Learning Goals and Assessment

The objective of this course is to learn quantitative and empirical methods that have proven to be useful in macro research. We will emphasize applications rather than the development of the methods, but we will also cover their foundations and intuition.

Because current research in macroeconomics focuses on growth and business cycle phenomena, the appropriate methods are dynamic, time series oriented. Hence we will discuss time series, recursive methods, and other dynamic tools. Given its increasing prominence, we will cover some basic numerical and computational issues as well. By the end of the course, course participants should be familiar with a quantitative and empirical arsenal applicable to their own research projects.

The grade for the course will be determined by class assignments (60%) and a term project (40%) to be discussed later.

References, Prerequisites, Activities

This course will draw on multiple references, but the following ones are probably the most useful ones (depending on topic):

The most essential sources for our purposes are marked with an asterisk (*).

Working knowledge of a computer programming language, such as GAUSS or MATLAB will be necessary. Knowledge of an econometrics package such as RATS will be also useful.

Outline and Basic Readings

The literature is huge and, in some cases, still evolving. Here is a list the main topics and associated basic references. This is only a start, and we will add (or drop) readings and topics as needed.

1. **Growth vs Cycles. Dealing with Trends**


   DD, chapter 6

2. **Univariate Time Series Analysis**


   DD, ch. 7
   MHH, ch. 13
   H, ch. 3, 5-8

3. **Multivariate Time Series: VARs and Related Topics**


   MHH, ch. 14
   H, ch. 10, 11
4. **Numerical Topics: Optimization and Equation Solving**


   MF, ch. 2-5  
   J, ch. 3-5, 7  
   MHH, ch. 3

5. **State Space Methods: Kalman, Applications**


   MHH, ch. 15  
   DD, ch. 8  
   H, ch. 13

6. **Generalized Method of Moments**


   DD, ch. 12  
   MHH, ch. 10  
   H, ch. 14

7. **Dynamic Programming and Recursive Methods**


   SL, ch. 3-5, 9-10  
   LS, ch. 3-6


   MF, ch. 6-9
9. **Numerical Topics: Integration and Simulation Methods**

   Numerical Differentiation and Integration. Estimation by Simulation.

   MF, ch. 5
   J, 7-9
   DD, ch. 9, 12.2
   MHH, ch. 12

10. **Using DYNARE**

    Some fine points and pitfalls with DYNARE. Solving models with occasionally binding constraints


11. **Maximum Likelihood and Bayesian Estimation of DSGE Models**

    DD, ch. 13-14
    MHH, ch. 1-2, 4