Bavarian Graduate Program in Economics

Frontiers in Macroeconomics – February 2007

Syllabus

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I. Objective

This course provides an introduction to modern macroeconomics from a dynamic general equilibrium point of view. We start with basic growth models, discuss recent advances in the theory of endogenous growth and the theory of business cycles, move on to the analysis of monetary economies, and conclude with a discussion of the marcoeconomic consequences of imperfections in goods and labor markets. Throughout, we encounter methods and techniques that apply to deterministic and stochastic settings. They include, difference and differential equations, stability analysis, dynamic programming, and optimal control theory.

II. Literature

Useful graduate textbooks that cover a broad range of macroeconomic topics include Blanchard and Fischer (1989), *Lectures on Macroeconomics*, Ljungqvist and Sargent (2004), *Recursive Macroeconomic Theory*, and Romer (2006), *Advanced Macroeconomics*. On monetary topics, the classic references are Walsh (2003), *Monetary Theory and Policy*, and Woodford (2003), *Interest and Prices*. Most sections of this course use handouts, rely on chapters of these or more specialized books, and supplement these texts with journal articles.

A deeper understanding of the mathematical tools applied in advanced macroeconomic studies may require more than what is covered in a mathematical appendix of a textbook. Besides the references mentioned below, Sydsæter and Hammond (1995), *Mathematics for Economic Analysis*, and Simon and Blume (1994), *Mathematics for Economists*, cover a wide range of relevant topics, though, the latter at a more advanced level. Dixit (1990), *Optimization in Economic Theory*, and Sundaram (1996), *A First Course in Optimization Theory*, provide a sound introduction to optimization theory, again the latter at a more advanced level. A good introduction to measure theory is Rudin (1976), *Principles of Mathematical Analysis*. Sydsæter, Strøm, and Berck (2005), *Economists' Mathematical Manual*, has a comprehensive collection of useful results and formulae. Issues of mathematical

logic and proofs are nicely presented in Velleman (2006).

III. Format

There are two classes in the morning and two lectures in the afternoon of each day. After lunch, there is time to work on problem sets that apply and deepen the understanding of the material discussed in class. The first lecture in the afternoon is devoted to the discussion of the problem sets.

IV. Preliminary Timetable

Monday, February 19, 2007

Introduction

- Blanchard and Fischer (1989), *Lectures on Macroeconomics*, Introduction
- Krugman (1994), *Peddling Prosperity*, Part I.1
- Romer (2006), *Advanced Macroeconomics*, Introduction

The Neoclassical View on Growth

- Barro and Sala-í-Martin (2004), *Economic Growth*, Introduction and Chapter 1
- Buchheim (1997), *Einführung in die Wirtschaftsgeschichte*, Chapter III
- Jones (2002), *Introduction to Economic Growth*, Chapter 1
- Jones and Scrimgeour (2004), *The Steady-State Growth Theorem: A Comment on Uzawa (1961)*
- Romer (2006), Chapter 1
- Solow (1956), *A Contribution to the Theory of Economic Growth*

- Solow (2000), *Growth Theory: An Exposition*

Models of Overlapping Generations

- Blanchard and Fischer (1989), Chapter 3
- Barr and Diamond (2006), *The Economics of Pensions*
- Barro and Sala-í-Martin (2004), Chapter 3
- de la Croix and Michel (2002), *A Theory of Economic Growth*, Chapters 1–3
- Galor and Ryder (1989), *Existence, Uniqueness, and Stability of Equilibrium in an Overlapping-Generations Model with Productive Capital*
- Irmen (2007c), *Lecture Notes – Models of Overlapping Generations I*

Tuesday, February 20, 2007

Consumption and Investment – The Ramsey Problem

- Blanchard and Fischer (1989), Chapter 2
- Heer and Maußner (2005), Dynamic General Equilibrium Modelling, Chapter 1
- Romer (2006), Chapter 2
- Ljungqvist and Sargent (2004), Chapters 1–4
- Stockey and Lucas (1989), *Recursive Methods in Economic Dynamics*, Chapter 2 and 6
- the classic articles Ramsey (1928), Cass (1965), and Koopmans (1965)

Wednesday, February 21, 2007

Stochastic Growth – The Brock–Mirman Model

- Brock and Mirman (1972), *Optimal Economic Growth and Uncertainty: The Discounted Case*
- Heer and Maußner (2005), Chapter 1
- Romer (2006), Chapter 4
- Stockey and Lucas (1989), Chapter 2

The Neoclassical Growth Model in Continuous Time

- Arnold (1997), *Wachstumstheorie*, Chapter 3
- Barro and Sala-í-Martin (2004), Chapter 2
- Blanchard and Fischer (1989), Chapter 2
- Romer (2006), Chapter 2
- Irmen (2007a), *Lecture Notes – Dynamic Optimization in Continuous Time*
- Irmen (2007d), *Lecture Notes – The Euler Equation – Discrete versus Continuous Time*

Thursday, February 22, 2007

Endogenous Growth Theory

- Arnold (1997), Chapter 8
- Barro and Sala-í-Martin (2004), Chapter 1.3, 4.1, 6,7
- Gancia and Zilibotti (2005), *Horizontal Innovation in the Theory of Growth and Development*
- Grossman and Helpman (1991), *Innovation and Growth in the Global Economy*, Chapters 3 and 4
- Irmen (2007b), Lecture Notes – Models of Endogenous Economic Growth – Variety Expansion

Friday, February 23, 2007

Dynamic Monetary Economies

- Blanchard and Fischer (1989), Chapter 4
- Walsh (2003), *Monetary Theory and Policy*, Chapter 1 and 2

Goods and Labor Markets

- Blanchard and Fischer (1989), Chapter 9
- Blanchard and Giavazzi (2003), *Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets*

References

Arnold, L. (1997): *Wachstumstheorie*. Vahlen, München.

Barr, N., and P. Diamond (2006): "The Economics of Pensions," *Oxford Review of Economic Policy*, 22(1), 15–39.

Barro, R. J., and X. Sala-í-Martin (2004): *Economic Growth*. MIT Press, Cambridge, MA, 2nd edn.

Blanchard, O. J., and S. Fischer (1989): *Lectures on Macroeconomics*. MIT Press, Cambridge, MA.

Blanchard, O. J., and F. Giavazzi (2003): "Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets," *Quarterly Journal of Economics*, 118, 879–907.

Brock, W. A., and L. Mirman (1972): "Optimal Economic Growth and Uncertainty: The Discounted Case," *Journal of Economic Theory*, 4.

Buchheim, C. (1997): *Einführung in die Wirtschaftsgeschichte*. C.H. Beck, München.

Cass, D. (1965): "Optimum Growth in an Aggregative Model of Capital Accumulation," *Review of Economic Studies*, 32, 233–240.

de la Croix, D., and P. Michel (2002): *A Theory of Economic Growth – Dynamics and Policy in Overlapping Generations*. Cambridge University Press, Cambridge, UK.

Dixit, A. K. (1990): *Optimization in Economic Theory*. Oxford University Press, Oxford, 2nd edn.

Galor, O., and H. E. Ryder (1989): "Existence, Uniqueness, and Stability of Equilibrium in an Overlapping-Generations Model with Productive Capital," *Journal of Economic Theory*, 49, 360–375.

Gancia, G., and F. Zilibotti (2005): "Horizontal Innovation in the Theory of Growth and Development," in *Handbook of Economic Growth*, ed. by P. Aghion, and S. Durlauf.

Grossman, G. M., and E. Helpman (1991): *Innovation and Growth in the Global Economy*. MIT Press, Cambridge, MA.

Heer, B., and A. Maussner (2005): *Dynamic General Equilibrium Modelling*. Springer Verlag, Heidelberg.

Irmen, A. (2007a): "Lecture Notes – Dynamic Optimization in Continuous Time," *mimeo (15 pages), University of Heidelberg*.

——— (2007b): "Lecture Notes – Models of Endogenous Economic Growth – Variety Expansion," *mimeo (26 pages), University of Heidelberg*.

——— (2007c): "Lecture Notes – Models of Overlapping Generations I," *mimeo (34 pages), University of Heidelberg*.

——— (2007d): "Lecture Notes – The Euler Equation – Discrete versus Continuous Time," *mimeo (4 pages), University of Heidelberg*.

Jones, C. I. (2002): *Introduction to Economic Growth*. W.W. Norton, New York, London, 2nd edn.

Jones, C. I., and D. Scrimgeour (2004): "The Steady-State Growth Theorem: A Comment on Uzawa (1961)," *NBER Working Paper 10921*.

Koopmans, T. (1965): "On the Concept of Optimal Economic Growth," in *The Economic Approach to Development Planning*. North Holland, Amsterdam.

Krugman, P. (1994): *Peddling Prosperity - Economic Sense and Nonsense in the Age of Diminished Expectations*. Norton & Company, New York - London.

Ljungqvist, L., and T. J. Sargent (2004): *Recursive Macroeconomic Theory*. The MIT Press, Cambridge, Massachusetts, 2nd edn.

Ramsey, F. P. (1928): "A Mathematical Theory of Savings," *Economic Journal*, 38, 543–559.

Romer, D. (2006): *Advanced Macroeconomics*. McGraw Hill, New York, 3rd edn.

Rudin, W. (1976): *Principles of Mathematical Analysis*. McGraw-Hill, New York, 3rd edn.

Simon, C., and L. Blume (1994): *Mathematics for Economists*. Norton & Company, New York.

Solow, R. M. (1956): "A Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics*, 70(1), 65–94.

——— (2000): *Growth Theory: An Exposition*. Oxford University Press, Oxford, 2 edn.

Stockey, N., and R. Lucas (1989): *Recursive Methods in Economic Dynamics*. Harvard University Press.

Sundaram, R. K. (1996): *A First Course in Optimization Theory*. Cambridge University Press, New York.

Sydsæter, K., and P. J. Hammond (1995): *Mathematics for Economic Analysis*. Prentice-Hall International, New Jersey.

Sydsæter, K., A. Strøm, and P. Berck (2005): *Economists' Mathematical Manual*. Springer, Heidelberg, 4th edn.

Velleman, D. J. (2006): *How to Prove it – A Structured Approach*. Cambridge University Press, Cambridge, UK, 2nd edn.

Walsh, C. E. (2003): *Monetary Theory and Policy*. The MIT Press, Caambridge, MA, 2003 edn.

Woodford, M. (2003): *Interest and Prices – Foundations of a Theory of Moetary Policy*. Princeton University Press, Princeton.