

Syllabus Macroeconomics –part I

This module deals with the basics in intertemporal optimization. One instructor (Gianluca Femminis) shall lecture for 18 hours (inclusive of some tutorials)

Basic growth theory (5 hours). After a quick reprise of the Solow model, the classic Ramsey model will be analyzed in some details. Attention will be devoted both to the economic intuition for the results and to the embedded analytical issues. Lectures: 23/4/2019 h 14.30-16.30 (2); 24/4/2019 h 14.30-17.30 (3).

An introduction to the dynamic programming approach to growth theory (2 hours). The ‘Bellman principle’ will be introduced and illustrated through examples based on the classic growth models. Lectures: 30/4/2019 h 9.30-11.30 (2)

Endogenous growth theory (3 hours) The most important workhorses in endogenous growth will be succinctly illustrated. Lecture: 3/5/2019 14.30-17.30 (3)

Dynamic investment model (2 hours). A simple model, based on Tobin’s q , will be used to add persistence to the model. Lecture: 7/5/2019 h 9.30-11.30 (2)

Competitive equilibrium with complete markets (3 hours). A stochastic competitive economy will be analyzed, to highlight the role of complete markets and the meaning of a “representative agent”. Lecture: 8/5/2019 h 14.30-17.30 (3)

Extra Lecture/ tutorial/rehearsal: 15/5/2019 h 14.30-17.30 (3)

Textbooks: Despite its introductory nature, there is no single textbook for this module. However, lectures will refer to textbooks such as G. McCandless (2008), *The ABC of RBC*, Harvard University Press; L. Ljungqvist and T. Sargent (2012), *Recursive Macroeconomic Theory* (3rd edition), M.I.T. Press; B. Heijdra (2018), *Foundations of Modern Macroeconomics*, Oxford University Press.

Essential references

Mc Candless, Chapter 1 and 3

G. Femminis, “From simple growth to numerical simulations: A primer in Dynamic Programming”, (2016) available at: <https://ideas.repec.org/p/ctc/serie1/def050.html>

Heijdra, Chapter 13,14, 4

Ljungqvist and Sargent, Chapter 8.

Further readings

Lucas, R. J. (1988). On the mechanics of economic development, *Journal of Monetary Economics*, 22, pp. 3-42.

Mankiw, N., Romer, D. and D. Weil (1992). A contribution to the empirics of economic Growth, *Quarterly Journal of Economics*, 107, pp. 407 – 437.

Glomm, G. and B. Ravikumar (1994). Public investment in infrastructure in a simple growth model, *Journal of Economic Dynamics and Control*, 18, pp. 1173-1187.

Jones, C. (1995). R&D-based models of economic growth, *Journal of Political Economy* 103, pp. 759–84.

Temple, J. (1999). The New Growth Evidence, *Journal of Economic Literature* 37, pp. 112–156.

Aghion, P., E. Caroli, and C. García-Peñalosa (1999). Inequality and economic growth: The Perspective of the New Growth Theories, *Journal of Economic Literature*, 37, pp. 1615–1660.

Blanchard O. J. and C. M. Kahn (1980). The solution of linear difference models under rational expectations. *Econometrica*, 48, pp. 1305-1311.

Abel, A. B. (1982). Dynamic effects of permanent and temporary tax policies in a q model of investment, *Journal of Monetary Economics*, 9, pp. 353-373.

Syllabus Macroeconomics –part II

This module deals with developments in business cycle analysis. Three instructors (Abonico, Tirelli and Ropele) will contribute an overall teaching load of 36 hours

Analysis of business cycle regularities and Real Business Cycle (RBC) theory (6 hours). RBC models essentially are stochastic versions of the Ramsey Cass and Koopmans model, where uncertainty is determined by the occurrence of productivity shocks. Instructor: Patrizio Tirelli 26/4/2019 h 9.30-12.30 and 29/4/2019 h 9.30-12.30

Analysis of the basic New Keynesian model (3 hours). Prices are assumed to be sticky, in each period a fraction of firms cannot re-optimize its price and keep it fixed to the previous period. Intermediate good firms are monopolistically competitive. A role for monetary policy arises. Instructor Alice Albonico 17/5/2019 h 10-13

Introduction to simulation with the software Dynare (3 hours). Instructor Alice Albonico 28/5/2019 h 10-13

Analysis of a medium scale DSGE model (6 hours). We will refer mainly to Christiano, Eichenbaum and Evans (2005) to introduce frictions in the New Keynesian model (price and wage indexation, wage stickiness, variable capacity utilization, habits in consumption, adjustment costs on investments). Impulse response functions analysis to different types of shocks. Instructor Alice Albonico 7/6/2019 h 10-13 14/6/2019 h 10-13

Unemployment models (3 hours). The basic BC model adopts a rudimentary description of the labor market. Firms hire workers in competitive spot labor markets and there is no unemployment. Search and matching models, (see Mortensen and Pissarides, 1994, for a seminal contribution), provide a suitable framework for understanding unemployment dynamics, the properties of vacancies and of flows in and out of the labor force. A number of contributions have incorporated search into RBC models. The course outlines the key ideas behind the models of job market search and discusses implications for business cycle models. Instructor: Patrizio Tirelli 12/6/2019 h 9.30-12.30

Changing sources of volatility in business cycle models (3 hours). The turmoil of the Great Recession fueled research for a better understanding of the sources of aggregate volatility. Here we focus on three stylized shocks: i) sectoral productivity shocks; ii) news shocks; iii) uncertainty shocks. 13/6/2019 h 9.30-12.30

Optimal monetary policy in basic New Keynesian DSGE model (3 hours). We will study optimal monetary policy in two distinct settings, i.e. under discretion and under commitment. In the former case the central bank sets the interest rate by optimizing period-by-period a microfounded welfare function while in the latter case the central bank solves a dynamic optimization problem incorporating the forward-looking behavior of consumers and firms. We will talk about *time inconsistency* of policies and discuss the main differences between discretion and commitment in terms of adjustment dynamics and welfare effects. Instructor Tiziano Ropele 18/6/2019

Fiscal policy in medium-scale New Keynesian DSGE model (3 hours). We will introduce fiscal policy in a medium-scale New Keynesian DSGE model in order to discuss the notion of *Ricardian Equivalence Proposition* (REP) and then present the conditions under which the REP breaks down. In this latter regard, we will familiarize with a simple DSGE model with heterogeneous agents (optimizing consumers vs. rule-of-thumb consumers) to study the effects of government spending shocks. Instructor Tiziano Ropele 20/6/2019

Models with incomplete markets and heterogeneous agents (6 hours). In this last part of the module we will lay the foundations to build a class of models whose equilibria feature a nontrivial endogenous distribution of income and wealth across agents. This setting is particularly apt to address positive and normative policy questions regarding the redistributive and welfare effects of fiscal and monetary policies, consumption insurance, etc. We will work with economies characterized by “incomplete markets” where agents are subject to idiosyncratic income shocks and can only borrow/save through a risk-free bond. We will discuss in detail the individual problem and then characterize the income and wealth distribution. Because quantitative heterogeneous-agent modelling requires some knowledge in computational methods, we will also briefly sketch common solution approaches. Instructor Tiziano Ropele 25/6/2019 and 27/6/2019 (2/7/2019 if necessary)

Essential references (additional material will be made available as the course unfolds).

RBC models

King, R. G., & Rebelo, S. T. (1999). Resuscitating real business cycles. *Handbook of macroeconomics, 1*, 927-1007.

McCandless, G. (2008). The abcs of rbcs. *Cambridge, Massachusetts, London*.

Rebelo, S. (2005). *Real business cycle models: Past, present, and future* (No. w11401). National Bureau of Economic Research.

Lecture notes.

Unemployment models

Andolfatto, D. (1996). Business cycles and labor-market search. *The American Economic Review*, 112-132.

Amaral, P. S., & Tasci, M. (2016). The cyclical behavior of equilibrium unemployment and vacancies across OECD countries. *European Economic Review*, 84, 184-201.

Hagedorn, M., & Manovskii, I. (2008). The cyclical behavior of equilibrium unemployment and vacancies revisited. *American Economic Review*, 98(4), 1692-1706.

Justiniano, A., & Michelacci, C. (2011). *The cyclical behavior of equilibrium unemployment and vacancies in the US and Europe* (No. w17429). National Bureau of Economic Research.

Mortensen, D. T., & Pissarides, C. A. (1999). New developments in models of search in the labor market. *Handbook of labor economics*, 3, 2567-2627.

Rogerson, R., Shimer, R., & Wright, R. (2005). Search-theoretic models of the labor market: A survey. *Journal of economic literature*, 43(4), 959-988.

Shimer, R. (2005). The cyclical behavior of equilibrium unemployment and vacancies. *American economic review*, 95(1), 25-49.

Lecture notes

Shocks and business cycles

Barsky, R. B., & Sims, E. R. (2011). News shocks and business cycles. *Journal of Monetary Economics*, 58(3), 273-289.

Beaudry, P., & Portier, F. (2014). News-driven business cycles: Insights and challenges. *Journal of Economic Literature*, 52(4), 993-1074.

Bloom, N. (2014). Fluctuations in uncertainty. *Journal of Economic Perspectives*, 28(2), 153-76.

- Jaimovich, N., & Rebelo, S. (2009). Can news about the future drive the business cycle?. *American Economic Review*, 99(4), 1097-1118.
- Cascaldi-Garcia, D., & Galvao, A. B. (2018). News and uncertainty shocks. FRB International Finance Discussion Paper, (1240).
- Krusell, P., & McKay, A. (2010). News shocks and business cycles. *FRB Richmond Economic Quarterly*, 96(4), 373-397.
- Schmitt-Grohé, S., & Uribe, M. (2012). What's news in business cycles. *Econometrica*, 80(6), 2733-2764.
- Justiniano, A., Primiceri, G. E., & Tambalotti, A. (2010). Investment shocks and business cycles. *Journal of Monetary Economics*, 57(2), 132-145.
- Ben Zeev, N., & Khan, H. (2015). Investment-specific news shocks and US business cycles. *Journal of Money, Credit and Banking*, 47(7), 1443-1464.

New Keynesian model

- Gali J., 2008. *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework (and Its Applications)*, Princeton University Press.

Dynare

- Griffoli T.M., 2007-2008. *Dynare User Guide, An introduction to the solution & estimation of DSGE models*.

Medium scale DSGE

- Christiano L., Eichenbaum M. and Evans C., 2005. *Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy*, *Journal of Political Economy*.

Optimal monetary policy

- Gali J., 2008. *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework (and Its Applications)*, Princeton University Press

Fiscal policy

- Gali, J., D. López-Salido and J. Vallés (2003). Rule-of-Thumb Consumers and the Design of Interest Rate Rules, *Journal of Money Credit and Banking*
- Gali, J., D. López-Salido and J. Vallés (2003). Understanding the effects of Government Spending on Consumption, *Banco de Espana*

Incomplete markets and heterogenous agents models

- Aiyagari, R. (1994). Uninsured Idiosyncratic Risk and Aggregate Saving, *Quarterly Journal of Economics*.
- Heer, B. and A. Maubner (2005). *Dynamic General Equilibrium Modelling, Computational Methods and Applications*, Springer.
- Huggett, M. (1993). The Risk-Free Rate in Heterogeneous-Agent Incomplete-Insurance Economies, *Journal of Economic Dynamics and Control*.