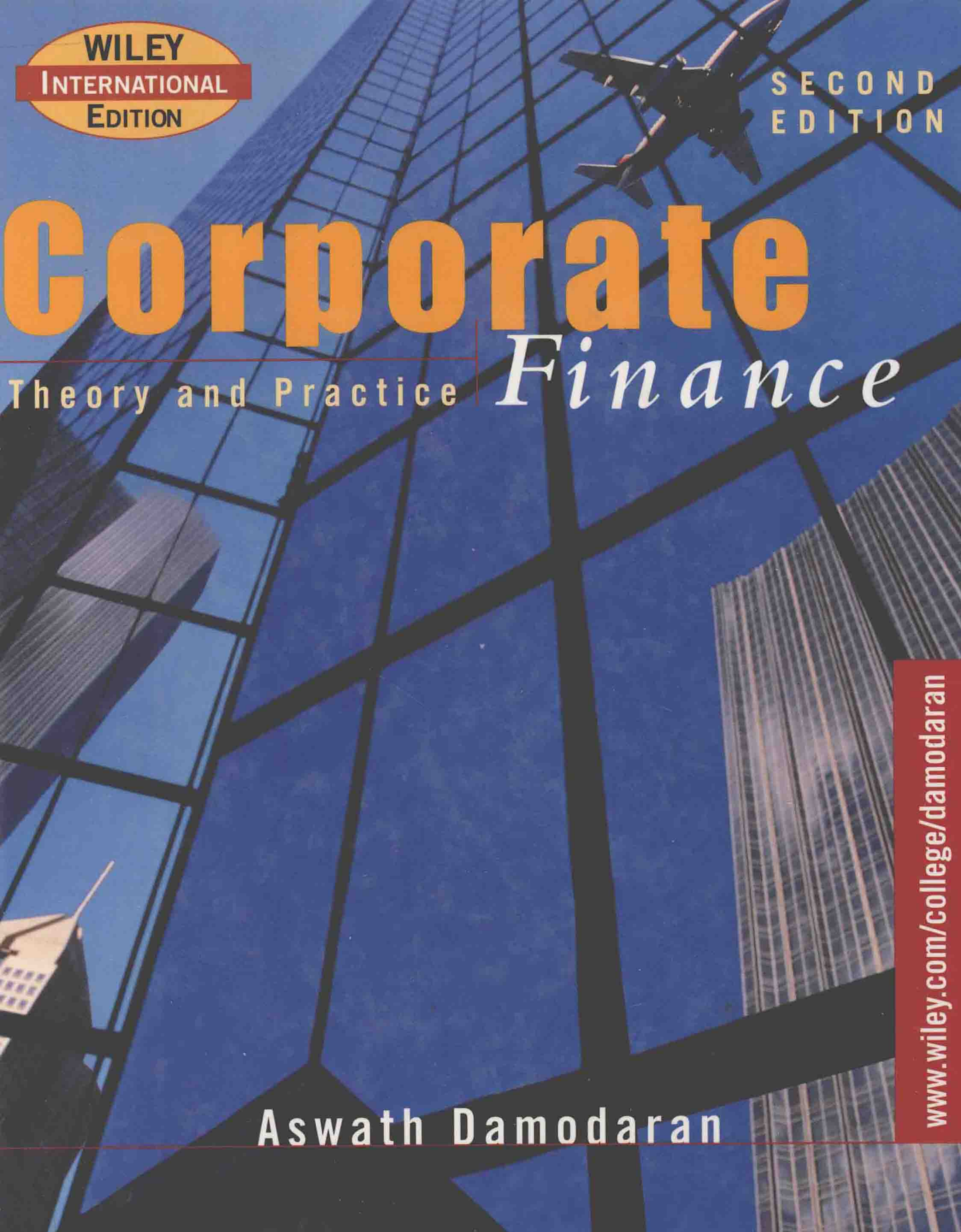

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Corporate Finance

Theory and Practice

Aswath Damodaran

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Corporate Finance

Theory and Practice

Second Edition

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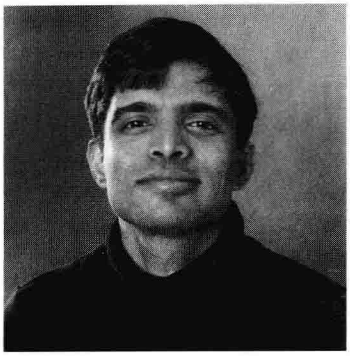
Dedication

*This book is dedicated to Michele,
whose patience and support made it possible,
and to Ryan, Brendan, Kendra, and Kiran,
who helped in their own way.*

About the Author



Aswath Damodaran is a professor of finance at the Stern School of Business at New York University, and teaches the corporate finance and equity valuation courses in the MBA program. He received his MBA and Ph.D. from the University of California at Los Angeles. His research interests lie in valuation and applied corporate finance.

He has published articles in the *Journal of Financial and Quantitative Analysis,* the *Journal of Finance,* the *Journal of Financial Economics,* and the *Review of Financial Studies,* and has written two books on equity valuation *(Damodaran on Valuation* and *Investment Valuation)* and two on corporate finance *(Corporate Finance: Theory and Practice* and *Applied Corporate Finance: A User's Manual).* He has co-edited a book on investment management with Peter Bernstein *(Investment Management)* and is working on a book on investment philosophies.

He was a visiting lecturer at the University of California, Berkeley, from 1984 to 1986, where he received the Earl Cheit Outstanding Teaching Award in 1985. He has been at NYU since 1986, received the Stern School of Business Excellence in Teaching Award (awarded by the graduating class) in 1988, 1991, 1992, and 1999, and was the youngest winner of the University-wide Distinguished Teaching Award (in 1990). He was profiled in *Business Week* as one of the top twelve business school professors in the United States in 1994.

Preface

Corporate finance encompasses all of a firm's decisions that have financial implications. Thus, there is a corporate financial aspect to almost every action taken by a firm, no matter what functional area claims responsibility for it. A firm's actions can generally be categorized as decisions about where to invest the firm's funds (the investment decision), where to raise these funds (the financing decision), and how much cash to return to the owners (the dividend decision). The value of the firm reflects its success in each of these areas. Firms that allocate resources to "good" projects, finance them with the "appropriate mix" of debt and equity, and reinvest the "right amount" back into operations will have higher value than firms that fail on any of these criteria. Notice that there is nothing in this description that presupposes that firms are large or publicly traded, or that financial markets function efficiently. Although these characteristics may make the job of corporate financial analysis easier, the fundamental principles of corporate finance should apply for all firms — small and large, private and public, domestic and foreign.

There is only one way to learn corporate finance well, and that is by analyzing real companies with real problems. Consequently, I have illustrated principles throughout this book with extended applications involving three companies — the publicly traded firms of The Home Depot and Boeing and a private software firm that I call InfoSoft. I have also introduced other companies selectively to illustrate specific problems. These applications are not mere addenda to models, but are an integral part of explaining and developing them.

In keeping with the definition of corporate finance given above, I have designed this book for a wide audience. Obviously, it will be most useful for those who plan to make a career in corporate finance, whether at corporations, investment banks, or management consulting firms. At the same time, those in other areas of business, be it marketing, production, or organizational behavior, should find the tools and principles developed here of use in their chosen fields. Finally, several parts of this book would be useful to small business owners and entrepreneurs looking for ways to improve their understanding of the financial aspects of their businesses.

There is a wide range of books on corporate finance. The "nuts-and-bolts" books essentially focus on working through problems and exercises. They eschew raising provocative questions, provide closure on complicated questions, and provide the reader with a sense of being in control of the topic. The "big picture" books provide readers with a state-of-the-art view of corporate finance and a tantalizing vision of things to come. The "practitioner" books focus on corporate financial tools and techniques, and pay little attention to the underlying theory. This book is my attempt to find common ground among theory, applications, and examples, and to provide a guide for those who want not only to practice corporate finance, but also to understand it well enough to develop their own models as they move along.

I believe that this book's primary strength is its focus on applying complex theory to real firms, while minimizing the compromises that inevitably have to be made in the process. I have also tried to maintain a balance between immersing readers in the details of corporate financial analysis — the tools and techniques that are used on a day-to-day basis — and the big picture of corporate finance, which allows them to see how these tools and techniques fit together and what common principles apply across all of them.

The genesis for this book lay in the classroom, and the result has been shaped by the reactions and responses of students to examples that I have used in my lectures. I have always learned more from the students I teach than they learn from me, and I hope that I have been able to distill some of this learning in this book.

It is my goal that the extended examples in this book will induce readers to try out the theory on other companies. By doing so, they will not only come to understand the limitations of the theory better, but also learn how to adapt it to the real world. To make this process easier, the spreadsheets that were used to generate the applications in this book are provided on the text website. Readers should be able to use these spreadsheets to analyze a project, examine the optimal debt ratio for a firm, estimate how much cash it has available to pay out to stockholders, and value the firm.

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A Reader's Guide

Every decision that a firm makes has a corporate finance component to it, even if it is called a strategic, a marketing, or an advertising decision. Moreover, the principles of corporate finance apply not just to corporations and large businesses. Every business, small or large, privately owned or publicly traded, has to make decisions about how to raise funds for investments and where to invest these funds. The first theme of this book is the universality of the basic principles of corporate finance.

The second theme of this book is that corporate financial theory is grounded in applications. If a theory cannot be applied to real companies with real data, you will not find it in this book.

The third theme is that corporate finance is more than an exercise in number crunching. Certainly numbers are central to corporate finance, but as you will see, there is also a great deal of room for innovation and creative problem solving.

Structure of the Book

The book is structured around the three principles that comprise corporate finance. Part One lays the groundwork for the analysis of these principles. It begins with a discussion of the objective of stock price maximization, which underlies corporate financial theory, and follows up with an examination of three basic tools that we use in decision making — the concept of present value, the analysis of financial statements, and the valuation of any asset. The focus of Part Two is the decision of whether and where to invest a firm's resources (the investment decision). Part Three covers the funding decision and analyzes what the funding options for a firm are and what the best options may be (the financing decision). Decisions about how much to reinvest back into the business — the dividend decision — and how much to take out of it are the subject of Part Four. Part Five returns to the link between valuation and corporate finance decisions.

A Real World Focus

The proliferation of news and information about decisions corporations make every day suggests that we do not need to use hypothetical businesses to illustrate the principles of corporate finance. Therefore I have chosen three firms to exemplify my points about corporate financial policy:

1. *Boeing* is the leading manufacturer of commercial jet aircraft in the world and provides related services to the commercial airline industry worldwide. The company also has extensive interests in information, space and defense systems, including military aircraft, helicopters, space and missile systems. We will use Boeing to illustrate the issues that a large manufacturing firm, with a diversified stockholder base, has to face in the course of making investment, financing, and dividend decisions.
2. *The Home Depot* operates more than 600 stores in the United States and Canada, selling home improvement products such as plumbing, heating and electrical supplies, floor and wall coverings, hardware, tools and paint. We will use The Home Depot to examine some of the corporate finance questions that come up for service firms, which make small investments that are generally not capital-intensive.
3. *InfoSoft* is a privately owned firm which develops and sells entertainment software. We will take InfoSoft through the corporate financial decision making process to illustrate some of the issues confronted by private businesses with limited information, and we will examine how high growth businesses in uncertain environments make decisions.

Many of the chapters are followed by a practice exercise titled "Real Companies, Real Time," where you can apply the principles presented in the chapter to any firm that you choose to analyze.

An Interactive Learning Tool

I have developed several features to make the learning in this book as interactive and current as possible:

- In Practice examples using the three companies described above allow us to apply corporate finance principles to typical firms. Preceding these illustrations is a logo symbolizing the firm's business.
- Spreadsheet programs are available on the Web to do some of the analysis that will be presented in this book. For instance, there are spreadsheets that calculate the optimal financing mix for a firm as well as valuation spreadsheets. You can find these spreadsheets on the Web site for the book, located at www.wiley.com/college/damodaran. Wherever you see the logo it refers to material on the Web.
- Current data on some of the inputs that we will use in our analysis is also available on the Web site for this book. Thus, when we estimate the risk parameters for firms, we will draw attention to the data set on the Web that reports average risk parameters by industry.
- Concept checks (CC) appear at intervals throughout the chapters. These questions allow you to test your understanding of the concepts introduced in the preceding section.
- Critical thinking questions (CT) are slightly more involved exercises that emphasize the key points in the chapter.
- Real Companies, Real Time practice sets at the end of some chapters will allow you to replicate the analysis in that chapter on a company of your choice.
- Each chapter concludes with a number of review questions and problems.

A Chapter-by-Chapter Guide

Chapter 1 briefly lays out what I think corporate finance is all about and explains why I have structured the book the way I have. For those readers who do not have a finance background, the chapter also provides a measure of how I view a business and its functions.

Chapter 2 is the philosophical core of this book. I consider the objective in corporate finance to be the maximization of firm value, but this objective is not universally accepted. In fact, there are many both within and outside the business community who argue that it is either too narrow an objective or the wrong objective. The first half of this chapter examines many of the real limitations these critics point to, but then I present what I hope is a strong case that firms should continue to focus on this objective.

A significant portion of what we do in finance relates to the time value of money. We consider the mechanics of time value in Chapter 3, not only in the context of decisions that firms might have to make on a day-to-day basis but also in the larger context of decisions that individuals make on how much to save for retirement or a child's college education.

In Chapter 4, on financial statements, I tried to maintain a balance between accounting mechanics and the imperatives of financial analysis. The chapter includes enough information on how financial statements are constructed to allow you to use it as a reference guide when looking at a company's annual report or 10-K and also presents the questions that we as financial analysts would like these statements to answer, as well as the modifications needed to get the answers.

Chapter 5 provides an introduction to valuing all kinds of assets, from default-free zero coupon bonds to equity in high growth companies. It also introduces the notion of price as distinct from value. I use this setting to describe the notion of market efficiency and why it is so central to corporate finance.

The next 10 chapters cover the investment decision. I do not believe that it makes much sense to talk about investment decision rules before explaining what projects need to make as hurdle rates. Consequently, I deal with risk and expected returns in Chapters 6 through 8. I also draw a clear distinction between measuring hurdle rates for a firm (Chapter 7) and for individual projects (Chapter 8), because I believe this distinction is particularly important for firms in multiple lines of business. In addition, I spend a substantial amount of time on the estimation issues associated with applying risk and return models in practice. This emphasis reflects my belief that the biggest challenges with estimating hurdle rates are not theoretical but are related to estimation issues. I consider investments in foreign projects (Chapter 11), investments in working capital (Chapters 13 and 14), and investments in existing projects (Chapter 15) within the broader context of investment analysis. I have tried to bring to the analysis of these investment decisions the same objectives and analytical tools that I would use on any investment. In Chapter 12 I discuss the ways in which project interactions, synergies, and options can be incorporated into the investment analysis.

Turning next to the financing decision, I begin with the presentation in Chapter 16 of the entire range of financing choices available to firms, ranging from private equity to preferred stock. While I considered looking at these choices in separate chapters, I think it is more important to present the choices in one chapter and emphasize both the common elements and the differences between them. In Chapter 17, we will look at two related questions. The first is how a firm's financing choices vary during its life cycle of growth, expansion, maturity, and decline. The second is the process by which firms make the transition from one stage of financing (owner's funds, private equity) to another. Chapters 18 through 20 consider three steps in the analysis of a firm's financing mix, beginning with an analysis of the optimal financing mix for a firm (Chapters 18 and 19), followed by an examination of what to do when a firm is under- or over-levered and how to determine what kind of financing a firm should use (Chapter 20). Again, the emphasis is on applying the theory, with reasonable assumptions, to help firms make their financing decisions.

In Chapters 21 through 23, I look at the dividend decision, beginning with a fairly conventional treatment of dividends and the tradeoff on dividend payout, as well as different hypotheses about whether dividends increase or decrease value. Chapter 22 examines how much a firm can pay in dividends by measuring the cash left over after all reinvestment needs have been met, and whether there will be pressure on a firm to pay this out. Finally, in Chapter 23, I expand the dividend decision to look at other ways in which firms can affect the value of the stock held by their owners, ranging from cosmetic actions (stock splits and tracking stock) to real actions, divestitures, and spinoffs.

Chapters 24 through 26 return to valuation. Having laid the corporate financial groundwork, I can now link valuation to the investment, financing, and dividend decisions of a firm. I do this, in the context of valuing a firm in Chapter 24 and by examining how to increase the value of a firm in Chapter 25. Finally, in Chapter 26, I apply the same valuation tools to value control and synergy in acquisitions.

In Chapter 27 I attempt to apply option pricing models in a variety of contexts in corporate finance and valuation. I begin by using them to value the options embedded in investment projects, including the options to expand, abandon, or delay projects. I also use them to value financing flexibility and equity in deeply troubled firms.

As you read this book, I hope you find material that is interesting and useful to you, but more importantly, I hope you enjoy the creative aspects of corporate financial analysis as much as I have.

Contents in Brief

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