



Macroeconomic Theory I - ECON 503
Fall 2021-2022

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References:

Nancy L. Stokey and Robert E. Lucas, Jr. with Edward C. Prescott, 1999, *Recursive Methods in Economic Dynamics*, Harvard University Press.

Lars Ljungqvist and Thomas Sargent, *Recursive Macroeconomic Theory*, The MIT Press.

David Romer, 1996, *Advanced Macroeconomics*, McGraw-Hill.

Lecture notes by Nezih Güner

R. K. Sundaram, 1996, *A First Course in Optimization Theory*, Cambridge University Press.

G. T. McCandless and Neil Wallace, 1991, *Introduction to Dynamic Macroeconomic Theory: An Overlapping Generations Approach*, Harvard University Press.

Roger E. A. Farmer, 1993, *The Macroeconomics of Self-Fulfilling Prophecies*, The MIT Press, Cambridge, MA

Hal R. Varian, 1992, *Microeconomic Analysis*, 3rd Edition, W.W. Norton and Company, New York.

Jerome Adda and Russell W. Cooper, 2003, *Dynamic Economics: Quantitative Methods and Applications*, The MIT Press, Cambridge, MA.

Course Description:

This course is the first of a sequence that will introduce you to the methods of, and some of the issues in modern macroeconomics. Specifically, this semester is an introduction to the basic tools and concepts of dynamic economic theory.

In the first half of the semester we will focus on *finite* dimensional economic environments. We will start with a *static* model and study features of *equilibria* and *Pareto-optimality* for the environment. Then, we will introduce *time* to study *intertemporal* decision making. After introducing certain new features to our new *dynamic* model, we will study implications of certain government policies.

In the second half, we will study deterministic *neoclassical growth models*, one of the main workhorses of modern macroeconomics. *Dynamic programming* and *recursive competitive equilibrium* are the tools that you will be learning. Simple computational methods for analyzing these models will also be discussed and we will begin to write computer programs to help us solve and understand the properties of economic models that are often too complicated to be solved analytically.

The reading material for the course can be obtained at the Reserve Collection of the Information Center. Additional readings may be assigned throughout the semester.

Grading: Problem Sets: 20%, Midterm: 40%, Final: 40%

Attendance is absolutely mandatory and negligence affects grades!

Course Outline

I. General Equilibrium Theory under Certainty in Finite Dimensional Exchange Economies

- Defining an exchange economy

- Walrasian Equilibrium

- First and Second Welfare Theorems

- Further Readings
 - Lecture notes by Nezh Güner
 - Varian, “Exchange (Chapter 17)”
 - Farmer, “General Equilibrium under Certainty (Chapter 4)”

II. Introducing Time and Uncertainty

- Two-period exchange economy
- Arrow-Debreu Equilibrium
- Sequential Markets Equilibrium
- More than two periods
- Life-cycle/permanent income hypothesis
- Further Readings (more will be added later),
 - Lecture Notes by Nezhil Güner
 - Romer, “Consumption (Chapter 7)”
 - Adda and Cooper, Chapter 6.2.

III. Overlapping Generations Economies

- Structure of OLG economies
- Competitive equilibrium and its properties
- Introducing a government
- Ricardian Equivalence
- Introducing production
- Readings:
 - Lecture Notes by Nezhil Güner
 - Ljungqvist and Sargent, “Equilibrium with Complete Markets (Chapter 8)”
 - Romer, “Consumption (Chapter 2B)”

IV. Neoclassical Growth Model

- Solow Model
- Neoclassical Growth Model
- Introducing Taxes into the Growth Model
- Readings:
 - Lecture Notes by Nezhil Güner
 - Ljungqvist and Sargent, “Equilibrium with Complete Markets (Chapter 8)”

V. Finite Horizon Dynamic Programming

- Life-cycle model and its implications
 - Lecture Notes by Nezh Güner
 - Sundaram (1996), Chapter 11

VI. Dynamic Programming Under Certainty

- Mathematical Preliminaries: Metric Spaces, Contraction Mapping Theorem, The Theorem of Maximum
 - Lecture Notes, Chapter 7.
 - Stokey, Lucas, and Prescott, Chapter 3
 - Sundaram (1996), Chapter 12.
- Dynamic Programming Under Certainty: Basic Results
 - Lecture Notes, Chapter 8-10.
 - Stokey, Lucas, and Prescott, Chapters 4, 5.
 - Sundaram (1996), Chapter 12.
- Deterministic Dynamics
 - Lecture Notes, Chapter 11
 - Stokey, Lucas, and Prescott, Chapter 6.
- Equilibrium Concepts: Date-0 Arrow-Debreu, Sequence of Markets, Recursive Competitive Equilibrium.