Risk Management and Financial Institutions

THIRD EDITION

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JOHN C. HULL
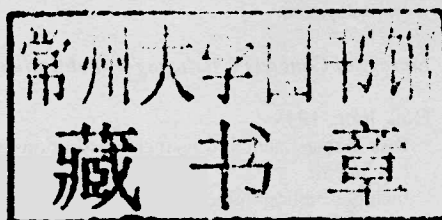
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To Michelle, Peter, and David

Much has happened in financial markets since the second edition of this book was published. We have experienced the worst crisis in more than 70 years. Risk management has assumed more importance than ever before in financial institutions. Market participants are wrestling with initiatives such as Basel III and Dodd–Frank. Liquidity risk and scenario analysis are receiving much more attention.

Risk Management and Financial Institutions has been expanded and updated to reflect these market developments. Like my other popular text *Options, Futures, and Other Derivatives*, this book is designed to be useful to practicing managers as well as college students. Those studying for GARP and PRMIA qualifications will find the book particularly helpful.

The book is appropriate for elective courses in either risk management or financial institutions. It is not necessary for students to take a course on options and futures markets prior to taking a course based on this book. But if they have taken such a course, some of the material in the first eight chapters does not need to be covered.

The level of mathematical sophistication and the way material is presented has been managed carefully so that the book is accessible to as wide an audience as possible. For example, when covering copulas in Chapter 11, I present the intuition followed by a detailed numerical example; when covering maximum likelihood methods in Chapter 10 and extreme value theory in Chapter 14, I provide numerical examples and enough details for readers to develop their own Excel spreadsheets. I have also provided my own Excel spreadsheets for many applications on my website: www.rotman.utoronto.ca/~hull.

This is a book about risk management, so there is relatively very little material on the valuation of derivatives. (This is the main focus of my other two books *Options, Futures, and Other Derivatives* and *Fundamentals of Futures and Options Markets*.) The appendices at the end of the book include material that summarizes some of the key results that are important in risk management and the DerivaGem software can be downloaded from my website.

WHAT'S NEW

The third edition has been fully updated and contains much new material. In particular:

1. There is a new chapter on Basel 2.5, Basel III, and Dodd–Frank.
2. There is more material on counterparty credit risk.
3. There is more material on the calculation of credit VaR (for both the banking book and the trading book).

4. The chapter on the crisis has been updated and is now positioned earlier in the book.
5. There is more material on central clearing, collateralization, and the overnight indexed swap rate.
6. There is more material on Vasicek's model and other similar models. The use of maximum likelihood methods to estimate the parameters in Vasicek's model is now covered.
7. The software illustrating VaR calculations has been enhanced.
8. There is more material on the implementation of the AMA approach for operational risk.
9. Appendices explaining how CDSs and synthetic CDOs are valued have been included.
10. There are a number of enhancements to the DerivaGem software, which is available from my website: www.rotman.utoronto.ca/~hull.
11. New software for applications such as principal components analysis and the manipulation of credit transition matrices is now available on my website.

SLIDES

Several hundred PowerPoint slides can be downloaded from my website or from Wiley's Higher Education website. Adopting instructors are welcome to adapt the slides to meet their own needs.

QUESTIONS AND PROBLEMS

End-of-chapter problems are divided into two groups: "Practice Questions and Problems" and "Further Questions." Solutions to the former are at the end of the book. Solutions to the latter and accompanying software are available to adopting instructors from Wiley's Higher Education website.

INSTRUCTOR'S MANUAL

The instructor's manual is made available online to adopting instructors by Wiley. It contains solutions to "Further Questions" (with Excel spreadsheets), notes on the teaching of each chapter, and some suggestions on course organization.

ACKNOWLEDGMENTS

Many people have played a part in the production of this book. I have benefited from interactions with many academics and practicing risk managers. I would like to thank the students in my MBA and Master of Finance risk management courses at University of Toronto, many of whom have made suggestions as to how the material could be improved. Yoshit Rostogi provided excellent research assistance.

Alan White, a colleague at the University of Toronto, deserves a special acknowledgment. Alan and I have been carrying out joint research and consulting in the area of derivatives and risk management for over 25 years. During that time we have spent countless hours discussing key issues. 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 many people at Wiley, particularly Evan Burton, Meg Freeborn, Vincent Nordhaus, and Mary Daniello for their enthusiasm, advice, and encouragement.

I welcome comments on the book from readers. My e-mail address is hull@rotman.utoronto.ca.

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