Preface

In this book, we illustrate how to use Stata to perform intermediate and advanced analyses in financial econometrics. The book is mainly for graduate students and practitioners who have an average econometric background. We provide a comprehensive overview of ARMA modeling, as well as univariate and multivariate GARCH models. Our approach consists of presenting a brief but rigorous summary of the theoretical framework, which we then implement using many examples. In particular, we report several empirical applications using real financial markets data to illustrate how to model conditional mean and conditional variance of typical financial time series. Users can easily replicate all the applications, executed using Stata 14, with the datasets and do-files we provide to get familiar with the techniques and Stata commands.

Throughout the book, we use acronyms extensively. For your convenience, we have included a glossary of acronyms at the end of the book.

The book is organized as follows. Chapter 1 provides an introduction to the following: the main features of financial time series, commands for obtaining descriptive statistics, analyzing normality, conducting stationarity tests, autocorrelation, heteroskedasticity, and model selection criteria. Chapter 2 provides a detailed description of the univariate ARMA framework to model the conditional mean of financial time series, with a specific focus on the S&P 500 returns time series.

Chapter 3 introduces the notion of conditional volatility and the popular family of GARCH models, specifically designed to capture the autoregressive nature of the volatility of asset returns. Brief descriptions of GARCH-M, asymmetric GARCH (SAARCH, TGARCH, GJR, APARCH) models, and nonlinear GARCH (PARCH, NGARCH, NGARCHK) models are followed by empirical implementations considering the S&P 500. Chapter 4 extends the univariate GARCH models to the multivariate framework, to account for not only volatility but also correlations between assets. Seminal multivariate GARCH models, such as vech and BEKK models, are described mainly to highlight the curse of dimensional issues; the chapter largely focuses on the CCC and DCC models widely used in the profession. Extensive empirical applications are conducted using four stock indices to stress the empirical validity of the MGARCH framework.

The last two chapters focus on risk management and contagion analyses, two leading research themes among academics and practitioners in the field of financial econometrics. In particular, chapter 5 introduces the concept of risk, risk measures, and their properties, concluding with an overview on some unilevel VaR and multilevel VaR backtesting procedures proposed in the literature. The empirical applications reported illustrate the methods and the way to implement them. Chapter 6 focuses on contagion analysis,

where alternative methodologies are presented to evaluate the presence of a contagion. The techniques are illustrated by empirical applications examining the presence of a contagion among the United States, the United Kingdom, Germany, and Japan.

We acknowledge several people to whom we are in debt. First, we are grateful to David Drukker for having sponsored and encouraged us to pursue this project. His support was vital throughout the long gestation of the book, and he read and commented on several drafts of it. Second, we thank Elisabetta Pellini, who carefully read the complete version of the book and provided detailed and constructive feedback at various stages of the project on both the completion of the final document and the empirical applications. Third, we thank Jan Novotny for providing us with useful comments to a preliminary version of the book. Finally, we thank Lisa Gilmore and Deirdre Skaggs for production, LaTeX, and editorial assistance. Any mistakes within the book are ours.