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# BREALEY MYERS

PRINCIPLES OF CORPORATE FINANCE



# PREFACE

This book describes the theory and practice of corporate finance. We hardly need to explain why financial managers should master the practical aspects of their job, but we should spell out why down-to-earth, red-blooded managers need to bother with theory.

Managers learn from experience how to cope with routine problems. But the best managers are also able to respond to change. To do this you need more than time-honored rules of thumb; you must understand *why* companies and financial markets behave the way they do. In other words, you need a *theory* of finance.

Does that sound intimidating? It shouldn't. Good theory helps you grasp what is going on in the world around you. It helps you to ask the right questions when times change and new problems must be analyzed. It also tells you what things you do *not* need to worry about. Throughout this book we show how managers use financial theory to solve practical problems.

Of course, the theory presented in this book is not perfect and complete—no theory is. There are some famous controversies in which financial economists cannot agree on what firms ought to do. We have not glossed over these controversies. We set out the main arguments for each side and tell you where we stand.

Once understood, good theory is common sense. Therefore we have tried to present it at a common-sense level, and we have avoided proofs and heavy mathematics. There are no ironclad prerequisites for reading this book except algebra and the English language. An elementary knowledge of accounting, statistics, and microeconomics is helpful, however.

## **CHANGES IN THE SEVENTH EDITION**

This book is written for students of financial management. For many readers, it is their first look at the world of finance. Therefore in each edition we strive to make the book simpler, clearer, and more fun to read. But the book is also used as a reference and guide by practicing managers around the world. Therefore we also strive to make each new edition more comprehensive and authoritative.

We believe this edition is better for both the student and the practicing manager. Here are some of the major changes:

We have streamlined and simplified the exposition of major concepts, with special attention to Chapters 1 through 12, where the fundamental concepts of valuation, risk and return, and capital budgeting are introduced. In these chapters we cover only the most basic institutional material. At the

same time we have rewritten Chapter 14 as a free-standing introduction to the nature of the corporation, to the major sources of corporate financing, and to financial markets and institutions. Some readers will turn first to Chapter 14 to see the contexts in which financial decisions are made.

We have also expanded coverage of important topics. For example, real options are now introduced in Chapter 10—you don't have to master option-pricing theory in order to grasp what real options are and why they are important. Later in the book, after Chapter 20 (Understanding Options) and Chapter 21 (Valuing Options), there is a brand-new Chapter 22 on real options, which covers valuation methods and a range of practical applications.

Other examples of expanded coverage include behavioral finance (Chapter 13) and new international evidence on the market-risk premium (Chapter 7). We have also reorganized the chapters on financial planning and working capital management. In fact we have revised and updated every chapter in the book.

This edition's international coverage is expanded and woven into the rest of the text. For example, international investment decisions are now introduced in Chapter 6, right alongside domestic investment decisions. Likewise the cost of capital for international investments is discussed in Chapter 9, and international differences in security issue procedures are reviewed in Chapter 15. Chapter 34 looks at some of the international differences in financial architecture and ownership. There is, however, a separate chapter on international risk management, which covers foreign exchange rates and markets, political risk, and the valuation of capital investments in different currencies. There is also a new international index.

The seventh edition is much more Web-friendly than the sixth. Web references are highlighted in the text, and an annotated list of useful websites has been added to each part of the book.

Of course, as every first-grader knows, it is easier to add than to subtract, but we have pruned judiciously. Some readers of the sixth edition may miss a favorite example or special topic. But new readers should find that the main themes of corporate finance come through with less clutter.

### **MAKING LEARNING EASIER**

Each chapter of the book includes an introductory preview, a summary, and an annotated list of suggestions for further reading. There is a quick and easy quiz, a number of practice questions, and a few challenge questions. Many questions use financial data on actual companies accessible by the reader through Standard & Poor's Educational Version of Market Insight. In total there are now over a thousand end-of-chapter questions. All the questions refer to material in the same order as it occurs in the chapter. Answers to the quiz questions may be found at the end of the book, along with a glossary and tables for calculating present values and pricing options.

We have expanded and revised the mini-cases and added specific questions for each mini-case to guide the case analysis. Answers to the mini-cases are available to instructors on this book's website ([www.mhhe.com/bm7e](http://www.mhhe.com/bm7e)).

Parts 1 to 3 of the book are concerned with valuation and the investment decision, Parts 4 to 8 with long-term financing and risk management. Part 9 focuses on financial planning and short-term financial decisions. Part 10 looks at mergers and corporate control and Part 11 concludes. We realize that many teachers will prefer a different sequence of topics. Therefore, we have ensured that the text is modular, so that topics can be introduced in a variety of orders. For example, there will be no difficulty in reading the material on financial statement analysis and short-term decisions before the chapters on valuation and capital investment.

We should mention two matters of style now to prevent confusion later. First, the most important financial terms are set out in boldface type the first time they appear; less important but useful terms are given in italics. Second, most algebraic symbols representing dollar values are shown as capital letters. Other symbols are generally lowercase letters. Thus the symbol for a dividend payment is "DIV," and the symbol for a percentage rate of return is "*r*."

## **SUPPLEMENTS**

In this edition, we have gone to great lengths to ensure that our supplements are equal in quality and authority to the text itself.

### **Instructor's Manual**

ISBN 0072467886

The Instructor's Manual was extensively revised and updated by C. R. Krishnaswamy of Western Michigan University. It contains an overview of each chapter, teaching tips, learning objectives, challenge areas, key terms, and an annotated outline that provides references to the PowerPoint slides.

### **Test Bank**

ISBN 0072468025

The Test Bank was also updated by C. R. Krishnaswamy, who included well over 1,000 new multiple-choice and short answer/discussion questions based on the revisions of the authors. The level of difficulty is varied throughout, using a label of easy, medium, or difficult.

### **PowerPoint Presentation System**

Matt Will of the University of Indianapolis prepared the PowerPoint Presentation System, which contains exhibits, outlines, key points, and summaries in a visually stimulating collection of slides. Found on the Student CD-ROM, the Instructor's CD-ROM, and our website, the slides can be edited, printed, or rearranged in any way to fit the needs of your course.

### **Financial Analysis Spreadsheet Templates (F.A.S.T.)**

Mike Griffin of KMT Software created the templates in Excel. They correlate with specific concepts in the text and allow students to work through financial problems and gain experience using spreadsheets. Each template is tied to a specific problem in the text.

### **Solutions Manual**

ISBN 0072468009

The Solutions Manual, prepared by Bruce Swensen, Adelphi University, contains solutions to all practice questions and challenge questions found at the end of each chapter. Thoroughly checked for accuracy, this supplement is available to be purchased by your students.

### **Study Guide**

ISBN 0072468017

The new Study Guide was carefully revised by V. Sivarama Krishnan of Cameron University and contains useful and interesting keys to learning. It includes an introduction to each chapter, key concepts, examples, exercises and solutions, and a complete chapter summary.

### **Videos**

ISBN 0072467967

The McGraw-Hill/Irwin Finance Video Series is a complete video library designed to bring added points of discussion to your class. Within this professionally developed series, you will find examples of how real businesses face today's hottest topics, like mergers and acquisitions, going public, and careers in finance.

### **Student CD-ROM**

Packaged with each text is a CD-ROM for students that contains many features designed to enhance the classroom experience. Three learning modules from the new Finance Tutor Series are included on the CD: Time Value of Money Tutor, Stock and Bond Valuation

Tutor, and Capital Budgeting Tutor. In each module, students answer questions and solve problems that not only assess their general understanding of the subject but also their ability to apply that understanding in real-world business contexts. In “Practice Mode,” students learn as they go by receiving in-depth feedback on each response before proceeding to the next question. Even better, the program anticipates common misunderstandings, such as incorrect calculations or assumptions, and then provides feedback only to the student making that specific mistake. Students who want to assess their current knowledge may select “Test Mode,” where they read an extensive evaluation report after they have completed the test.

Also included are the PowerPoint presentation system, Financial Analysis Spreadsheet Templates (F.A.S.T.), video clips from our Finance Video Series, and many useful Web links.

### Instructor's CD-ROM

ISBN 0072467959

We have compiled many of our instructor supplements in electronic format on a CD-ROM designed to assist with class preparation. The CD-ROM includes the Instructor's Manual, the Solutions Manual, a computerized Test Bank, PowerPoint slides, video clips, and Web links.

### Online Learning Center

([www.mhhe.com/bm7e](http://www.mhhe.com/bm7e))

This site contains information about the book and the authors, as well as teaching and learning materials for the instructor and the student, including:

### PageOut: The Course Website Development Center and PageOut Lite

[www.pageout.net](http://www.pageout.net)

This Web page generation software, free to adopters, is designed for professors just beginning to explore website options. In just a few minutes, even the most novice computer user can have a course website.

Simply type your material into the template provided and PageOut Lite instantly converts it to

HTML—a universal Web language. Next, choose your favorite of three easy-to-navigate designs and your Web home page is created, complete with online syllabus, lecture notes, and bookmarks. You can even include a separate instructor page and an assignment page.

PageOut offers enhanced point-and-click features including a Syllabus Page that applies real-world links to original text material, an automated grade book, and a discussion board where instructors and their students can exchange questions and post announcements.

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PREFACE

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**Richard A. Brealey**  
**Stewart C. Myers**

# CHAPTER ONE



FINANCE AND  
THE FINANCIAL  
MANAGER

**THIS BOOK IS** about financial decisions made by corporations. We should start by saying what these decisions are and why they are important.

Corporations face two broad financial questions: What investments should the firm make? and How should it pay for those investments? The first question involves spending money; the second involves raising it.

The secret of success in financial management is to increase value. That is a simple statement, but not very helpful. It is like advising an investor in the stock market to “Buy low, sell high.” The problem is how to do it.

There may be a few activities in which one can read a textbook and then do it, but financial management is not one of them. That is why finance is worth studying. Who wants to work in a field where there is no room for judgment, experience, creativity, and a pinch of luck? Although this book cannot supply any of these items, it does present the concepts and information on which good financial decisions are based, and it shows you how to use the tools of the trade of finance.

We start in this chapter by explaining what a corporation is and introducing you to the responsibilities of its financial managers. We will distinguish *real assets* from *financial assets* and *capital investment decisions* from *financing decisions*. We stress the importance of financial markets, both national and international, to the financial manager.

Finance is about money and markets, but it is also about people. The success of a corporation depends on how well it harnesses everyone to work to a common end. The financial manager must appreciate the conflicting objectives often encountered in financial management. Resolving conflicts is particularly difficult when people have different information. This is an important theme which runs through to the last chapter of this book. In this chapter we will start with some definitions and examples.



## 1.1 WHAT IS A CORPORATION?

Not all businesses are corporations. Small ventures can be owned and managed by a single individual. These are called *sole proprietorships*. In other cases several people may join to own and manage a *partnership*.<sup>1</sup> However, this book is about *corporate* finance. So we need to explain what a **corporation** is.

Almost all large and medium-sized businesses are organized as corporations. For example, General Motors, Bank of America, Microsoft, and General Electric are corporations. So are overseas businesses, such as British Petroleum, Unilever, Nestlé, Volkswagen, and Sony. In each case the firm is owned by stockholders who hold shares in the business.

When a corporation is first established, its shares may all be held by a small group of investors, perhaps the company’s managers and a few backers. In this case the shares are not publicly traded and the company is *closely held*. Eventually, when the firm grows and new shares are issued to raise additional capital, its shares will be widely traded. Such corporations are known as *public companies*.

<sup>1</sup>Many professional businesses, such as accounting and legal firms, are partnerships. Most large investment banks started as partnerships, but eventually these companies and their financing needs grew too large for them to continue in this form. Goldman Sachs, the last of the leading investment-bank partnerships, issued shares and became a public corporation in 1998.

Most well-known corporations in the United States are public companies. In many other countries, it's common for large companies to remain in private hands.

By organizing as a corporation, a business can attract a wide variety of investors. Some may hold only a single share worth a few dollars, cast only a single vote, and receive a tiny proportion of profits and dividends. Shareholders may also include giant pension funds and insurance companies whose investment may run to millions of shares and hundreds of millions of dollars, and who are entitled to a correspondingly large number of votes and proportion of profits and dividends.

Although the stockholders own the corporation, they do not manage it. Instead, they vote to elect a *board of directors*. Some of these directors may be drawn from top management, but others are non-executive directors, who are not employed by the firm. The board of directors represents the shareholders. It appoints top management and is supposed to ensure that managers act in the shareholders' best interests.

This *separation of ownership and management* gives corporations permanence.<sup>2</sup> Even if managers quit or are dismissed and replaced, the corporation can survive, and today's stockholders can sell all their shares to new investors without disrupting the operations of the business.

Unlike partnerships and sole proprietorships, corporations have **limited liability**, which means that stockholders cannot be held personally responsible for the firm's debts. If, say, General Motors were to fail, no one could demand that its shareholders put up more money to pay off its debts. The most a stockholder can lose is the amount he or she has invested.

Although a corporation is owned by its stockholders, it is legally distinct from them. It is based on *articles of incorporation* that set out the purpose of the business, how many shares can be issued, the number of directors to be appointed, and so on. These articles must conform to the laws of the state in which the business is incorporated.<sup>3</sup> For many legal purposes, the corporation is considered as a resident of its state. As a legal "person," it can borrow or lend money, and it can sue or be sued. It pays its own taxes (but it cannot vote!).

Because the corporation is distinct from its shareholders, it can do things that partnerships and sole proprietorships cannot. For example, it can raise money by selling new shares to investors and it can buy those shares back. One corporation can make a takeover bid for another and then merge the two businesses.

There are also some *disadvantages* to organizing as a corporation. Managing a corporation's legal machinery and communicating with shareholders can be time-consuming and costly. Furthermore, in the United States there is an important tax drawback. Because the corporation is a separate legal entity, it is taxed separately. So corporations pay tax on their profits, and, in addition, shareholders pay tax on any dividends that they receive from the company. The United States is unusual in this respect. To avoid taxing the same income twice, most other countries give shareholders at least some credit for the tax that the company has already paid.<sup>4</sup>

<sup>2</sup>Corporations can be immortal but the law requires partnerships to have a definite end. A partnership agreement must specify an ending date or a procedure for wrapping up the partnership's affairs. A sole proprietorship also will have an end because the proprietor is mortal.

<sup>3</sup>Delaware has a well-developed and supportive system of corporate law. Even though they may do little business in that state, a high proportion of United States corporations are incorporated in Delaware.

<sup>4</sup>Or companies may pay a lower rate of tax on profits paid out as dividends.



## 1.2 THE ROLE OF THE FINANCIAL MANAGER

To carry on business, corporations need an almost endless variety of **real assets**. Many of these assets are tangible, such as machinery, factories, and offices; others are intangible, such as technical expertise, trademarks, and patents. All of them need to be paid for. To obtain the necessary money, the corporation sells claims on its real assets and on the cash those assets will generate. These claims are called **financial assets** or **securities**. For example, if the company borrows money from the bank, the bank gets a written promise that the money will be repaid with interest. Thus the bank trades cash for a financial asset. Financial assets include not only bank loans but also shares of stock, bonds, and a dizzying variety of specialized securities.<sup>5</sup>

The financial manager stands between the firm's operations and the **financial (or capital) markets**, where investors hold the financial assets issued by the firm.<sup>6</sup> The financial manager's role is illustrated in Figure 1.1, which traces the flow of cash from investors to the firm and back to investors again. The flow starts when the firm sells securities to raise cash (arrow 1 in the figure). The cash is used to purchase real assets used in the firm's operations (arrow 2). Later, if the firm does well, the real assets generate cash inflows which more than repay the initial investment (arrow 3). Finally, the cash is either reinvested (arrow 4a) or returned to the investors who purchased the original security issue (arrow 4b). Of course, the choice between arrows 4a and 4b is not completely free. For example, if a bank lends money at stage 1, the bank has to be repaid the money plus interest at stage 4b.

Our diagram takes us back to the financial manager's two basic questions. First, what real assets should the firm invest in? Second, how should the cash for the investment be raised? The answer to the first question is the firm's **investment, or capital budgeting, decision**. The answer to the second is the firm's **financing decision**.

Capital investment and financing decisions are typically *separated*, that is, analyzed independently. When an investment opportunity or "project" is identified, the financial manager first asks whether the project is worth more than the capital required to undertake it. If the answer is yes, he or she then considers how the project should be financed.

But the separation of investment and financing decisions does *not* mean that the financial manager can forget about investors and financial markets when analyzing capital investment projects. As we will see in the next chapter, the fundamental financial objective of the firm is to maximize the value of the cash invested in the firm by its stockholders. Look again at Figure 1.1. Stockholders are happy to contribute cash at arrow 1 only if the decisions made at arrow 2 generate at least adequate returns at arrow 3. "Adequate" means returns at least equal to the returns available to investors outside the firm in financial markets. If your firm's projects consistently generate *inadequate* returns, your shareholders will want their money back.

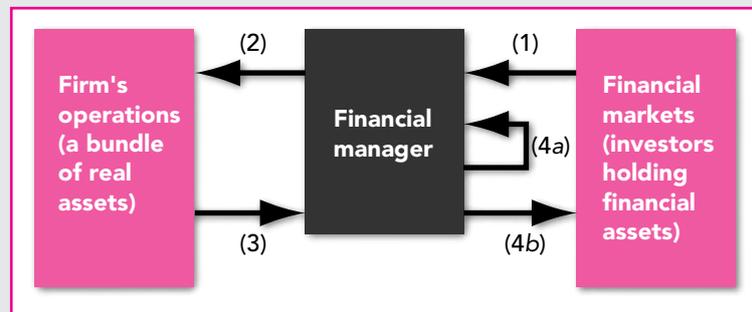
Financial managers of large corporations also need to be men and women of the world. They must decide not only *which* assets their firm should invest in but also *where* those assets should be located. Take Nestlé, for example. It is a Swiss company, but only a small proportion of its production takes place in Switzerland. Its 520 or so

<sup>5</sup>We review these securities in Chapters 14 and 25.

<sup>6</sup>You will hear financial managers use the terms *financial markets* and *capital markets* almost synonymously. But *capital markets* are, strictly speaking, the source of long-term financing only. Short-term financing comes from the *money market*. "Short-term" means less than one year. We use the term *financial markets* to refer to all sources of financing.

**FIGURE 1.1**

Flow of cash between financial markets and the firm's operations. Key: (1) Cash raised by selling financial assets to investors; (2) cash invested in the firm's operations and used to purchase real assets; (3) cash generated by the firm's operations; (4a) cash reinvested; (4b) cash returned to investors.



factories are located in 82 countries. Nestlé's managers must therefore know how to evaluate investments in countries with different currencies, interest rates, inflation rates, and tax systems.

The financial markets in which the firm raises money are likewise international. The stockholders of large corporations are scattered around the globe. Shares are traded around the clock in New York, London, Tokyo, and other financial centers. Bonds and bank loans move easily across national borders. A corporation that needs to raise cash doesn't have to borrow from its hometown bank. Day-to-day cash management also becomes a complex task for firms that produce or sell in different countries. For example, think of the problems that Nestlé's financial managers face in keeping track of the cash receipts and payments in 82 countries.

We admit that Nestlé is unusual, but few financial managers can close their eyes to international financial issues. So throughout the book we will pay attention to differences in financial systems and examine the problems of investing and raising money internationally.



### 1.3 WHO IS THE FINANCIAL MANAGER?

In this book we will use the term *financial manager* to refer to anyone responsible for a significant investment or financing decision. But only in the smallest firms is a single person responsible for all the decisions discussed in this book. In most cases, responsibility is dispersed. Top management is of course continuously involved in financial decisions. But the engineer who designs a new production facility is also involved: The design determines the kind of real assets the firm will hold. The marketing manager who commits to a major advertising campaign is also making an important investment decision. The campaign is an investment in an intangible asset that is expected to pay off in future sales and earnings.

Nevertheless there are some managers who specialize in finance. Their roles are summarized in Figure 1.2. The **treasurer** is responsible for looking after the firm's cash, raising new capital, and maintaining relationships with banks, stockholders, and other investors who hold the firm's securities.

For small firms, the treasurer is likely to be the only financial executive. Larger corporations also have a **controller**, who prepares the financial statements, manages the firm's internal accounting, and looks after its tax obligations. You can see that the treasurer and controller have different functions: The treasurer's main responsibility is to obtain and manage the firm's capital, whereas the controller ensures that the money is used efficiently.

**FIGURE 1.2**

Senior financial managers in large corporations.

Still larger firms usually appoint a **chief financial officer (CFO)** to oversee both the treasurer's and the controller's work. The CFO is deeply involved in financial policy and corporate planning. Often he or she will have general managerial responsibilities beyond strictly financial issues and may also be a member of the board of directors.

The controller or CFO is responsible for organizing and supervising the capital budgeting process. However, major capital investment projects are so closely tied to plans for product development, production, and marketing that managers from these areas are inevitably drawn into planning and analyzing the projects. If the firm has staff members specializing in corporate planning, they too are naturally involved in capital budgeting.

Because of the importance of many financial issues, ultimate decisions often rest by law or by custom with the board of directors. For example, only the board has the legal power to declare a dividend or to sanction a public issue of securities. Boards usually delegate decisions for small or medium-sized investment outlays, but the authority to approve large investments is almost never delegated.



## 1.4 SEPARATION OF OWNERSHIP AND MANAGEMENT

In large businesses separation of ownership and management is a practical necessity. Major corporations may have hundreds of thousands of shareholders. There is no way for all of them to be actively involved in management: It would be like running New York City through a series of town meetings for all its citizens. Authority has to be delegated to managers.

The separation of ownership and management has clear advantages. It allows share ownership to change without interfering with the operation of the business. It allows the firm to hire professional managers. But it also brings problems if the managers' and owners' objectives differ. You can see the danger: Rather than attending to the wishes of shareholders, managers may seek a more leisurely or luxurious

working lifestyle; they may shun unpopular decisions, or they may attempt to build an empire with their shareholders' money.

Such conflicts between shareholders' and managers' objectives create *principal-agent problems*. The shareholders are the principals; the managers are their agents. Shareholders want management to increase the value of the firm, but managers may have their own axes to grind or nests to feather. **Agency costs** are incurred when (1) managers do not attempt to maximize firm value and (2) shareholders incur costs to monitor the managers and influence their actions. Of course, there are no costs when the shareholders are also the managers. That is one of the advantages of a sole proprietorship. Owner-managers have no conflicts of interest.

Conflicts between shareholders and managers are not the only principal-agent problems that the financial manager is likely to encounter. For example, just as shareholders need to encourage managers to work for the shareholders' interests, so senior management needs to think about how to motivate everyone else in the company. In this case senior management are the principals and junior management and other employees are their agents.

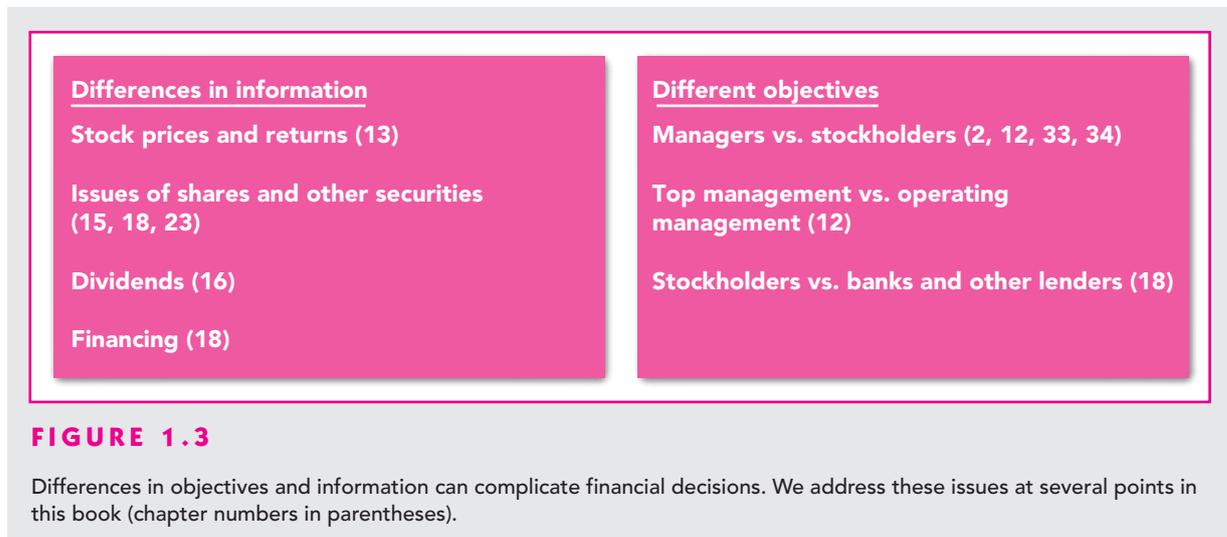
Agency costs can also arise in financing. In normal times, the banks and bondholders who lend the company money are united with the shareholders in wanting the company to prosper, but when the firm gets into trouble, this unity of purpose can break down. At such times decisive action may be necessary to rescue the firm, but lenders are concerned to get their money back and are reluctant to see the firm making risky changes that could imperil the safety of their loans. Squabbles may even break out between different lenders as they see the company heading for possible bankruptcy and jostle for a better place in the queue of creditors.

Think of the company's overall value as a pie that is divided among a number of claimants. These include the management and the shareholders, as well as the company's workforce and the banks and investors who have bought the company's debt. The government is a claimant too, since it gets to tax corporate profits.

All these claimants are bound together in a complex web of contracts and understandings. For example, when banks lend money to the firm, they insist on a formal contract stating the rate of interest and repayment dates, perhaps placing restrictions on dividends or additional borrowing. But you can't devise written rules to cover every possible future event. So written contracts are incomplete and need to be supplemented by understandings and by arrangements that help to align the interests of the various parties.

Principal-agent problems would be easier to resolve if everyone had the same information. That is rarely the case in finance. Managers, shareholders, and lenders may all have different information about the value of a real or financial asset, and it may be many years before all the information is revealed. Financial managers need to recognize these *information asymmetries* and find ways to reassure investors that there are no nasty surprises on the way.

Here is one example. Suppose you are the financial manager of a company that has been newly formed to develop and bring to market a drug for the cure of toetitis. At a meeting with potential investors you present the results of clinical trials, show upbeat reports by an independent market research company, and forecast profits amply sufficient to justify further investment. But the potential investors are still worried that you may know more than they do. What can you do to convince them that you are telling the truth? Just saying "Trust me" won't do the trick. Perhaps you need to *signal* your integrity by putting your money where your mouth is. For example, investors are likely to have more confidence in your plans if they see that you and the other managers have large personal stakes in the new



enterprise. Therefore your decision to invest your own money can provide information to investors about the true prospects of the firm.

In later chapters we will look more carefully at how corporations tackle the problems created by differences in objectives and information. Figure 1.3 summarizes the main issues and signposts the chapters where they receive most attention.



## 1.5 TOPICS COVERED IN THIS BOOK

We have mentioned how financial managers separate investment and financing decisions: Investment decisions typically precede financing decisions. That is also how we have organized this book. Parts 1 through 3 are almost entirely devoted to different aspects of the investment decision. The first topic is how to value assets, the second is the link between risk and value, and the third is the management of the capital investment process. Our discussion of these topics occupies Chapters 2 through 12.

As you work through these chapters, you may have some basic questions about financing. For example, What does it mean to say that a corporation has “issued shares”? How much of the cash contributed at arrow 1 in Figure 1.1 comes from shareholders and how much from borrowing? What types of debt securities do firms actually issue? Who actually buys the firm’s shares and debt—individual investors or financial institutions? What are those institutions and what role do they play in corporate finance and the broader economy? Chapter 14, “An Overview of Corporate Financing,” covers these and a variety of similar questions. This chapter stands on its own bottom—it does not rest on previous chapters. You can read it any time the fancy strikes. You may wish to read it now.

Chapter 14 is one of three in Part 4, which begins the analysis of corporate financing decisions. Chapter 13 reviews the evidence on the *efficient markets* hypothesis, which states that security prices observed in financial markets accurately reflect underlying values and the information available to investors. Chapter 15 describes how debt and equity securities are issued.

Part 5 continues the analysis of the financing decision, covering dividend policy and the mix of debt and equity financing. We will describe what happens when

firms land in financial distress because of poor operating performance or excessive borrowing. We will also consider how financing decisions may affect decisions about the firm's investment projects.

Part 6 introduces options. Options are too advanced for Chapter 1, but by Chapter 20 you'll have no difficulty. Investors can trade options on stocks, bonds, currencies, and commodities. Financial managers find options lurking in *real* assets—that is, *real options*—and in the securities the firms may issue. Having mastered options, we proceed in Part 7 to a much closer look at the many varieties of long-term debt financing.

An important part of the financial manager's job is to judge which risks the firm should take on and which can be eliminated. Part 8 looks at risk management, both domestically and internationally.

Part 9 covers financial planning and short-term financial management. We address a variety of practical topics, including short- and longer-term forecasting, channels for short-term borrowing or investment, management of cash and marketable securities, and management of accounts receivable (money lent by the firm to its customers).

Part 10 looks at mergers and acquisitions and, more generally, at the control and governance of the firm. We also discuss how companies in different countries are structured to provide the right incentives for management and the right degree of control by outside investors.

Part 11 is our conclusion. It also discusses some of the things that we *don't* know about finance. If you can be the first to solve any of these puzzles, you will be justifiably famous.

## SUMMARY



In Chapter 2 we will begin with the most basic concepts of asset valuation. However, we should first sum up the principal points made in this introductory chapter.

Large businesses are usually organized as corporations. Corporations have three important features. First, they are legally distinct from their owners and pay their own taxes. Second, corporations provide limited liability, which means that the stockholders who own the corporation cannot be held responsible for the firm's debts. Third, the owners of a corporation are not usually the managers.

The overall task of the financial manager can be broken down into (1) the investment, or capital budgeting, decision and (2) the financing decision. In other words, the firm has to decide (1) what real assets to buy and (2) how to raise the necessary cash.

In small companies there is often only one financial executive, the treasurer. However, most companies have both a treasurer and a controller. The treasurer's job is to obtain and manage the company's financing, while the controller's job is to confirm that the money is used correctly. In large firms there is also a chief financial officer or CFO.

Shareholders want managers to increase the value of the company's stock. Managers may have different objectives. This potential conflict of interest is termed a principal-agent problem. Any loss of value that results from such conflicts is termed an agency cost. Of course there may be other conflicts of interest. For example, the interests of the shareholders may sometimes conflict with those of the firm's banks and bondholders. These and other agency problems become more complicated when agents have more or better information than the principals.

The financial manager plays on an international stage and must understand how international financial markets operate and how to evaluate overseas investments. We discuss international corporate finance at many different points in the chapters that follow.

Financial managers read *The Wall Street Journal (WSJ)*, *The Financial Times (FT)*, or both daily. You should too. *The Financial Times* is published in Britain, but there is a North American edition. *The New York Times* and a few other big-city newspapers have good business and financial sections, but they are no substitute for the *WSJ* or *FT*. The business and financial sections of most United States dailies are, except for local news, nearly worthless for the financial manager.

*The Economist*, *Business Week*, *Forbes*, and *Fortune* contain useful financial sections, and there are several magazines that specialize in finance. These include *Euromoney*, *Corporate Finance*, *Journal of Applied Corporate Finance*, *Risk*, and *CFO Magazine*. This list does not include research journals such as the *Journal of Finance*, *Journal of Financial Economics*, *Review of Financial Studies*, and *Financial Management*. In the following chapters we give specific references to pertinent research.

## FURTHER READING

1. Read the following passage: “Companies usually buy (a) assets. These include both tangible assets such as (b) and intangible assets such as (c). In order to pay for these assets, they sell (d) assets such as (e). The decision about which assets to buy is usually termed the (f) or (g) decision. The decision about how to raise the money is usually termed the (h) decision.” Now fit each of the following terms into the most appropriate space: *financing, real, bonds, investment, executive airplanes, financial, capital budgeting, brand names*.
2. Vocabulary test. Explain the differences between:
  - a. Real and financial assets.
  - b. Capital budgeting and financing decisions.
  - c. Closely held and public corporations.
  - d. Limited and unlimited liability.
  - e. Corporation and partnership.
3. Which of the following are real assets, and which are financial?
  - a. A share of stock.
  - b. A personal IOU.
  - c. A trademark.
  - d. A factory.
  - e. Undeveloped land.
  - f. The balance in the firm’s checking account.
  - g. An experienced and hardworking sales force.
  - h. A corporate bond.
4. What are the main *disadvantages* of the corporate form of organization?
5. Which of the following statements more accurately describe the treasurer than the controller?
  - a. Likely to be the only financial executive in small firms.
  - b. Monitors capital expenditures to make sure that they are not misappropriated.
  - c. Responsible for investing the firm’s spare cash.
  - d. Responsible for arranging any issue of common stock.
  - e. Responsible for the company’s tax affairs.
6. Which of the following statements always apply to corporations?
  - a. Unlimited liability.
  - b. Limited life.
  - c. Ownership can be transferred without affecting operations.
  - d. Managers can be fired with no effect on ownership.
  - e. Shares must be widely traded.
7. In most large corporations, ownership and management are separated. What are the main implications of this separation?
8. What are agency costs and what causes them?

## QUIZ

## CHAPTER TWO

# PRESENT VALUE AND THE OPPORTUNITY COST OF CAPITAL

**COMPANIES INVEST IN** a variety of real assets. These include tangible assets such as plant and machinery and intangible assets such as management contracts and patents. The object of the investment, or capital budgeting, decision is to find real assets that are worth more than they cost. In this chapter we will take the first, most basic steps toward understanding how assets are valued.

There are a few cases in which it is not that difficult to estimate asset values. In real estate, for example, you can hire a professional appraiser to do it for you. Suppose you own a warehouse. The odds are that your appraiser's estimate of its value will be within a few percent of what the building would actually sell for.<sup>1</sup> After all, there is continuous activity in the real estate market, and the appraiser's stock-in-trade is knowledge of the prices at which similar properties have recently changed hands. Thus the problem of valuing real estate is simplified by the existence of an active market in which all kinds of properties are bought and sold. For many purposes no formal theory of value is needed. We can take the market's word for it.

But we need to go deeper than that. First, it is important to know how asset values are reached in an active market. Even if you can take the appraiser's word for it, it is important to understand *why* that warehouse is worth, say, \$250,000 and not a higher or lower figure. Second, the market for most corporate assets is pretty thin. Look in the classified advertisements in *The Wall Street Journal*: It is not often that you see a blast furnace for sale.

Companies are always searching for assets that are worth more to them than to others. That warehouse is worth more to you if you can manage it better than others. But in that case, looking at the price of similar buildings will not tell you what the warehouse is worth under your management. You need to know how asset values are determined. In other words, you need a theory of value.

This chapter takes the first, most basic steps to develop that theory. We lead off with a simple numerical example: Should you invest to build a new office building in the hope of selling it at a profit next year? Finance theory endorses investment if net present value is positive, that is, if the new building's value *today* exceeds the required investment. It turns out that net present value is positive in this example, because the rate of return on investment exceeds the opportunity cost of capital.

So this chapter's first task is to define and explain net present value, rate of return, and opportunity cost of capital. The second task is to explain why financial managers search so assiduously for investments with positive net present values. Is increased value today the *only* possible financial objective? And what does "value" mean for a corporation?

Here we will come to the fundamental objective of corporate finance: maximizing the current market value of the firm's outstanding shares. We will explain why *all* shareholders should endorse this objective, and why the objective overrides other plausible goals, such as "maximizing profits."

Finally, we turn to the *managers'* objectives and discuss some of the mechanisms that help to align the managers' and stockholders' interests. We ask whether attempts to increase shareholder value need be at the expense of workers, customers, or the community at large.

In this chapter, we will stick to the simplest problems to make basic ideas clear. Readers with a taste for more complication will find plenty to satisfy them in later chapters.

<sup>1</sup>Needless to say, there are some properties that appraisers find nearly impossible to value—for example, nobody knows the potential selling price of the Taj Mahal or the Parthenon or Windsor Castle.



## 2.1 INTRODUCTION TO PRESENT VALUE

Your warehouse has burned down, fortunately without injury to you or your employees, leaving you with a vacant lot worth \$50,000 and a check for \$200,000 from the fire insurance company. You consider rebuilding, but your real estate adviser suggests putting up an office building instead. The construction cost would be \$300,000, and there would also be the cost of the land, which might otherwise be sold for \$50,000. On the other hand, your adviser foresees a shortage of office space and predicts that a year from now the new building would fetch \$400,000 if you sold it. Thus you would be investing \$350,000 now in the expectation of realizing \$400,000 a year hence. You should go ahead if the **present value (PV)** of the expected \$400,000 payoff is greater than the investment of \$350,000. Therefore, you need to ask, What is the value today of \$400,000 to be received one year from now, and is that present value greater than \$350,000?

### Calculating Present Value

The present value of \$400,000 one year from now must be less than \$400,000. After all, *a dollar today is worth more than a dollar tomorrow*, because the dollar today can be invested to start earning interest immediately. This is the first basic principle of finance. Thus, the present value of a delayed payoff may be found by multiplying the payoff by a **discount factor** which is less than 1. (If the discount factor were more than 1, a dollar today would be worth *less* than a dollar tomorrow.) If  $C_1$  denotes the expected payoff at period 1 (one year hence), then

$$\text{Present value (PV)} = \text{discount factor} \times C_1$$

This discount factor is the value today of \$1 received in the future. It is usually expressed as the reciprocal of 1 plus a *rate of return*:

$$\text{Discount factor} = \frac{1}{1 + r}$$

The rate of return  $r$  is the reward that investors demand for accepting delayed payment.

Now we can value the real estate investment, assuming for the moment that the \$400,000 payoff is a sure thing. The office building is not the only way to obtain \$400,000 a year from now. You could invest in United States government securities maturing in a year. Suppose these securities offer 7 percent interest. How much would you have to invest in them in order to receive \$400,000 at the end of the year? That's easy: You would have to invest  $\$400,000/1.07$ , which is \$373,832.<sup>2</sup> Therefore, at an interest rate of 7 percent, the present value of \$400,000 one year from now is \$373,832.

Let's assume that, as soon as you've committed the land and begun construction on the building, you decide to sell your project. How much could you sell it for? That's another easy question. Since the property will be worth \$400,000 in a year, investors would be willing to pay \$373,832 for it today. That's what it would

<sup>2</sup>Let's check this. If you invest \$373,832 at 7 percent, at the end of the year you get back your initial investment plus interest of  $.07 \times 373,832 = \$26,168$ . The total sum you receive is  $373,832 + 26,168 = \$400,000$ . Note that  $373,832 \times 1.07 = \$400,000$ .

cost them to get a \$400,000 payoff from investing in government securities. Of course, you could always sell your property for less, but why sell for less than the market will bear? The \$373,832 present value is the only feasible price that satisfies both buyer and seller. Therefore, the present value of the property is also its market price.

To calculate present value, we discount expected payoffs by the rate of return offered by equivalent investment alternatives in the capital market. This rate of return is often referred to as the **discount rate, hurdle rate, or opportunity cost of capital**. It is called the *opportunity cost* because it is the return foregone by investing in the project rather than investing in securities. In our example the opportunity cost was 7 percent. Present value was obtained by dividing \$400,000 by 1.07:

$$PV = \text{discount factor} \times C_1 = \frac{1}{1+r} \times C_1 = \frac{400,000}{1.07} = \$373,832$$

### Net Present Value

The building is worth \$373,832, but this does not mean that you are \$373,832 better off. You committed \$350,000, and therefore your **net present value (NPV)** is \$23,832. Net present value is found by subtracting the required investment:

$$NPV = PV - \text{required investment} = 373,832 - 350,000 = \$23,832$$

In other words, your office development is worth more than it costs—it makes a *net* contribution to value. The formula for calculating NPV can be written as

$$NPV = C_0 + \frac{C_1}{1+r}$$

remembering that  $C_0$ , the cash flow at time 0 (that is, today), will usually be a negative number. In other words,  $C_0$  is an investment and therefore a cash *outflow*. In our example,  $C_0 = -\$350,000$ .

### A Comment on Risk and Present Value

We made one unrealistic assumption in our discussion of the office development: Your real estate adviser cannot be *certain* about future values of office buildings. The \$400,000 represents the best *forecast*, but it is not a sure thing.

If the future value of the building is risky, our calculation of NPV is wrong. Investors could achieve \$400,000 with certainty by buying \$373,832 worth of United States government securities, so they would not buy your building for that amount. You would have to cut your asking price to attract investors' interest.

Here we can invoke a second basic financial principle: *A safe dollar is worth more than a risky one*. Most investors avoid risk when they can do so without sacrificing return. However, the concepts of present value and the opportunity cost of capital still make sense for risky investments. It is still proper to discount the payoff by the rate of return offered by an equivalent investment. But we have to think of *expected* payoffs and the *expected* rates of return on other investments.<sup>3</sup>

<sup>3</sup>We define "expected" more carefully in Chapter 9. For now think of expected payoff as a realistic forecast, neither optimistic nor pessimistic. Forecasts of expected payoffs are correct on average.

Not all investments are equally risky. The office development is more risky than a government security but less risky than a start-up biotech venture. Suppose you believe the project is as risky as investment in the stock market and that stock market investments are forecasted to return 12 percent. Then 12 percent becomes the appropriate opportunity cost of capital. That is what you are giving up by not investing in equally risky securities. Now recompute NPV:

$$PV = \frac{400,000}{1.12} = \$357,143$$
$$NPV = PV - 350,000 = \$7,143$$

If other investors agree with your forecast of a \$400,000 payoff and your assessment of its risk, then your property ought to be worth \$357,143 once construction is underway. If you tried to sell it for more, there would be no takers, because the property would then offer an expected rate of return lower than the 12 percent available in the stock market. The office building still makes a net contribution to value, but it is much smaller than our earlier calculations indicated.

The value of the office building depends on the timing of the cash flows and their uncertainty. The \$400,000 payoff would be worth exactly that if it could be realized instantaneously. If the office building is as risk-free as government securities, the one-year delay reduces value to \$373,832. If the building is as risky as investment in the stock market, then uncertainty further reduces value by \$16,689 to \$357,143.

Unfortunately, adjusting asset values for time and uncertainty is often more complicated than our example suggests. Therefore, we will take the two effects separately. For the most part, we will dodge the problem of risk in Chapters 2 through 6, either by treating all cash flows as if they were known with certainty or by talking about expected cash flows and expected rates of return without worrying how risk is defined or measured. Then in Chapter 7 we will turn to the problem of understanding how financial markets cope with risk.

### Present Values and Rates of Return

We have decided that construction of the office building is a smart thing to do, since it is worth more than it costs—it has a positive net present value. To calculate how much it is worth, we worked out how much one would need to pay to achieve the same payoff by investing directly in securities. The project's present value is equal to its future income discounted at the rate of return offered by these securities.

We can say this in another way: Our property venture is worth undertaking because its rate of return exceeds the cost of capital. The rate of return on the investment in the office building is simply the profit as a proportion of the initial outlay:

$$\text{Return} = \frac{\text{profit}}{\text{investment}} = \frac{400,000 - 350,000}{350,000} = .143, \text{ about } 14\%$$

The cost of capital is once again the return foregone by *not* investing in securities. If the office building is as risky as investing in the stock market, the return foregone is 12 percent. Since the 14 percent return on the office building exceeds the 12 percent opportunity cost, you should go ahead with the project.

Here then we have two equivalent decision rules for capital investment:<sup>4</sup>

- *Net present value rule.* Accept investments that have positive net present values.
- *Rate-of-return rule.* Accept investments that offer rates of return in excess of their opportunity costs of capital.<sup>5</sup>

### The Opportunity Cost of Capital

The opportunity cost of capital is such an important concept that we will give one more example. You are offered the following opportunity: Invest \$100,000 today, and, depending on the state of the economy at the end of the year, you will receive one of the following payoffs:

Slump	Normal	Boom
\$80,000	\$110,000	\$140,000

You reject the optimistic (boom) and the pessimistic (slump) forecasts. That gives an expected payoff of  $C_1 = 110,000$ ,<sup>6</sup> a 10 percent return on the \$100,000 investment. But what's the right discount rate?

You search for a common stock with the same risk as the investment. Stock X turns out to be a perfect match. X's price next year, given a normal economy, is forecasted at \$110. The stock price will be higher in a boom and lower in a slump, but to the same degrees as your investment (\$140 in a boom and \$80 in a slump). You conclude that the risks of stock X and your investment are identical.

Stock X's current price is \$95.65. It offers an expected rate of return of 15 percent:

$$\text{Expected return} = \frac{\text{expected profit}}{\text{investment}} = \frac{110 - 95.65}{95.65} = .15, \text{ or } 15\%$$

This is the expected return that you are giving up by investing in the project rather than the stock market. In other words, it is the project's opportunity cost of capital.

To value the project, discount the expected cash flow by the opportunity cost of capital:

$$PV = \frac{110,000}{1.15} = \$95,650$$

This is the amount it would cost investors in the stock market to buy an expected cash flow of \$110,000. (They could do so by buying 1,000 shares of stock X.) It is, therefore, also the sum that investors would be prepared to pay you for your project.

To calculate net present value, deduct the initial investment:

$$NPV = 95,650 - 100,000 = -\$4,350$$

<sup>4</sup>You might check for yourself that these are equivalent rules. In other words, if the return  $50,000/350,000$  is greater than  $r$ , then the net present value  $-350,000 + [400,000/(1+r)]$  must be greater than 0.

<sup>5</sup>The two rules can conflict when there are cash flows in more than two periods. We address this problem in Chapter 5.

<sup>6</sup>We are assuming that the probabilities of slump and boom are equal, so that the expected (average) outcome is \$110,000. For example, suppose the slump, normal, and boom probabilities are all  $1/3$ . Then the expected payoff  $C_1 = (80,000 + 110,000 + 140,000)/3 = \$110,000$ .

The project is worth \$4,350 less than it costs. It is *not* worth undertaking.

Notice that you come to the same conclusion if you compare the expected project return with the cost of capital:

$$\begin{aligned}\text{Expected return on project} &= \frac{\text{expected profit}}{\text{investment}} \\ &= \frac{110,000 - 100,000}{100,000} = .10, \text{ or } 10\%\end{aligned}$$

The 10 percent expected return on the project is less than the 15 percent return investors could expect to earn by investing in the stock market, so the project is not worthwhile.

Of course in real life it's impossible to restrict the future states of the economy to just "slump," "normal," and "boom." We have also simplified by assuming a perfect match between the payoffs of 1,000 shares of stock X and the payoffs to the investment project. The main point of the example does carry through to real life, however. Remember this: The opportunity cost of capital for an investment project is the expected rate of return demanded by investors in common stocks or other securities subject to the same risks as the project. When you discount the project's expected cash flow at its opportunity cost of capital, the resulting present value is the amount investors (including your own company's shareholders) would be willing to pay for the project. Any time you find and launch a positive-NPV project (a project with present value exceeding its required cash outlay) you have made your company's stockholders better off.

### A Source of Confusion

Here is a possible source of confusion. Suppose a banker approaches. "Your company is a fine and safe business with few debts," she says. "My bank will lend you the \$100,000 that you need for the project at 8 percent." Does that mean that the cost of capital for the project is 8 percent? If so, the project would be above water, with PV at 8 percent =  $110,000/1.08 = \$101,852$  and  $\text{NPV} = 101,852 - 100,000 = +\$1,852$ .

That can't be right. First, the interest rate on the loan has nothing to do with the risk of the project: It reflects the good health of your existing business. Second, whether you take the loan or not, you still face the choice between the project, which offers an expected return of only 10 percent, or the equally risky stock, which gives an expected return of 15 percent. A financial manager who borrows at 8 percent and invests at 10 percent is not smart, but stupid, if the company or its shareholders can borrow at 8 percent and buy an equally risky investment offering 15 percent. That is why the 15 percent expected return on the stock is the opportunity cost of capital for the project.



## 2.2 FOUNDATIONS OF THE NET PRESENT VALUE RULE

So far our discussion of net present value has been rather casual. Increasing value *sounds* like a sensible objective for a company, but it is more than just a rule of thumb. You need to understand why the NPV rule makes sense and why managers look to the bond and stock markets to find the opportunity cost of capital.

In the previous example there was just one person (you) making 100 percent of the investment and receiving 100 percent of the payoffs from the new office building. In corporations, investments are made on behalf of thousands of shareholders with varying risk tolerances and preferences for present versus future income. Could a positive-NPV project for Ms. Smith be a negative-NPV proposition for Mr. Jones? Could they find it impossible to agree on the objective of maximizing the market value of the firm?

The answer to both questions is no; Smith and Jones will always agree if both have access to capital markets. We will demonstrate this result with a simple example.

### How Capital Markets Reconcile Preferences for Current vs. Future Consumption

Suppose that you can look forward to a stream of income from your job. Unless you have some way of storing or anticipating this income, you will be compelled to consume it as it arrives. This could be inconvenient or worse. If the bulk of your income comes late in life, the result could be hunger now and gluttony later. This is where the capital market comes in. The capital market allows trade between dollars today and dollars in the future. You can therefore eat moderately both now and in the future.

We will now illustrate how the existence of a well-functioning capital market allows investors with different time patterns of income and desired consumption to agree on whether investment projects should be undertaken. Suppose that there are two investors with different preferences. *A* is an ant, who wishes to save for the future; *G* is a grasshopper, who would prefer to spend all his wealth on some ephemeral frolic, taking no heed of tomorrow. Now suppose that each is confronted with an identical opportunity—to buy a share in a \$350,000 office building that will produce a sure-fire \$400,000 at the end of the year, a return of about 14 percent. The interest rate is 7 percent. *A* and *G* can borrow or lend in the capital market at this rate.

*A* would clearly be happy to invest in the office building. Every hundred dollars that she invests in the office building allows her to spend \$114 at the end of the year, while a hundred dollars invested in the capital market would enable her to spend only \$107.

But what about *G*, who wants money now, not in one year's time? Would he prefer to forego the investment opportunity and spend today the cash that he has in hand? Not as long as the capital market allows individuals to borrow as well as to lend. Every hundred dollars that *G* invests in the office building brings in \$114 at the end of the year. Any bank, knowing that *G* could look forward to this sure-fire income, would be prepared to lend him  $\$114/1.07 = \$106.54$  today. Thus, instead of spending \$100 today, *G* can spend \$106.54 if he invests in the office building and then borrows against his future income.

This is illustrated in Figure 2.1. The horizontal axis shows the number of dollars that can be spent today; the vertical axis shows spending next year. Suppose that the ant and the grasshopper both start with an initial sum of \$100. If they invest the entire \$100 in the capital market, they will be able to spend  $100 \times 1.07 = \$107$  at the end of the year. The straight line joining these two points (the innermost line in the figure) shows the combinations of current and future consumption that can be achieved by investing none, part, or all of the cash at the 7 percent rate offered in the capital market. (The interest rate determines the slope of this line.) Any other point along the line could be achieved by spending

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