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IN THIS ARTICLE, MIRANDA LAM considers texts that are suitable for an undergraduate course in Financial Modeling using Excel.

## Financial Modeling

by Miranda Lam, Salem State College, Salem, Massachusetts

The advance of personal computers and software, especially spreadsheet applications, has revolutionized financial analysis. But, until recently, Financial Modeling was taught only as an advanced graduate topic. Even though computer applications, including spreadsheets, are basic elements in business core curriculum and assignments requiring the use of computers have become routine, many undergraduate students fail to fully utilize the analytical power of spreadsheets. A few students actually solve problems using calculators and enter the results as numbers, using the spreadsheet only as a formatting tool. Some use the spreadsheet as a glorified calculator. Many students create spreadsheets in an ad hoc manner, making analysis difficult, often inaccurate, and sometimes impossible. Such misuses are common because the concept of financial modeling is seldom taught at the undergraduate level. When the author first taught Financial Modeling in 1994, there was no textbook available and only a handful of universities offered such a course. Instructors typically use computer reference books for spreadsheet software such as Excel and mainframe software such as Interactive Financial Planning System (IFPS) supplemented by their own handouts and exercises. Today, Financial Modeling is a popular course and an important element of the finance curriculum in many schools. Publishers and authors have responded to demands for textbooks devoted to the subject, and several new undergraduate level textbooks have been introduced in the past few years. This article reviews the following textbooks: *Financial Modeling*

*Using Excel and VBA* (2004) by Chandan Sengupta; *Excel Modeling in the Fundamentals of Corporate Finance* (2nd edition, 2005) by Craig Holden; *Excel Modeling in the Fundamentals of Investments* (2nd edition, 2005) by Craig Holden; and *Financial Analysis with Microsoft Excel 2002* (3rd edition, 2004) by Timothy Mayes and Todd Shank.

Financial Modeling is typically taught as an elective course after students have taken an introductory finance course, which covers basic finance concepts such as the time value of money, risk and return, stock and bond valuations, capital budgeting, and working capital management. Within such a curriculum, the Financial Modeling course focuses more on the applications and implementations of financial theories. A few years ago, while developing a new graduate Financial Modeling course, the author revisited a long debate in teaching Financial Modeling: Are we teaching Excel or are we teaching finance? The truth is that the computing power of spreadsheets significantly changes the way financial analysis is conducted, and for students to fully capitalize on such power requires mastery of both finance and modeling theories as well as technical aspects of the software. Some spreadsheet enthusiasts envision that finance will be taught using spreadsheets as the primary computational tool in the future, making financial calculators obsolete in the same way that financial calculators have replaced annuity tables. The hurdles and merits of a spreadsheet-modeling-based pedagogy are numerous and beyond the scope of this article. As of today, spreadsheet software has not replaced the financial



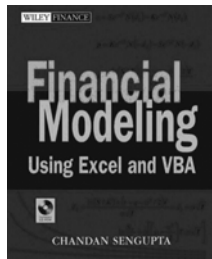
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Her articles have appeared in such journals as *Journal of Banking and Finance*, *Financial Analyst's Journal*, *Review of Quantitative Finance and Accounting*, *Review of Pacific Basin Financial Markets and Policies*, *Journal of Business and Economics Studies*, and *Financial Practice and Education*. She has taught financial modeling for 10 years, since she was a doctoral student. Dr. Lam is also a chartered financial analyst.

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calculator in the introductory finance course. A separate course, Financial Modeling, is needed to properly teach and integrate financial and modeling theories and advanced spreadsheet tools. The challenge is to balance between theories and software specific technical details, focusing on analytical abilities provided by technology. The diversity of topics and approaches exhibited by the textbooks reviewed reflects this challenge and underscores the fact that the role of Financial Modeling in a finance curriculum is still in its early stage of development.



**Financial Modeling Using Excel and VBA**  
by Chandan Sengupta

Wiley, 2004,  
657 pages

<http://www.wiley.com>

*FINANCIAL MODELING USING EXCEL AND VBA* by Chandan Sengupta is the longest of the books reviewed. It is divided into four parts. The first 13 chapters (Parts I and II) are based on Excel and contain sufficient materials for a one-semester undergraduate course. Parts III and IV are based on VBA (Visual Basic for Applications), which may be considered a more advanced topic. To keep the focus on an undergraduate Financial Modeling course, this review will cover primarily Parts I and II in the book.

Sengupta is the only text that includes a formal introduction to modeling concepts and devotes an entire chapter to explaining how to build good spreadsheet models. Concepts of modeling are first presented in Chapter 1 and expounded in Chapter 5. Of these texts, Sengupta contains the most Excel "tips" and its discussions of Excel features and functions in Chapters 2, 3, and 4 of Part I contain useful details seldom covered in introductory computer classes. Students need to possess a good working knowledge of Excel in order to follow the examples and dis-

cussions. Part II is the main part of the text for an undergraduate course. The chapters cover the following finance topics: financial statements forecasting, time value of money, financial planning, analyzing market history, bond pricing and duration, simulating stock prices, and option pricing. Each chapter begins with a review of the relevant financial theories followed by a number of examples. Each example contains a description of the problem, modeling strategy, step-by-step guide to building and testing the model, uses of the model, and limitations. These examples are the gems of the book. They are well-designed, rigorous, and great learning tools. The reviews of financial theories are very succinct and assume students have already mastered the underlying theories.

Sengupta comes with a CD-ROM containing all the completed models, a VBA quick reference, and a selected list of Excel and VBA functions. The book itself comes in e-book format. The author designed this book for "self-study, classroom use, and reference," and the style has more resemblance to a computer reference book than a finance textbook. The writing assumes a conversational manner, which is a friendly change from standard textbook language, but can be long-winded at times. The weakness of Sengupta is that there are no instructional support materials. Instructors will need to develop assessment tools independently since the CD-ROM provides all the models already completed. Excel and modeling are the strength of the Sengupta book, and the modeling and Excel concepts discussed are typically not covered in other finance and computer classes. This book is best suited for students who have a solid understanding of basic finance theories and a good working knowledge of Excel.



**Excel Modeling in the Fundamentals of Corporate Finance (2nd ed.)**  
by Craig W. Holden

Prentice Hall,  
2004

<http://www.prenticehall.com/>



**Excel Modeling in the Fundamentals of Investments (2nd ed.)**  
by Craig W. Holden

Prentice Hall, 2004,  
135 pages

<http://www.prenticehall.com/>

CRAIG HOLDEN CREATED A SERIES of Excel Modeling textbooks, including *Excel Modeling in the Fundamentals of Corporate Finance* and *Excel Modeling in the Fundamentals of Investments*, currently both in their second edition. Although these books are also designed to supplement other traditional finance textbooks, they function well together as primary textbooks for an undergraduate Financial Modeling course when supplemented with handouts on modeling concepts. The author has used the two Holden books together (1st edition) in an undergraduate Financial Modeling class. Each book contains 15 chapters, but five chapters are duplicated in both books. The overlapped chapters are an inconvenience but only a trivial one. The topics in the 25 distinct chapters include time value of money, bond and stock valuation, capital budgeting, personal and corporate financial planning, option pricing, bond analysis, portfolio optimization, and futures parity. Each chapter contains several problems designed to illustrate and apply a particular finance concept, followed by skill-building problems and live in-class problems. Many of the problems build on previous problems as the Excel model increases in complexity. Each problem begins with a description, solution strategy, and step-by-step instruc-

tions for building the Excel model. There are many what-if questions, and by answering these questions students experience the analytical power of a well-designed model. At the end of each chapter are skill-building problems. Students use the models from the chapter to answer these problems. These skill-building problems and what-if questions provide a self-check for students because errors in their models will result in incorrect answers. The live in-class problems are great teaching tools. Instructors can download partially completed models from the publisher's Web site and complete the models in class as demonstrations or have students complete the models in class. The partially completed models save valuable class time and allow students and instructors to move directly to the challenging parts of the models. Some chapters contain skill-extending problems, which require changes or additions to the models in the chapter.

Of these texts, the Holden books provide the broadest coverage of finance concepts. It is unlikely and not recommended to include all 25 chapters in a one-semester course. Some topics such as option pricing, bond convexity, and futures parity, are often considered advanced and may be excluded. The step-by-step instructions for creating the models are clear and easy to follow. The weakness of the Holden books is inadequate discussion of modeling concepts. For example, the models use "inputs," "choice variables," and "output variables," but there is no discussion of how to classify variables into these respective categories. Some instructors may be surprised to find no discussion of finance theories in the Holden books. In the author's experience, this omission is not a negative factor when an introductory finance course is a pre-requisite for the Financial Modeling course. In fact, this omission is intentional and, if necessary, a traditional finance textbook can be easily incorporated thanks to the design of the Holden books. Each Holden book comes with a CD-ROM, which contains the entire book in a pdf file and alternative

versions of the chapters using notation from the most popular finance textbooks.



**Financial Analysis  
with Microsoft  
Excel (3rd ed.)**

by Timothy R. Mayes  
& Todd M. Shank

South Western,  
2003, 432 pages

[http://www.  
swlearning.com/](http://www.swlearning.com/)

*FINANCIAL ANALYSIS WITH EXCEL* by Mayes and Shank was the first textbook on Financial Modeling and is currently in its third edition. The book contains 11 chapters, which fit easily into a one-semester course with potential time for term projects or presentations. The first chapter introduces basic Excel functionalities, which are typically covered in an introductory computer class, and students can review on their own if needed. The remaining chapters cover the following finance topics: financial statement analysis, cash budget, financial forecasting, break-even and leverage analysis, time-value-of-money, stock and bond valuation, cost of capital, capital budgeting, risk, and diversification. Each chapter begins with a list of learning objectives, followed by detailed discussions of finance theories, including all relevant formulas along

with numerical examples. An Excel problem is presented after each key finance concept, along with instructions including key formulas, for creating the model. Advanced Excel functions/commands and some modeling concepts are introduced as part of the instructions. The conclusion contains a list of new Excel functions and commands presented within each chapter. Mayes and Shank is the only book reviewed that includes end-of-chapter problems, which are quite complex and require students to build the models from scratch.

Compared to Sengupta and Holden, the writing style and layout of Mayes and Shank most resembles a typical textbook and contains the most in-depth discussion of finance theories, similar to an introductory level finance textbook. On the other hand, these materials may be redundant if an introductory finance course is a pre-requisite for the Financial Modeling course. It is also the only book that covers financial statement analysis and cash budget. Given that Mayes and Shank is in its third edition, it is perhaps not surprising that it has good instructional support materials. The instructor's resource CD-ROM contains additional Excel problems and solutions to all problems in the textbook. It also contains add-in programs that perform complex calculations, such as 2-stage stock valuation models and

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simulations. One of the features I like in Mayes and Shank is that an advanced Excel concept is used more than once and prior applications are specifically referenced. For example, Scenario Manager is used in three different chapters. Repeat exposure helps students solidify their mastery of the technique and understand when an Excel tool is applicable. Similar to Holden, Mayes and Shank is also deficient in formal discussions of modeling concepts. Instructions for creating the models are not laid out in a step-by-step manner because explanations of Excel functions and commands are embedded with instructions and formulas for creating the models. On one hand, this arrangement makes the instructions more difficult to follow. On the other hand, students have to discover each step, instead of simply going through a list of steps. The discovery process may help some students better understand the model they are creating, making it easier for them to create models on their own, which is the ultimate objective of the course.

### Concluding Comments

The textbooks reviewed differ vastly in style and pedagogical approach, and each has unique merits and weaknesses. Sengupta resembles a computer reference book, whereas Mayes and Shank looks much like a fundamental finance textbook, and Holden is a vast collection of problems. Nevertheless, fundamental finance concepts such as

time value of money, stock and bond valuation, capital budgeting, risk and return, and financial statement forecasting are covered in all of the books. A nice feature in all of these texts is a picture for each completed model, which is a great visual aid for students. Excel commands and functions that are pertinent to financial analysis, such as Scenario Manager, Solver, and Regression are also included in all of the texts. In addition, Sengupta and Mayes and Shank include models using simulations. In terms of Excel techniques, Sengupta is the most advanced. Both Holden and Mayes/Shank use mostly "plain vanilla" Excel. Sengupta is the only book that includes formal exposition on modeling theories and concepts. In terms of finance theories, Mayes and Shank provides the most detailed discussions, while Sengupta provides only concise reviews, and the subject is absent in Holden. Both Sengupta and Holden will work well in a Financial Modeling course that requires an introductory finance course as pre-requisites. Mayes and Shank is most suitable if students have no prior knowledge of finance. Alternatively, Holden will also work for these students if supplemented by an introductory finance textbook. In terms of pedagogy, Sengupta and Holden provide clear step-by-step instructions for creating the models. Mayes and Shank requires more effort from students. In terms of instructional support, Mayes/Shank and Holden of-

fer more resources than Sengupta. It is exciting to see new textbooks for Financial Modeling being developed. I applaud the authors for their efforts and success. The diversity of the texts reviewed here mirrors the variety of roles a Financial Modeling course may take in the curriculum.

### Errata

The print version of the last Bookshelf column, "Boomer Decisions" (v35, n4, July 2004), shows an incorrect date for a change in the taxation of Social Security benefits that was made during the Clinton Administration. The incorrect date of 1991 is in the last paragraph of page 19. The correct date is 1993. The change provides that you may need to shift \$850 of Social Security income to the taxable column of your tax return for each \$1000 in taxable income that you take from your pension plan. The online version of *Decision Line* has been corrected.

[http://www.decisionsciences.org/DecisionLine/Vol35/35\\_4/35\\_4books.pdf](http://www.decisionsciences.org/DecisionLine/Vol35/35_4/35_4books.pdf) ■

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### DEANS' PERSPECTIVE, from page 22

in me and for those who have given so uncommonly of themselves.

In Arkansas, we often remind students that we drink from wells we did not dig, live in houses that we did not build, and are warmed by fires we did not start. Every dean needs to recognize that others laid the foundation for any success he or she may enjoy.

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