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BOOK REVIEW

van der Hoek, J. and Elliott, R.J.: Binomial Models in Finance

Springer, New York, 2006, 303 pages, 74,85 EUR

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Since financial advice and explanation on the Internet, TV and in print are literally spam-like ubiquitous and often misleading, either by ignorance or by duplicity, a clear exposition of the central ideas of financial investment and prices can only be most welcome.

Using a central idea, the binomial process, the two authors present such a serious effort. The binomial process is the assumption that a financial asset can be described by three outcomes: a risk-free path and two stochastic events, one event below, and one above the risk-free outcome (hence, binomial). Given these two discrete outcomes, we must decide how to evaluate the financial position and to act appropriately, i.e., given a specific terminal state, or sets of states, how should one act today. From this setup the time respectively decision structure and the book essentially is a collection of backwards recursions, for selling, buying, investing, hedging etc.

There are 12 factual chapters (2–13) plus appendices on the binomial distribution, the central limit theorem, various linear programming results, e.g., Farkas lemma, Kuhn–Tucker theorem, etc.

The chapters describe the following:

(2) The binomial process for stock options,
(3) The binomial process for other financial assets,
(4) The periodization of the binomial process preparing a binomial tree,
(5) Hedging, a central backwards recursion centered around a three-period example,
(6) Forward contracting, another backwards recursion process,
(7) American and other option pricing procedures, a link to empirical market facts,
(8) Details of procedures and recursions when options depend not only on the terminal position,

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(9) Some sensitivity procedures, so called 'Greek' coefficients,
(10) The role of dividends (cum and ex), by modifying the recursions again,
(11) The role of randomness, specifically standard deviations, under the 'volatility' heading, again generating variations of recursions,
(12) An elaborate recursive implementation of binomial tree construction, a center piece of original work of one of the authors (van der Hoek),
(13) Extensively various interest rate models as applied to financial markets.

As one may conjecture from this heavy list already, the presentation of the material is often ostensibly an outline of theory as well as a guide to the literature plus a heavy dose of examples, recipes and exercises. In the preface the authors cite the audience of 'MBA students, upper level undergraduates, beginning doctoral students, analysts and senior executives'. This is misleading.

The many outlines of procedures, the ample number of examples and exercises can generally not be understood by these audiences on their own. Not only on page 145 'sometimes we may meet problems', but in general very often the presentation is very sparse, if not cryptic. E.g., for the recursions – the formal centerpieces – they almost never provide a completely watertight statement. If one works with a specific illustration for some time, one discovers the missing parts, e.g., the initial conditions, range of indices, excluded cases etc., i.e., the statements are not false, yet often frustratingly incomplete. On the other hand established procedures, such as least squares need no explanation (e.g., p. 36–39), or are unnecessarily repetitive (e.g., p. 178–179) or plain recipés (e.g., putting numbers from nowhere into formulas). The same is true for the well-known Newton and secant methods. The appendices – except for the original work D – particularly on LP, do not appear to be a help for these audiences, as they are too brief and too unrelated.

Also the educational tactic of letting the reader fill in the gap – see the many exercises which ask for this – requires a background the the described audience typically lacks.

As a final criticism (above and beyond this book), this reviewer has never understood and does not understand here why financial analysis is improved, in particular for the uninitiated reader, by giving elementary statistical concepts – elementary and established for more than a century – new names, such as e.g., standard deviations $= ? =$ volatility and tail of a distribution $= ? =$ complimentary distribution. Also the 'Greek' clothes for simple variation of functions outside financial marketing is hard to understand.

However, in spite of all these qualifications, this reviewer is recommending the book. If a solid formal background – stronger than the one cited above – is available and one is ready to spend some time and effort on the topic, the reader will like the book for the following:

– The wealth of material, which is integrated by the beautiful idea of the binomial process,
– The diverse ideas how to cope with the financial market,
– The guide and access to the literature at the conclusion, even though the path may be harder than promised.

Obviously financial analysis is more fascinating and demanding than the two authors tell their readers before they present their tough program.