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# Fundamentals of Futures and Options Markets

*Fifth Edition*



John C. Hull

FIFTH EDITION

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# FUNDAMENTALS OF FUTURES AND OPTIONS MARKETS

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**To  
My Students**

# Preface

I was originally persuaded to write this book by colleagues who liked my other book *Options, Futures, and Other Derivatives*, but found the material a little too advanced for their students. *Fundamentals of Futures and Options Markets* covers much of the same ground as *Options, Futures, and Other Derivatives*, but in a way that readers who have had limited training in mathematics find easier to understand. One important difference between the two books is that there is no calculus in the present book. *Fundamentals* is suitable for undergraduate and graduate elective courses offered by business, economics, and other faculties. In addition, many practitioners who want to improve their understanding of futures and options markets will find the book useful.

Instructors can use this book in many different ways. Some may choose to cover only the first eleven chapters, finishing with binomial trees. For those who want to do more, there are many different sequences in which the material in Chapters 12 to 23 can be covered. From Chapter 16 onward, each chapter has been designed so that it is independent of the others and can be included in or omitted from a course without causing problems. I would recommend finishing a course with Chapter 23, which students always find interesting and entertaining.

## ***What's New in This Edition***

1. There is a new chapter on credit derivatives (Chapter 21).
2. The opening six chapters have been replaced by seven chapters that cover forward, futures, and swap contracts in a more student-friendly way. The chapter on hedging using futures has been moved to Chapter 3. Chapter 4 is now devoted to understanding how interest rates are calculated and used. Chapter 5 covers the determination of futures and forward prices. Chapter 6 deals with interest rate futures and Chapter 7 covers swaps.
3. Forty descriptions of real-world situations and interesting issues, referred to as *Business Snapshots*, illustrate points being made in the text.
4. There is a new release of DerivaGem (version 1.51), which includes Excel functions and examples of how they can be used.
5. The sequencing of Chapters 15 to 18 has been changed to better meet the needs of students and instructors.
6. The “Introduction to Binomial Trees” chapter has been extended to provide a more complete coverage of binomial trees in one place relatively early in the book.
7. For readers unfamiliar with the exponential and logarithm functions, an explanatory appendix has been added to Chapter 4.



8. The *Solutions Manual* has been expanded to become a *Solutions Manual and Study Guide*
9. There have been two changes to the mathematical notation. Here,  $K$  is used instead of  $X$  for an option's strike price, and  $\delta t$ ,  $\delta x$ , etc., have been replaced by  $\Delta t$ ,  $\Delta x$ , etc. (This reverses a change made in the last edition, where I was trying to avoid overworking  $\Delta$ , but found that the change was not popular!)
10. New end-of-chapter problems have been added.

The book (including end-of-chapter references) has been fully updated. Many changes have been made to improve the presentation of material.

### **Software**

DerivaGem version 1.51 is included with this book. This consists of two Excel applications: the *Options Calculator* and the *Applications Builder*. The Options Calculator consists of the software in the previous release (with minor improvements including the unlocking of worksheets). The Applications Builder consists of a number of Excel functions from which users can build their own applications. It includes a number of sample applications and enables students to explore the properties of options and numerical procedures more easily. It also allows more interesting assignments to be designed.

The software is described more fully at the end of the book. Updates to the software can be downloaded from my website:

<http://www.rotman.utoronto.ca/~hull>

### **Slides**

Several hundred PowerPoint slides are available from my website. Instructors adopting the book for their courses are welcome to adapt the slides to meet their own needs.

### **Answers to End-of-Chapter Problems**

At the end of each chapter (except the last) there are seven quiz questions that students can use to provide a quick test of their understanding of the key concepts. The answers to these are given at the end of the book. There are also over 270 Questions and Problems at the ends of chapters. Answers to these and advice for readers on how each chapter of the book should be studied are in the *Solutions Manual and Study Guide* (ISBN 0-13-144570-7), which is published by Prentice Hall. In addition, there are about one hundred Assignment Questions at the ends of chapters. Solutions to these are in the *Instructor's Manual*, which is available from Prentice Hall only to adopting instructors.

### **Acknowledgments**

Many people have played a part in the production of this book. Academics, students, and practitioners who have made excellent and useful suggestions over the years include Farhang Aslani, Emilio Barone, Giovanni Barone-Adesi, George Blazenko, Laurence Booth, Phelim Boyle, Peter Carr, Don Chance, J. P. Chateau, Brian Donaldson, Jerome Duncan, Steinar Ekern, Robert Eldridge, David Fowler, Louis Gagnon, Mark Garman, Dajiang Guo, Bernie Hildebrandt, Jim Hilliard, Basil Kalymon, Patrick Kearney, Cheng-kun Kuo, Elizabeth Maynes, Eddie Mizzi, Izzy Nelken, Paul Potvin, Richard Rendleman, Gordon Roberts, Edward Robbins, Chris Robinson, John Rumsey,

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I would particularly like to thank Alan White. Alan is a colleague at the University of Toronto with whom I have been carrying out joint research in options and futures for over twenty years. We have spent many hours discussing different issues concerning options and futures markets. Many of the new ideas in this book, and many of the new ways used to explain old ideas, are as much Alan's as mine. Alan has done most of the development work on the DerivaGem software.

Special thanks are due to my editor at Prentice Hall, Jackie Aaron, for her support, enthusiasm, advice, and encouragement. I am also grateful to Scott Barr, Leah Jewell, Paul Donnelly, and Maureen Riopelle, who at different times in the past have played key roles in the development of the book.

I welcome comments on the book from readers. My e-mail address is:

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John Hull  
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