

Economic Growth

Spring 2008

Mondays 10-12: CSS 2-1-30

Wednesdays 10-12: CSS 5-1-22

The basic text for the course is:

Barro, R. J., and X. Sala-i-Martin, *Economic Growth*, 2. ed., MIT Press 2004, henceforth B & S.
In addition, journal articles and lecture notes will be used.

Lecture plan (final)¹

Author names refer to items in the syllabus list below. Short lecture notes (downloadable) are called LN.

I. Setting the stage (and providing a common language)

- A. Some facts about growth and world income distribution. Compound rates of growth: B & S Introduction. LN 1-2.
- B. Terminology of the course: B & S pp. 23-30, Groth (2007) Ch. 1.
- C. Different concepts of neutral technical progress. Brush-up of the Solow model in continuous time: B & S 51-56.
- D. The concepts of σ convergence and β convergence: LN 3. B & S pp. 50-51, 462. Cursory: Dalgaard & Vastrup (2001).
- E. Divergence – big time; world income distribution: Pritchett (1997), Jones (1997), both cursory.
- F. Adjustment speed. LN 4 (§ 3-4 only cursory).
- G. Basic balanced growth theorems. LN 5.

II. Applications of the Ramsey model with exogenous technical change

- A. Brush-up of the Ramsey model (basic representative agent model); transitional dynamics. B & S pp. 85-111 (108-110 cursory). Alternative text: Groth (2007) Ch. 5, pp. 201-230.
- B. Household heterogeneity and dynamics of wealth distribution: B & S pp. 118-121.
- C. Government and taxation: B & S pp. 143-149.
- D. Structural change: Kongsamut et al. (2001) cursory.
- E. Open economy: B & S pp. 161-65 cursory.
- F. Persistence of technology differences, technology transfer, catching-up: Bernard & Jones (1996).

III. Simple accumulation-based endogenous growth

- A. The AK model: B & S 205-211.
- B. Learning-By-Investing (the Arrow model and Romer's 1986 model). Semi-endogenous growth vs. fully endogenous growth: LN 10, B & S pp. 212-220.
- C. Static comparative advantage vs. dynamics of learning by doing. Resource curse?: LN.
- D. Productive government services: B & S pp. 220-225.
- E. Income distribution, political economy and growth: Alesina & Rodrik (1994). Cursory: Perotti (1996).
- F. Necessary conditions for fully endogenous growth in a one-sector model: B & S pp. 232-235.

¹ Syllabus, see p. 3.

IV. Models with human capital formation

- A. The degenerate case (same technology in both sectors): B & S pp. 239-242. LN.
- B. Different technologies in the two sectors.
 - 1. The general case: LN. Cursory: B & S pp. 247-251.
 - 2. The Uzawa-Lucas model: self-education (with physical capital only in manufacturing): LN 16 (§ 3-5 cursory).
- C. A Mincerian approach to human capital: Jones (2002).

V. Innovation-based endogenous growth

- A. A model of U.S. growth in a world of ideas: Jones (2002) (§ III-IV cursory).
- B. Horizontal innovations: increasing-variety models.
 - 1. A simple model: B & S pp. 285-300.
 - 2. Erosion of monopoly power; a dilemma in patent design: B & S pp. 305-309.
 - 3. An extended Romer 1990 model: Alvarez & Groth (2005) cursory.
- C. Vertical innovations: increasing product quality and creative destruction (quality ladder models): Groth (2006) § 1-2.
- D. Semi-endogenous version. Weak vs. strong scale effects. Knife-edge problems: Jones (1995) (excl. § 4-5), Groth (2006) § 3-4.

VI. Further theoretical and empirical issues

- A. Population growth and technical change. Cursory: Kremer (1993) § I-II, IV.B-V (short version in D. Romer, 2006, *Advanced Macroeconomics*, § 3.7).
- B. Growth accounting vs. sources of growth: B & S pp. 433-447, 457-460.
- C. Empirical analysis of a cross section of countries. Cursory: B & S pp. 462, 511-541, and Islam (2003).

VII. Natural resources, environment and economic growth

This theme cancelled.

VIII. Policy issues

- A. A macroeconomic cost-benefit analysis of the climate change problem: Arrow (2007). LN 19.
- B. Igniting growth and sustaining growth ("the political economy of the possible"). Very cursory: Rodrik (2004).

In order to go in for the final written exam (four hours, closed book) at the end of the semester it is required that the *midterm paper* (end of March) has been accepted.

Learning by doing

Tell me and I will forget
Show me and I will remember
Involve me and I will understand
Step back and I will act

(Chinese proverb on learning)
Syllabus for Economic Growth (final)
Spring 2008

- Alesina, A., and D. Rodrik, 1994, Distributive Politics and Economic Growth, *Quarterly Journal of Economics* 109, no. 2.
- Alvarez, M. J., and C. Groth, 2005, Too Little or Too Much R&D? *European Economic Review* 49, 437-456. Cursory.
- Arrow, K. J., 2007, Global Climate Change: A Challenge to Policy, *The Economists' Voice* 4, Iss. 3, Article 2, 1-5.
- Barro, R. J., and X. Sala-i-Martin, 2003, *Economic Growth*, 2. ed., MIT Press, Cambridge (Mass.). Selected parts, see Course Plan.
- Bernard, A. B., and C. I. Jones, 1996, Technology and Convergence, *Economic Journal* 106, 1037-44.
- Dalgaard, C.-J., and J. Vastrup, 2001, On the Measurement of σ -convergence, *Economics Letters* 70, 283-87. Cursory.
- Groth, C., 2006, What Have We Learnt From the Robustness Debate? Working paper, § 1-4.
- Groth, C., 2007, Lecture Notes to Macroeconomics, Dept. Econ., Univ. of Copenhagen, Ch. 1. Available on the course website. In addition Ch. 5 (pp. 201-230) may be read as an alternative to B & S, Ch. 2.
- Islam, Nazrul, 2003, What have we learnt from the convergence debate? *Journal of Economic Surveys* 17, 3, 309-362. Cursory.
- Jones, Charles I., 1995, R&D-based Models of Economic Growth, *Journal of Political Economy* 103 (excl. § 4 and 5).
- Jones, Charles I., 1997, On the Evolution of World Income Distribution, *Journal of Economic Perspectives* 11, no. 3, 19-36. Cursory.
- Jones, Charles I., 2002, Sources of U-S. Economic Growth in a World of Ideas, *American Economic Review* 92, 1, 220-239.
- Kongsamut, P., S. Rebelo and D. Xie, 2001, Beyond balanced growth, *Review of Economic Studies* 68, 869-882. Cursory.
- Kremer, M., 1993, Population Growth and Technological Change: One Million B.C. to 1990, *Quarterly Journal of Economics* 108, no. 3, § I-II, IV.B-V, all cursory.
- Perotti, R., 1996, Growth, Income Distribution, and Democracy: What the Data Say, *Journal of Economic Growth* 1, 149-87. Cursory.
- Pritchett, L., 1997, Divergence, Big Time, *Journal of Economic Perspectives* 11, no. 3. Cursory.
- Rodrik, D., 2004, Growth Strategies. Manuscript for a chapter in *Handbook of Economic Growth*, ed. by P. Aghion and S. Durlauf (PDF version on the course website). All cursory.
- Lecture Notes 1-19.

Apart from the B & S book, the texts will be downloadable for students with access to the course pack at the course website. The *Lecture notes* are available on the course website.

The items in the above list are referred to in the course plan. Some items are classified as only *cursory reading*. This implies that you should read them in order to obtain general knowledge of the main point while you do not have to master the technicalities involved.

Exercise problems. It is recommended to refresh your memory of the exercise problems discussed during the semester. These problems (in some cases with brief solutions) are available on the course website.

It is recommended to check the *correction lists* (referring to the main textbook, articles, exercise problems and lecture notes) that will appear on the course website during the semester.

You are always welcome to send me e-mails with comments or questions or to make an appointment for a meeting at my office.

Supplementary textbooks

Jones, C., 2002, *Introduction to Economic Growth*, 2nd ed., Norton, New York.

Valdés, B., 1999, *Economic Growth. Theory, Empirics, and Policy*, Edward Elgar. Includes entertaining discussions.

These two texts are more elementary than B & S.

More demanding:

Aghion, P., and P. Howitt, 1998, *Endogenous Growth Theory*, MIT Press.

Aghion, P., and S.N.Durlauf, eds., 2006, *Handbook of Economic Growth*. Vol. 1A-1B. Amsterdam (a voluminous handbook for researchers; also many useful things for students).

Acemoglu, D., 2007, *Introduction to Modern Economic Growth*, manuscript, very up-to-date, <http://econ-www.mit.edu/faculty/acemoglu/books>

Supplementary articles

Aghion, P., and P. Howitt, 2006, Appropriate Growth Policy: A Unifying Framework, *Journal of The European Economic Association* 4, 269-314.

Dalgaard, C.-J., and C. T. Kreiner, 2001, Is Declining Productivity Inevitable? *Journal of Economic Growth* 6, § 1-3 and 5.

Dalgaard, C.-J., and C. T. Kreiner, 2003, Endogenous Growth: A Knife Edge or the Razor's Edge? *Scandinavian Journal of Economics* 105, No. 1, 73-85.

Groth, C., 2007, A New-Growth Perspective on Non-renewable Resources. In: L. Bretschger and S. Smulders, eds., *Sustainable Resource Use and Economic Dynamics*, Springer: Dordrecht, pp. 127-163.

Romer, P. M., 1990, Endogenous technological change, *Journal of Political Economy* 98, (supplementary issue) S71-S103.

Smulders, S., 1995, Entropy, Environment, and Endogenous Economic Growth, *International Tax and Public Finance* 2, 319-340.
