$

	A	B	C	D
1				
2				
3	\$ 100.00	Pmt	Payment	
4	10.0%	Rate	Interest rate	
5				
6				
7				
8	\$ 1,000.00	=A3/A2 (entered into Cell A8)		
9				
10				

Using a spreadsheet, merely enter the perpetuity formula into a cell, as shown here in Cell A8.

Suppose interest rates, and hence the opportunity cost rate, rose to 15 percent. What would happen to the security's value? The interest rate increase would lower its value to \$666.67:

$$PV (\text{Perpetuity}) = \frac{\$100}{0.15} = \$666.67.$$

Assume that interest rates fell to 5 percent. The rate decrease would increase the perpetuity's value to \$2,000:

$$PV (\text{Perpetuity}) = \frac{\$100}{0.05} = \$2,000.$$

The value of a perpetuity changes dramatically when interest (opportunity cost) rates change. All securities' values are affected by interest rate changes, but some, like perpetuities, are more sensitive to interest rate changes than others such as short-term government bonds. The risks associated with interest rate changes are discussed in more detail in Chapter 7.

Self-Test Questions

1. What is a perpetuity?
2. What happens to the value of a perpetuity when interest rates increase or decrease?

Uneven Cash Flow Streams

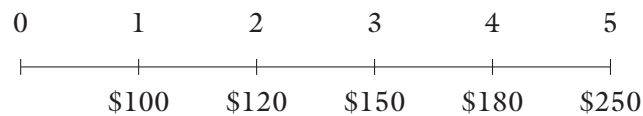
The definition of an annuity includes the words “constant amount,” so annuities involve cash amounts that are the same in every period. Although some financial decisions, such as bond valuation, do involve constant cash amounts, most important healthcare financial analyses involve uneven, or nonconstant, amounts. For example, the financial evaluation of a proposed outpatient clinic or MRI facility rarely involves constant cash amounts.

In general, the term *payment (PMT)* is reserved for annuity situations, in which the dollar amounts are constant, and the term *cash flow* denotes uneven cash flows.

Present Value



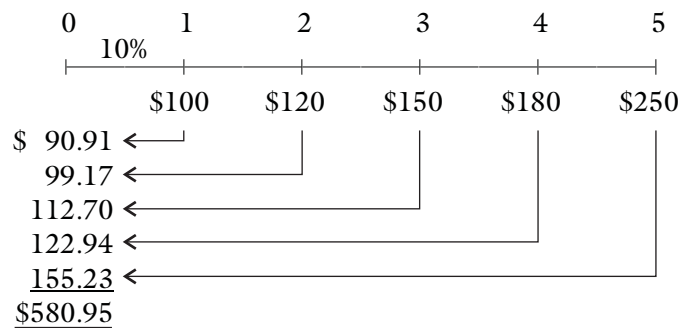
The present value of an uneven cash flow stream is found as the sum of the present values of the individual cash flows of the stream. For example, suppose that Wilson Memorial Hospital is considering the purchase of a new x-ray machine. The hospital’s managers forecast that the operation of the new machine would produce the following stream of cash inflows (in thousands of dollars):



What is the present value of the new x-ray machine investment if the appropriate discount rate (i.e., the opportunity cost rate) is 10 percent?

Regular calculator solution:

The PV of each individual cash flow can be found using a regular calculator, then these values are summed to find the PV of the stream, \$580,950:



Spreadsheet solution:

	A	B	C	D
1				
2	10.0%	Rate	Interest rate	
3				
4	\$ 100	Value 1	Year 1 CF	
5	\$ 120	Value 1	Year 2 CF	
6	\$ 150	Value 1	Year 3 CF	
7	\$ 180	Value 1	Year 4 CF	
8	\$ 250	Value 1	Year 5 CF	
9				
10	\$ 580.95	=NPV(A2,A4:A8) (entered into Cell A10)		

The NPV function calculates the present value of a stream, called a spreadsheet *range*, of cash flows. First, the cash flow values must be entered into consecutive cells in the spreadsheet, as shown above in Cells A4 through A8. Next, the discount (opportunity cost) rate must be placed into a cell (as in Cell A2 above). Then, place the cursor in Cell A10, use the function wizard to select Financial and NPV, and then enter A2 as Rate and A4:A8 as Value1. Press OK, and the value \$580.95 is displayed in the cell. (Note that the Value1 entry is the range of cash flows contained in Cells A4 through A8. Also, note that NPV stands for *net present value*, which indicates that the resulting present value is the net of the present values of two or more cash flows.)

The NPV function assumes that cash flows occur at the **end** of each period, so NPV is calculated as of the **beginning** of the period of the first cash flow specified in the range, which is one period before the cash flow occurs. Because the cash flow specified as the first flow in the range is a Year 1 value, the calculated NPV occurs at the beginning of Year 1, or the end of Year 0, which is correct for this illustration. However, if a Year 0 cash flow is included in the range, the NPV would be calculated at the beginning of Year 0, or the end of Year -1, which typically is incorrect. This problem will be addressed in the next major section.

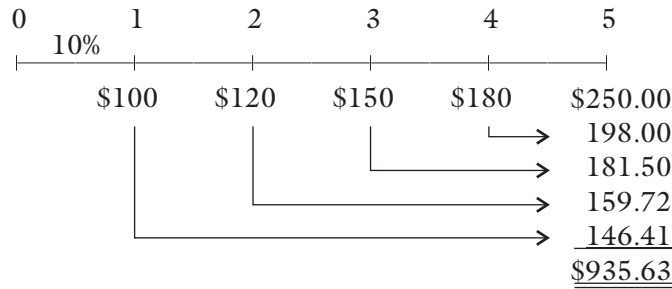
Future Value



The future value of an uneven cash flow stream is found by compounding each payment to the end of the stream and then summing the future values.

Regular calculator solution:

The future value of each individual cash flow can be found using a regular calculator. Then, these values are summed to find the future value of the stream, \$935,630:



Spreadsheet solution:

Most spreadsheet programs do not have a function that computes the future value of an uneven cash flow stream. However, future values can be found by building a formula in a cell that replicates the regular calculator solution.

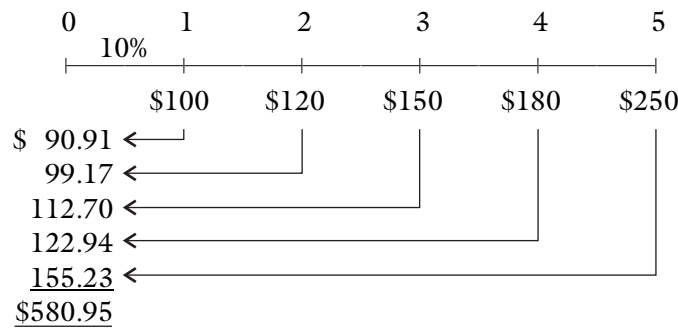
Self-Test Questions

1. Give two examples of financial decisions that typically involve uneven cash flows.
2. Describe how present values of uneven cash flow streams are calculated using a regular calculator. Using a spreadsheet.
3. What is meant by net present value (NPV)?

Using Time Value Analysis to Measure ROI

In most investments, an individual or business spends cash today with the expectation of receiving cash in the future. The financial attractiveness of such investments is measured by *return on investment (ROI)*, or just *return*. There are two basic ways of expressing ROI: (1) in dollar terms and (2) in percentage terms.

To illustrate the concept, let's reexamine the cash flows expected to be received if Wilson Memorial Hospital buys its new x-ray machine (shown on the time line in thousands of dollars). In the last section, we determined that the PV of these flows, when discounted at a 10 percent rate, is \$580,950:



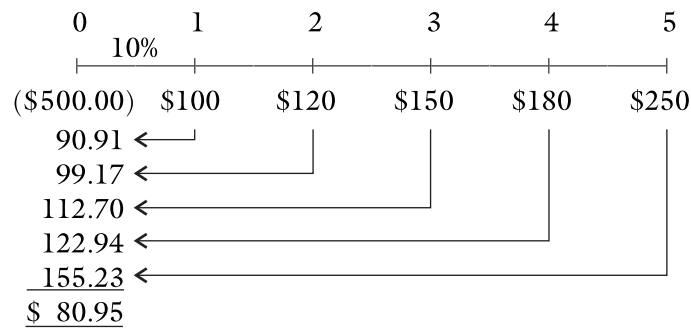
Dollar Return



The \$580,950 calculated above represents the present value (in financial terms) of the cash flows that the x-ray machine is **expected** to provide to Wilson Memorial Hospital. Note that these cash flows are not known with certainty but represent the best estimates of the hospital's managers.

To measure the *dollar return* on the investment, typically called NPV, the cost of the x-ray machine must be compared to the present value of the expected benefits (the cash inflows). If the machine is expected to cost \$500,000, and the present value of the inflows is \$580,950, then the NPV on the machine is $\$580,950 - \$500,000 = \$80,950$. Note that this measure of dollar return incorporates time value through the discounting process. Also, the opportunity cost inherent in the use of the \$500,000 is accounted for because the 10 percent discount rate reflects the return that can be earned on alternative investments of similar risk. Thus, the x-ray machine is expected to produce an \$80,950 return above that required for its riskiness as accounted for by the 10 percent opportunity cost rate.

The dollar return process can be combined into a single calculation by adding the cost of the x-ray machine to the time line:



Spreadsheet solution:

	A	B	C	D
1				
2	10.0%	Rate	Interest rate	
3	\$ (500)		Year 0 CF	
4	\$ 100	Value 1	Year 1 CF	
5	\$ 120	Value 1	Year 2 CF	
6	\$ 150	Value 1	Year 3 CF	
7	\$ 180	Value 1	Year 4 CF	
8	\$ 250	Value 1	Year 5 CF	
9				
10	\$ 80.95	=NPV(A2,A4:A8)+A3 (entered into Cell A10)		

Note that the situation here is the same as in the previous cash flow stream, except there is an initial investment outlay of \$500 added in Cell A3. Because the NPV of the cash inflows in Cells A4 through A8 represents the

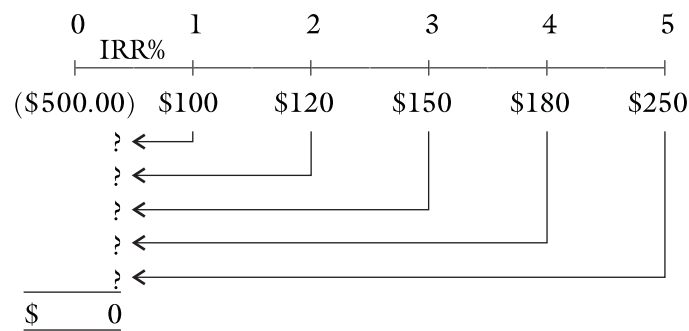
value one period before the first (A4) cash flow, all that must be done is to add the investment outlay to the calculated NPV. This is done in Cell A10 above by adding A3 to the NPV function and the result, \$80.95, appears in that cell.

Rate of Return



The second way to measure ROI is by *rate of return*, or *percentage return*. This measures the interest rate that must be earned on the investment outlay to generate the expected cash inflows. In other words, this measure provides the expected periodic rate of return on the investment. If the cash flows are annual, as in this example, the rate of return is an annual rate. In effect we are solving for I, the interest rate that equates the present value of the cash inflows to the dollar amount of the cash outlay.

Mathematically, if the PV of the cash inflows equals the investment outlay, then the NPV of the investment is forced to \$0. This relationship is shown here:



Note that the rate of return on an investment, particularly an investment in plant or equipment, typically is called the *internal rate of return (IRR)*. Although a trial-and-error procedure can be used on a regular calculator to determine the rate of return, it is better to use a financial calculator or spreadsheet.

Spreadsheet solution:

	A	B	C	D
1				
2	10.0%	Guess	Interest rate	
3	\$ (500)	Values	Year 0 CF	
4	\$ 100	Values	Year 1 CF	
5	\$ 120	Values	Year 2 CF	
6	\$ 150	Values	Year 3 CF	
7	\$ 180	Values	Year 4 CF	
8	\$ 250	Values	Year 5 CF	
9				
10	15.3%	=IRR(A3:A8,A2) (entered into Cell A10)		

The IRR function is used to calculate rate of return. Choose Financial and IRR on the function wizard, then enter A3:A8 as Values and A2 as Guess.

The result, 15.3%, appears in Cell A10, the cell that has the IRR function in it. Note that IRR stands for internal rate of return, a somewhat archaic term that is still used instead of ROI or just rate of return. (Note that a starting guess is required to calculate the IRR because the methodology used by the spreadsheet IRR function is actually a trial-and-error process that requires a starting point.)

We will have much more to say about investment returns in Chapters 7, 11, and 12. For now, an understanding of the basic concept is sufficient.

1. What does the term “ROI” mean?
2. Differentiate between dollar return and rate of return.
3. Is the calculation of ROI an application of time value analysis? Explain your answer.

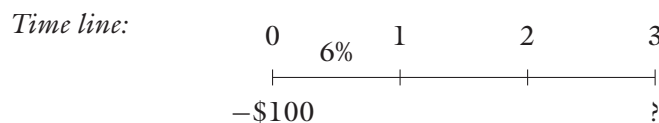
Self-Test Questions

Semiannual and Other Compounding Periods



In all the examples thus far, the assumption was that interest is compounded once a year, or annually. This is called *annual compounding*. Suppose, however, that Meridian Clinic puts \$100 into a bank account that pays 6 percent annual interest, but it is compounded *semiannually*. How much would the clinic accumulate at the end of one year, two years, or some other period? Semiannual compounding means that interest is paid each six months, so interest is earned more often than under annual compounding.

To illustrate semiannual compounding, assume that the \$100 is placed into the account for three years. The following situation occurs under **annual** compounding:



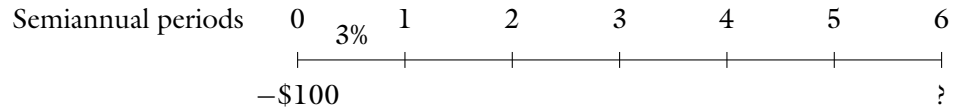
$$FV_N = PV \times (1 + I)^N = \$100 \times (1.06)^3$$

Spreadsheet solution:

	A	B	C	D
1				
2	3	Nper	Number of periods	
3	\$ 100.00	Pv	Present value	
4	6.0%	Rate	Interest rate	
5				
6	\$ 119.10	=100*(1.06)^3 (entered into Cell A6)		
7				
8	\$ 119.10	=A3*(1+A4)^A2 (entered into Cell A8)		
9				
10	\$ 119.10	=FV(A4,A2,-A3) (entered into Cell A10)		

Now, consider what happens under **semiannual** compounding. Because interest rates usually are stated as annual rates, this situation would be described as 6 percent interest, compounded semiannually. With semiannual compounding, $N = 2 \times 3 = 6$ semiannual periods, and $I = 6/2 = 3\%$ per semiannual period. Here is the solution.

Time line:



$$FV_N = PV \times (1 + I)^N = \$100 \times (1.03)^6$$

Spreadsheet solution:

	A	B	C	D
1				
2	6	Nper	Number of periods	
3	\$ 100.00	Pv	Present value	
4	3.0%	Rate	Interest rate	
5				
6	\$ 119.41	=100*(1.03)^6 (entered into Cell A6)		
7				
8	\$ 119.41	=A3*(1+A4)^A2 (entered into Cell A8)		
9				
10	\$ 119.41	=FV(A4,A2,-A3) (entered into Cell A10)		

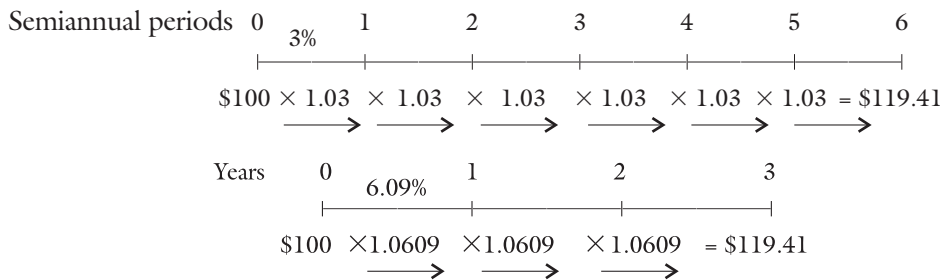
The \$100 deposit grows to \$119.41 under semiannual compounding, but only to \$119.10 under annual compounding. This result occurs because interest on interest is being earned more frequently under semiannual compounding.

Throughout the economy, different compounding periods are used for different types of investments. For example, bank accounts often compound interest monthly or daily, most bonds pay interest semiannually, and stocks generally pay quarterly dividends.³ Furthermore, the cash flows stemming from capital investments, such as new hospital wings or diagnostic equipment, can be analyzed in monthly, quarterly, or annual periods or even some other interval. Time value analyses with different compounding periods must be put on a common basis to make meaningful comparisons.

To begin, note that the *stated*, or *nominal*, *interest rate* in the Meridian Clinic semiannual compounding example is 6 percent. The *effective annual rate*, which accounts for intrayear compounding, is the rate that produces the same ending value under annual compounding. In the example, the effective annual rate is the rate that would produce a future value of \$119.41 at the end of Year 3 under **annual compounding**. The solution is 6.09 percent:

	A	B	C	D
1				
2				
3	3	Nper	Number of periods	
4	\$ (100.00)	Pv	Present value	
5	\$ 119.41	Fv	Future value	
6				
7				
8	6.09%	=RATE(A3,A4,A5) (entered into Cell A8)		
9				
10				

Thus, if one bank offered to pay 6 percent interest with semiannual compounding on a savings account, while another offered 6.09 percent with annual compounding, both banks would be paying the same effective annual rate because the ending value is the same under both sets of terms:



In general, the effective annual rate (EAR) can be determined, given the stated rate and number of compounding periods per year, by using this equation:

$$\text{Effective annual rate (EAR)} = (1 + I_{\text{Stated}}/M)^M - 1.0.$$

Here, I_{Stated} is the stated (nominal) interest rate and M is the number of compounding periods per year. The term I_{Stated}/M is the *periodic* interest rate, so the EAR equation can be restated as:

$$\text{Effective annual rate (EAR)} = (1 + \text{Periodic rate})^M - 1.0.$$

To illustrate use of the EAR equation, consider that the effective annual rate when the stated rate is 6 percent and semiannual compounding occurs is 6.09 percent:

$$\begin{aligned} \text{EAR} &= (1 + 0.06/2)^2 - 1.0 \\ &= (1.03)^2 - 1.0 \\ &= 1.0609 - 1.0 = 0.0609 = 6.09\%. \end{aligned}$$

As shown in the preceding calculations, semiannual compounding, or for that matter any compounding that occurs more than once a year, can be handled two ways. First, the input variables can be expressed as periodic

variables rather than annual variables. In the Meridian Clinic example, use $N = 6$ periods, rather than $N = 3$ years, and $I = 3\%$ per period, rather than $I = 6\%$ per year. Second, find the effective annual rate and then use this rate as an annual rate over the number of years. In the example, use $I = 6.09\%$ and $N = 3$ years.

For another illustration of the concept, consider the interest rate charged on credit cards. Many banks charge 1.0 percent per month and, in their advertising, state that their annual percentage rate (APR) is 12.0 percent.⁴ However, the true cost rate to credit card users is the effective annual rate of 12.7 percent:

$$\begin{aligned} \text{EAR} &= (1 + \text{Periodic rate})^M - 1.0 \\ &= (1.01)^{12} - 1.0 = 0.127 = 12.7\%. \end{aligned}$$

Self-Test Questions

1. What changes must be made in the calculations to determine the future value of an amount being compounded at 8 percent semiannually versus one being compounded at 8 percent annually?
2. Why is semiannual compounding better than annual compounding from an investor's standpoint?
3. How does the effective annual rate differ from the stated (nominal) rate?

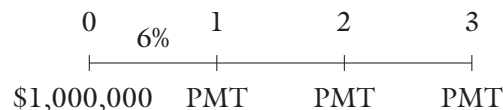
Amortized Loans



One important application of time value analysis involves loans that are to be paid off in equal installments over time, such as automobile loans, home mortgage loans, and most business debt other than very short-term loans and long-term bonds. If a loan is to be repaid in equal periodic amounts—monthly, quarterly, or annually—it is said to be an *amortized loan*. The word *amortize* comes from the Latin *mors*, meaning *death*, so an amortized loan is one that is “killed off” over time.

To illustrate the concept, suppose Santa Fe Healthcare System borrows \$1 million from the Bank of New Mexico that will be repaid in three equal installments at the end of each of the next three years. The bank is to receive 6 percent interest on the loan balance that is outstanding at the beginning of each year. The first task in analyzing the loan is to determine the amount Santa Fe must repay each year, or the annual payment. To find this amount, recognize that the loan represents the present value of an annuity of PMT dollars per year for three years, discounted at 6 percent.

Time line:



Spreadsheet solution:

	A	B	C	D
1				
2	6.0%	Rate	Interest rate	
3	3	Nper	Number of periods	
4	\$ 1,000,000	Pv	Present value	
5				
6				
7				
8	\$ 374,110	=PMT(A2,A3,-A4) (entered into Cell A8)		
9				
10				

Therefore, if Santa Fe pays the bank \$374,110 at the end of each of the next three years, the percentage cost to Santa Fe, and the rate of return to the bank, will be 6 percent.

Each payment consists partly of interest and partly of repayment of principal. This breakdown is given in the *amortization schedule* shown in Table 3.1. The interest component is largest in the first year, and it declines as the outstanding balance of the loan is reduced over time. For tax purposes, a taxable business borrower reports the interest payments in Column 3 as a deductible expense each year, while the lender reports these same amounts as taxable income.

The spreadsheet function PPMT can be used to construct the amortization table. This function calculates the principal payment for any given input year.

1. When constructing an amortization schedule, how is the periodic payment amount calculated?
2. Does the periodic payment remain constant over time?
3. Do the principal and interest components remain constant over time? Explain your answer.

Self-Test Questions

Year	Beginning Amount (1)	Payment (2)	Interest ^a (3)	Repayment of Principal ^b (4)	Remaining Balance (5)
1	\$1,000,000	\$ 374,110	\$ 60,000	\$ 314,110	\$685,890
2	685,890	374,110	41,153	332,957	352,933
3	352,933	374,110	21,177	352,933	0
		<u>\$1,122,330</u>	<u>\$122,330</u>	<u>\$1,000,000</u>	

TABLE 3.1
Loan Amortization Schedule

^aInterest is calculated by multiplying the loan balance at the beginning of each year by the interest rate. Therefore, interest in Year 1 is $\$1,000,000 \times 0.06 = \$60,000$; in Year 2 is $\$685,890 \times 0.06 = \$41,153$; and in Year 3 is $\$352,933 \times 0.06 = \$21,177$.

^bRepayment of principal is equal to the payment of \$374,110 minus the interest charge for each year.

A Review of Interest Rate Types

This chapter has covered many time value concepts, including three different types of interest rate. In this section, we review these rates.

Stated Rate

The *stated (nominal) rate* is the rate that is stated in financial contracts. Convention in the stock, bond, mortgage, commercial loan, consumer loan, and other markets calls for terms to be expressed in stated rates. A banker, broker, or mortgage lender will normally quote the stated rate. However, if compounding is not annual, the stated rate must indicate the number of compounding periods per year. For example, a bank savings account may offer 10 percent interest compounded quarterly, or a money market mutual fund may offer a 12 percent rate, with interest paid monthly. The stated rate is **not** used for calculations (i.e., never use I_{Stated} on a time line, in the calculator, or in a spreadsheet formula or function) **unless compounding occurs once a year** ($M = 1$). In this case, $I_{\text{Stated}} = \text{Periodic rate} = \text{Effective annual rate}$.

Periodic Rate

The periodic rate is the rate charged by a lender or paid by a borrower, or any other time value rate, expressed on a per period basis. It can be a rate per year, per six months, per quarter, per month, per day, or per any other time interval. For example, a bank may charge 1 percent per month on its credit card loans or a finance firm may charge 3 percent per quarter on consumer loans. $\text{Periodic rate} = I_{\text{Stated}}/M$, which implies that $I_{\text{Stated}} = \text{Periodic rate} \times M$, where M is the number of compounding periods per year. To illustrate the concept, consider the finance firm loan at 3 percent per quarter:

$$I_{\text{Stated}} = \text{Periodic rate} \times M = 3\% \times 4 = 12\%,$$

and

$$\text{Periodic rate} = I_{\text{Stated}}/M = 12\%/4 = 3\% \text{ per quarter.}$$

The periodic rate can be used when cash flows occur more frequently than once a year, and the number of cash flows per year corresponds to the number of compounding periods per year. Thus, if dealing with a retirement annuity that provides monthly payments; a semiannual payment bond; a consumer loan with quarterly payments; or with a credit card loan with monthly payments, the calculations would use $\text{Periodic rate} = I_{\text{Stated}}/M$. The implication in all these examples is that the interest compounding period is the same as the cash flow period. **The periodic rate can only be used directly in calculations when the cash flow period coincides with the interest rate compounding period (e.g., quarterly payments and quarterly compounding).**

Effective Annual Rate

This is the rate that, under annual compounding ($M = 1$), would produce the same results as a given stated rate with compounding more frequently than annual ($M > 1$). The effective annual rate (EAR) is found as follows:

$$\begin{aligned}(\text{EAR}) &= (1 + I_{\text{Stated}}/M)^M - 1.0 \\ &= (1 + \text{Periodic rate})^M - 1.0.\end{aligned}$$

For example, suppose that either a 1 percent per month credit card loan or a 3 percent per quarter consumer loan can be used to make a purchase. Which one should be chosen? To answer this question, the cost rate of each alternative must be expressed as an EAR.

$$\begin{aligned}\text{EAR}_{\text{Credit card loan}} &= (1 + 0.01)^{12} - 1.0 = (1.01)^{12} - 1.0 \\ &= 1.127 - 1.0 = 0.127 = 12.7\%.\end{aligned}$$

$$\begin{aligned}\text{EAR}_{\text{Consumer loan}} &= (1 + 0.03)^4 - 1.0 = (1.03)^4 - 1.0 \\ &= 1.126 - 1.0 = 0.126 = 12.6\%.\end{aligned}$$

Thus, the consumer loan is slightly less costly than the credit card loan. This result should have been intuitive because although both loans have the same 12 percent stated rate, monthly payments would have to be made on the credit card, while under the consumer loan terms, only quarterly payments would have to be made.

The EAR is also used when the interest-rate compounding period occurs more often than the period between payments or cash flows. For example, if payments occur semiannually, but interest is compounded quarterly, then the EAR must be used. In this case, the EAR is really an “effective semiannual rate” calculated as $(1 + I_{\text{Stated}}/4)^2 - 1.0$, which is then applied to the semiannual payment stream.

1. Define the stated rate, the periodic rate, and the effective annual rate.
2. How are these three rates related?
3. Can you think of a situation where all three of these rates are the same?

Self-Test Questions

Key Concepts

Financial decisions often involve situations in which future cash flows must be valued. The process of valuing future cash flows is called *time value analysis*. Here are the key concepts behind this type of analysis:

- *Times lines* are used to help analysts lay out the cash flows involved in a time value analysis.

- *Compounding* is the process of determining the *future value (FV)* of a lump sum, an annuity, or an uneven cash flow stream.
- *Discounting* is the process of finding the *present value (PV)* of a lump sum, an annuity, or an uneven cash flow stream.
- An *annuity* is a series of equal, periodic cash flows, which are often called *payments (PMT)*.
- An annuity that has payments occurring at the end of each period is called an *ordinary* annuity.
- If each annuity payment occurs at the beginning of the period rather than at the end, the annuity is an *annuity due*.
- A *perpetuity* is an annuity that lasts forever.
- If an analysis involving more than one cash amount does not meet the definition of an annuity, it is called an *uneven cash flow stream*.
- The financial attractiveness of an investment is measured by its *return on investment (ROI)*.
- ROI can be measured either in *dollar* or *percentage* terms.
- The *stated (nominal) rate* is the annual rate normally quoted in financial contracts.
- The *periodic rate* equals the stated rate divided by the number of compounding periods per year.
- If compounding occurs more frequently than once a year, it is often necessary to calculate the *effective annual rate (EAR)*, which is the rate that produces the same results under annual compounding as compared with more frequent compounding.
- An *amortized* loan is one that is paid off in equal amounts over some specified number of periods. An *amortization schedule* shows how much of each payment represents interest, how much is used to reduce the principal, and the remaining balance on each payment date.

Time value analysis is one of the cornerstones of healthcare financial management, so readers should feel comfortable with this material before moving ahead.

Chapter Models and Problems

This chapter has an accompanying spreadsheet model that helps students understand how spreadsheets can be used to solve time value analysis problems.

In addition, the chapter has 13 problems in spreadsheet format that allow students to practice their time value analysis skills.

Both the model and problem spreadsheet are available on this book's companion website at ache.org/UnderstandingFinancialManagement5.

Selected References

Owner's manual for your calculator.

After-market reference manual for your spreadsheet software.

Help menu for your spreadsheet software.

Selected Websites

- There are many websites that contain online time value analysis calculators. For example, see www.easysurf.cc/vfpt2.htm.
- For a single online time value calculator, see www.arachnoid.com/lutus/finance.html.

Selected Case

The following case in *Cases in Healthcare Finance* can be assigned to help students learn more about time value analysis:

- Case 12: Panhandle Surgery Centers, which examines the time value analysis techniques discussed in this chapter.

Notes

1. Time value analyses also can be solved using mathematical multipliers obtained from tables. At one time, tables were the most efficient way to conduct time value analyses, but newer solution techniques have made tabular solutions obsolete.
2. Actually, owning a single nursing home is riskier than owning the stock of a firm that has a large number of nursing homes with geographical diversification. Also, an owner of Manor Care's stock can easily sell the stock if things go sour, whereas it would be much more difficult for Oakdale to sell its nursing home. These differences in risk and liquidity suggest that the true opportunity cost rate is probably higher than the return that is expected from owning the stock of a large long-term care company. However, direct ownership of a nursing home implies control, while ownership of the stock of a large firm usually does not. Such control rights would tend to reduce the opportunity cost rate. The main point here is that in practice it may not be possible to obtain a "perfect" opportunity cost rate. Nevertheless, an imprecise one is better than none at all.
3. Some financial institutions even pay interest that is compounded *continuously*. However, continuous compounding is not relevant to healthcare financial management, so it will not be discussed here.
4. The *annual percentage rate (APR)* and *annual percentage yield (APY)* are terms defined in Truth in Lending and Truth in Savings Laws. APR is defined as Periodic rate \times Number of compounding periods per year, so it ignores the consequences of compounding. Although the APR on a credit card with interest charges of 1.0 percent per month is $1.0\% \times 12 = 12.0\%$, the true effective annual rate as calculated in the text is 12.7 percent.

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