

Macroeconomic Theory I

Economic Growth

(and Introduction to Dynamic General Equilibrium Economies)

The first half of the semester will focus on models of economic growth. This will serve also as an introduction to the analysis of dynamic general equilibrium economies.

As organized below, the material is supposed to take 14 lectures, which of course violates our budget constraint. If we are fast enough, we might be able to cover everything. Otherwise, we will adjust as we proceed.

There are seven sections. In each section, the basic readings are indicated by stars. The non-star items are selected for your reference, but are not required for the course.

If you are an MIT Econ PhD student, you have to take the course (or pass the waiver on Friday 2/8). Otherwise, please come and see me to discuss whether this course is appropriate for you.

1. A Prelude to Growth Facts and Growth Models (2 lectures)

Topics: “Why growth theory?”; stylized facts on world growth and world income distribution; the Solow Model; steady state, golden rule, and transitional dynamics; productivity shocks and policy effects; conditional convergence; exogenous technological change; two sectors, *AK*, and the general convex growth model; nonconvexities and poverty traps.

- * Barro, R.J., and X. Sala-i-Martin (1995), *Economic Growth*, chapters 1 and 12.
- * Romer, D. (2001), *Advanced Macroeconomics*, chapters 1 and 3-A.
- * Jones, C. (1997), “On the Evolution of the World Income Distribution,” *Journal of Economic Perspectives* 11, 19-36.
- * Mankiw, N.G., D. Romer, and D. Weil (1992), “A Contribution to the Empirics of Economic Growth,” *Quarterly Journal of Economics* 107, 401-437.

Barro, R., *Determinants of Economic Growth: A Cross-Country Empirical Study*, MIT Press, 1997.

Hall, R., and C. Jones (1999), “Why Do Some Countries Produce So Much More Output than Others?” *Quarterly Journal of Economics* 114, 83-116.

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

Solow, R.M. (1970), *Growth Theory: An Exposition*, Clarendon Press.

2. Introduction to DGE Models and the Ramsey Growth Model (2 lectures)

Topics: The Neoclassical Growth Model (Ramsey-Cass-Koopmans-Brock-Mirman); discrete-time dynamic programming; continuous-time optimal control; steady state, the modified golden rule, and transitional dynamics; productivity and taste shocks; Ricardian equivalence and policy shocks; log-linearized dynamics; open economies; adjustment costs; money.

* Barro, R.J., and X. Sala-i-Martin (1995), *Economic Growth*, chapters 2 and 3.

* Blanchard, O., and S. Fischer (1989), *Lectures on Macroeconomics*, chapter 3.

* Stokey, N.L., and R.E. Lucas, Jr., *Recursive Methods in Economic Dynamics*, chapter 2.

Abel, A., and O. Blanchard (1983), "An Intertemporal Equilibrium Model of Saving and Investment," *Econometrica* 51, 675-692.

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

Cass, D. (1966), "Optimum Growth in an Aggregative Model of Capital Accumulation: A Turnpike Theorem," *Econometrica* 34, 833-850.

Lucas, R.E., Jr. (1990), "Why Doesn't Capital Flow from Rich to Poor Countries?" *American Economic Review* 80, 92-96.

Ramsey, F.P. (1928), "A Mathematical Theory of Saving," *Economic Journal* 38, 543-559.

Romer, D. (2001), *Advanced Macroeconomics*, part A of chapter 2.

3. Introduction to SDGE Models and Applications (2 lectures)

Topics: The Ramsey model with aggregate uncertainty; complete markets; the Consumption-CAPM; the equity-premium puzzles; tax smoothing; optimal fiscal policy.

* Blanchard, O., and S. Fischer (1989), *Lectures on Macroeconomics*, sections 10.1 and 11.3.

* Romer, D. (2001), *Advanced Macroeconomics*, section 7.5

* Stokey, N.L., and R.E. Lucas, Jr., *Recursive Methods in Economic Dynamics*, chapter 2.

* Lucas, R.E. Jr. (1978), "Asset Prices in an Exchange Economy," *Econometrica* 46, 1429-1445.

- Angeletos, G.M. (2001), "Fiscal Policy with Non-Contingent Debt and the Optimal Maturity Structure," *Quarterly Journal of Economics*, forthcoming.
- Barro, R.J. (1979), "On the Determination of the Public Debt," *Journal of Political Economy* 87, 940-71.
- Barro, R.J. (1989), "The Neoclassical Approach to Fiscal Policy," in R. Barro, ed., *Modern Business Cycle Theory*, Harvard University Press.
- Baxter, M., and R. King (1988), "Fiscal Policy in General Equilibrium," *American Economic Review* 78, 315-334.
- Blanchard, O., and R. Perotti (2001), "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes Output," *Quarterly Journal of Economics*, forthcoming; NBER Working Paper 7269.
- Brock, W., and L.J. Mirman (1972), "Optimal Economic Growth and Uncertainty: The Discounted Case." *Journal of Economic Theory* 4, 197-513.
- Chamley, C. (1986), "Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives," *Econometrica* 54 (May), 607-22.
- Chari, V.V., and P. Kehoe (1999), "Optimal Fiscal and Monetary Policy," NBER Working Paper 6891.
- King, R., and S. Rebelo (1999), "Resuscitating Real Business Cycles," in M. Woodford and J. Taylor, ed., *Handbook of Macroeconomics*.
- Kydland, F., and E.C. Prescott (1982), "Time to Build and Aggregate Fluctuations," *Econometrica* 50, 1345-1370.
- Lucas, R.E, Jr., and N.L. Stokey (1983), "Optimal Fiscal and Monetary Policy in an Economy without Capital," *Journal of Monetary Economics* 12, 55-93.
- Romer, D. (2001), *Advanced Macroeconomics*, chapter 7.

4. Savings, Finite Horizons, and Overlapping Generations (2 lectures)

Topics: The life-cycle hypothesis and bequests; finite horizons in the Ramsey model (Blanchard); OLG economies (the Diamond model); public debt; bubbles; social security; hyperbolic discounting.

- * Barro, R.J., and X. Sala-i-Martin (1995), *Economic Growth*, section 3.4.
 - * Blanchard, O., and S. Fischer (1989), *Lectures on Macroeconomics*, chapter 3 and sections 5.1-5.2.
 - * Blanchard, O. (1985), "Debt, Deficits and Finite Horizons," *Journal of Political Economy* 93, 223-247.
 - * Diamond, P. (1965), "National Debt in a Neoclassical Growth Model," *American Economic Review* 55, 1126-1150.
 - * Barro, R.J (1974), "Are Government Bonds Net Wealth?" *Journal of Political Economy* 82, 1095-1117.
- Abel, A.B., N.G. Mankiw, L.H. Summers, and R.J. Zeckhauser (1989), "Assessing Dynamic Inefficiency: Theory and Evidence," *Review of Economic Studies* 56, 1-20.

- Barro, R. (1999), "Ramsey Meets Laibson in the Neoclassical Growth Model," *Quarterly Journal of Economics* 114, 1125-1152.
- Caballero, R.J., and M.L. Hammour, "Speculative Growth," MIT mimeo.
- Feldstein, M. (1985), "The Optimal Level of Social Security Benefits," *Quarterly Journal of Economics* 100, 303-320.
- Laibson, D. (1997), "Golden Eggs and Hyperbolic Discounting," *Quarterly Journal of Economics* 112, 443-478.
- Modigliani, F. (1986), "Life Cycle, Individual Thrift, and the Wealth of Nations," *American Economic Review* 76, 297-313.
- Romer, D. (2001), *Advanced Macroeconomics*, chapter 2, part B.
- Samuelson, P.A. (1958), "An Exact Consumption Loan Model of Interest with and without the Social Contrivance of Money," *Journal of Political Economy* 1958, 467-482.
- Summers, L. (1981), "Capital Taxation and Accumulation in a Life Cycle Growth Model," *American Economic Review* 71, 533-544.
- Tirole, J. (1985), "Asset Bubbles and Overlapping Generations," *Econometrica* 53, 1499-1528.

5. Endogenous Growth: AK, Spillovers, Human Capital (2 lectures)

Topics: The general AK model; endogenizing A; externalities and spillovers (Romer); public goods (Barro); human capital and learning-by-doing (Lucas); macroeconomic complementarities; policy effects (Rebelo).

- * Barro, R.J., and X. Sala-i-Martin (1995), *Economic Growth*, chapters 4 and 5
 - * Romer, P. M. (1986), "Increasing Returns and Long-Run Growth," *Journal of Political Economy* 94, 1002-1037.
 - * Lucas, R.E., Jr. (1988), "On the Mechanics of Economic Development," *Journal of Monetary Economics* 22, 3-42.
 - * Barro, R.J. (1990), "Government Spending in a Simple Model of Endogenous Growth," *Journal of Political Economy* 98, 103-125.
- Acemoglu, D., and J. Angrist (2000), "How Large are the External Returns to Schooling? Evidence from Compulsory Schooling Laws," NBER Macroeconomics Annual.
- Aghion, P., and P. Howitt (1998), *Endogenous Growth Theory*, chapter 10.
- Caballero, R., and A. Jaffe (1993), "How High Are the Giants' Shoulders?" NBER Macroeconomics Annual.
- Jones, L. and R. Manuelli (1990), "A Convex Model of Equilibrium Growth," *Journal of Political Economy* 98, 1008-1038.
- Lucas, R.E., Jr. (1993), "Making a Miracle," *Econometrica* 61, 251-272.

- Rebelo, S. (1991), "Long-Run Policy Analysis and Growth," *Journal of Political Economy* 99, 500-521.
- Rivera-Batiz, L., and P. Romer (1991), "Economic Integration and Endogenous Growth," *Quarterly Journal of Economics* 106, 531-556.
- Young, A. (1993), "Invention and Bounded Learning by Doing," *Journal of Political Economy* 101, 443-472.

6. Endogenous Growth: R&D, Innovation, Technological Change (2 lectures)

Topics: Expanding varieties (Romer); Schumpeterian growth and quality ladders; directed technological change; international trade and growth; technology diffusion.

- * Barro, R.J., and X. Sala-i-Martin (1995), *Economic Growth*, chapters 6 and 7
 - * Romer, P.M. (1990), "Endogenous Technological Change," *Journal of Political Economy* 98, 71-102.
 - * Aghion, P., and P. Howitt (1992), "A Model of Growth Through Creative Destruction," *Econometrica* 60, 323-351.
 - * Acemoglu, D. (2001), "Directed Technological Change," NBER Working Paper 8287.
- Acemoglu, D. (2000), "Labor- and Capital-Augmenting Technical Change," NBER Working Paper 7544.
- Acemoglu, D., and J. Ventura (2001), "The World Income Distribution," NBER Working Paper 8083.
- Aghion, P., and P. Howitt (1998), *Endogenous Growth Theory*, chapters 1-3.
- Barro, R., and X. Sala-i-Martin (1992), "Public Finance in Models of Economic Growth," *Review of Economic Studies* 59, 645-662.
- Barro, R., and X. Sala-i-Martin (1995), "Technological Diffusion, Convergence, and Growth," *Journal of Economic Growth* 2, 1-26.
- Brezis, E., P.R. Krugman, and D. Tsiddon (1993), "Leapfrogging in International Competition: A Theory of Cycles in National Technological Leadership," *American Economic Review* 83, 1211-1219
- Grossman, G.M. and E. Helpman (1990), "Comparative Advantage and Long-Run Growth," *American Economic Review* 80, 796-815.
- Grossman, G.M. and E. Helpman (1991), "Quality Ladders in the Theory of Economic Growth," *Review of Economic Studies* 58, 43-61.
- Jones, C. (1995), "R&D-Based Models of Economic Growth," *Journal of Political Economy* 103, 759-784.
- Krugman, P.R. (1979), "A Model of Innovation, Technology Transfer, and the World Distribution of Income," *Journal of Political Economy* 87, 253-266.
- Parente, S.L., and E.C. Prescott (1994), "Barriers to Technology Adoption and Development," *Journal of Political Economy* 102, 298-321.
- Ventura, J. (1997), "Growth and Interdependence," *Quarterly Journal of Economics* 112, 57-84.

7. Beyond K , H , and R&D: Markets, Institutions, Wealth Distribution (2 lectures)

Topics: Financial markets and growth; self-insurance and precautionary savings; risk sharing and risk taking; incomplete markets and wealth distribution; institutions and growth.

* Lecture Notes (to be distributed in class)

* Galor, O., and J. Zeira (1993), "Income Distribution and Macroeconomics," *Review of Economic Studies* 60, 35-52.

* Acemoglu, D., S. Johnson and J. Robinson (2001), "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution," NBER Working Paper.

Acemoglu, D., and F. Zilibotti (1997), "Was Prometheus Unbound by Chance? Risk, Diversification, and Growth," *Journal of Political Economy* 105, 709-751.

Acemoglu, D., S. Johnson and J. Robinson (2000) "The Colonial Origins of Comparative Development: An Empirical Investigation," *American Economic Review*, forthcoming.

Aiyagari, S.R. (1994), "Uninsured Idiosyncratic Risk and Aggregate Saving," *Quarterly Journal of Economics* 109, 659-84.

Angeletos, G.M., and L. Calvet (2002), "Idiosyncratic Production Risk, Growth, and the Business Cycle," MIT-Harvard Working Paper.

Banarjee, A., and A. Newman (1993), "Occupational Choice in the Process of Development," *Journal of Political Economy* 101, 274-298.

Bernanke, B., and M. Gertler (1989), "Agency Costs, Collateral, and Business Fluctuations," *American Economic Review* 79, 87-114.

Caballero, R. (1990), "Consumption Puzzles and Precautionary Saving," *Journal of Monetary Economics* 25, 113-136.

Caselli, F., and J. Ventura (2000), "A Representative Consumer Theory of Distribution," *American Economic Review* 90, 909-926.

Cole, H., G. Mailath and A. Postlewaite (1992), "Social Norms, Savings Behavior, and Growth," *Journal of Political Economy* 100, 1092-1125.

Greenwood, J., and B. Jovanovic (1990), "Financial Development, Growth, and the Distribution of Income," *Journal of Political Economy* 98, 219-240.

Obstfeld, M. (1994), "Risk-Taking, Global Diversification, and Growth," *American Economic Review* 84, 1310-1329.

Weil, P. (1993), "Precautionary Savings and the Permanent Income Hypothesis," *Review of Economic Studies* 60, 367-383.