Preface to the Second Edition

This second, revised edition contains a significant number of changes and additions to the original text. We were guided in our choices by the comments of a number of readers and reviewers as well as instructors using the text with graduate classes, and we are grateful to them for their advice. Any errors that remain are of course entirely our responsibility.

In the five years since the book was first published, the subject has continued to grow at an astonishing rate. Graduate courses in mathematical finance have expanded from their business school origins to become standard fare in many mathematics departments in Europe and North America and are spreading rapidly elsewhere, attracting large numbers of students. Texts for this market have multiplied, as the rapid growth of the *Springer Finance* series testifies. In choosing new material, we have therefore focused on topics that aid the student's understanding of the fundamental concepts, while ensuring that the techniques and ideas presented remain up to date. We have given particular attention, in part through revisions to Chapters 5 and 6, to linking key ideas occurring in the two main sections (discrete- and continuous-time derivatives) more closely and explicitly.

Chapter 1 has been revised to include a discussion of risk and return in the one-step binomial model (which is given a new, extended presentation) and this is complemented by a similar treatment of the Black-Scholes model in Chapter 7. Discussion of elementary bounds for option prices in Chapter 1 is linked to sensitivity analysis of the Black-Scholes price (the 'Greeks') in Chapter 7, and call-put parity is utilised in various settings.

Chapter 2 includes new sections on superhedging and the use of extended trading strategies that include contingent claims, as well as a more elegant derivation of the Black-Scholes option price as a limit of binomial approximants.

Chapter 3 includes a substantial new section leading to a complete proof of the equivalence, for discrete-time models, of the no-arbitrage condition and the existence of equivalent martingale measures. The proof, while not original, is hopefully more accessible than others in the literature.

This material leads in Chapter 4 to a characterisation of the arbitrage interval for general market models and thus to a characterisation of complete models, showing in particular that complete models must be finitely generated.

The new edition ends with a new chapter on risk measures, a subject that has become a major area of research in the past five years. We include a brief introduction to Value at Risk and give reasons why the use of coherent risk measures (or their more recent variant, deviation measures) is to be preferred. Chapter 11 ends with an outline of the use of risk measures in recent work on partial hedging of contingent claims.

The changes we have made to the text have been informed by our continuing experience in teaching graduate courses at the universities of Adelaide, Calgary and Hull, and at the African Institute for Mathematical Sciences in Cape Town.

Acknowledgments Particular thanks are due to Alet Roux (Hull) and Andrew Royal (Calgary) who provided invaluable assistance with the complexities of LaTeX typesetting and who read large sections of the text. Thanks are also due to the Social Sciences and Humanities Research Council of Canada for continuing financial support.

Calgary, Alberta, Canada — Robert J. Elliott
Hull, United Kingdom — P. Ekkehard Kopp
May 2004

http://www.springer.com/978-0-387-21292-0

Mathematics of Financial Markets
Elliott, R.J.; Kopp, P.E.
2005, XII, 354 p., Hardcover
ISBN: 978-0-387-21292-0