COURSE SYLLABUS

ADVANCED MACROECONOMICS

Instructors:

Part I
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Part II
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Fall, 2015
Course level: PhD
3 Credits (4 ECTS Credits)

Pre-requisites: This is a compulsory, core class for first-year PhD students. Enrollment is open to interested second-year MA students as well.

Office hours: by appointment (konyai@ceu.hu, briglevicst@mnb.hu). You will also have office hours with the TA before problem sets (TBA).

Course Description
We introduce the fundamental methods and toolkit needed to analyze dynamic general equilibrium optimizing models in discrete time. The goal of this course is to provide students with understanding a set of key macroeconomic models. While there is no single textbook for the course, the lectures loosely follow sections in Krussell (K): *Real Macroeconomic Theory*, manuscript, 2014.
For the lectures on incomplete markets Ljungqvist and Sargent: *Recursive Macroeconomic Theory* is a helpful reference.
Additional recommended readings will be available online.

Learning Outcomes
- ✓ Students understand the mechanics of the relevant models taught.
- ✓ They are able to set up and solve standard dynamic macroeconomic models.
- ✓ They understand how macro models relate to macro data.

- ✓ They know how to use standard software for solving and simulating macro models.

Course Requirements

Assessment for the whole 3-credit course is through a final exam and problem sets, the former accounting for 80%, the latter for 20% of the total course grade. You are free to work in study groups for problem sets, but you need to hand in an individual solution.

Software

You will need to use software to solve some homework questions. You are strongly advised to use Matlab, which has a student edition that can be purchased at a very reasonable price. You will also need Dynare, which is a free add-on to Matlab and it is explicitly designed for solving dynamic macroeconomic models. Another option is to substitute Matlab with Octave, which is a free and open source program. Octave is 99% compatible with Matlab, and it can also work with Dynare. You might run into problems in the 1% of cases when Matlab and Octave differ, so Matlab is the safer option.

COURSE SCHEDULE

Part I

Lecture 1-2 Introduction

1. Data and facts in macroeconomics
   - 1.1. Trend and cycle
   - 1.2. VARs and SVARs
   - 1.3. Estimating SVARs in Matlab
2. The canonical model

➔ **Assignment 1**

Lectures 3-6 Deterministic models and dynamic programming

3. Solution methods (K, Ch 3-4)
   - 3.1. The sequences approach
   - 3.2. Dynamic programming
4. Solving deterministic models
   - 4.1. Dynamic programming with Matlab
   - 4.2. Deterministic simulation with Dynare
5. Equilibrium and the planner's problem (K, Ch 5)
   - 5.1. Date zero (Arrow-Debreu) markets
   - 5.2. Sequential markets
6. Growth (K, Ch 9)

➔ **Assignment 2**

Lectures 7-9 Stochastic models and business cycles

7. Uncertainty (K, Ch 6)
   7.1. Stochastic processes
   7.2. Introducing uncertainty
8. Real business cycles (K, Ch 6, 12)
   8.1. The stochastic growth model
   8.2. Labor supply
   8.3. Calibration
   8.4. Solving RBC models with DYNARE

➔ **Assignment 3**

Lectures 10-12 Applications

9. Representative agent models
   9.1. Asset pricing and market completeness (K, Ch 10)
   9.2. Open economy
   9.3. DSGE models
10. Overlapping generations

➔ **Assignment 4**

Part II

Lectures 13-18 Incomplete market models

1. Incomplete markets vs. Arrow-Debreu-McKenzie model
   - Hugget, Mark (1993) "The risk-free rate in heterogenous-agent incomplete-market models", *Journal of Economic Dynamics and Control*, p.953-969
2. Efficient computational methods
   - Policy function iteration
   - Method of endogenous grid-points (Carroll 2006, *Economics Letters*)
   - Computing ergodic distributions
   - Parallel computing, GPU computing (Aldrich 2014, *Handbook of Comp. Econ.*)

➔ **Assignment 5**

3. Asset pricing
   - Krusell, P., Mukoyama T. and Smith A. (2011) "Asset prices in a Huggett economy", *Journal of Economic Theory*, p. 812-844
4. Production in incomplete market models
   - Aiyagari R., 1994, "Uninsured idiosynchratic risk and aggregate saving", *Quarterly Journal of Economics*, p. 659-84

- Davila J., Hong J, Krusell P. and Ríos-Rull J-V, (2012) "Constrained efficiency in the Neoclassical Growth Model with Uninsurable Idiosyncratic Shocks", *Econometrica*, p. 2431-2467

5. Aggregate shocks
    - Krusell P. and Smith A., 1998, "Income and Wealth Heterogeneity in the Macroeconomy", *Journal of Political Economy*, p. 867-896
    - Den Haan W., 2010, "Comparison of Solutions to the Incomplete Markets Model with Aggregate Uncertainty*", Journal of Economic Dynamics and Control*, p. 4-27

➔ **Assignment 6**