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**Frank J. Fabozzi, Sergio M. Focardi,
Svetlozar T. Rachev, Teo Jašić and Stefan Mittnik:
FINANCIAL ECONOMETRICS: FROM BASICS
TO ADVANCED MODELLING TECHNIQUES**

Wiley; 1st edition (Dec 8, 2006), 576 pages, hardcover, 71.81 USD

ISBN-10: 0471784508

ISBN-13: 978-0471784500

Introduction

Central thesis - tone of review

Financial Econometrics From Basics to Advanced Modelling Techniques provides comprehensive coverage of financial econometrics and its role in today's investment management process. The major objective of the book is to show how to interpret the results obtained through econometric packages. The experienced author team of Svetlozar Rachev, Stefan Mittnik, Frank Fabozzi, Sergio Focardi, and Teo Jašić not only presents the reader with an abundant amount of information on financial econometrics, but they also walk him through the concepts that modellers and those that use model results encounter in their professional life.

The major strength of the book is rather wide coverage of the role of econometrics in the modern finance management, while its major deficiency is quite undersized approach to the real life data examples in the book. The book is much more **suitable** for the professionals that use models in their professional life, while

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the modellers might be impaired by quite short "walk-through" approach to the practical problems that researchers might encounter. In other words the text is an overview, rather than a guide to alternative techniques.

The major strength of the book is the fact that covered topics are not selected according to criteria of the nature of econometric techniques such as in Enders' (2004) *Applied Econometric Time Series* or Wooldridge's (2001) *Econometric Analysis of Cross Section and Panel Data*. An analytical knife in this book has been directed by the principle of contemporary models in the field of financial management regardless of the sole nature and origins of the econometrical models.

Compared to other similar advanced econometric editions, *Financial Econometrics* covers much wider amount of topics. Together with standard time series related sequence of chapters - going from AR(F)IMA class of models, through ARCH and VAR all the way to Cointegration techniques - the book offers quite extensive coverage of the problems related with issues that are important for financial markets analysis and not necessarily related with time series analysis.

Furthermore, although *Financial Econometrics From Basics to Advanced Modelling Techniques* covers advanced topics in econometrics, there is a quite thorough coverage of many basic econometric issues in chapters 2 through 5. The analysis starts with a probability remainder in chapter 2 and continues in chapter 3 with elementary description of the most basic issues related to the theory and estimation of a simple regression. The chapter 4 provides some basic insights in probit, logit, instrumental variables and method of moments, while the chapter 5 describes quite thoroughly application of described basic models in the field of finance.

This part of the book (chapters 2 through 5) is - in scope and level - closest to the first seven chapters of Verbeek's (2004) *A Guide to Modern Econometrics*. The fact that *Financial Econometrics From Basics to Advanced Modelling Techniques* covers introductory as well as advanced econometric topics represents - together with indiscriminative focus on the financial management models - yet another distinguishing characteristic of the book. It is possible to say that *Financial Econometrics* covers financial econometrics regardless of the class of the models, starting from intermediate (almost introductory) level and ending with moderately advanced models such as linear cointegration analysis.

Authors are trying to familiarize the reader with a wide range of topics in modern finance econometrics, focusing on what is important for understanding empirical work. The reader will find all the important concepts of financial econometrics thoroughly explained and illustrated with examples based on real-world data.

Financial Econometrics From Basics to Advanced Modelling Techniques is very well written advanced econometric book. Statements in the book are based

on mathematical proofs and the style is much closer to the mathematical interpretation compared to the usual econometric approach. Nevertheless, the book is not too technical or too detailed for the average financial market analyst or economist to grasp the essential ideas and to extract the information that is needed.

The book does not concentrate on the mathematics behind each technique (although the important ones are there) nor on formal proofs, but on the intuition behind the approaches and their practical relevance. A bright illustration of this is following sentence describing intuition behind the concept of cointegration: "Two or more processes are said to be cointegrated if they stay close to each other even if they 'drift about' as individual processes. A colourful illustration is that of the drunken man and his dog: Both stumble about aimlessly but never drift too far apart" (Rachev et al. 2007, p. 373-374).

The real life examples in the book are provided by authors and several other acknowledged individuals.¹ In that way all the theories described in book, together with technical analysis represent a strong reference for potential readers.

Although the book is great and necessary for understanding econometric work related to financial markets, an overview approach to examples might make it difficult for readers focusing on doing empirical work. In other words, the book might be improved with a bit more extensive approach to the practical problems related to the application of described econometric models.

In the preface authors assert that the walk-through examples are provided for readers to repeat them using any of the more popular econometric packages available and data of the readers choice (Rachev et. al. 2007, p. xxii) and in the walk-through examples authors highlight the fact that they do not claim the validity of results in the examples: "The objective of this exercise is not to investigate the econometric validity of this assumption but to show how to estimate VAR models and perform diagnostic checks" (Rachev et al. 2007, p. 360) or "...we do not claim any validity for the results..." (Rachev et al. 2007, p. 363).

The nature of the disclaimer is easiest to understand within real data examples. In the chapter 10, in the description of lag length selection indicator, the issue of sample size changes and its impact on the results has been ignored. Authors provide example for lag length selection in the VAR model by comparing AIC for the model with one lag and the model without lag, without sample adjustment (Rachev et al. 2007, p. 368-372).²

¹ Appendix on comparing probability distributions has been coauthored with Christian Mann, Robert Scott provided real time data for chapter 4 and spline method. Raman Vardharaj provided mutual fund data for chapter 3. Martin Fridson and Greg Braylovskiy provided corporate bond data in chapter 4, and David Wright for the equity duration data.

² Obviously, AIC is going to be biased to the model with smallest number of observations (bigger number of lags), since number of observations is numerator in the AIC equation (Enders 2004; Verbeek 2004).

In the chapter 11, quite nice example of cointegration with Johansen methodology is described transparently and clearly. Nevertheless, two quite important practical issues have not been discussed within the exercise. Firstly, the trace and eigenvalue tests quite often result with ambiguous (different number of cointegrating vectors) results. Secondly, both indicators quite often (especially in small samples which are usual for beginners) indicate number of cointegrating vectors larger than one. How to restrict the model or is it possible to use a model with two or more cointegrating vectors is definitively very important if someone aspires to build econometric models (Rachev et. al. 2007, p. 380-381).

Furthermore, in the same chapter, authors have highlighted the fact that "Cointegration ... is a concept that applies to integrated process", but in the real data example for cointegration, they only assume that the series have unit root in levels, without any formal unit root testing. This approach might be appropriate for the model users, but it is a bit confusing and misleading for the inexperienced model builders. Similar approach can be noticed in the chapter 3, under subtitle "pitfalls of regressions". Authors describe the problem of spurious regression quite clearly and transparently, but they have not elaborated the issues of multicointegration and practical problems which might arise in the systems that have integrated variables that are of different orders of integration (Rachev et al. 2007, p. 123).

In general it is possible to claim that the book might be improved with a CD or web page containing data used in examples or artificially data generated processes for practice. It is a common knowledge that it is impossible to learn any of the econometric techniques if there is not data and benchmark results to match. Furthermore, nonlinear econometrics (menu costs, arbitrage costs, etc...) as a hot-test issue definitely deserves a bit more space (a chapter maybe) in the book.

Conclusion

The *Financial Econometrics From Basics to Advanced Modelling Techniques* is a **must have** for all people involved in stock markets and portfolio decisions/analysis. The major benefit of the book is its narrow specialisation, it is definitely very difficult to find econometrics textbook that is solely specialised to the financial markets and a handy guide even compared with mainstream textbooks. The overview approach to the application of econometric techniques slightly undermines the role of the book for inexperienced readers focusing on building models and empirical work. On the other side, coupled with Enders (2004) or some other more applied book, *Financial Econometrics: From Basics to Advanced Modelling Techniques* represents strong companion even for model building.

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From basics to advanced modeling techniques | Find, read and cite all the research you need on ResearchGate.Â Mixed ARMA-GARCH models are used to model both conditional mean and conditional variance when they depend on the past [Ruppert, 2011, Rachev et al., 2007]. S4 Diagnostics: After estimating the parameters of the candidate models, it should be checked whether all relevant information of the data has been captured by a candidate model and if the model is suitable. In this regard, the deviation of the estimated values by the model from the real observations, i.e. the residuals of model, should not show any systematic pattern that can be used for their prediction [Rachev et al., 2007]. Financial econometrics is the science of modeling and forecasting financial time series. The development of financial econometrics was made possible by three fundamental enabling factors: (1) the availability of data at any desired frequency, including at the transaction level; (2) the availability of powerful desktop computers and the requisite IT infrastructure at an affordable cost; and (3) the availability of off-the-shelf econometric software. The combination of these three factors put advanced econometrics within the reach of most financial firms.Â We illustrate the application of both techniques on a portfolio of selected U.S. stocks and show an application of PCA to bond portfolio management, to control interest rate risk.