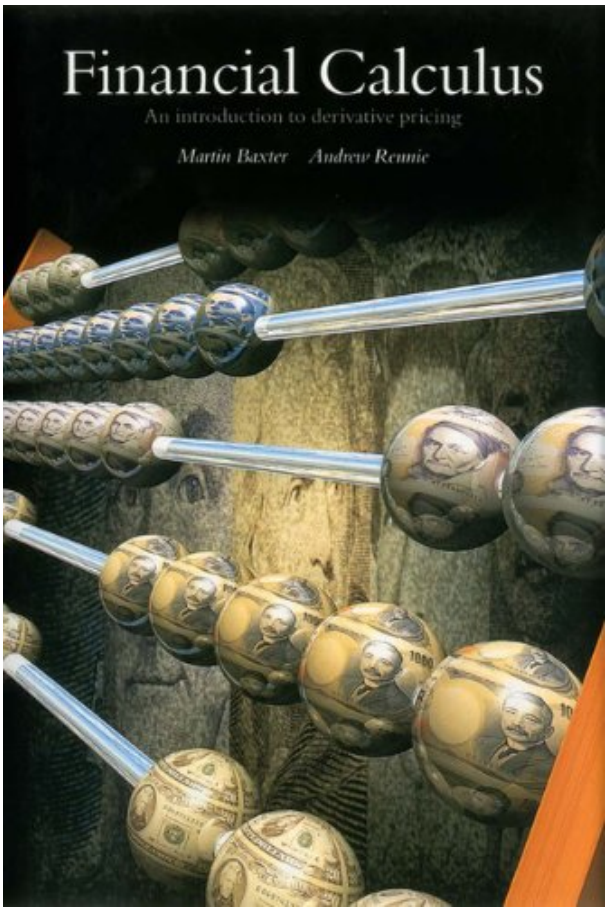
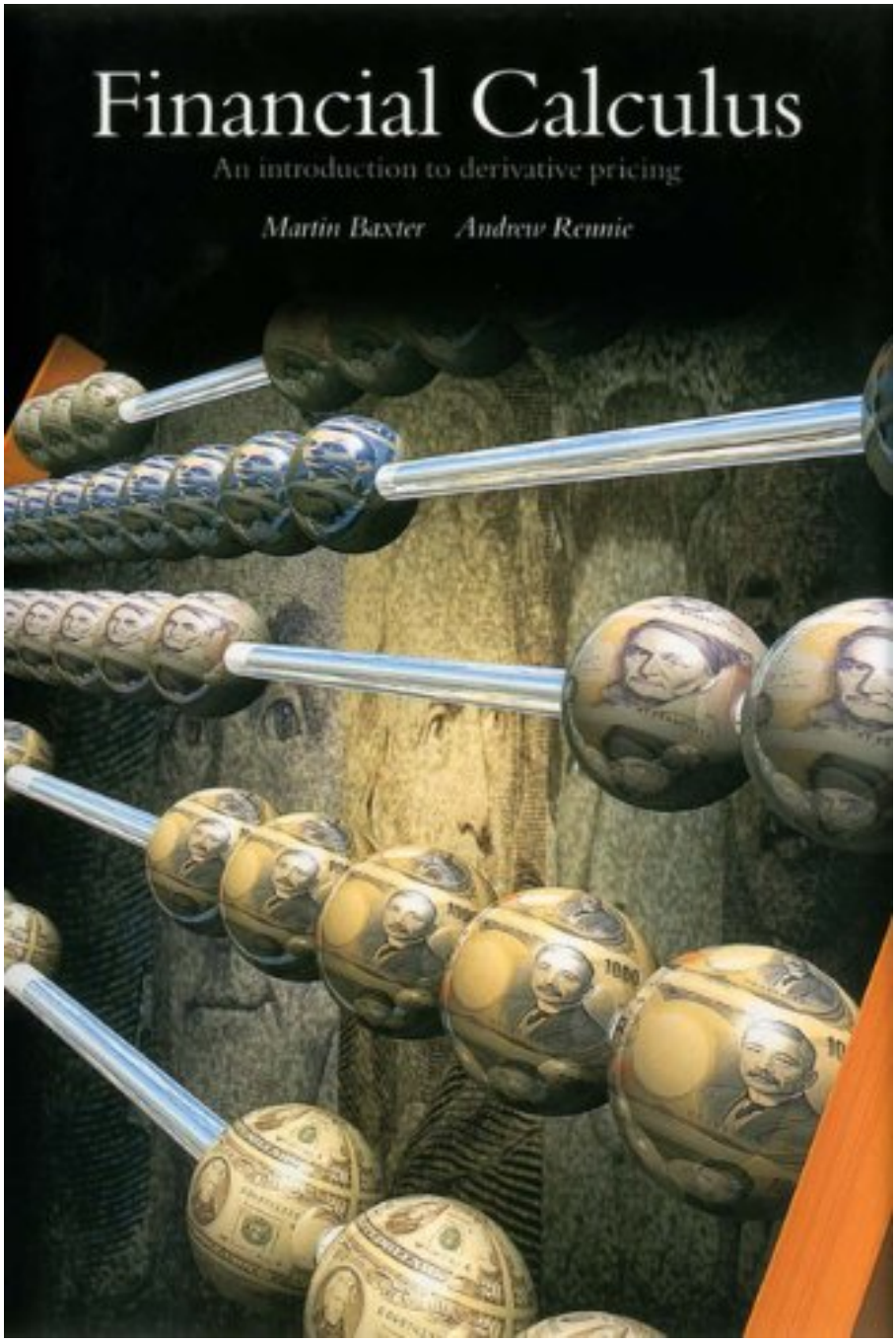
FINANCIAL CALCULUS: AN INTRODUCTION TO DERIVATIVE PRICING BY MARTIN BAXTER, ANDREW RENNIE





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Review

"...a rigorous and accessible account of the probabilistic structure behind the pricing, construction, and hedging of derivative securities....Real examples from stock, currency, and interest rate markets are used. The text also gives a clear view and introduction to modern mathematical finance for probabilists and statisticians."

The Journal of the American Statistical Association

"This is an excellent book for anyone who want an intuitive understanding of the use of stochastic calculus in financial engineering."

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The rewards and dangers of speculating in the modern financial markets have come to the fore in recent times with the collapse of banks and bankruptcies of public corporations as a direct result of ill-judged investment. At the same time, individuals are paid huge sums to use their mathematical skills to make well-judged investment decisions. Here now is the first rigorous and accessible account of the mathematics behind the pricing, construction and hedging of derivative securities. Key concepts such as martingales, change of measure, and the Heath-Jarrow-Morton model are described with mathematical precision in a style tailored for market practitioners. Starting from discrete-time hedging on binary trees, continuous-time stock models (including Black-Scholes) are developed. Practicalities are stressed, including examples from stock, currency and interest rate markets, all accompanied by graphical illustrations with realistic data. A full glossary of probabilistic and financial terms is provided. This unique, modern and up-to-date book will be an essential purchase for market practitioners, quantitative analysts, and derivatives traders, whether existing or trainees, in investment banks in the major financial centres throughout the world.

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Most helpful customer reviews

69 of 70 people found the following review helpful.
Nice, compact book on financial engineering
By Dr. Lee D. Carlson
This book is an introduction to financial engineering from the standpoint of martingales, and assumes the reader knows only elementary calculus and probability theory. After giving a motivating example entitled "the parable of the bookmaker" the authors clarify in the introduction the difference between pricing derivatives by expected value versus using the concept of arbitrage. Vowing then never to use the strong law of large numbers to price derivatives, discrete processes are take up in the next chapter. The authors do an

excellent job of discussing the binomial tree model using only elementary mathematics. Interestingly, they introduce the concept of a filtration in constructing the binomial tree model for pricing. Filtrations are usually introduced formally in other books as a measure theory concept. They then define a martingale using a filtration and a choice of measure. The use of martingales pretty much dominates the rest of the book. They emphasize that a martingale can be a martingale with respect to one measure but not to another. Continuous models are the subject of the next chapter, where the ubiquitous Brownian motion is introduced. The discussion is very lucid and easy to understand, and they explain why the conditions in the definition of Brownian motion make its use nontrivial; namely, one must pay attention to all the marginals conditioned on all the filtrations (or histories). The Ito calculus is then appropriately introduced along with stochastic differential equations. The authors do a good job of discussing the difference between stochastic calculus and Newtonian calculus. Recognizing that the Brownian motion they have defined is with respect to a given measure, they then ask the reader to consider the effect of changing the measure, thus motivating the idea of a Radon-Nikodym derivative. Their discussion is very intuitive and promotes a clear understanding rather than giving a mere formal measure-theoretic definition. Many interesting examples of changes are given. Portfolio construction and the Black-Scholes model follows. Basing their treatment of the Black-Scholes model of martingales gives an interesting and enlightening alternative to the usual ones based on partial differential equations (they do however later show how to obtain the usual equations). The next chapter discusses how to use the Black-Scholes equations to price market securities and how to assess the market price of risk. The discussion is very understandable but not enough exercises are given. Modeling interest rates is the subject of the next chapter. The mathematical treatiment is somewhat more involved than the rest of the the book. Several models of interest rate dynamics are discussed here very clearly, including the Ho/Lee, Vasicek, Cox-Ingersoll-Ross, Black-Karasinski, and Brace-Gatarek-Musiela models. A few of these models were unfamliar to me so I appreciated the author's detailed discussion. The book ends with a discussion of extensions to the Black-Scholes model. The emphasis is on multiple stock and foreign currency interest-rate models. A brief discussion of the Harrison/Pliska theorem is given with references indicated for the proof. An excellent book and recommended for beginning students or mathematicians interested in entering the field. My sole objection is the paucity of exercises in the last few chapters.

45 of 48 people found the following review helpful.
Absolutely top-notch
By A Customer
This is an elegant book for students of financial mathematics. You won't see the tedious Theorem/Proof format so common in other similar textbooks. But what it lacks in rigor it more than makes up for in other more important areas: superb writing, clear explanations and brilliant insight into the most popular valuation models. For instance, the concise but very clear derivation of the Black-Scholes formula should impress anyone who has studied the PDE-based derivation covered by Hull and others.
There is little discussion of empirical issues. This, in my opinion, was a wise choice by the authors. Any such discussion would severely dilute the strength of the book -- namely, the fundamentals of stochastic calculus applied to arbitrage pricing. For those interested in empirical features of the markets, I'd suggest "Econometrics of Financial Markets" (Andy Lo, et al).
I find it ironic that the punchline for the whole book -- a chapter on exotic option valuation where probabilistic techniques such as the reflection principle naturally come into play -- did not make it to production. But this excellent chapter is available on the errata Web page under [...]
This book is a great place to begin study for quantitative MBA students or math students with an interest in option valuation. Supplement this book with Oksendal or Karatzas / Shreve, perhaps, for more in-depth material on stochastic calculus.

27 of 28 people found the following review helpful.
A Necessary Book for (aspiring) Financial Engineers
By longhorn24

Baxter/Rennie deserves its reputation as the best introductory book to modern financial engineering because of its terse, elegant description of the martingale approach to asset pricing. The basic machinery of financial engineering comes from fields in applied analysis such as stochastic calculus and martingale theory, whose presentation is often weighed down with overbearing technical considerations. While necessary from a mathematician's perspective (and often relevant even in many real-world cases), a reader with mathematical maturity but without formal training in measure theory or probability can nonetheless appreciate and understand the basic tools used over and over again in Black-Scholes, and more generally, in martingale methods for pricing.

The quantitative analyst often needs to thorougly understand both the theory and the techical aspects of implementation of these models, and often studies these subjects in graduate programs. Many participants in quantitative fields such as fixed income and derivative trading/pricing often want an intuitive notion of what these "quants" are doing. Baxter/Rennie serves as a good book that is far more advanced than the excellent book by Hull; the latter is a wonderful introduction to quantitative fields, but Baxter/Rennie is the first book that truly introduces the math in a unified presentation that encompasses the three most important tools of mathematical finance (assuming, of course, the Ito-Doeblin calculus driven by Brownian motion); the Cameron-Martin-Girsanov (CMG) Theorem that permits changes of measure, the Feynman-Kac formula and the Martingale Representation Theorem.

Like most books on the subject, Baxter/Rennie attempts (but actually succeeds unlike many competing texts) to give a relatively harmless, intuitive introduction to the Ito-Doeblin calculus and martingales; the two are linked through the martingale properties of Brownian motion, which later permits martingale pricing under a risk-neutral measure.

Chapter 3, the core of the book, introudces Black-Scholes-Merton theory as a simple, special case of martingale pricing. For those who are sick of reading PDE proofs of the Black-Scholes formula that are technically correct but don't actually teach anything about finance, this chapter is for you.

Chapter 5, which introduces the market models of modern fixed income pricing, provides a presentation different from most other books by introducing the general methods (Heath-Jarrow-Morton, or HJM) models first, and giving the short-rate models as a special case of the HJM model. While this is chronologically out-of-order and arguably gives the "harder" case first, it is consistent with the no-arbitrage (or martingale) approach to asset pricing and emphasizes the approach that now dominates the feld.

The final chapter provides an extension of the models in the previous chapter, i.e. by generalizing to the multidimensional cases, etc. These are intuitively similar (although technically more complex) to the cases presented in the earlier chapters, and in keeping with the simple, elegant presentation of the book, are treated appropriately as relatively basic extensions.

Baxter/Rennie emphasizes the models, not the pricing of individual securities; the elegance and economic meaning are stressed at the expense of practical considerations in many cases. For this reason, the book would be a good text for a motivated undergradate studying math/"hard" sciences or an MBA student, quantitative traders or other practitioners responsible for using, but not building models.

For those learning quantitative analysis more seriously, this book would be a good complement to Shreve's Stochastic Calculus in Finance Vol II (not to be confused with the MUCH more technical monograph by the same author). The latter covers many more mathematical topics and their applications in pricing actual instruments, and has an exhaustive list of excellent problems; nonetheless, the book is meant for a full-year sequence in mathematical finance at the Masters' level and by the very nature of being so complete it lacks

the elegance of Baxter/Rennie.

My recommendation for those learning mathematical finance is to buy both Baxter/Rennie and Shreve Vol. II. Work through the problems in the latter text and you'll know a little bit of everything from stochastic volatility to jump proceses. Review the former before and interview and you'll be able to quickly answer basic questions in simple English (or whatever language you speak other than math). While it doesn't have many good problems (and they are relatively basic compared to Shreve, for example), that's not the point of the book - it's meant to develop intuition, not technical skill or theoretical abstraction. Buy both - if you're entering this field or are already studying/working in it, you can afford both of them.

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Review
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The Journal of the American Statistical Association

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Obtain the benefits of reading routine for your life design. Reserve Financial Calculus: An Introduction To Derivative Pricing By Martin Baxter, Andrew Rennie notification will always associate with the life. The reality, knowledge, science, health, religious beliefs, enjoyment, and also a lot more could be found in composed books. Numerous authors offer their experience, science, research, and all things to share with you. One of them is with this Financial Calculus: An Introduction To Derivative Pricing By Martin Baxter, Andrew Rennie This e-book Financial Calculus: An Introduction To Derivative Pricing By Martin Baxter, Andrew Rennie will certainly offer the required of notification and also declaration of the life. Life will be finished if you recognize a lot more points through reading e-books.