

# Macroeconomics II

## CEMFI

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**Course Description:** This course has four aims: 1) introduce uncertainty into Arrow-Debreu/Sequential Markets structure and study its implications for asset pricing and insurance, 2) get you acquainted with the stochastic version of the Neoclassical Growth model, and real business cycle theory 3) study the extensions of the neoclassical framework that allows for frictions in labor and good markets, with a focus on the equilibrium search (DMP) and New Keynesian (NK) models, 4) study the role of government policies within neoclassical growth model and NK models.

As the recent Great Recession has demonstrated, economists still struggle to understand fluctuations (booms and busts) in economic activity. Given this background, this course will provide an overview of the main models and tools that macroeconomists use to study business cycles. The course will start with an analysis of infinite horizon exchange economies with uncertainty under complete markets. We will then study non-stochastic and stochastic versions of the neoclassical growth model, one of the main workhorses of modern macroeconomics. The role of government policies within the neoclassical model will also be analyzed. We will pay particular attention to numerical solutions of these models using policy functions, on a Discrete State Space, or using Log-Linear Approximations. The course will then move beyond the neoclassical framework, in which both labor and goods markets are competitive, and introduce frictions. First, the implications of labor market frictions, i.e., the inability of workers to find job openings and firms to find workers immediately, will be studied. Then frictions in the goods markets, the inability of firms to change their prices costlessly, will be introduced. Models with goods market frictions will be used to further study linearization techniques. The role of monetary and fiscal policy will be studied within the context of models with frictions.

**Readings:** There are several excellent books that cover different parts of the material in this course. The course will not, however, follow any particular textbook. It will be mainly based on lecture notes and published or unpublished articles.

- *Introduction to Modern Economic Growth (Acemoglu)* by Daron Acemoglu, Princeton University Press (2004).
- *Frontiers of Business Cycle Research (Cooley)* by Thomas Cooley (editor), Princeton University Press (1995)
- *Monetary Policy, Inflation and the Business Cycle: An Introduction to the New Keynesian Framework (Gali)* by Jordi Gali, Princeton University Press, 2015.
- *Dynamic General Equilibrium Modelling* by Burkhard Heer and Alfred Mausser (**HM**), Springer (2009)
- *Recursive Macroeconomic Theory* by Lars Ljungqvist and Thomas Sargent (**LS**), MIT Press (2012).
- *Economic Dynamics in Discrete Time* by Jianjun Miao (**Miao**), MIT Press (2014)
- *Equilibrium Unemployment Theory (Pissarides)* Christopher Pissarides, MIT Press, 2000.

**Grading:** Assignments (10%), Participation (10%), Final Exam (80%).

**Assignments:** There will be 6 assignments; most of these assignments will be mostly paper-and-pencil analytical questions where occasionally you might need to use a software (e.g. Matlab) for simple calculations/simulations; one or two of these assignments will be computational exercises. The computational assignments will be done in groups. The others, while you can study and solve them in groups, have to be submitted individually.

**TA Sessions:** Your TA will hold regular review sessions. There will be two types of sessions: ones that will go over the solutions of assignments and ones that will teach you computational techniques. These computational TA sessions will use Matlab and Dynare.

## Course Outline

### 1. Competitive general equilibrium under uncertainty — **Weeks 1-2**

- Uncertainty
- Equilibrium with Complete Markets
- Applications: Asset Pricing, Risk Sharing
- Readings: LS Chapters 8 and 13, Miao Chapter 13
- Mathematical refreshment: Markov Processes

### 2. One Sector Growth Model (quick review) — Week 2

- Planning Problem
- Markets and Equilibrium Concepts: Date-0 Markets, Sequential Equilibrium
- Is market equilibrium efficient?

- Government policies in one-sector growth model
- Readings: Acemoglu Chapter 5, LS Chapter 11, HM Chapter 1

### 3. One Sector Growth Model under uncertainty — Weeks 3-4

- Basic set-up
- Solving stochastic version of one-sector growth model with policy function iteration
- Solving stochastic version of one-sector growth model with linearization techniques
- Readings: HM, Chapters 1 and 2, Acemoglu Chapter 17, Miao Chapter 14
- Selected Readings
  - Prescott, Edward C. (1986). "Theory Ahead of Business Cycle Measurement," Federal Reserve Bank of Minneapolis Quarterly Review, 10, 9-22.
  - Lucas R. (1977), "Understanding Business Cycles," Carnegie Rochester Conference Series on Public Policy, Brunner K. and Meltzer H (eds.) 5, pp. 7-29.
  - Plosser C. (1989), "Understanding Real Business Cycles," Journal of Economic Perspectives, 3-3, Summer, 51-77.
  - Hansen, G. (1985), "Indivisible Labor and the Business Cycle," Journal of Monetary Economics, 16, 309-327
  - Hansen, Gary and Wright, Randall. (1992) "The Labor Market in Business Cycle Theory" Federal Reserve Bank of Minneapolis Quarterly Review, Spring.

### 4. Labor Market Frictions — Weeks 5-6

- Basic Framework
  - Pissarides Chapters 1 and 2
- Labor Market Frictions and Business Cycles
  - Andolfatto, D. (1996), "Business Cycles and Labour-Market Search," American Economic Review, Vol.86-1, March., pp.112-132.
  - Shimer, R. (2005), "The Cyclical Behavior of Equilibrium Unemployment and Vacancies," American Economic Review, 95(1): 25- 49.

### 5. Goods Market Frictions — Weeks 6-8

- Monopolistic Competition in a Real Business Cycle Model
- New Keynesian Models of Business Cycles
  - Gali Chapters 3, 6, 7, Miao Chapter 19
  - Bils, Mark, and Peter J. Klenow. 2004. "Some Evidence on the Importance of Sticky Prices." Journal of Political Economy, 112(5): 947-85.

- Chari, V. V., Patrick J. Kehoe, and Ellen R. McGrattan. 2007. "Business Cycle Accounting." *Econometrica*, 75(3): 781-836.
- Clarida, R., J. Gall, and M. Gertler. 2000. "Monetary Policy Rules and Macroeconomic Stability: Evidence and Some Theory." *Quarterly Journal of Economics* 115 (1): 147-180.
- McCandless, G. and W. Weber. 1995 "Some Monetary Facts." *Federal Reserve Bank of Minneapolis Quarterly Review*, Summer 1995.
- Nakamura, E. and J. Steinsson. 2013. "Price Rigidity: Microeconomic Evidence and Macroeconomic Implications," *Annual Review of Economics*.
- Romer, Christina and David Romer. 2014. "A New Measure of Monetary Shocks: Derivation and Implications." *American Economic Review* 94 (4): 1055-1084.

#### 6. Incorporate Financial Frictions into a Business Cycle Model —Weeks 8-9

- Bernanke, Gertler and Gilchrist 1999, "The financial accelerator in a quantitative business cycle framework" in Taylor, J.B. and Woodford M.(Eds.), *Handbook of Macroeconomics*, Vol. 1C. North Holland, Amsterdam, pp. 1341-1393.
- Carlstrom, C. T., & Fuerst, T. S. (1997). Agency Costs, Net Worth, and Business Fluctuations: A Computable General Equilibrium Analysis. *The American Economic Review*, 87(5), 893-910.
- Christiano, Lawrence & Motto, Roberto & Rostagno, Massimo, 2010. "Financial factors in economic fluctuations," Working Paper Series 1192, European Central Bank.

#### 7. Fiscal Policies in Neoclassical Growth Model and Optimal Taxation with Commitment (Ramsey Problem) —Weeks 9-10

- Readings: LS Chapters 11 and 15