Dynamic Macroeconomics (Part I)
University of Bonn

JProf. Dr. Donghai Zhang

Summer Semester 2020

Outline:
This course introduces students to techniques that allow them to solve and bring modern business cycle models to the data. Importantly, this course is designed as a hands-on course that requires students to write their own Matlab code to implement the concepts discussed in class! This is the first half of a full semester course. The second half will be taught by Prof. Christan Bayer. Tutorials/exercise sessions are integrated into the lectures.

What you should do before the beginning of the semester :

1. You will be working with Matlab, so please install it.
   - A Matlab primer is available on Ecampus.
   - Download the Sims-folder from Ecampus and store it in a directory you will be working in during the course.
   - install Dynare
2. Due to the shortened semester, we will not discuss the details about the RBC model in lectures, but you should be familiar with this model. The folder Lecture0 contains relevant materials for you to self-study at home.

Virtual Lectures:
The first half consists of 9 lectures with 2 hours per lecture.
We will deliver virtual lecture via Zoom:
Thursday 14:00-16:00; Zoom: https://zoom.us/j/379802235
Friday 10:00-12:00; Zoom: https://zoom.us/j/200894111
First lecture: April 23rd, 2020.
Last lecture: May 28th, 2020.
Exceptions: May 1 and May 21 public holiday
Note: We are all new to this new format. There might be unpredicted changes/shocks, when such a shock occurs, email will be the main method of communication. Check your emails regularly

(e.g., 5 minutes before a lecture), and do not hesitate to contact me (email: donghai.zhang@uni-bonn.de) if you have any problems.

Virtual Office hours:
Four office hours: April 27, May 11, May 25, June 1; from 5pm-6pm; Zoom: https://zoom.us/j/618672859
Important: please write me an email in advance, if you want to join a virtual individual meeting.

Course Homepage:
All relevant materials for the course are available on a shared dropbox folder: https://www.dropbox.com/sh/gcgv0zg6pznigc3/AAAs0eLdtLbHK-4VImgbYXVVa?dl=0
Password: macro

Grades:
Grades will be based on a final written exam.

List of Topics

1. **Linear Rational Expectations Models**
    - Lecture 0: The Real Business Cycle model (Self-study before the beginning of the course)
    - Lecture 1: The New Keynesian model
    - Lecture 2: Three Ways of Solving Linear Rational Expectations Models
    - Lecture 3: Dynare
    - Lecture 4: NK v.s RBC: evidence from SVAR
2. **Solution of Non-linear Deterministic Models**.
    - Lecture 5: Root-finding algorithms
    - Lecture 6: NK with the ZLB constraint
        - Method 1: Occasional binding constraint
        - Method 2: Complementarity Problem
        - A stochastic NK model with the ZLB constraint: analytical solution
3. **The Kalman Filter and Maximum Likelihood Estimation of DSGE Models**
    - Lecture 7: Kalman Filter theory
    - Lecture 8: Kalman Filter applications
4. **Bayesian Estimation**
    - Lecture 9: Bayesian theory and application

Please note: I reserve the right to change the information in this syllabus at any time.