

BOOK REVIEWS

American-Style Derivatives: Valuation and Computation, by Jerome Detemple, 2006, Chapman & Hall/CRC, Boca Raton, FL, pp. 248. ISBN: 978-1584885672

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In his book *American-Style Derivatives: Valuation and Computation*, Jerome Detemple presents the subject areas of financial engineering and investment finance with “an extensive treatment of the theoretical and computational aspects of derivative securities pricing” (p. 1). While the author provides the reader with a comprehensive discussion of background theories and a review of the literature on derivative securities in general, the main focus of the text is on pricing and valuation of American-style derivative securities.

Financial engineers and finance professionals who are considering reading *American-Style Derivatives* should be advised that Detemple has written a relatively short but rigorous book that is targeted toward readers who want to know how to price complex American-style derivative securities at an advanced level. While each chapter of the book offers background information and theories necessary to understand derivatives pricing theory and different option pricing models, most of the computational material is only accessible to readers who have mastered an advanced level of mathematical training. Further, the book concentrates on reviewing and expanding the discussion of the history and pricing of American-style derivatives rather than strategies for the use of derivative securities. Lastly, each chapter contains a well-organized appendix that provides mathematical proofs of each equation featured in the book. However, each chapter is also packed with so many formulas, theories, lemmas, corollaries, and propositions that even an advanced student or professional may need to take pause and may consider searching for a more simple explanation of the concepts elsewhere.

For those readers seeking condensed background information on the development of the theory and computational aspects of derivative securities pricing, perhaps the most useful chapter of *American-Style Derivatives* is the introductory chapter. In this chapter, Detemple explains his approach to explaining derivative security pricing, in general, and its relation to recent improvements in computational methods used in American-style derivative pricing. The author surveys the history of option contracts use and discusses important milestones along the way to the current understanding of option pricing theory. From the early work of Bachelier (1900) that modeled the random behavior of asset prices to the more recent work of Black, Scholes, and Merton

(Black and Scholes, 1973; Merton, 1973) (p. 2) and their development of modern option pricing theory, Detemple explains the development of derivative pricing theory in chronological order and in the order of significance to the field of finance.

From this foundation, Detemple continues his treatment of derivative securities' pricing methods by first reviewing the valuation methods of European-style contingent claims in Chapter 2 (p. 7), followed by an explanation and extension of the pricing of American-style derivatives based on the Ito price process and the general Brownian motion framework in Chapter 3 (p. 37). Chapter 4 is a discussion of plain-vanilla options, as well as more exotic options such as the floating strike price Asian option (p. 55), while Chapter 5 provides further explanation of the valuation of exotic options such as American-style barrier and capped option contracts using the Black-Scholes method (p. 85).

In Chapter 6, Detemple provides an examination of the concepts and pricing of multiple asset options, which include max-options, min-options, and spread-options (p. 107). Chapter 7 introduces the reader to the valuation of American- and European-style occupation time derivatives, which are valued based on the amount of time the underlying asset remains in a defined price range (p. 155). Finally, Chapter 8 provides an overview and explanation of the most recent developments in the numerical methods used to price and value American-style option agreements. It is in this concluding chapter that Detemple explains that there is no single, simple method for valuing American-style derivatives but rather a need to develop a numerical method to determine the value of each contingent claim contract agreement separately (p. 195).

Given the depth and quality of the discussion in *American-Style Derivatives*, it is difficult to find fault either with the structure of the book or with the author's treatment of the specific subject matter. The book is rich with explanations of the stochastic process and is rigorous in its treatment of the advanced computational methods that make derivative securities both complex to price and useful to those who can harness their power to manage financial risk and gain excess financial returns. However, the main weakness of the book lies with the publisher's claim that the materials and discussion in this book are appropriate for readers with limited exposure to and training in advanced computational methods.

By suggesting that the book is accessible to the general finance audience, the publisher does a disservice to the work of the author, who has made a contribution to the field of finance by providing both theoretical background information and computational methods for financial engineers who price and value American-style derivatives. The publisher's description of *American-Style Derivatives* will likely give readers the impression that Detemple's book is similar to the textbooks written by John C. Hull dating from 1993 to 2009, Robert W. Kolb dating from 1991 to 2007, or the groundbreaking papers and publications written by John Cox, Stephen Ross, and Mark Rubinstein beginning in 1976 on the topic of binomial options and discrete time probabilities (Cox and Ross, 1976; Cox, Ross, and Rubinstein, 1979; Cox and Rubinstein, 1985). Detemple's work is along similar lines as the previously mentioned authors; however, his approach puts him squarely in the area of mathematical finance and financial engineering and not in the area of financial and/or risk management as the publisher's description suggests.

As the derivative securities and financial engineering area of the field of finance has developed over the last two decades, researchers, authors, and professors have differed as to the best approach to take in teaching and addressing this complex subject matter (Gilster, 1993). Early on in the development process, some authors decided to provide simplified explanations of the theory and concentrated on the application of derivative securities (e.g., Kolb, 1991), while more recently, some authors have decided to concentrate their respective efforts on providing an advanced understanding of the pricing and management of derivative securities (e.g., Hull, 2008, 2009; McDonald, 2006; Kolb and Overdahl, 2007). Still other authors have attempted to provide much deeper, rigorous, and more robust treatments of the quantitative aspects of derivative securities pricing and valuation. With *American-Style Derivatives*, Detemple has sided with the third approach, which features the positive benefits of developing the theory and computational aspects of the subject matter but also has some drawbacks in that the material may appear to be too complex for the likely users of derivative securities.

Given this problem, a second edition of *American-Style Derivatives* could be broadened to reach a more general audience by making two adjustments to Detemple's current treatment of derivative securities valuation. First, the author could extend the discussion beyond the literature review and computational methods and include material on strategy and implementation by using actual numerical examples of the valuation and pricing methods discussed in each chapter of the book. Second, the author could include more discussion of how each American-style derivative security described in the book can be used to manage risk and/or increase investment returns. By adding these two key components and explicitly discussing the connection between the complex computational methods and the fundamental principles of investment finance, Detemple can expand the audience for *American-Style Derivatives* beyond the subject areas of financial engineering, mathematics, and computational methods.

Furthermore, the general lack of discussion in the literature concerning the development of complex quantitative methods used to value derivative securities and risk and return has led to a knowledge gap between the financial engineers who design and price derivative securities and the financial managers who manage derivative securities (Apgar, 2006). This knowledge gap is one of the driving forces behind the current financial turmoil in the American financial markets and the systematic turmoil in the global economic and financial system (*The Economist*, 2007a, b).

As noted by Riccardo Rebonato (2007), such systematic problems have arisen and will likely continue because many of the financial engineers with the skills to understand the computational methods appear to not understand the basic principles that are required to use and manage these complex instruments, while many of the financial managers who understand the basic principles of financial management appear to not understand how to price and value complex derivative securities. If this trend continues, the disaster that has played out over the past few years in the global financial markets will likely continue until the knowledge levels of these two divergent groups can be brought closer together.

Detemple has an obvious talent for explaining, developing, and extending the computational methods involved in the pricing of derivative securities. However, given the current economic/financial climate, *American-Style Derivatives* may seem dated because it lacks in connecting the history of the pricing and valuation of derivatives

and the use, and misuse, of these complex financial instruments. If Detemple, as well as similar authors, continue to take the approach of only concentrating on providing complex, rigorous, and robust treatments of the quantitative aspects of the topic, the areas of financial engineering and financial management may continue to have serious problems dealing with systematic risk (Rebonato, 2007).

Finally, given the depth and quality of the work presented, if Detemple decides to write a second edition of *American-Style Derivatives*, perhaps he could expand his already significant contribution to the field of finance and the area of financial engineering by including aspects that bridge the gap between the knowledge bases of the financial engineers and financial managers. By bridging this gap, Detemple could make a further contribution to the field by helping readers understand not only the pricing of derivatives but also the effective use, and the causes of inappropriate mishandling, of American-style derivatives.

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Corporate Survival: The Critical Importance of Sustainability Risk Management, by Dan R. Anderson, 2005, IUniverse, Lincoln, NE, pp. 427. ISBN: 0595364608

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At last! An American president who recognizes that climate change exists! At last! The global risk and insurance business begins to link environmental issues with frequency and severity of loss causing events! And, at last, a carefully written, well-researched textbook that links corporate survival with the issue of sustainability.

I am referring to Dan R. Anderson's book, *Corporate Survival: The Critical Importance of Sustainability Risk Management*. It is a book that should be read by every corporate risk manager, large account broker, commercial lines underwriter, risk consultant, corporate director, university professor, and university student who plans a career helping businesses manage their risks.

The driving force in this well-organized and "a joy to read" book is the key word "sustainability." As a result of our recent financial crises, we are all too aware of nonsustainable behaviors. While all of us are interested in what has happened in the past as an indicator of the future, this book is all about the future. And whose future? It is about the future of the business world and all of us who cannot escape the results of its powerful decisions.

The author explains why sustainability risk management is a key element of "sustainable development," which is defined as, "development that meets the needs of the present world without compromising the ability of the future generations to meet their own needs." Is it about managing environmental risks including genetically modified crops? Yes, but so much more. Because sustainability risk management includes ethics and social justice, this well-thought-out book includes chapters on new theories of liability, increasing global litigation, reputation risks, social justice risks, stockholder resolutions, corporate governance, and more.

The author effectively makes a business case for sustainability risk management by showing how it can reduce costs, increase long-term profits, and increase long-term share value. He also explains how ignoring timely risk management principles could imperil the survival of the firm.

Are you interested in trends that make corporations more vulnerable to litigation and reputation risk? They are explained in Chapters 2 and 3. Are stockholder actions and directors' and officers' liability of concern to you? Read Chapters 4 and 5. If you want to learn how climate change, asbestos and the superfund, and genetically modified crops might affect the business world, see Chapters 6–8. The book concludes with sustainability risk assessment, risk control, and risk finance, the subjects of Chapters 9 and 10.

To underscore the importance of sustainability in insurance underwriting, the United Nations Environmental Program–Financial Initiatives is currently conducting a worldwide survey of insurance practitioners asking them to evaluate the linkage between commercial underwriting and the ESG factors (environmental, social, and governance) in order to develop "principles of sustainable insurance" (please see http://www.unepfi.org/work_streams/insurance/index.html).

Anderson is eminently qualified to write this book. His research of this subject goes back to 1972 with a publication on pollution liability. Since then, his interest in environmental risk management has increased and broadened to sustainability risk management including social justice risks. I am encouraging my students to read it if they want to have a career with a future and if they want to enjoy the satisfaction of helping businesses do the right thing.

Do I recommend this book? Absolutely! Will it open your eyes to the need to apply sound risk management principles to a more sustainable business world? I hope so.

Solvency: Models, Assessment and Regulation, by Arne Sandström, 2006, Chapman & Hall/CRC, Boca Raton, FL, pp. 433. ISBN: 978-1584885542

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Solvency: Models, Assessment and Regulation is a timely and thorough historical analysis of the recent European work on solvency and financial strength, and related accounting issues, with particular emphasis on risk categorizations proposed by the International Actuarial Association. The book provides readers and prospective researchers with a veritable "Who's Who" of the numerous organizations intimately involved in the European Union (EU) solvency debate, and an understanding of the various EU directives that impact insurers, reinsurers, and financial conglomerates, as well as a comprehensive review of past, present, and (recommended) future steps needed to achieve more effective and efficient solvency regulation. The author, Arne Sandström, unquestionably succeeds, incorporating several detailed quantitative examples through a well-written and organized text.

The first main section of the book presents a historical perspective of the approaches, research, and theory underlying the initial directives for EU solvency and accounting, beginning with those undertaken among several member states of the predecessor European Economic Community (i.e., "Solvency 0"). The section chronicles the development of directives leading to the 1990s Solvency I, including the Basle I (1998) banking accords, and steps being taken and recommended toward more successful implementation of the currently proposed Solvency II regime. The first section concludes with a comparative review of the general framework of ideas, models, and solvency assessment systems used in six EU countries (Denmark, Finland, Germany, Netherlands, Sweden, and the United Kingdom), and six non-EU countries (Australia, Canada, Norway, Singapore, Switzerland, and the United States).

The second section develops a standardized model for life and nonlife solvency assessment for supervisory purposes, and corresponding financial reporting accounting, based upon technical provisions measuring a fair value best estimate of the distribution of stand-alone insurer total liabilities plus a solvency risk margin (market value margin). The prudent solvency margin is posited to entail a charge that covers both a hard minimum capital requirement and a higher soft solvency capital requirement, which are each dependent upon a full balance sheet approach using International Accounting Standards. These basic concepts are then expanded and explored in much greater technical detail, and a numerical illustration is provided.

The third main section extends the application and discussion of the theoretical concepts developed in the previous section from stand-alone company solvency assessment to groups, financial conglomerates, and reinsurance, as well as to internal models, forecasts, risk management, and stress-testing procedures. The final section provides detailed appendices including the basic theory of the standardized approach, excerpts from the various EU life, nonlife, reinsurance, groups and conglomerates directives, and principles and guidelines from the International Association of Insurance Supervisors. A thorough reference list is also provided.

Overall, the book offers a thorough and thoughtful discussion of the current state of evolution regarding solvency regulation, theory, and research in the EU. Policymakers, insurance academics, researchers, students, and other interested parties around the world may find this book highly relevant in understanding solvency models, formulation, assessment, and the debate over alternative strategies for reform. The book offers an objective overview of the issues that is understandable to both technical and nontechnical readers, as well as important insights into identifying the key players, theory, and application across diverse and potentially unfamiliar systems.

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