# Econ 211: Advanced Macroeconomics

University of California, San Diego - Spring 2009 Giacomo Rondina (Part I) and Davide Debortoli (Part II) Friday, 9:00am-11:50am, Econ 304

Course description

The object of this course is to introduce students to a variety of tools used in advanced dynamic macroeconomic models. The focus will be on the theoretical aspects of these models, rather than on the specific economic implications or on the numerical solution methods (the objective of ECON 216). Indeed, the goal is to provide examples of how some specific problems are addressed and how the tools can be used in a variety of contexts. The emphasis will be on models with infinitely lived agents and rational expectations. The first part of the course (taught by Giacomo Rondina) begins with a formal treatment of recursive methods and dynamic programming. It then introduces two representations of dynamic general equilibrium in macroeconomics. Within such frameworks, several models are analyzed. In the second part (taught by Davide Debortoli), we introduce techniques to analyze policy problems in dynamic models and discuss some applications to optimal fiscal and monetary policy problems. By way of contrast with some of the models of the first part of the course, we will discuss the implications of some sources of inefficiencies like market incompleteness, lack of commitment and imperfect information.

# Textbooks

We will make use of pieces of the following textbooks:

(LS) Ljungqvist and Sargent, Recursive Macroeconomic Theory, 2nd edition, MIT press, 2004.

(SL) Stockey and Lucas (1989), *Recursive Methods in Economic Dynamics*, Harvard University Press, 1989. In addition, references about specific topics will be provided during the lectures.

# Requirements

Your performance will be evaluated according to the following scheme: 2 or 3 homeworks (10%), a cumulative final take-home exam (40%) and an individual research proposal (50%). The latter should be a brief illustration (between 5 and 10 pages) of an original research idea where the techniques analyzed in class are applied. It should include a clear statement of the research question, a motivation, an essential literature review and an outline of the methodology to be used. The proposals will be presented in class during the last week of the quarter and should be delivered at the end of the final exams week.

# PART I: DYNAMIC GENERAL EQUILIBRIUM MACROECONOMICS (Giacomo Rondina)

#### I.A: RECURSIVE METHODS AND GENERAL EQUILIBRIUM

#### 1. Introduction

(a) Modern Macroeconomic Theory and the Recursive Approach

#### 2. Mathematical Preliminaries

- (a) Complete Metric Spaces.
- (b) The Contraction Mapping Theorem (CMT) and Blackwell's Sufficient Conditions.
- (c) The Theorem of the Maximum.
- (d) The Principle of Optimality and the Transversality Conditions.

#### 3. Dynamic Programming

- (a) Bounded Returns, Constant Returns, Unbounded Returns.
- (b) Existence of a Value Function.
- (c) Characterization of a Value Function.

# 4. Competitive Equilibrium with Complete Markets (LS Ch. 8 and Ch. 12)

- (a) Time-0 Trading of Arrow-Debreu Securities
- (b) Examples of Arrow-Debreu Economies
- (c) Sequential Trading of Arrow Securities
- (d) Recursive Competitive Equilibrium and Recursive Version of Pareto Problem
- (e) Application: Complete Markets and The Cost of Business Cycle [Lucas, 1987]
- (f) Competitive Equilibrium with Complete Markets in a Production Economy

#### I.B: Applications of Dynamic General Equilibrium Analysis

# 1. Asset Prices in General Equillibrium (LS Ch. 13)

- (a) The Term Structure of the Interest Rate
- (b) The Modigliani-Miller Theorem

# 2. Ricardian Equivalence (LS Ch. 10 and Ch. 13)

(a) Ricardian Equivalence in Partial Equilibrium Models

(b) Ricardian Equivalence in General Equilibrium Models

#### 3. Incomplete Markets: Single-Agent Models (LS Ch 16)

- (a) Self Insurance in Single-Agent Models.
- (b) Ad-hoc and Natural Borrowing Limits.
- (c) Supermartingale Convergence Theorem.

# 4. Incomplete Markets: Multiple-Agent "Bewley" Models (LS Ch 17)

- (a) Saving Problem and Self Insurance [Ayagari, 1994]
  - i. Physical Capital and Private IOU's.
  - ii. Inside and Outside Money.
  - iii. Exchange Rate Indeterminacy.
- (b) Models with Fluctuations in Aggregate Variables [Krusell and Smith, 1998].

#### 1. Fiscal Policy and Government Debt under Uncertainty.

- (a) Government debt under given deficit rules. Sustainability of debt policies. Complete and Incomplete insurance. [LS, Ch. 11].
- (b) Social planner vs. decentralized equilibria. Ricardian Equivalence, Lump-Sum Taxes vs. Distortionary Taxation. [Chary and Kehoe (1999)].

# 2. Optimal Policy under Full Insurance.

- (a) The Neoclassical Growth Model and the Ramsey taxation problem. The Primal Approach. [LS, Ch. 15].
- (b) Optimal Labor Taxes: tax smoothing.
- (c) Capital vs. Labor Taxation. Zero capital taxes in the long-run. Robustness and various extensions. [Chamley (1986), Judd (1985)].

# 3. Optimal Policies and Contractual Problems.

- (a) Examples of contractual problems. Participation Constraints. Risk of Default. Incomplete Markets. Lack of Commitment. Imperfect information.
- (b) Methodologies
  - i. Recursive contracts. [Marcet and Marimon (1998)].
  - ii. The Abreu-Pierce and Stacchetti approach.

# 4. Heterogenous Agents and Imperfect information.

- (a) Efficiency vs. Redistribution. Participation Constraints. [Alvarez and Jermann (2000)].
- (b) Imperfect information and incentive compatibility contraints.
- (c) The Mirleess approach to optimal taxation. [Albanesi and Sleet (2004), Golosov, Kocherlakota nad Tsyvinski (2003)].

# 5. Optimal Policies with Incomplete Markets.

- (a) Optimal debt polices under complete and incomplete markets.
- (b) Tax smoothing and Effects of debt limits under incomplete markets. [Ayiagari et al. (2003)].
- (c) How to achieve the complete markets allocation.
  - i. Debt maturity structure. [Lucas and Stokey (1983)].
  - ii. Capital taxes.

iii. Inflationary policies and the zero-lower bound on nominal interest rates. [Schmitt-Gröhé and Uribe (2003)].

#### 6. Optimal Policies and Lack of Commitment.

- (a) Time inconsistency of optimal policies. [Kydland and Prescott (1978)].
- (b) How to restore time consistency. Debt maturity structure [Lucas and Stockey, 1983] and reputation mechanisms [Chari and Kehoe (1999)].
- (c) Models with default and reputational equilibria [Chari and Kehoe (1990)].
- (d) Time consistent (Markov Perfect) policies [Klein, Krussell and Rios-Rull, 2003]. Loose Commitment [Debortoli and Nunes (2007)].
- (e) Dynamic Models with political turnover. Theories and Evidence. [Alesina and Tabellini (1990), Battaglini and Coate (2008), Debortoli and Nunes (2008)].