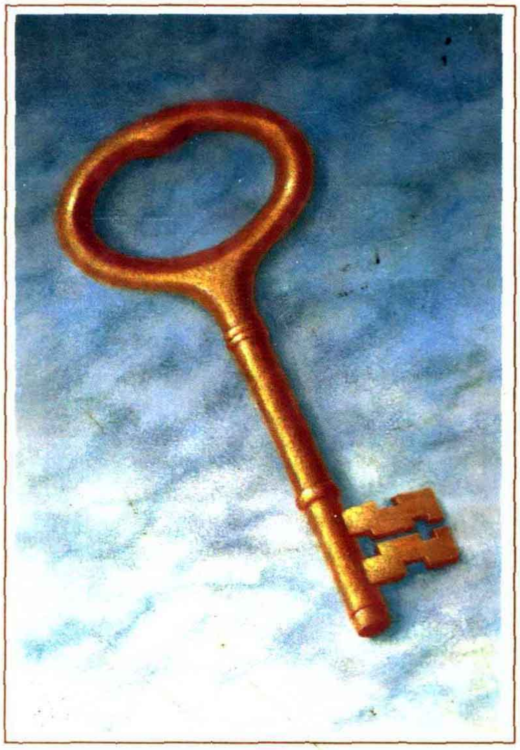
SECOND EDITION

CORPORATE FINANCE



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Corporate Finance

Second Edition

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To our families
and friends with love
and gratitude.

About the Authors

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Stephen Ross is presently the Sterling Professor of Economics and Finance at Yale University. One of the most widely published authors in finance and economics, Professor Ross is recognized for his work in developing the Arbitrage Pricing Theory. He has also made substantial contributions to the discipline through his research in signalling, agency theory, options, and the theory of the term structure of interest rates. Previously the president of the American Finance Association, he serves as an associate editor of the *Journal of Finance* and the *Journal of Economic Theory*. He is co-chairman of Roll and Ross Asset Management Corporation.

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Randolph Westerfield is Chairman of the Finance and Business Economics Department and Charles B. Thornton Professor of Finance at the University of Southern California.

Dr. Westerfield came to USC from the Wharton School, University of Pennsylvania, where he was Chairman of the Finance Department and Senior Associate at the Rodney L. White Center for Financial Research. For three consecutive years, the Wharton Student Committee on Undergraduate Teaching Evaluation awarded him the highest score for teaching undergraduate finance.

His research interests are in corporate financial policy, investment management and analysis, mergers and acquisitions, and pension fund management. Dr. Westerfield has served as a member of the Continental Bank (Philadelphia) trust committee. He has also been a consultant to a number of corporations, including AT&T, Mobil Oil, and Westinghouse, as well as to the United Nations and the U.S. Departments of Justice and Labor. Dr. Westerfield is the author of more than 30 monographs and articles. He is a member of the editorial review board of the *Journal of Banking and Finance* and the *Financial Review*.

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Jeffrey F. Jaffe has been a frequent contributor to finance and economic literature in such journals as the *Quarterly Economic Journal, The Journal of Finance, The Journal of Financial and Quantitative Analysis,* and *The Financial Analysts' Journal*. His best known work concerns insider trading, where he showed both that corporate insiders earn abnormal profits from their trades and that regulation has little effect on these profits. He has also made contributions concerning initial public offerings, regulation of utilities, the behavior of marketmakers, the fluctuation of gold prices, the theoretical effect of inflation on the interest rate, the empirical effect of inflation on capital asset prices, the relationship between small capitalization stocks and the January effect, and the capital structure decision.

Preface

The teaching and the practicing of corporate finance have become more challenging than ever before. The last 10 years have seen fundamental changes in financial markets and financial instruments. Scarcely a day goes by without an announcement in the financial press about such matters as takeovers, junk bonds, financial restructuring, and leveraged buyouts. Both the theory and practice of corporate finance have been moving ahead with uncommon speed, and our teaching must keep pace.

These developments place new burdens on the teaching of corporate finance. On one hand, the changing world of finance makes it more difficult to keep materials up to date. On the other hand, the teacher must distinguish the permanent from the temporary and avoid the temptation to follow fads. Our solution to this problem is to emphasize the modern fundamentals of the theory of finance and to make the theory come to life with contemporary examples. All too often the beginning student views corporate finance as a collection of unrelated topics which are unified largely because they are bound together between the covers of one book. As in the first edition, our aim is to present corporate finance as the working of a small number of integrated and powerful intuitions.

Changes in the Second Edition

The second edition is, in our opinion, a great improvement over the first edition. So much of the text has been rewritten that all of the changes cannot be mentioned in this brief preface. However, the most important changes concern the topics of net present value and capital budgeting, risk and return, and capital structure.

Net Present Value and Capital Budgeting

Chapters 4 through 7 contain a streamlined, yet complete, treatment of capital budgeting procedures. Chapter 4, which introduces the operational material on NPV,[1] contains a unique section on simplifying procedures. This section should enhance student understanding considerably. Chapter 5 greatly expands the mate-

[1] As in the first edition, Chapter 3 treats the conceptual underpinnings of the net present value approach via the Fisher/Hirshleifer analysis. However, unlike the first edition, Chapter 4 is self-contained so that it can be assigned without requiring the student to read Chapter 3.

rial on the valuation of stocks and bonds given in the first edition. For example, the valuation model for growth opportunities is examined in detail. A self-contained appendix on the term structure is included. The discussion of alternative investment rules has been moved to chapter 6 to provide a stronger integration with the basic valuation concepts. New pedagogy on the IRR approach is introduced here. Chapter 7 considers practical issues in capital budgeting. Much effort has gone into improving the clarity of this chapter. Further, new material on working capital and on capital budgeting simplifications has been added.

Risk and Return

In the previous edition, the capital asset pricing model (CAPM) and the arbitrage pricing theory (APT) were discussed in the same chapters. In this edition, we separate the two theories into different chapters. Based on our experience, this format makes risk and return easier to teach and understand.

Chapter 8 both discusses the past history of the U.S. capital markets (using the authoritative Ibbotson-Sinquefield data) and develops the concepts of standard deviation, covariance, and correlation. This material can be assigned to the student whether using the CAPM or the APT approach. The CAPM is presented in Chapter 9, and the APT is presented in Chapter 10. These two chapters are self-contained so that an instructor can choose the approach that best suits his or her teaching needs. Though some instructors may choose to assign both chapters, we believe that one of the two chapters will suffice in most cases. Chapter 11 applies the concepts of risk and return to capital budgeting. Chapter 11 can be assigned whether the instructor uses the CAPM or the APT approach.

Capital Structure and Dividend Policy

In the previous edition, we had one chapter on capital structure and two chapters on dividend policy. We have now expanded the material on capital structure to two chapters, while deleting the first edition's second chapter on dividend policy. The first chapter on capital structure (Chapter 14) handles the capital structure decision in a world without taxes and in a world with corporate taxes. This material has been substantially rewritten. Among other improvements, we introduce the concept of market value balance sheets, an intuitive way of explaining changes in capital structure. The second chapter on capital structure (Chapter 15) treats bankruptcy costs, other agency costs, and the Miller model. Besides being much clearer, this chapter contains many issues not covered in the first edition. Once a student understands the capital budgeting decisions, he or she is ready for capital budgeting with leverage. Chapter 16 examines *both* the weighted average cost of capital (WACC) and the adjusted present value (APV) approaches. This chapter contains a unique section where the two approaches are compared and contrasted.

Attention to Pedagogy

We see three keys to good pedagogy in a corporate finance text: (1) extensive examples, questions, and problems; (2) consistency in the level of difficulty; and (3) conceptual coherence.

There is room for both easy and difficult textbooks in corporate finance. Of course, good textbooks should not shift haphazardly from difficult to easy, and vice versa. Our objective is to write a text that is consistently moderate in difficulty. Our book is designed for two audiences—the MBA and the undergraduate. Therefore our objective has been to write a book with sufficient flexibility to be taught to both of these audiences. We have written the core material on value, risk, capital budgeting, and capital structure at a consistently moderate level of difficulty. Some chapters can be omitted without loss of continuity for a more introductory-level treatment. More specialized chapters, such as those on options, warrants and convertibles, and mergers and acquisitions, may be covered in more advanced courses.

We have found that many textbooks lack conceptual coherence. We attempt to use consistently the intuitions of arbitrage, net present value, efficient markets, and options throughout the book. However, we have also attempted to enliven some of the conceptual material by including the recent results of modern financial research. This research has at times raised more questions than answers; therefore we have presented some of the puzzles, anomalies, and unresolved questions of corporate finance. We hope that this will pique the curiosity of the students and motivate them to work harder to grasp the complexities of modern corporate finance.

Study Features

Getting the theory and concepts current and up-to-date is only one phase of developing a corporate finance text. To be an effective teaching tool, the text must present the theory and concepts in a coherent way that can be easily learned. With this in mind, we have included several study features:

1. *Concept Questions.* After each major section in a chapter is a unique learning tool called "Concept Questions." Concept Questions point to essential material and allow students to test their recall and comprehension periodically.
2. *Key Terms.* Students will note that important words are highlighted in boldface type the first time they appear. They are also listed at the end of the chapter along with the page number on which they first appear. New words appear in *italics* when they are first mentioned. Both key terms and new words are defined in the glossary at the end of the text.
3. *Demonstration problems.* Throughout the text we have provided worked-out examples to give students a clear understanding of the logic and structure of the solution process.
4. *Boxed material.* Key concepts are summarized and expanded in boxes for each reference.
5. *Equations.* Key equations are highlighted in color for easy reference.
6. *Problems sets.* Because problems are so critical to a student's learning, we have extensively revised and rewritten the sets at the end of each chapter. The refined problems have been thoroughly reviewed and class-tested. The problem sets are graded for difficulty, moving from

easier problems intended to build confidence and skill to more difficult problems designed to challenge the enthusiastic student. Additionally, we have tried to make the problems in the critical "concept" chapters, such as those on value, risk, and capital structure, especially challenging and interesting. We provide answers to selected problems at the end of the book.

7. *Enumerated chapter summaries.* At the end of each chapter a numbered summary provides a quick review of key concepts in the chapter.
8. *Suggested readings.* Each chapter is followed by a short, annotated list of books and articles to which interested students can refer for additional information.

Supplements

As with the text, developing supplements of extraordinary quality and utility was the primary objective. Each component in the supplements package underwent extensive review and revision. As a result, the package contains several features not offered with any other corporate finance text.

Instructor's Manual

Prepared by Kirt Butler, *Lecture Notes* includes ideas or comments on context and teaching, up-to-date practical examples, selected equations, and suggestions for handouts and transparencies to use with your lectures.

Supplemental Problems in addition to those in the text are offered for use during lectures or for testing.

Answers to the Text Problems and Concept Questions are provided.

A Computer Section describes how to use *Spreadsheet Models for Corporate Finance* offered free to adopters of the text. It offers suggestions on classroom use of the 20 Lotus 1-2-3 worksheets and tips on good spreadsheet techniques. New to this edition is a pull-out student manual that guides the software user through the models. It provides additional assistance to that already included on the disk.

Test Bank

Prepared by Nelson J. Lacey, of the University of Massachusetts at Amherst, the Test Bank includes over 800 multiple-choice questions and problems—approximately 30 per chapter.

Computest III

All questions from the Test Bank are included in a computerized version. Computest III allows you to edit, scramble, add, or delete questions. It is available in IBM format.

Student Problem Manual

Written by R. Bruce Swensen of Adelphi University and Brad Jordan of the University of Missouri at Columbia, the Student Problem Manual is a direct companion to the text. It is uniquely designed to involve the student in the learning process. Each chapter contains Chapter Highlights in narrative form, 15 problems and worked-out solutions, and 15-20 fill-in Concept Test questions and answers.

Software

Provided free to adopters, *Spreadsheet Models for Corporate Finance* consists of 20 Lotus 1-2-3 spreadsheets. Developed by Delvin D. Hawley of the University of Mississippi and Hugh McLaughlin of Bentley College, the software provides additional review of concepts and refines students' spreadsheet techniques and skills for constructing simple models.

Acetates

Over 100 acetates provide numerous worked-out solutions to problems and highlight key charts and tables.

The Intended Audience of This Book

Many years ago, there was generally only one course in corporate finance at a typical business school. This course was taught in different versions in both the undergraduate and MBA programs. This is no longer true. Although there are many variations at different schools, we have observed two general course sequences. Our book is designed to fit into both of these curriculum approaches.

The first is a two-semester (or quarter) sequence. The first course includes valuation, risk, capital budgeting, and capital structure. Long-term financing, financial planning (short-term and long-term), mergers and acquisitions, and special topics are covered in the second semester. Sometimes capital budgeting, risk, and capital structure are taught again in the second semester but at a higher level than in the first semester.

The second course sequence that we have observed is a core course and a case course with special topics. The core course covers valuation, risk, capital budgeting, and capital structure in the first semester; the core material is reinforced in a case course in the second semester. In addition, new topics in long-term financing, international finance, and mergers and acquisitions are usually covered.

This book has been written for the introductory courses in corporate finance at the MBA level and for advanced courses in many undergraduate programs. Some instructors will find our text appropriate for the introductory course at the undergraduate level as well.

We assume that most students either will have taken or will be concurrently enrolled in courses in accounting, statistics, and economics. This exposure will help students understand some of the more difficult material. However, the book is self-contained, and a prior knowledge of these areas is not essential. The only mathematics prerequisite is basic algebra.

Acknowledgments

This textbook was developed and written with the assistance of many fine people. The reviewers for the first edition contributed useful suggestions and comments which we continue to utilize in this current edition. We extend our thanks once again for their countless insights.

Nasser Arshadi: *University of Missouri at St. Louis*
Gordon Bonner: *University of Delaware*
Kirt Butler: *Michigan State University*
Andreas Christofi: *University of Maryland at College Park*
William Damon: *Vanderbilt University*
Anand Desai: *University of Florida*
Jean-Francois Dreyfus: *New York University*
Robert Eldridge: *George Washington University*
Gary Emery: *University of Oklahoma*
James Haltiner: *College of William and Mary*
Delvin Hawley: *University of Mississippi*
Hal Heaton: *Brigham Young University*
Andrea Heuson: *University of Miami*
James Jackson: *Oklahoma State University*
Brad Jordan: *University of Missouri at Columbia*
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Dennis Logue: *Dartmouth College*
Terry Maness: *Baylor University*
Suren K. Mansinghka: *San Francisco State University*
Robert L. McDonald: *Northwestern University*
Huge McLaughlin: *Bentley College*
Rick Meyer: *University of South Florida*
Dennis Officer: *University of Kentucky*
Ajay Patel: *University of Missouri at Columbia*
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Anthony Sanders: *Ohio State University*
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Lankford Walker: *Eastern Illinois University*
Ralph Walkling: *Ohio State University*
F. Katherine Warne: *Washington University*
Thomas Zorn: *University of Nebraska at Lincoln*
Kent Zumwalt: *Colorado State University*

Work on the current edition of the book commenced in July 1988. As we revised and refined this edition, several people reviewed the manuscript, providing detailed comments and useful suggestions, all of which have helped to make this edition a much better textbook.

Thomas Bankston: *Angelo State University*
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Annette Poulsen: *University of Georgia*
Lemma Senbet: *University of Wisconsin at Madison*
Kuldeep Shastri: *University of Pittsburgh*
A. Charlene Sullivan: *Purdue University*
R. Bruce Swensen: *Adelphi University*
Richard Taylor: *Arkansas State University*
Haluk Unal: *University of Maryland at College Park*
Berry Wilson: *Georgetown University*

Three students at the Wharton School, Dave Decker, Max Kozower, and Giri Sekhar, read much of the book and worked through most of the problems. Their suggestions improved the quality of the book and eliminated many errors and typos. In addition, the second edition was class-tested in some spring 1989 and summer 1989 sections of Corporation Finance at Wharton, and in spring 1989 at the University of Southern California.

The most important, substantive contributions of all to the second edition were clearly made by the following two individuals. Ruth Pagell, Associate Librarian of the Van Pelt Library of the University of Pennsylvania, read through many chapters. Her suggestions and detailed criticism were most useful in creating a clear, concise, and user-friendly text. Howard Kaufold, Associate Director of the Wharton Graduate Division, provided much helpful advice on the material on capital budgeting, risk and return, capital structure, and leasing. His suggestions gave much-needed focus to certain topics, a not unexpected result given his preeminence as a teacher.

We owe a debt of gratitude to Sharon Sievert, a former Ph.D. student at the Wharton School now employed by Putnam, Hayes and Bartlett. Under the authors' supervision, she revised the problem sets at the end of each chapter. Her knowledge, persistence, and attention to detail have resulted in a superior set of problems. Ricardo Rodriguez of the University of Miami checked all the mathematics in the book, both in the text and in the problems. He pointed out a number of errors and typos, for which we are extremely grateful. In addition, he suggested ways of improving the clarity of a number of problems. Kang Yon, a Ph.D. student of the Finance Department of the Wharton School, checked all the end-of-chapter problems and proofread the entire book. He caught a number of errors, thereby greatly enhancing the quality of the book. His attention to detail and his understanding of the subtleties of the English language have benefitted the book immeasurably. As a final step, Chris Gertes, an undergraduate at the Wharton School, proofread many of the chapters. He corrected a number of typos and we thank him for his help.

Over the past two years, readers have provided assistance by detecting and reporting errors. Our goal is to offer the best textbook available on the subject, so this information was invaluable as we prepared the second edition. We want to

ensure that all future editions are error-free and therefore we will offer $10 per arithmetic error to the first individual reporting it. Any arithmetic error resulting in subsequent errors will be counted double. All errors should be mailed to the following address: Professor Randolph W. Westerfield, School of Business Administration, University of Southern California, University Park, Los Angeles, CA 90089.

Much credit must go to a superior group of people at Irwin. Our special thanks goes to Terri Eynon, Developmental Editor, who deftly smoothed out potentially chaotic situations in the publishing process, and to Mike Junior, Sponsoring Editor, whose vision and optimism made this edition a reality.

We also give special thanks to Paul Hiles of the Wharton School, who typed the entire manuscript in expert fashion and helped in many other ways. In addition, Helen Pitts of the School of Business Administration at USC gave us a great deal of assistance in preparing the manuscript.

Finally, we wish to thank our families and friends, Carol, Kate, Jon, Jan, Mark, Lynne, Tina, Paula, and Ruth for their forbearance and help.

Stephen A. Ross
Randolph W. Westerfield
Jeffrey F. Jaffe
November 1, 1989

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