FINANCIAL MODELS AND SIMULATION

Dimitris N. Chorafas

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FINANCIAL MODELS AND SIMULATION

Also by Dimitris N. Chorafas

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Preface

Financial analysis and *auditing* have many things in common but they also have several differences. Progress in auditing comes by taking things apart, and in financial analysis by putting things together. Therefore:

- The term *analysis* is a misnomer.
- What is really meant is *synthesis* of analytical results.

A common element of financial analysis and of auditing is that of *modeling*. Whether done through a formal, structured approach using mathematics and computers or by means of analogical reasoning by the expert, modeling can be instrumental in revealing hidden relationships which help to analyze and synthesize pertinent information elements.

A good deal of these information elements come through databased accounting procedures, market input, time series and other data streams. Sometimes the input is quantitative but quite often it presents both quantitative and qualitative aspects. Hence the approach which characterizes the 15 chapters of this book.

* * *

This is a *how to* book written for business executives and management, accounting and finance students. Though it involves financial models it requires no background in mathematics. Every term is explained in the text in a way which is fully comprehensive. Practical examples permit the reader to gain insight into the way modern financial analysis is done.

The book divides into four parts, each addressing one major area of interest. Part One explains the practice of financial modeling and gives *applications examples* from both financial institutions and manufacturing organizations.

As an introduction to the leading edge of financial analysis, Chapter 1 presents ways and means currently in use, aimed to simplify a world of complexity in the handling of financial data, starting from the contribution of Luca Paciolo in the late 15th century, and proceeding to the modern management accounting standards.

Modeling concepts in finance and accounting is the theme of Chapter 2, which also introduces the basic notions of financial modeling. This presentation stresses the need for interdisciplinary approaches and leads to a comprehensive definition of the modeling domain in Chapter 3.

Chapter 4 examines the organizational prerequisites to the successful development and implementation of financial models, including the quality

of inputs and what might constitute an acceptable error level in management accounting. In the background is the concept that financial analysis is done for decision support reasons and that it has to integrate with management accounting practices.

Models for budgeting and budgetary control are the focal point of Part Two, which is applications oriented. Chapter 5 addresses the issues connected with financial planning and budgeting procedures, examining the budget as a short-term financial plan and linking its observance to the notion of *management accountability.*

The effective development of budgets, their expression in an algorithmic form and plan versus actual evaluation, requires a budget analyzer. This is the theme of Chapter 6, which also discusses the prerequisites to a budgetary model. Chapter 7 explains how to build financial models in order to control costs, as well as how to use cost standards.

A whole methodology and associated procedures for control over costs and budgets is presented in Chapter 8, which also underlines the importance of getting acceptance of financial plans by those who will be responsible for implementing them. Both quantitative and qualitative approaches are presented, and through practical examples it is explained how they can be put into practice.

* * *

Contrary to what many books suggest, accounting is not a process which obeys strictly quantitative rules. Accounting is both qualitative and *judgmental.* Who is to say:

- The appropriate allowance for bad debt?
- The reserves which should be made for law suits?
- The right presentation of accounting results for management control reasons?

In very large measure, accounting rules include a great deal of judgmental interpretation. The presentation of results is itself an art whose heterogeneity can reach significant proportions. But decisions require a level of homogeneity, hence the need for models and standards.

Part Three is structured in this frame of reference. Chapter 9 addresses the issues related to models for balance sheet reporting. It explains the organizational and technological impact on the company's balance sheet and presents applications which involve 'What-if' experimentation.

By contrast, Chapter 10 covers the new and burgeoning domain of financial instruments for Off-Balance Sheet transactions: Options, Futures, Forwards, and Swaps. It explains the role of the financial analyst in connection with derivatives, presents the role models play in volatility and hedging, and discusses why derivatives are really marked-to-model – while every bank says that its instruments are marked-to-market.

The theme of Chapter 11 is cash flow and its management. After defining the many meanings of 'cash flow', the text looks into cash flow as a critical resource, explaining the prerequisites for a dynamic financial analysis and the sense of non-traditional financial research. This is carried further in Chapter 12 which focuses on ways and means for judging profitability – from the customer mirror to the organizational prerequisites for accurate and timely management reporting.

Part Four exploits the background which has been developed through the first twelve chapters, and serves as a conclusion. Chapter 13 presents practical examples on how the use of financial ratios can serve as a thermometer of the enterprise's finances. Ratio analysis is discussed under the perspective both of manufacturing companies and of financial institutions.

There are of course more powerful means for analysis and control than ratios, and Chapter 14 presents the creative use of algorithmic solutions – both with balance sheet and off-balance sheet instruments. Chapter 15 focuses on the role of visualization in connection with financial analysis. It is not enough to obtain quantitative results. These must also be presented in a comprehensive manner.

* * *

When we think about what underpins *success in finance*, we find that there is a strong relationship between the level of our knowhow and our professional performance. In this simple sentence lies the aim of the present book. The new perspectives it opens to its readers will be an integral part of a person's career advancement and his or her professional survival.

Since this book has been based on an extensive research project, I wish to express my appreciation for the collaboration received from 244 senior managers, systems designers, computers and communications specialists and finance experts in America, England, Germany, Austria, Sweden, Denmark, and Japan.

Eighty-nine computer manufacturers, communications companies, financial institutions, service companies and university laboratories participated in this effort. A personalized list can be found in the Acknowledgments on pp. 348–50.

Let me close by expressing my thanks to everybody who contributed to this book: to my colleagues for their insights, to the company executives as well as university faculties who reviewed selected parts of this book for the assistance which was given, and to Eva-Maria Binder for the drawings, typing and index.

Valmer and Vitznau DIMITRIS N. CHORAFAS

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