Time-Series Analysis and Forecasting

December 2019

Acknowledgements

NABE extends a special thank you to the members of the Working Group whose support and guidance shaped this course.

Gregory Daco, Chief US Economist, Oxford Economics USA

Jim Diffley, CBE, Senior Director, IHS Markit

Charles Steindel, CBE, Resident Scholar; Editor, Business Economics, Ramapo College of NJ

Luis B. Torres, CBE, Research Economist, Real Estate Center at Texas A&M

Chris P. Varvares, CBE, VP and Co-head US Economics, Macroeconomic Advisers LLC

About the Author

Robert McNown is responsible for the development of this Guide and related materials for the NABE course in Time Series Analysis and Forecasting. Dr. McNown is Professor Emeritus in Economics at the University of Colorado, Boulder. He received his BA in Economics from UCLA and his PhD in Economics from UC San Diego. His primary areas of research and teaching interest are Econometrics, Time Series Analysis, Demography, and International Economics. Dr. McNown has held visiting faculty positions at Tribhuvan University (Kathmandu, Nepal) as a Fulbright Lecturer, People's University (Beijing) under World Bank sponsorship, Semester at Sea, the Department of Econometrics at Sydney University (Australia), and at the National Economics University in Hanoi, Vietnam as a Fulbright Scholar.
Dr. McNown has conducted training sessions in applied econometrics and time series econometrics at the Bank of Kenya (2007), the National Bank of Croatia (2007, 2008), Haver Analytics in New York (2013-2015), the International Monetary Fund (2013-2017), and the Bank of Korea (2014). He has been teaching Applied Econometrics in the NABE Certified Business Economist program since 2015.
He has also been involved in the development and application of macro-econometric models for forecasting state and local district tax revenues for the Colorado Governor's Office, the Regional Transportation District of the Denver metropolitan area, and the University of Colorado's Department of Finance.

This Guide was prepared with the assistance of Michelle Thrun. Michelle earned her BA in Economics with a Quantitative Emphasis Certificate and a Mathematics Minor from the University of Colorado Boulder (2016). She is currently Private Client Coordinator in the Denver office of Alliance-Bernstein. Michelle contributed to the development of similar course materials in Applied Econometrics as a Research Assistant for JTC Econometrics LLC (2016). Her contributions to the development of the materials for Time Series Analysis and Forecasting included writing assistance, implementing and checking exercises, developing the PowerPoint slides, and drafting some of the chapters.

Time-Series Analysis and Forecasting, developed for the National Association for Business Economics.

CERTIFIED BUSINESS ECONOMIST

The Certified Business Economist® (CBE) is the Certification in Applied Economics and Data Analytics.

The CBE designation is a symbol of distinction that business economists and analysts earn by meeting a prescribed level of achievement. It documents your professional accomplishments, experience, and abilities.

The Curriculum:

Applied Econometrics
This program covers cutting-edge developments in econometric methodologies and quantitative analysis, emphasizing business applications of statistical techniques.

Business Applications of Statistics and Data Analytics
This program in statistics and quantitative methods focuses on practical, applied problems and covering topics as hypothesis testing, tools for working with big data, basic regression methods, and diagnostics.

Economics of Strategy and Managerial Decision Making
This program covers the integration of microeconomic theory with real-world business scenarios to facilitate decision making, problem solving, and planning.

Economic Measurement Seminar
Instructed by leading data users and data providers, this program provides an overview of the sources and characteristics of the most vital economic statistics.

Communication and Presentation Skills for Business Economists and Analysts
A prerequisite for the CBE designation, this program offers the skills needed for effective verbal communication and best practice presentation tools and techniques.

Writing Skills for Business Economists and Analysts
A prerequisite for the CBE designation, this program provides useful tips for effective written communication and identifies common pitfalls experienced by writers in communicating technical information to clients and end users of varying levels of sophistication.

The CBE Examination:

Today's business economists and analysts are expected to master a wide array of disciplines. The CBE examination is based on an advanced body of knowledge, developed and reviewed by leading business economists to ensure that it reflects the most relevant information and core competencies sought by today's top employers.

The CBE Exam is designed to be a comprehensive multiple-choice assessment, testing a candidate's practical and applied knowledge in the following areas:

- Applied Econometrics
- Business Applications of Statistics and Data Analytics
- Economic Measurement
- Economics of Strategy and Managerial Decision Making
- Macroeconomics and Microeconomics

Candidates may choose prepare independently or enroll in NABE's courses if guided learning is preferred. Detailed content outlines will be posted for each subject area and sample test questions will be available.

The Certified Business Economist Requirements*:

- Examination - candidates must pass a comprehensive practical examination.
- Membership - candidates must be a member in good standing with NABE.
- Experience - candidates must have two years of work experience in applied business economics or in a related field.
- Education - candidates must attain at least a four-year degree.
- Curriculum Requirements - candidates must complete NABE's Communication and Presentation Skills for Business Economists and Writing Skills for Business Economists certificate courses or courses deemed equivalent by NABE.
- Ethics - candidates must sign and adhere to the NABE Code of Ethics.
  Continuing Education/renewal - designees are required to earn 30 hours of continuing education every two years to renew the certification. A renewal fee applies.

About NABE

The National Association for Business Economics is the premier professional association for business economists and others who use economics in the workplace. Since 1959, NABE has attracted the most prominent figures in economics, business, and academia to its membership with highly-regarded conferences, educational and career development offerings, industry surveys, and its unrivaled networking opportunities. Past presidents of NABE include former Chairman of the Board of Governors for the Federal Reserve System, Alan Greenspan, several former Federal Reserve Governors, and other senior business leaders.

NABE's mission is to provide leadership in the use and understanding of economics.

Time-Series Analysis and Forecasting
Table of Contents