Course: Topics in Business Cycle Modeling (V31.0390.001)
Instructor: Chetan Dave
Term: Spring 2011
Lectures

Instructor’s Contact Information

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General Course Information

Pre-requisites, Co-requisites, & other restrictions
Intermediate Microeconomics (V31.0010), Intermediate Macroeconomics (V31.0012), Topics in Econometrics (V31.0380), and Calculus (V63.0123); or Microeconomics (V31.0011), Macroeconomics (V31.0013), and Introduction to Econometrics (V31.0266)

Course Description
This advanced course covers the mathematical and computer tools required for mastering modern business cycle analyses in the tradition of linear rational expectations modeling. After an introduction to the relevant mathematics, the course covers the foundational real business cycle model followed by a series of model modifications. The objective is to convey the details of taking a model, modifying it for use in answering a question of interest and then implementing the model on a computer in order to assess its’ abilities to answer the question. Thus, the course also involves a heavy computing portion in which students are taught model implementation via computers in a hands-on fashion.

Learning Outcomes
Learn how to model data for use with a macroeconomic business cycle model. Learn how to employ that data in implementing a model on a computer. Learn how to modify a model and compare the modified model with previous analyses.

Required Texts
Coury, T. and C. Dave, A Course in Macroeconomic Theory, Manuscript. Relevant extracts to be handed out in class.

Recommended Materials
Course Outline

A. Time Series Econometrics and Data Representation
   a. Difference Equations and Systems of Difference Equations
   b. Expectational Difference Equations and Systems of Expectational Difference Equations
   c. Removing Trends and Isolating Cycles
   d. VAR(1) Data Representations: Impulse Responses and Variance Decompositions
   e. An Introduction to STATA and Time Series Modeling in STATA

B. Dynamic Optimization and Linearization
   a. Review of Optimization Theory
   b. Dynamic Optimization: Setup
   c. Dynamic Optimization: Solution via Discrete Time Stochastic Lagrangians
   d. Using Taylor’s Theorem
   e. An Introduction to MATLAB

C. The Standard Two Sector Real Business Cycle Model (*Instructor-led Implementation*)
   a. Model Objectives
   b. Model Setup
   c. Obtaining the Nonlinear Representation of the Model
   d. Steady State Calculations and Linearizing the Model
   e. Model Solution
   f. Model Calibration
   g. Model Implementation in MATLAB
   h. Interpretation of results
   i. Model implementation wrap-up

D. Modifying the Model I: Introducing Shocks (*Instructor-led Implementation*)
   a. Model Objectives
   b. Model Setup
   c. Obtaining the Nonlinear Representation of the Model
   d. Steady State Calculations and Linearizing the Model
   e. Model Solution
   f. Model Calibration
   g. Model Implementation in MATLAB
   h. Interpretation of results

E. Modifying the Model II: Introducing Real Frictions (*Student-led Implementation*)
   a. Model Objectives
   b. Model Setup
   c. Obtaining the Nonlinear Representation of the Model
   d. Steady State Calculations and Linearizing the Model
   e. Model Solution
   f. Model Calibration
   g. Model Implementation in MATLAB
   h. Interpretation of results

F. Class Presentations of Group Projects
Course Policies

**Grading Criteria**  Instructor Guided Group Projects (maximum group size of 5) for 60% of the final grade, Monthly Assignments for 40% of the final grade. The economics department curve for non-principles courses assigns grades of A or A- to the top 29% of the class and grades of B+, B or B- to the next 40% of the class. Grades are based solely on projects and assignments, there will be no extra credit or additional work in exchange for grades.

The economics department grants incompletes only in genuine emergencies that are documented and approved by the department’s Director of Undergraduate Studies.

**Class Attendance** Not required but highly recommended. Same applies for labs.

**Classroom Citizenship** Students are expected to be diligent in the pursuit of their studies and regular in their attendance. As noted above, class attendance is not required; failure to attend is at your own risk. You are responsible for any announcements made or information given during class, no excuses will be accepted. The exams will be based on lecture material and required readings. Some of the lecture material may not be in the readings and the student should have carefully read the material at least once before class. The same applies to lab sections.

**Student Grievance Procedures**  Complaints and questions about exam grades must be submitted in writing, written responses will follow. The sequence to follow is: first contact your TA then if matters are unresolved you can appeal to the instructor.

*This syllabus is subject to change at the discretion of the Instructor.*