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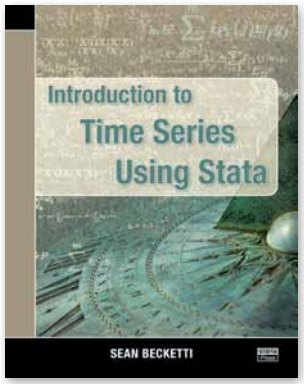
Introduction to Time Series Using Stata



By Sean Becketti

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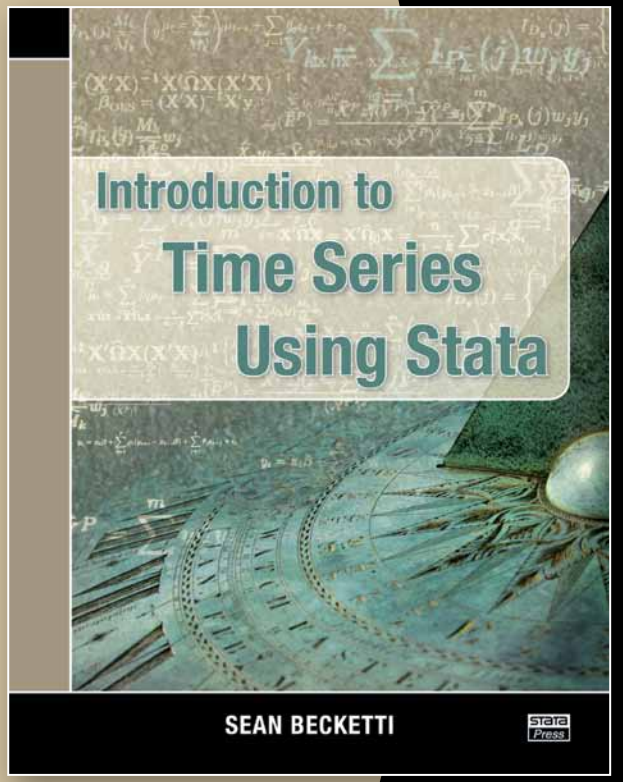

About the author

Sean Becketti is a financial industry veteran with three decades of experience in academics, government, and private industry. Over the last two decades, Becketti has led proprietary research teams at several leading financial firms, responsible for the models underlying the valuation, hedging, and relative value analysis of some of the largest fixed-income portfolios in the world.

He was a developer of Stata in its infancy, and he was Editor of the *Stata Technical Bulletin*, the precursor to the *Stata Journal*, between 1993 and 1996. He has been a regular Stata user since its inception, and he wrote many of the first time-series commands in Stata.

The book's audience

This book will appeal to

- Master's-level and advanced undergraduate students in economics and business schools
- Researchers new to time-series analysis and forecasting
- New Stata users intending to work with time-series data in Stata
- Analysts in industry and government needing a simple reference on time series and forecasting

Comment from the Stata technical group

Introduction to Time Series Using Stata, by Sean Becketti, provides a practical guide to working with time-series data using Stata and will appeal to a broad range of users. The many examples, concise explanations that focus on intuition, and useful tips based on the author's decades of experience using time-series methods make the book insightful not just for academic users but also for practitioners in industry and government.

The book is appropriate both for new Stata users and for experienced users who are new to time-series analysis.

Chapter 1 provides a mild yet fast-paced introduction to Stata, highlighting all the features a user needs to know to get started using Stata for time-series analysis. Chapter 2 is a quick refresher on regression and hypothesis testing, and it defines key concepts such as white noise, autocorrelation, and lag operators.

Chapter 3 begins the discussion of time series, using moving-average and Holt–Winters techniques to smooth and forecast the data. Becketti also introduces the concepts of trends, cyclicality, and seasonality and shows how they can be extracted from a series. Chapter 4 focuses on using these methods for forecasting and illustrates how the assumptions regarding trends and cycles underlying the various moving-average and Holt–Winters techniques affect the forecasts produced. Although these techniques are sometimes neglected in other time-series books, they are easy to implement, can be applied to many series quickly, often produce forecasts just as good as more complicated techniques, and, as Becketti emphasizes, have the distinct advantage of being easily explained to colleagues and policy makers without backgrounds in statistics.

Chapters 5 through 8 encompass single-equation time-series models. Chapter 5 focuses on regression analysis in the presence of autocorrelated disturbances and details various approaches that can be used when all the regressors are strictly exogenous but the errors are autocorrelated, when the set of regressors includes a lagged dependent variable and independent errors, and when the set of regressors includes a lagged dependent variable and autocorrelated errors. Chapter 6 describes the ARIMA model and Box–Jenkins methodology, and chapter 7 applies those techniques to develop an ARIMA-based model of U.S. GDP. Chapter 7 in particular will appeal to practitioners because it goes step by step through a real-world example: here is my series, now how do I fit an ARIMA model to it? Chapter 8 is a self-contained summary of ARCH/GARCH modeling.

In the final portion of the book, Becketti discusses multiple-equation models, particularly VARs and VECs. Chapter 9 focuses on VAR models and illustrates all key concepts, including model specification, Granger causality, impulse-response analyses, and forecasting, using a simple model of the U.S. economy; structural VAR models are illustrated by imposing a Taylor rule on interest rates. Chapter 10 presents nonstationary time-series analysis. After describing nonstationarity and unit-root tests, Becketti masterfully navigates the reader through the often-confusing task of specifying a VEC model, using an example based on construction wages in Washington, DC, and surrounding states. Chapter 11 concludes.

Introduction to Time Series Using Stata, by Sean Becketti, is a first-rate, example-based guide to time-series analysis and forecasting using Stata. It can serve as both a reference for practitioners and a supplemental textbook for students in applied statistics courses.