Although the theoretical foundations of modern finance were laid almost half a century ago (and indeed, many would argue that surprisingly little theoretical progress has been made since then), the empirical side of finance has grown beyond all recognition both in terms of the volume of studies and their rigour. Several key developments coincided to facilitate this development in the subject. Firstly, considerable progress was made in statistical theory and an array of new econometric approaches was developed. Secondly, the availability of computers and computing power increased manyfold, which not only allowed the estimation of sophisticated models and the utilization of approaches involving processor-intensive techniques, but also enabled researchers to store and manipulate large financial databases. Thirdly, researchers are increasingly well trained in advanced quantitative techniques, and the availability of more powerful and yet at the same time more user-friendly statistical software packages have meant that models previously requiring weeks of code writing can now be estimated at the click of a mouse.

Of course, this computing power and ease of implementation have brought their own problems, perhaps not the least of which is the bewildering array of possible approaches from which a researcher could select to address a particular issue. Making this choice optimally and implementing the model validly requires considerable technical knowledge, and this constitutes the point of departure for the present collection. Our objective is to draw together in a single volume a set of chapters that will assist the reader in determining the appropriate method or model to solve a specific problem in finance, and to provide the reader with an example that demonstrates how to implement it. The book is divided into thematic parts in order to more closely group the chapters around five key subfields of research in empirical finance. Renowned experts within their field have produced each chapter.

The book is aimed primarily at doctoral researchers and academics who are engaged in conducting original empirical research in finance. It is written at the intermediate to advanced level using a ‘cookbook’ type approach and is highly practical in nature, with extensive use made of data and examples. Depending on the nature of the material covered, some chapters are organized more in the form of critical reviews of the literature with emphasis on the research designs of the studies, while others constitute worked illustrations of many of the key techniques that are commonly implemented in leading research in this area.

In addition, the book will be useful to researchers in the financial markets and also advanced Masters-level students who are writing dissertations. The objective has been to present the quantitative techniques together with real-world, state-of-the-art research examples. Our approach is to describe a question or issue in finance and then to demonstrate the methodologies that may be used to solve it. All of the techniques described are used to address real problems rather than being presented for their own sake, and the areas of application have been carefully selected so that a broad range of methodological approaches can be covered.
In Part I, we consider asset pricing and investments, the foundation and the subject of a broad range of research. The first chapter by Massimo Guidolin surveys the application of Markov switching models in financial economics, with a particular emphasis on tackling asset pricing questions. This is followed by a chapter from William T. Ziemba who reconsiders the classical portfolio optimization problem and discusses strategies for real-world implementations. Over the past few years, financial bubbles have been regularly discussed both in the academic literature and in the popular media. In Chapter 3, Keith Anderson, Chris Brooks and Apostolos Katsaris demonstrate, using a range of models, how researchers can test for the presence of bubbles in asset markets.

In Part II, we move to looking at research in the area of derivatives. Chapter 4 by Marcel Prokopczuk and Yingying Wu demonstrates how to estimate a commodity futures or interest rate term structure model using the Kalman filter. This is followed by Chapter 5 from Lars Stentoft, who explains how simulation methods can be used to price American options. In Chapter 6, Ke Chen and Ser-Huang Poon discuss how to numerically compute derivatives prices in affine model frameworks. Finally, in Chapter 7, Yongwoong Lee and Ser-Huang Poon describe how Markov Chain Monte Carlo estimation techniques can be used in the context of credit risk models.

Part III examines banking and microstructure. The former area was traditionally thought of as being predominantly discursive in nature, but more recently a wide range of relatively sophisticated approaches have been employed, while the latter field has witnessed some of the biggest advances in modelling techniques across the whole of finance, partly due to the increasing availability of very large databases in this area. Chapter 8 by Hong Liu, Phil Molyneux and John O.S. Wilson tackles a key issue by discussing and evaluating possible approaches for measuring competition in banking. Next, in Chapter 9, Geraldo Cerqueiro, Hans Degryse and Steven Ongena look at the choice to lend by banks and demonstrate how heteroscedastic regression models can be employed in this context. Liquidity is the subject of Chapter 10 by Thomas Johann and Erik Theissen. Whilst comparing and contrasting traditional methods of measuring liquidity, they also question these in light of recent developments in international equity markets. In Chapter 11, Woon Sau Leung and Nicholas Taylor present a contagion analysis of the US subprime crisis and investigate how financial markets in the rest of the world felt its spillover effects.

Part IV is devoted to the subfield of corporate finance. Chapter 12 by Andrey Golubov, Dimitris Petmezas and Nickolaos G. Travlos presents a review of empirical research into mergers and acquisitions of corporations and the impact these activities have. Manuel Ammann, David Oesch and Markus Schmid discuss the importance of constructing accurate corporate governance indices from an international perspective in Chapter 13. Finally, Chapter 14 by David A. Carter, Daniel A. Rogers, Betty J. Simkins and Stephen D. Treanor shows how the multivariate regression model methodology is employed and analyses the impact of the decision to hedge fuel prices for airlines in relation to unpredictable weather patterns in the United States (US).

In Part V we conclude the book by looking at risk modelling. Firstly, in Chapter 15, Silvia Stanescu and Radu Tunaru examine the accuracy of the popular value-at-risk (VaR) approach and explain how to compute confidence intervals for this risk measure. Next, Deniz Erdemlioglu, Sébastien Laurent and Christopher J. Neely look at problems in foreign exchange modelling, focusing on models for volatility and jumps. In Chapter
Edward I. Altman then reviews how techniques for analysing the financial distress of corporations have developed through to the present. The final chapter by Ölan T. Henry, Nilss Olekalns and Kalvinder K. Shields outlines new methods for detecting and quantifying dynamic responses to news on unobservable variables. They demonstrate the applicability of their method in the context of the international capital asset pricing model.