

## Book Review

*An Elementary Introduction to Mathematical Finance*, Sheldon M. Ross, Cambridge University Press; 3<sup>rd</sup> Edition (2011), 305pp. (hardback), £35.00. ISBN: 9780521192538

This textbook on the basics of option pricing has been authored by Sheldon M. Ross who is Epstein Chair Professor in the Department of Industrial and Systems Engineering, University of Southern California. He is also a Ph.D. in statistics from Stanford University. The first edition of the book was published in 1999, the second edition came out in 2003 and now the third edition has been published in 2011.

The book is aimed at both professional traders and undergraduates studying the basics of finance. Student members of the Actuarial Profession studying the Core Technical series may find the book useful as additional reading apart from the Core Reading.

Assuming no prior knowledge of probability, the book offers clear, simple explanations of arbitrage, the Black-Scholes option pricing formula, and other topics such as utility functions, optimal portfolio selections, and the capital assets pricing model. In this third edition are new chapters on Brownian motion and geometric Brownian motion, stochastic order relations and stochastic dynamic programming, along with expanded sets of exercises and references for all the chapters.

The first objective of the book is to derive Black-Scholes formula. Chapters 1 to 6 develop background for the derivation covering topics such as probability, normal random variables, geometric Brownian motion, interest rates, concept of arbitrage and arbitrage theorem followed by simple derivation of Black-Scholes formula in Chapter 7. Chapters 8 and 9 discuss variants of Black-Scholes formula.

In Chapter 10, stochastic order relations are discussed and how they can be useful in determining which of a class of investments is best without factoring in the investor's utility function. Chapters 11 and 12 discuss optimisation models, including deterministic and stochastic algorithms followed by an introduction to exotic options in Chapter 13.

Chapters 14 and 15 discuss possible ways for valuation of derivatives if the underlying asset does not follow a geometric Brownian motion and future price changes may not be independent of past price movements. With reference to commodities, mean reversion concept is discussed.

The book has a number of example questions and solutions in each chapter. It also includes a number of Exercise Questions in each chapter which might help students to test their understanding of the concepts. However the book does not seem to carry the solutions to these Exercise Questions.

Overall the book is written as a text book for students and is useful as an introduction to option pricing.

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