

Corporate Finance



FIFTH CANADIAN EDITION



Jonathan Berk | Peter DeMarzo | David Stangeland

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Dedication

To Rebecca, Natasha, and Hannah for the love and for being there. — J. B.

To Kauai, Pono, Koa, and Kai for all the love and laughter. — P. D.

To Hayden, my parents, my family and friends for all the love, support, encouragement, and motivation. — D. S.

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Preface

Approach

The first Canadian edition of this text was written just as the financial crisis of 2008–2009 was unfolding. That financial crisis, and the continuing crises that followed, reinforced the need to understand finance to ensure that good financial decisions are made. As we said in the first edition, understanding finance is important and is the purpose of this book:

In our over 60 years of combined teaching experience, we have found that leaving out core material deemed “too hard” actually makes the subject matter less accessible. The core concepts in finance are simple and intuitive. What makes the subject challenging is that it is often difficult for a novice to distinguish between these core ideas and other intuitively appealing approaches that, if used in financial decision making, will lead to incorrect decisions. De-emphasizing the core concepts that underlie finance strips students of the essential intellectual tools they need to differentiate between good and bad decision making. Therefore, our primary motivation for writing this book was to equip students with a solid grounding in the core financial concepts and tools needed to make good decisions.

There is little doubt that one of the most important contributing factors to the 2008–2009 financial crisis was that many practitioners who should have known better did not understand, or chose to ignore, the core concepts that underlie finance in general (and the pedagogy in this book in particular), leading them to make many very bad decisions.

We present corporate finance as an application of a set of simple, powerful ideas. At the heart is the principle of the absence of arbitrage opportunities, or Law of One Price: In life, you don't get something for nothing. This simple concept is a powerful and important tool in financial decision making. By relying on it, and the other core principles in this book, financial decision makers can avoid the bad decisions brought to light by the financial crisis. We use the Law of One Price as a compass; it keeps financial decision makers on the right track and is the backbone of the entire book. We introduce the Law of One Price concept as the basis for net present value and the time value of money in Chapter 3, *Arbitrage and Financial Decision Making*. In the opening of each part, and as pertinent throughout the remaining chapters, we relate major concepts to the Law of One Price, creating a framework to ground the student and connect theory to practice.

Canadian Content and Context

A Canadian text should reflect Canadian realities and show how they fit into the bigger picture. The Canadian tax system, for example, differs significantly from that of the United States regarding dividends, capital gains, capital cost allowance, leasing, and foreign subsidiary income and its taxation in the parent company. We use the relevant Canadian tax code to make the examples more realistic to students and to give them exposure to how Canadian taxation works. There are many institutional and market differences between Canada and the United States. We have incorporated information on both countries' institutions and markets and often include comparisons with other countries. We feel it is important that students understand Canada's relative position on a number of issues related to markets, the financial crisis, corporate governance, and

corporate finance. To this end, we have selected Canadian examples, when appropriate, for use in the text. Many of the companies we use as examples are familiar to Canadian students—they are companies that have had interesting successes or failures. We feel that, in addition to learning corporate finance, students should have familiarity with Canadian business and its rich history.

What's New

We have updated all text discussions and figures, tables, and facts to accurately reflect developments in the field in the last three years. Given the success of the first four editions, we focused substantive changes on areas where there was clear evidence that such change would be beneficial. Specific highlights include the following:

- Chapter 1 has been renamed from *The Corporation* to *The Corporation and Financial Markets* as financial markets have taken a larger role in the chapter. Several enhancements have been made, including additional discussion of the firm and society to complement the discussion of stakeholder satisfaction, corporate social responsibility, and how these connect to the goal of shareholder wealth maximization. The section on stock markets has been expanded to include dark pools and added discussion on limit orders and high-frequency traders. A new section on fintech has also been added. While students may think fintech is a new phenomenon, we highlight how the Toronto Stock Exchange was a fintech pioneer in 1977 when it introduced the first fully automated trading system and how that system was adopted around the world by many other exchanges. Reflective of these changes, four new end-of-chapter problems have been added. Some professors like to dig into the details of taxation as it relates to different business forms and investor accounts, so we improved the accessibility of the online appendix that addresses types of payouts of the different business forms and the type of investor account into which the payouts flow. This tax appendix is quite detailed and reflects the latest Canada Revenue Agency rules.
- In Part 2, *Tools* (Chapters 3, 4, and 5), we updated data and discussions related to the material on arbitrage, financial decision making, time value, and interest rates. The section “Using Primitive Securities to Solve for a Security’s Price” in the online appendix for Chapter 3 has been revised so that it may be read independently of the prior section. A new data case was added to Chapter 3 examining arbitrage strategies in the context of bitcoin. While the use of financial functions is still shown in the context of Excel, better references to the financial calculator appendix of Chapter 4 are also now included within the body of the text.
- Part 3, *Basic Valuation* (Chapters 6 to 9), has been updated and several new features have been added. In Chapter 6, *Valuing Bonds*, we added a new online case study on the Greek default and debt restructuring. Chapter 7, *Valuing Stocks*, includes a new box on cryptocurrencies and price bubbles, and an enhancement of the introduction to free cash flow. In Chapters 8 and 9, we provide references to Canadian studies by Kent Baker, Shantanu Dutta, and Samir Saadi that shed light on the use of different investment decision rules and risk analysis techniques. When discussing project externalities in Chapter 9, we add a formal definition for complementary products and show how this can be a positive externality.
- Part 4, *Risk and Return* (Chapters 10 to 13), has many revisions including an updated Nobel Prize box, revised end-of-chapter problems and solutions, and an additional

Data Case. We included discussion of a global pandemic as a systematic risk in Chapter 10. A comprehensive interview with a pension-fund manager, Jeff Norton, is added in Chapter 11 and gives great insight into the market portfolio for Canadian investors and the tradeoffs between investing in equities and alternative assets and to what extent Canadian versus foreign investments should be included in the risky part of an investor's portfolio. Our discussion in Chapter 12 of the market risk premium now allows for the fact that the risk premium can change depending on the level of risk aversion among investors; this concept is related to the potentially higher level of risk aversion during the COVID-19 virus pandemic. Chapter 13 has updated coverage to reflect recent developments in asset pricing and behavioural finance, and a new section on smart beta was added.

- Part 5, *Options* (Chapters 14 to 16), has several updates including a major revision to the presentation of put–call parity for dividend paying stocks in Chapter 14. In Chapter 15, the figure showing the VIX Index through time has been updated to show the record high implied volatility (surpassing the global financial crisis) reached early on in the COVID-19 pandemic. In Chapter 16, where real options are discussed, we include a reference to another Canadian study by Baker, Dutta, and Saadi that indicates the use of real options analysis by managers.
- Part 6, *Capital Structure and Dividend Policy* (Chapters 17 to 20) incorporates various updates including revised current tax information across Canadian provinces/territories for corporate and personal taxes (in Chapter 18), a new Data Case for Chapter 20, revised information on ex-dividend dates and correspondingly revised end-of-chapter problems in Chapter 20.
- In Part 8, *Long-Term Financing* (Chapters 23 to 25), we improved the explanations in the Global Financial Crisis boxes and updated the material to reflect the unfolding COVID-19 pandemic (current at the time of writing). In addition, a new example on mitigating debt overhang was added to Chapter 25.
- In Part 9, *Short-Term Financing* (Chapters 26 and 27), Chapter 26, *Working Capital Management*, now includes an enhanced discussion of inventory management with references to just-in-time management and the occurrence of stock-outs during the COVID-19 pandemic. We have updated and added more detailed information on Canadian tax law with respect to foreign income and contrasts between the Canadian and U.S. tax laws, which differ from each other significantly.
- In Part 10, *Special Topics* (Chapters 28 to 31), Chapter 29, *Corporate Governance*, includes several new or revised elements. A new box on celebrity boards and their effectiveness in monitoring was added. Updated and expanded discussion on say-on-pay votes, the Dodd-Frank Act, and Canadian requirements was incorporated. A new subsection on how activist funds can influence managers to adopt better corporate strategies was added and discussion on whether cross-ownership by mutual funds raises anti-competitive concerns was included. Finally, two new end-of-chapter questions were added.

Part-by-Part Overview

Parts 1 and 2 lay the foundation for our study of corporate finance. Chapter 1 introduces the corporation and other business forms. An expanded discussion on taxation of business forms for Canadian investors is found in the online appendix to Chapter 1. We also examine the roles of the financial manager and financial markets, as well as conflicts surrounding ownership and control of corporations. Chapter 2 reviews basic corporate

accounting principles and financial statements. It includes ratios and ratio analysis and the DuPont identity.

Part 2 presents the basic tools that are the cornerstones of corporate finance. As we have already pointed out, Chapter 3 introduces the Law of One Price and net present value as the basis of the unifying framework that will guide the student through the course. A brief introduction to risk is included so students begin to understand how risk affects asset pricing. An appendix is available online for instructors who want to get into the mathematics of replicating portfolios or want to introduce primitive securities for valuing other securities. Chapter 4 introduces the time value of money and describes methods for estimating the timing of cash flows and computing the net present value of various types of cash flow patterns. An online appendix on using a financial calculator has been provided for this chapter. Chapter 5, *Interest Rates*, provides an extensive overview of issues that arise in estimating the appropriate discount rate.

Part 3 opens with bond valuation in Chapter 6 and is an excellent way to show a direct application of the time value and interest rate material from Chapters 4 and 5. The appendix to Chapter 6 introduces forward rates and theories of the term structure of interest rates. Chapter 7 includes stock valuation and material on market efficiency. It is another good application of the time value material from Chapter 4 and the market efficiency section reinforces the separation principles from Chapter 3. Chapter 8 begins the coverage on capital budgeting and we present and critique alternatives to net present value for evaluating projects. We explain the basics of valuation for capital projects in Chapter 9 and provide a clear and systematic presentation of the difference between earnings and free cash flow and give a solid introduction to Canadian tax effects from capital cost allowance (CCA).

The flexible structure of Part 4 allows professors to tailor coverage of risk and return to their needs—be it for a theory- or practice-heavy approach. Chapter 10, *Capital Markets and the Pricing of Risk*, provides the keys to understanding risk and return. The chapter also explains the distinction between diversifiable and systematic risk. After this comprehensive yet succinct treatment, professors may choose to continue to the theory coverage, now centralized in Chapter 11, *Optimal Portfolio Choice and the Capital Asset Pricing Model*, which presents the CAPM and examines the details of mean–variance portfolio optimization. Alternatively, professors can proceed directly to Chapter 12, *Estimating the Cost of Capital*, which presents a practical discussion of the cost of capital. Chapter 13 examines the role of behavioural finance and ties investor behaviour to the topic of market efficiency and alternative models of risk and return. Some professors may want to supplement the market efficiency material in Chapter 7 with Sections 13.1 to 13.6.

Part 5 focuses on the role of options in investing and financing decisions. Chapter 14 introduces financial options, their payoffs and profits, and put–call parity. Chapter 15 presents commonly used techniques for pricing options. Chapter 16 highlights the role of real options in capital budgeting and features a section on ordering multi-stage investments.

Part 6 addresses how a firm should raise the funds it needs to undertake its investments and the firm’s resulting capital structure. We focus on examining how the choice of capital structure affects the value of the firm in a perfect world in Chapter 17, and with frictions such as taxes and agency issues in Chapters 18 and 19. Chapter 19 features coverage of the asset substitution problem and debt overhang and relates these items to options concepts covered in Chapter 14. We focus on payout policy in Chapter 20.

In Part 7, we return to the capital budgeting decision with the complexities of the real world. Chapter 21 introduces the three main methods for capital budgeting with

leverage and market imperfections: the weighted average cost of capital (*WACC*) method, the adjusted present value (*APV*) method, and the flow-to-equity (*FTE*) method. We present these traditionally difficult but important ideas by emphasizing the underlying assumptions and core principles behind them, moving through progressively more complex ideas. This organization allows professors to delve as deeply into these techniques as is appropriate for their needs. Chapter 22 presents a capstone case for the first six parts of the book that applies the techniques developed up to this point to build a valuation model for a firm, Ideko Corp., using Excel.

In Part 8, we explain the institutional details associated with alternative long-term financing sources. Chapter 23 describes the process a company goes through when it raises equity capital. In Chapter 24, we review how firms can use the debt markets to raise capital and the role of asset-backed securities, collateralized debt obligations, and mortgage-backed securities in the financial crisis of 2008–2009. Chapter 25 introduces leasing as an alternative and in the lease analysis treats the CCA tax shields in a manner consistent with their presentation in Chapter 9.

In Part 9, we turn to the details of running the financial side of a corporation on a day-to-day basis. In Chapter 26, we discuss how firms manage their working capital. In Chapter 27, we explain how firms manage their short-term cash needs.

Part 10 addresses special topics. Chapter 28 discusses mergers and acquisitions, and Chapter 29 provides an overview of corporate governance. In Chapter 30, we consider corporations' use of insurance and financial derivatives to manage risk. We compare and contrast the different risk management techniques and present several new examples on practical risk management. Chapter 31 introduces the issues a firm faces when making a foreign investment and addresses the valuation of foreign projects and the tax effects on the Canadian parent company.

Customize Your Approach

Corporate Finance offers coverage of the major topical areas for introductory-level MBA students, as well as the depth required in a reference textbook for upper-level courses. Most professors customize their classes by selecting a subset of chapters reflecting the subject matter they consider most important. We designed this book from the outset with this need for flexibility in mind. Parts 2 through 6 are the core chapters in the book. We envision that most MBA programs will cover this material—yet even within these core chapters instructors can pick and choose what they wish to cover. Some possible approaches include:

- Single-quarter course: Cover Chapters 1 and 3–12. If time allows, or if students are previously familiar with the time value of money, add Chapters 17–19.
- Semester-long course: Incorporate chapters from Part 5, *Options*, and Part 10, *Special Topics*, as desired.
- Single mini-semester: Assign Chapters 1, 3–10, 17, and 18 if time allows.

Features

Teaching Students to Think Finance

With consistent presentation and an innovative set of learning aids, *Corporate Finance*, Fifth Canadian Edition, simultaneously meets the needs of future managers in both financial and non-financial roles. This textbook truly shows every student how to “think finance.”

Bridging Theory and Practice

The Law of One Price framework reflects the modern idea that the absence of arbitrage is the unifying concept of valuation. This critical insight is introduced in Chapter 3, revisited in each Part Opener, and integrated throughout the text—motivating all major concepts and connecting theory to practice.

To be successful, students need to master the core concepts and learn to identify and solve problems that today’s practitioners face.

- **Worked Examples** accompany every important concept using a step-by-step procedure that illustrates both the Problem and its Solution. Clear labels make them easy to find for help with homework or studying.
- **Common Mistake boxes** alert students to frequently made mistakes stemming from misunderstanding core concepts and calculations, as well as mistakes made in practice.
- **Global Financial Crisis boxes** reflect the reality of recent financial crises and the ongoing sovereign debt crisis, noting lessons learned.

Applications That Reflect Real Practice

Corporate Finance, Fifth Canadian Edition, features actual companies and leaders in the field.

- **Interviews** with notable practitioners highlight leaders in the field and address the effects of the financial crisis.
- **General Interest boxes** highlight timely material from financial publications that sheds light on business problems and real-company practices.

Simplified Presentation of Mathematics

One of the hardest parts of learning finance is mastering the jargon, math, and non-standardized notation. *Corporate Finance*, Fifth Canadian Edition, systematically uses:

- **Notation Boxes:** Each chapter begins with a Notation box that defines the variables and the acronyms used in the chapter and serves as a “legend” for students’ reference.
- **Numbered and Labelled Equations:** The first time a full equation is given in notation form it is numbered. Key equations are titled and revisited in the chapter summary and the end papers.
- **Using Excel Boxes:** When appropriate, hands-on instruction for Excel techniques is provided, including screenshots to help guide students.
- **Spreadsheet Tables:** Select tables are available on Pearson MyLab Finance as Excel files, enabling students to change inputs and manipulate the underlying calculations.

Practise Finance to Learn Finance

Working problems is the proven way to cement and demonstrate an understanding of finance.

- **Concept Check questions** at the end of each section enable students to test their understanding and target areas in which they need further review.

- **End-of-chapter problems written personally by Jonathan Berk, Peter DeMarzo, and David Stangeland** offer instructors the opportunity to assign first-rate materials to students for homework and practice with the confidence that the problems are consistent with the chapter content. Both the problems and solutions, which were also written by the authors, have been class-tested and accuracy checked to ensure quality. Selected end-of-chapter problems are also accompanied by Excel spreadsheets with different icons indicating what the spreadsheets are for, and where they can be found:

Selected end-of-chapter problems are also accompanied by an **Excel Solution** and/or an **Auto-Graded Excel Project**. This is indicated in bold text at the beginning of the question.

- **Excel Solutions** are available in the Instructor's Solutions Manual.
- **Auto-Graded Excel Projects** are available on Pearson's MyLab Finance. Using proven, field-tested technology, these new auto-graded Excel Projects allow instructors to seamlessly integrate Excel content into their course.
- **Data Cases** present in-depth scenarios in a business setting with questions designed to guide students' analysis. Many questions involve the use of Internet resources and Excel techniques.

Available in MyLab Finance

Pearson Canada's online resource, MyLab Finance, offers instructors and students all of the resources in one place. With MyLab Finance, you will be able to enliven your lectures with a variety of materials. Your students will be able to prepare and perform better on assignments and exams with customized study plans. MyLab Finance is available to instructors by going to pearsonmylabandmastering.com and following the instructions on the opening screen. Students receive access to MyLab Finance when they purchase their new text.

- **Pearson eText.** The Pearson eText gives students access to their textbook anytime, anywhere. In addition to note taking, highlighting, and bookmarking, the Pearson eText offers interactive and sharing features. Instructors can share their comments or highlights, and students can add their own, creating a tight community of learners within the class.
- **Auto-graded Excel Projects.** Using proven, field-tested technology, auto-graded Excel Projects allow instructors to seamlessly integrate Excel content into their course without having to manually grade spreadsheets. Students have the opportunity to practise important finance skills in Microsoft Excel, helping them to master key concepts and gain proficiency with Excel. Students simply download a spreadsheet, work live on a finance problem in Excel, and then upload that file back into MyLab Finance, where they receive reports on their work that provide personalized, detailed feedback to pinpoint where they went wrong on any step of the problem. These reports generate within minutes of submission.
- **Question Help.** MyLab Finance homework and practice questions are correlated to the textbook, and generate algorithmically to give students unlimited opportunity for mastery of concepts. If students get stuck, Learning Aids including Help Me Solve This, View an Example, eText Pages, and a Financial Calculator walk them through the problem and identify helpful info in the text, giving them assistance when they need it most.

- **Financial Calculator.** Students have access to a fully functional financial calculator inside MyLab Finance and a financial calculator app that they can download to their iPhone®, iPad®, or Android device.
- **Video Series.** Conceptual videos on several topics that can be challenging for students to grasp, including Default Risk, Market Efficiency, Diversification, Mutual Fund Performance, and more are available for instructors to assign in the assignment manager, or for student self-study in the multimedia library.
- **Personalized Learning.** Not every student learns the same way or at the same rate. With the growing need for acceleration through many courses, it's more important than ever to meet students where they learn. Personalized learning in MyLab Finance gives you the flexibility to incorporate the approach that best suits your course and your students.
 - **The Study Plan** acts as a tutor, providing personalized recommendations for each of your students based on their ability to master the learning objectives in your course. This allows students to focus their study time by pinpointing the precise areas they need to review, and allowing them to use customized practice and learning aids—such as videos, eText, tutorials, and more—to get them back on track. Using the report available in the Gradebook, you can then tailor course lectures to prioritize the content where students need the most support—offering you better insight into classroom and individual performance.
 - **Dynamic Study Modules** help students study effectively on their own by continuously assessing their activity and performance in real time. Here's how it works: students complete a set of questions with a unique answer format that also asks them to indicate their confidence level. Questions repeat until the student can answer them all correctly and confidently. Once completed, Dynamic Study Modules explain the concept using materials from the text. These are available as graded assignments prior to class, and accessible on smartphones, tablets, and computers. NEW! Instructors can now remove questions from Dynamic Study Modules to better fit their course.
- **Reporting Dashboard.** View, analyze, and report learning outcomes clearly and easily, and get the information you need to keep your students on track throughout the course, with the new Reporting Dashboard. Available via the Gradebook and fully mobile-ready, the Reporting Dashboard presents student performance data at the class, section, and program levels in an accessible, visual manner.
- **Easily scalable and shareable content.** MyLab Finance enables you to manage multiple class sections, and lets other instructors copy your settings so a standardized syllabus can be maintained across your department. Should you want to use the same MyLab Finance course next semester, with the same customized settings, you can copy your existing course exactly—and even share it with other faculty members.

Learning Solutions Managers. Pearson's Learning Solutions Managers work with faculty and campus course designers to ensure that Pearson technology products, assessment tools, and online course materials are tailored to meet your specific needs. This highly qualified team is dedicated to helping schools take full advantage of a wide range of educational resources by assisting in the integration of a variety of instructional materials and media formats. Your local Pearson Canada sales representative can provide you with more details on this service program.

Acknowledgments

Now that we have explained what is in this book, we can turn to thanking the people who made it happen. As any textbook writer will tell you, you cannot write a textbook of this scope without a substantial amount of help. First, we thank Amie Plourde, editorial director, and Keara Emmett, executive portfolio manager, for their vision of a high-quality corporate finance text for the Canadian market which continues to inspire our writing. Kamilah Reid-Burrell's knowledge, experience, leadership, and patience kept the various aspects of the project moving along smoothly. Toni Chahley needs special thanks for her hard work, encouragement, and understanding in her role as senior developmental editor—she is a true pleasure to work with. Her focus on getting the chapters written and moved through the developmental process was amazing. We also thank Sarah Gallagher and Jessica Hellen, as project managers, and Suzanne Simpson Millar, as production editor, who managed the production stages of the book with skill. Laurel Sparrow provided excellent copy editing, and we thank her for making the chapters more readable and grammatical. Therese Trainor, the technical checker, also gets our thanks for her keen eye to detail and the ability to catch and correct any error before the final printing. We are also thankful to Nicole Mellow for her skillful oversight of the Pearson MyLab Finance project—a formidable undertaking in its own right. Of course, we also thank Darcey Pepper for leading the successful marketing of the text in the Canadian market. Finally, we would like to thank our MyLab Finance content developmental author, Therese Trainor. Therese also undertook the task of technical checking the entire book as well as its online files—for this we owe many thanks.

Updating a textbook like ours requires a lot of painstaking work, and there are many who have provided insights and input along the way. We would especially like to call out Jared Stanfield for his important contributions and suggestions throughout. We are also appreciative of Marlene Bellamy's work conducting the lively interviews that provide a critically important perspective, and to the interviewees who graciously provided their time and insights.

Of course, this fifth edition text is built upon the shoulders of the first four, and we have many to thank for helping us make those early versions a reality. We remain forever grateful for Jennifer Koski's critical insights, belief in this project, and tireless effort, all of which were critical to the first edition. Many of the later, non-core chapters required specific detailed knowledge. Nigel Barradale, Reid Click, Jarrad Harford, and Marianne Plunkert ensured that this knowledge was effectively communicated. Joseph Vu and Vance P. Lesseig contributed their talents to the Concept Check questions and Data Cases, respectively.

Mark Rubinstein inspired us with his passion to get the history of finance right by correctly attributing the important ideas to the people who first enunciated them. Inspiration is one thing; actually undertaking the task is another. His book, *A History of the Theory of Investments: My Annotated Bibliography*, was indispensable—it provided the only available reference of the history of finance. As will be obvious to any reader, we have used it extensively in this text and we, as well as the profession as a whole, owe him a debt of gratitude for taking the time to write it all down.

We could not have written this text if we were not once ourselves students of finance. As any student knows, the key to success is having a great teacher. In our case we are lucky to have been taught and advised by the people who helped create modern finance: Ken Arrow, Darrell Duffie, Mordecai Kurz, Randall Morck, Richard Roll, and Stephen Ross. It was from them that we learned the importance of the core principles of finance, including the Law of One Price, on which this book is based. The learning process does not end at graduation and like most people we have had especially influential colleagues

and mentors from which we learned a great deal during our careers and we would like to recognize them explicitly here: Mike Fishman, Richard Green, Vasant Naik, Art Raviv, Mark Rubinstein, Joe Williams, and Jeff Zwiebel. We continue to learn from all of our colleagues and we are grateful to all of them. Finally, we would like to thank those with whom we have taught finance classes over the years: Anat Admati, Jerrod Falk, Ming Huang, Gady Jacoby, Dirk Jenter, Robert Korajczyk, Paul Pflaiderer, Sergio Rebelo, Richard Stanton, and Raman Uppal. Their ideas and teaching strategies have without a doubt influenced our own sense of pedagogy and found their way into this text.

*Jonathan Berk
Peter DeMarzo
David Stangeland*

Contributors

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Fifth Canadian Edition

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Sujata Madan, *McGill University*

Fourth Canadian Edition

Lobna Bouslimi, *Concordia University*
Tom Cottrell, *University of Calgary*
Anna Dodonova, *University of Ottawa*
Isaac Otchere, *Carleton University*
Eloisa Perez, *MacEwan University*
Mikhail Simutin, *University of Toronto*
Ken Vetzal, *University of Waterloo*
Wei Wang, *Queen's University*

Third Canadian Edition

Vadim di Pietro, *McGill University*
Alfred Lehar, *University of Calgary*
Andras Marosi, *University of Alberta*
Andrey Pavlov, *Simon Fraser University*
Blake Phillips, *University of Waterloo*
Gabriel J. Power, *Laval University*
Julie Slater, *Concordia University*
Jun Zhou, *Dalhousie University*

About the Authors



**Peter DeMarzo
and Jonathan Berk**

JONATHAN BERK is the A.P. Giannini Professor of Finance at the Graduate School of Business, Stanford University and is a research associate at the National Bureau of Economic Research. Before coming to Stanford, he was the Sylvan Coleman Professor of Finance at Haas School of Business at the University of California, Berkeley. Prior to earning his Ph.D., he worked as an associate at Goldman Sachs (where his education in finance really began).

Professor Berk's research interests in finance include corporate valuation, capital structure, mutual funds, asset pricing, experimental economics, and labour economics. His work has won a number of research awards including the Stephen A. Ross Prize in Financial Economics, TIAA-CREF Paul A. Samuelson Award, the Smith Breeden Prize, Best Paper of the Year in *The Review of Financial Studies*, and the FAME Research Prize. His paper, "A Critique of Size-Related Anomalies," was selected as one of the two best papers ever published in *The Review of Financial Studies*. In recognition of his influence on the practice of finance he has received the Bernstein-Fabozzi/Jacobs Levy Award, the Graham and Dodd Award of Excellence, and the Roger F. Murray Prize. He served two terms as an associate editor of the *Journal of Finance*, and a term as a director of the American Finance Association, the Western Finance Association, and academic director of the Financial Management Association. He is a fellow of the Financial Management Association and a member of the advisory board of the *Review of Finance* and the *Journal of Portfolio Management*.

Born in Johannesburg, South Africa, Professor Berk has two daughters, and is an avid skier and biker.

PETER DEMARZO is the Staehelin Family Professor of Finance at the Graduate School of Business, Stanford University. He is the current president of the American Finance Association and a research associate at the National Bureau of Economic Research. He teaches MBA and Ph.D. courses in corporate finance and financial modelling. In addition to his experience at the Stanford Graduate School of Business, Professor DeMarzo has taught at the Haas School of Business and the Kellogg Graduate School of Management, and he was a national fellow at the Hoover Institution.

Professor DeMarzo received the Sloan Teaching Excellence Award at Stanford and the Earl F. Cheit Outstanding Teaching Award at U.C. Berkeley. Professor DeMarzo has served as an associate editor for *The Review of Financial Studies*, *Financial Management*, and the *B.E. Journals in Economic Analysis and Policy*, as well as vice president and director of the American Finance Association. He has also served as vice president and president of the Western Finance Association. Professor DeMarzo's research is in corporate finance, asset securitization, and contracting, as well as market structure and regulation. His recent work has examined issues of the optimal design of contracts and securities, leverage dynamics and the role of bank capital regulation, and the influence of information asymmetries on stock prices and corporate investment. He has also received numerous awards including the Western Finance Association Corporate Finance Best-Paper Award, the Charles

River Associates Best-Paper Award, and the Barclays Global Investors/Michael Brennan Best-Paper of the Year Award from *The Review of Financial Studies*.

Professor DeMarzo was born in Whitestone, New York, and is married with three boys. He and his family enjoy hiking, biking, and skiing.



David Stangeland

DAVID STANGELAND, Ph.D., BComm (Distinction), CPA, CMA, did his undergraduate and graduate university education at the University of Alberta in Edmonton. In 1991, he moved to Winnipeg where he joined the Accounting and Finance Department in the I.H. Asper School of Business at the University of Manitoba. Dr. Stangeland is a professor of finance, was head of the Department of Accounting and Finance for two terms, was acting head of the Department of Economics for two years, was the associate dean of the I.H. Asper School of Business responsible for undergraduate and MBA programs, international exchange, and faculty administration, was department head again, and is currently associate dean for professional programs (MBA, Master of Finance, Master of Supply Chain Management, and Master of Business Analytics).

Professor Stangeland teaches finance courses at the University of Manitoba and in the Canadian Executive MBA program at the Warsaw School of Economics in Poland. His teaching has spanned undergraduate, MBA, and Ph.D. courses in corporate finance, investment banking, and international finance.

Professor Stangeland's research interests are in the areas of corporate governance, corporate control, and corporate finance. His work is well cited and has been published in several journals including the *Journal of Financial and Quantitative Analysis*, the *Journal of Banking & Finance*, the *Journal of Corporate Finance*, *Financial Management*, the *Stanford Journal of Law, Business, & Finance*, and numerous others.

Dr. Stangeland served on the national board of directors of CMA Canada and he chaired CMA Canada's pension committee. He was a member of the board of trustees for the University of Manitoba pension plans and is a member of the pension committees for the University of Manitoba. He is a member of the investment committees for the University of Manitoba pension plans and former member of the investment committee for Manitoba's Teachers' Retirement Allowances Fund. He also served on the independent review committees for two mutual fund companies. Professor Stangeland is a two-time recipient of the CMA Canada Academic Merit Award for Teaching and Research, a four-time winner of the University of Manitoba Teaching Services Award, and a recipient of the Associates Award for Research.

Professor Stangeland was born and raised in Edmonton, Alberta. He and his partner have a great appreciation for the outdoors, especially running, cycling, hiking, and skiing and, in the winter, travelling to warmer climates. Their go-to destination of choice is Puerto Vallarta, Mexico; they enjoy spending time at their condo there.

COMMON SYMBOLS AND NOTATION

A	market value of assets, premerger total value of acquirer	n	date of the last cash flow in a stream of cash flows, terminal date or forecast horizon, notational principal of a swap contract
APR	annual percentage rate	N_i	number of shares outstanding of security i
B	risk-free investment in the replicating portfolio	NPER	annuity spreadsheet notation for the number of periods or dates of the last cash flow
C	cash flow, call option price	NPV	net present value
CapEx	capital expenditures	NWC_t	net working capital in year t
CCA, CCA_t	capital cost allowance, capital cost allowance claimed in tax-year t	P	initial price of a bond, initial principal or deposit, or equivalent present value, put option price
$Corr(R_i, R_j)$	correlation between returns of i and j	P_i	price of security i
$Cov(R_i, R_j)$	covariance between returns of i and j	P/E	price-earnings ratio
CPN	coupon payment on a bond	PMT	annuity spreadsheet notation for cash flow
D	market value of debt	PV	present value; annuity spreadsheet notation for the initial amount
d	debt-to-value ratio	q	dividend yield
d	CCA rate	p	risk-neutral probability
Div_t	dividend paid on date t	r	interest rate, discount rate, cost of capital, projected cost of capital, cost of capital of an investment opportunity
dis	discount from face value	R_i	return of security i
E	market value of equity	R_{mkt}	return of the market portfolio
EAR	effective annual rate	R_p	return on portfolio P
EBIT	earnings before interest and taxes	RATE	annuity spreadsheet notation for interest rate
EBITDA	earnings before interest, taxes, depreciation, and amortization	r_E, r_D	equity and debt costs of capital
EPS_t	earnings per share on date t	r_f	risk-free interest rate
$E [R_i]$	expected return of security i	r_i	required return or cost of capital of security i
F, F_T	one-year and T -year forward exchange rate	r_U	unlevered cost of capital
FCF_t	free cash flow in year t	r_{wacc}	weighted average cost of capital
FV_n	future value, face value of a bond, on date n	S	stock price, spot exchange rate, value of all synergies
g	expected dividend growth rate, growth rate	Sale Price, S	the price of an asset sold at the <i>beginning</i> of tax-year $t + 1$
I	initial investment or initial capital committed to the project	$SD(R_i)$	standard deviation (volatility) of return of security i
Int_t	interest expense, interest expense on date t	T	option expiration date, maturity date, market value of target
IRR	internal rate of return		
K	strike price		
k	interest coverage ratio, number of compounding periods per year		
L	lease payment, market value of liabilities		
ln	natural logarithm		
MV_i	total market capitalization of security i		