Econ 210C: Macroeconomic Theory

Prof. Davide Debortoli (Part I) and Prof. Giacomo Rondina (Part II)

MW, 10:30am-11:50am, Econ 300

This course is divided into two parts. Both parts count equally (50%) towards the final grade. The grade will be determined by problems sets (10%) and by two in class exams (90%). The exam on the first part will be on Wed. Apr 29^{th}, while the exam on the second part will be on Mon. Jun 8^{th}. The TA for this course is Aiemit Lakdawala.

Part I: Monetary Theory and Policy

Davide Debortoli

The first part of the course provides an overview of the literature on monetary aspects of the business cycle, with a special emphasis on inflation dynamics and their implications for monetary policy. We will cover both the main theoretical models and some relevant empirical evidence. For each topic, I have suggested a chapter from three different books. You are supposed to read at least one of them. Other required readings are marked with an asterisk (*).

1. **Introduction, Motivation and Evidence** (1 lecture).
   Long-Run and Short-Run Evidence on Money, Output and Prices. The Narrative Approach. The VAR approach. The Structural approach.

   - Walsh2003, chapter 1.

   - (*) Christiano, L., M. Eichenbaum, and Charles L. Evans (1998):"Monetary Policy Shocks: What Have We Learned and to What End?", in J.B. Taylor, and M. Woodford eds., *Handbook of Macroeconomics*, vol. 1A, 65-148.
   - McCandless, George T. and W. Weber (1995): "Some Monetary Facts", Federal Reserve Bank of Minneapolis, *Quarterly Review*.
   - Stock, J. and M. Watson (2000): "Business Cycle Fluctuations in U.S. Macroeconomic Time Series", in J.B. Taylor and M. Woodford eds., *Handbook of Macroeconomics*, vol. 1A, 3-64.

2. **Introducing Money in the Neoclassical Model** (2 lectures).
   Money in the Utility Function (MIU) models. Cash in Advance constraint models. The Welfare Costs of

Inflation and the Friedman- Rule. The Cashless Economy. Neutrality of Money. Price - Level determination under different monetary rules.

- Galí2008, chapter 2.
- Walsh2003, chapter 2 and 3.
- Woodford2003, chapters 1.3. and 2.

- (*) Cooley, T. and G. Hansen (1989)" "Inflation Tax in a Real Business Cycle Model", *American Economic Review*, 79, issue 4, 733-748.
- Friedman, M. (1969): *The Optimum Quantity of Money and Other Essays*, Aldine Press, Chicago, IL.
- Sidrauski, M. (1967): "Inflation and Economic Growth", *Journal of Political Economy*, 104, issue 4, 661-682.
- Correia, I., and P. Teles: "The Optimal Inflation Tax", *Review of Economic Dynamics*, 2, issue 2, 325 - 346.

3. **The Basic New-Keynesian Framework** (2 lectures).
Empirircal evidence on sticky-prices. The Calvo model. The New-Keynesian Phillips curve. Equilibrium dynamics under alternative monetary rules.

- Galí2008, chapter 3.
- Walsh2003, chapter 5.
- Woodford2003, chapter 4.

- Blanchard O. and C. Kahn (2002): "The Solution of LInear Difference Models under Rational Expectations", *Econometrica*, 48, 1305-1311.
- Yun, T. (1996): "Nominal Price Rigidity, Money Supply Endogeneity and Business Cycles", *Journal of Monetary Economics* 37, 345-370.

4. **Monetary Policy Design in the Basic New-Keynesian Framework.** (2 lectures) Simple monetary policy rules. The Taylor Principle. A Welfare criterion. Optimal monetary policy and its implementation. Cost-push shocks. Discretion vs. Commitment. The Zero-Lower Bound.

- Galí2008, chapters 4 and 5.
- Woodford2003, chapter 6.

- Adam, K. and R. Billi (2006): "Optimal Monetary Policy under Commitment with a Zero Bound on Nominal Interest Rates", *Journal of Money, Credit and Banking*, 38, issue 7, 1877-1905.
- Barro, R. and D. Gordon (1983)" "A Positive Thoery of Monetary Policy in a Natural Rate Model", *Journal of Political Economy*, 91, issue 4, 589-610.
- Benigno P. and M. Woodford (2005): "Inflation Stabilization and Welfare: The Case of a Distorted Steady State", *Journal of the European Economic Association* 3, issue 6, 1185-1236.
- Bullard J. and K. Mitra (2002): "Learning About Monetary Policy Rules", *Journal of Monetary Economics*, vol. 49, issue 6, 1105-1130.
- (*) Clarida, R., J. Galì and M. Gertler (1999): "The Science of Monetary Policy: A New-Keynesian Perspective", *Journal of Economic Literature*, 37, 1661-1707.
- Debortoli, D. and R. Nunes (2007): "On Linear Quadratic Approximations", unpublished manuscript.
- Eggertsson, G., and M. Woodford (2003): "The Zero-Bound on Interest Rates and Optimal Monetary Policy", *Brooking Papers on Economic Activity*, 1, issue 1, 139-211.
- Orphanides, A (2003): "The Quest for Prosperity Without Inflation", *Journal of Monetary Economics*, 50, 633-663.
- Schmitt-Groh, S. and M. Uribe (2004): "Optimal Fiscal and Monetary Policy under Sticky Prices", *Journal of Economic Theory* 114, 198-230.
- Yun, T. (2005): "Optimal Monetary Policy with Relative Price Distortions", *American Economic Review*, vol. 95, issue 1, 89-109.
- (*) Woodford, M. (2001): "The Taylor Rule and Optimal Monetary Policy", *American Economic Review* 91, issue 2, 232-237.

5. **Alternative Sources of Nominal Rigidities** (2 lectures).
   Convex adjustment costs. Taylor models. State-dependent models. Sticky-Information models.

- Caplin A. and Spulber D. (1987): "Menu Costs and the Neutrality of Money", *Quarterly Journal of Economics*, vol. CII, issue (4), 703-725.
- Dotsey, M., R. King and A. Wolman (1999): "State Dependent Pricing and the General Equilibrium Dynamics of Money and Output", *Quarterly Journal of Economics*, vol. CXIV, issue 2, 655-690.
- Chari, V.V., P. Kehoe and E. McGrattan (2000): "Sticky Prices Models of the Business Cycle: Can the Contract Multiplier Solve the Persistence Problem", *Econometrica*, vol. 68, issue 5, 1151-1180.
- (*) Chari, V.V., P. Kehoe and E. McGrattan (2008): "New Keynesian Models: Not Yet Useful for Policy Analysis", NBER w14313.
- Fuhrer J. and G. Moore (1995): "Inflation Persistence", *Quarterly Journal of Economics*, 440, 2, 127-159.
- (*) Golosov M. and R. Lucas (2007): "Menu Costs and Phillips Curves", *Journal of Political Economy*, vol. 115, 171-199.

- Mankiw G. and R. Reis (2002): "Sticky Information vs. Sticky Prices: A Proposal to Replace the New Keynesian Phillips Curve", *Quarterly Journal of Economics*, vol. CXVII, issue 4, 1295-1328.
- Midrigan V. (2008), "Menu Costs, Multi-Product Firms and Aggregate Fluctuations", unpublished manuscript, NYU.
- Nakamura E. and J. Steinsson (2007): "Five Facts About Prices: A Reevaluation of Menu Cost Models", *Quarterly Journal of Economics*, vol. CXXIII, issue 4, 1415-1464.
- Rotemberg, Julio (1982): "Monopolistic Price Adjustment and Aggregate Output", *Review of Economic Studies*, 159, 517-531.

Part II: Dynamic General Equilibrium Macroeconomics

(Giacomo Rondina)

This part of the course 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.

II.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

II.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].

References

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.