

Introduction to Macroeconometric Forecasting

Version April 9, 2018

Course Description:

This course will provide (i) a thorough yet accessible presentation of some of the key reduced-form and structural models and methods that macroeconometrics currently has to offer to analyze macroeconomic data, and (ii) the application of these models and methods to the analysis and forecasting of macroeconomic variables.

Many classes will involve empirical illustration of the econometric and macroeconomic methods discussed in *STATA*, and course participants will be expected to complete assignments in *STATA*. At the end of the course, participants should feel comfortable to do independent, macroeconomic-theory based empirical work using time series data as arising in many areas of macroeconomics.

Course Learning Goals:

The course will contribute to the following learning goals of the Bachelor Program in Economics and Business Administration at Goethe University:

- Graduates of the program understand, reflect and apply state-of-the art theories. (LGB-1)
- Graduates of the program master quantitative methods. (LGB-2)
- Graduates of the program have factual knowledge from different fields and can apply it in their professional practice. (LGB-3)
- Graduates of the program have basic IT knowledge and intermediate proficiency in operating software and data tools. (LGB-5)

Course Pre-Requisites:

It is expected that course participants have successfully completed the course “Einführung in die Ökonometrie” (Introduction to Econometrics) *prior to* enrollment in this course. The course “Makroökonomie 2” (PMAK) may be taken concurrently to enrollment in this course:

Econometrics:

The course will *presume* knowledge of econometric methods as covered in the Bachelor Program in Economics and Business Administration at Goethe University in the course “Einführung in die Ökonometrie” (Introduction to Econometrics). A textbook that covers the relevant material in this latter course is: J.M. Wooldridge, *Introductory Econometrics*, Sixth Edition, Mason: South-Western Cengage Learning, 2016, Chapters 1 – 6 and 10 – 11 (covering linear regression with cross-sectional and time-series data).

Mathematics, Probability, Statistics and Linear Algebra:

The course will *presume* knowledge of mathematics, probability, statistics and linear algebra at the level of, say, Appendices A to D in J.M. Wooldridge, *Introductory Econometrics*, Sixth Edition, Mason: South-Western Cengage Learning, 2016.

Macroeconomics:

The course will build on knowledge of macroeconomics as covered in the Bachelor Program in Economics and Business Administration at Goethe University in the course “Makroökonomie 2” (PMAK). A textbook that covers the relevant material in this latter course is: P. Birch Sørensen and H.J. Whitta-Jacobsen, *Introducing Advanced Macroeconomics: Growth and Business Cycles*, Second Edition, Columbus: McGraw-Hill, 2011, Chapters 13 – 22 (covering business cycles and stabilization policy).

Course Credit:

The course will carry six credit points according to the European Credit Transfer System (ECTS).

Class Time and Location:

Wednesday, 4:15 pm – 5:45 pm (weekly, from April 11)

Room: Seminarhaus (SH) 0.101.

Wednesday, 2:15 pm – 3:45 pm (bi-weekly, from April 18)

Room: Seminarhaus (SH) 0.101.

The review sessions (that will review portions of the lecture material and work through the solution of the problem sets) will be taught by Zexi Sun, a doctoral candidate in the Ph.D. Program in Economics at Goethe University who specializes in macroeconomic and econometric research. See the separate document, “Detailed Schedule for the Lectures and Review Sessions”, for the dates of the lectures and review sessions. Some of the review sessions will take place in one of the PC labs of the Faculty of Economics and Business Administration.

Course Requirements:

Grades for this course will be based on the final examination only. The final examination will be a 90 minutes examination. The date and time of the final examination is set by the Examination Office of the Faculty of Economics and Business Administration. Course participants will need to register for the final examination following the procedure set forth by the Examination Office. Any inquiries concerning registration for the final examination are to be sent to the Examination Office directly: pruefungsamtwiwi.uni-frankfurt.de.

Notes for students outside the Bachelor Program in Economics and Business Administration: Goethe University students from degree programs other than the Bachelor Program in Economics and Business Administration, including international exchange students registered with the International Office of the Faculty of Economics and Business Administration, are certainly welcome to attend the course, but must observe the following:

There can be **no** exceptions regarding the course requirements detailed above (all course participants will need to register for the final examination following the procedure set forth by the Examination Office of the Faculty of Economics and Business Administration, and the final examination **must** be taken on the date, at the time and in the location specified for all students by the Examination Office of the Faculty of Economics and Business Administration). Any inquiries concerning course grades and the transfer of these to other degree programs need to be addressed to the Examination Office of the Faculty of Economics and Business Administration.

Office Hours:

Michael Binder, Tuesday, 5:00 pm – 6:00 pm (HoF, 3.50).

Zexi Sun, Wednesday, 9:00 am – 10:00 am (HoF, 3.60).

Course Website:

<https://olat-ce.server.uni-frankfurt.de/olat/auth/RepositoryEntry/5907939416>

The course website beyond this syllabus will contain course administrative announcements, slides for classes, files and data sets for working with *STATA*, problem sets, as well as sample examinations.

The material will be added to this site sequentially, as the course is progressing, thus allowing for the course to adapt as needed. The course website will be password protected. The password will be announced in the first class, and must not be passed on to anybody not attending the course this semester.

A word of caution regarding the course website: Course participants should **not** view the material on the course website as a substitute for attending classes. The classes in part may involve material that will not be posted on the course website.

Texts:

The slides to be made available for classes will be self-contained, integrating material from multiple sources and extending it as needed. There is thus not one single textbook covering all the material to be presented and discussed in this course. References that will feature in multiple sections of the course are the following:

Econometrics, Macroeconomics and Macroeconometrics:

- C.J. Costa Junior (2016): *Understanding DSGE Models: Theory and Applications*, Wilmington: Vernon Press.
- F.X. Diebold (2015): *Forecasting in Economics, Business, Finance and Beyond*, Open Text Available at www.ssc.upenn.edu/~fdiebold/Textbooks.html, Department of Economics, University of Pennsylvania.
- J.H. Stock and M.W. Watson (2015): *Introduction to Econometrics*, Updated Third Edition, Essex: Pearson.
- R.S. Tsay (2010): *Analysis of Financial Time Series*, Third Edition, Hoboken: John Wiley.
- R.S. Tsay (2017): *Multivariate Time Series Analysis*, Hoboken: John Wiley.
- M. Verbeek (2017): *A Guide to Modern Econometrics*, Fifth Edition, Hoboken: John Wiley.

STATA:

- A.C. Acock (2018): *A Gentle Introduction to STATA*, Sixth Edition, College Station: STATA Press.
- C. Beckett (2013): *Introduction to Time Series Using STATA*, College Station: STATA Press.

Course Outline:

1. Introduction to Forecasting
2. Autoregressive Moving Average (ARMA) Models and Forecasting
 - ARMA Models: Model Formulation
 - ARMA Models: Estimation
 - Forecasting with ARMA Models
3. Autoregressive Integrated Moving Average (ARIMA) Models and Forecasting
 - ARIMA Models: Model Formulation
 - ARIMA Models: Estimation
 - Forecasting with ARIMA Models
4. Vector Autoregressive (VAR) Models and Forecasting
 - VAR Models: Model Formulation
 - VAR Models: Estimation
 - Forecasting with VAR Models
5. New Keynesian Dynamic Stochastic General Equilibrium (NKDSGE) Models and Forecasting
 - NK-DSGE Models: Model Formulation
 - NK-DSGE Models: Estimation
 - Forecasting with NK-DSGE Models
6. Outlook