

Maxwell Stevenson  
*School of Business, The University of Sydney,*  
*Sydney N.S.W. 2006 Australia*  
*E-mail address: m.stevenson@econ.usyd.edu.au.*

doi:10.1016/j.ijforecast.2005.11.002

**Hans Levenbach, James P. Cleary, *Forecasting: Practice and process for demand management*, Duxbury, Belmont: Thomson, 2006, 622 pp., ISBN: 0-534-26268-6, Hardcover (software enclosed)**

This is a very comprehensive account covering many important aspects of demand forecasting and management. The structure of the book is very logical indeed, commencing with a clear introductory section on the objectives of this work, target audience and appropriate use of the material presented. The book is aimed at practicing forecasters and students even though it is clear that managers and end-users of forecasts will also find in this book a comprehensive treatment of how to evaluate basic demand forecasting approaches. Regarding this latter group of potential readers, there are some very useful suggestions for running courses and seminars for the purpose of enhancing the technical skills of practitioners performing demand forecasting functions in corporate environments. Four courses are recommended with a clear indication of the relevant chapters/sections that should be covered: structured approach to demand forecasting, demand forecasting and market analysis, time series and smoothing techniques, data analysis and modelling demand.

The principal unifying theme of this work is the presentation of demand forecasting as a process rather than a series of disconnected techniques. Demand forecasting, within the context of this book, means that the firm predicts the *right* amount of the *right* product to be in the *right* place at the *right* time for the *right* price, which is one of the underpinnings of what is now known as demand forecasting and replenishment planning for the supply chain. In those respects the book is to be distinguished from other typical textbooks that cover business forecasting in general.

The authors take the view that the focus is nowadays directed more to forecasting the disaggregated elements of product demand for supplying

warehouses, distributors, channels and consumers than to aggregates drive by economic and financial factors. Consequently, the most widely accepted relevant quantitative methods are presented. The development of this book progresses from the basic, most widely used techniques to the more sophisticated, less practiced methods and hypothesis testing theory is intentionally de-emphasised in favour of confidence interval estimation.

Qualitative/subjective methods are not covered in this book. A brief reference to panel consensus, the Delphi method, historical analogues, etc., is made in chapter 2 directing the reader for more information to other textbooks. DeLurgio (1998) and Hanke and Reitsch (1998) are used as extra points of reference for business forecasting in the majority of chapters. Moreover, some of the “esoteric” methods, such as neural networks, vector auto-regression and GARCH (Generalised Auto-Regressive Conditionally Heteroscedastic) models are also not included since they appear to be more relevant to applications to finance than demand planning.

Many practical examples are given in the book and data sets from a variety of sources have been used throughout to make certain points or illustrate a particular technique. Very good supplementary material is also included in the CD enclosed. According to the authors the failure of many forecasting efforts begins with flaws in the quality and handling of data rather than in the lack of modelling sophistication. Thus the book places greater emphasis on data analytic methodology (much of it intuitive and graphical) as a key to improved forecasting. The book deals with exploratory data analysis along with confirmatory modelling and consequently it emphasises techniques for which a “reasonable” amount of data is available or can be collected. As such, technological forecasting is not treated in this book. Nevertheless, new product forecasting, for which adequate data are rarely available, is covered.

The book is divided into six parts. Part 1 (chapters 1 and 2) introduces the forecasting process along with a broad classification of forecasting techniques.

Part 2 (chapters 3–5) deals with basic statistical concepts for exploring time series characteristics with a very comprehensive chapter 4 on the characteristics of time series. In the introduction to part 2 the authors caution the reader that “...most testing procedures

implicitly assume that the data follow a normal distribution, and this may not be the case in reality". Unfortunately, this important issue is not given sufficient explicit attention in the relevant chapters.

Part 3 (chapters 6 and 7) looks at seasonal decomposition, top-down market based forecasting and econometric techniques. Some reference is made in chapter 6 to Point of Sales (POS) data and various industry initiatives such as Quick Response (QR), Efficient Consumer Response (ECR), Continuous Replenishment Programmes (CRP) and Vendor Managed Inventories (VMI). The relevant discussion though is somewhat limited, or certainly not as extended as a contemporary book on demand forecasting requires. The discussion on the above mentioned "initiatives" is continued in chapter 9 but again with very limited explanatory information about how forecasting fits in those "initiatives". In chapter 7 the authors offer an overview, without much technical detail, on the uses and pitfalls of econometric analysis in business forecasting.

Part 4 discusses exponential smoothing methods (chapter 8) and disaggregating product-demand forecasting (chapter 9). Chapter 8 includes a rather brief section on handling special events (including promotions) with smoothing models. In the latter chapter one would expect a more detailed discussion on the interface between forecasting and stock control. Standard inventory management textbooks (e.g. [Silver, Pyke, & Peterson, 1998](#)) have for a long time included a chapter on demand forecasting. Conversely, more stock control related material could have been included in this book in order to start directing the students towards a more holistic view of the relevant systems.

A more extended discussion would also be expected on treating forecasting as a module of a wider solution [be it an inventory management package, a Supply Chain Management (SCM) or Enterprise Resource Planning (ERP) solution] rather than a stand-alone operational function. Chapter 9 also briefly discusses forecasting support systems and automated statistical forecasting.

Part 5 (chapters 10–14) deals with forecasting models. Chapter 10 discusses causality and residual analysis. Chapter 11 introduces the assumptions underlying linear regression analysis with normally distributed errors and chapter 12 presents the statistical

issues surrounding the use of linear regression models in various applications (addressing the potential effect of outliers on regression parameter estimates and methods for dealing with non-normal situations). Chapters 13 and 14 deal with the Box–Jenkins methodology for the ARIMA family of linear models.

Part 6 (chapters 15 and 16) examines managerial needs in acquiring excellence in forecasting performance, dealing with delivering the final forecast and improving the overall forecasting process. A brief section is included on combining forecasts and presenting models to management. Regarding this latter issue one would expect more information on how management of the gains achieved by using the  $x$  or  $y$  method ([Gardner, 1990](#)) or "selling the forecasts". Moreover there is no discussion of the forecast error related costs and their potential asymmetry.

In addition, the following two omissions are viewed as important: The book places an emphasis on the importance of (demand) data for successful decision making. Nevertheless, the difference between demand data and sales data is not given sufficient attention. There is no discussion on the common use of the latter as an approximation for the former, how we treat or should treat negative values in a series, dealing with missing data, etc.

Intermittent demand forecasting is ignored altogether. In that respect the book implicitly carries the assumption that the relevant Stock Keeping Units (SKUs) are of minor importance in an industrial setting. Intermittent demand items are almost invariably among the slower moving SKUs. However, despite the inherent infrequent demand occurrence associated with such items and the consequent, comparatively low contribution to the total turnover of an organisation, they may constitute up to 60% of the total stock value. Thus, small improvements regarding the management of those items may be translated into substantial cost savings.

Overall, the book is certainly very comprehensive and well-structured. There are many practical examples that will aid the digestion of the relevant information and very good supplementary material in the enclosed CD. The book is certainly more focused than any general business forecasting textbook. It does indeed offer something new in the academic literature, albeit with few omissions that could be considered for any potential subsequent edition.

## References

- DeLurgio, S. (1998). *Forecasting principles and applications*. New York:: Irwin/McGraw-Hill.
- Gardner Jr., E. (1990). Evaluating forecast performance in an inventory control system. *Management Science*, 36, 490–499.
- Hanke, J. E., & Reitsch, A. G. (1998). *Business forecasting* (6th edition). Englewood Cliffs, NJ:: Prentice-Hall.
- Silver, E. A., Pyke, D. F., & Peterson, R. (1998). *Inventory management and production planning and scheduling* (3rd edition). New York:: John Wiley & Sons Inc.

Aris A. Syntetos

*The School of Management, University of Salford,  
Maxwell Building, The Crescent,  
Salford M5 4WT, UK*

*E-mail address:* a.syntetos@salford.ac.uk.

Tel.: +44 161 295 5804;

fax: +44 161 295 5556.

doi:10.1016/j.ijforecast.2005.09.002

**Paul D. McNelis, *Neural networks in finance—gaining predictive edge in the market*, Elsevier Academic Press, 2005, ISBN 0-12-485967-4, hard-cover, 243 pages**

Probably finance is the area in business and economics where neural networks have been applied most frequently. A Google search on “neural networks” and “finance” delivers just under half a million hits. Several books and review articles on the topic already exist, e.g. Azoff (1994), Refenes (1995), Gately (1996), and Zhang, Patuwo and Hu (1998). Writing a new book on the topic is therefore quite a bold endeavour in itself, for which the author deserves praise.

The book is divided into two parts. Part I, comprising Chapters 2 to 4, covers the basic theory of neural networks. Part II, comprising Chapters 5 to 9, consists of empirical applications of neural networks in different areas of economics and finance.

Chapter 2 discusses the structure and interpretation of neural networks, focusing on the single hidden-layer feedforward neural network that is central to the book. A nice feature of this chapter is that relationships between neural networks and other econometric models and statistical tools are

pointed out, including smooth transition models, discrete choice models, dimensionality reduction and principal components.

Chapter 3 deals with the topic of estimating neural network parameters. There is surprisingly little attention paid to “traditional” estimation methods based on local gradient-based search algorithms such as backpropagation and Bayesian regularization. Instead, the chapter emphasizes the potential of “global” optimization methods such as simulated annealing and, in particular, genetic algorithms and evolutionary computing for estimating neural networks. The intuition behind the latter method, which perhaps is less well-known to (financial) economists is explained clearly, as well as the technical details involved.

Chapter 4 is on the evaluation of neural networks. This chapter not only contains an extensive overview of conventional in-sample diagnostics, but also stresses out-of-sample forecasting performance as the ultimate test of a neural network (or any other nonlinear model). For that purpose, the chapter includes an extensive overview of statistics for testing equal predictive accuracy of competing models.

Chapter 5 presents several simulation experiments with different linear and nonlinear data-generating processes. In this controlled environment, it is shown that neural networks have a competitive advantage over conventional linear models exactly when the true mechanism underlying the data is “substantially nonlinear”.

The “real-world” empirical applications in Chapters 6 to 9 include examples of forecasting (of production in the automotive industry, corporate bond spreads and inflation), classification (of credit card defaults and bank failures), and dimensionality reduction (in option pricing) with neural networks. In each case, linear models and neural networks are estimated for the relevant data set and used for the purpose at hand. In many cases, the neural network is found to be superior.

The book certainly makes a useful addition to the existing voluminous literature on neural networks in finance for several reasons. First, the description of the genetic algorithm in Chapter 3 is concise yet clear and accessible for readers without any prior knowledge about the technique. Second, the book is supported by a website containing