

Course plan for Economic Growth

Spring 2015

Lectures: Mondays 10-12, CSS 35-3-12

Class exercises (Niklas Brønager): Thursdays 8-10, CSS 2-1-12

Textbook:

Daron Acemoglu, *Introduction to Modern Economic Growth*, Princeton Univ. Press, 2009.
Section y in Chapter x is referred to as DA Ch. x.y.

In addition:

Lecture notes in Economic Growth. Chapter z is referred to as LN Ch. z.

A few supplementary articles, see syllabus below.

Lecture plan (final)

I. Setting the stage (and establishing a common language) (2/2 -2/3)

A. Facts about growth and world income distribution. DA Ch. 1. Cursory: Jones and Romer (2010).

B. Refresher on basic concepts.

1. Average compound rate of growth. Concepts of income convergence: LN Ch. 1.

2. Glossary concerning technology. Continuous time modeling. Factor income shares and the elasticity of factor substitution. LN Ch. 2 and 3; Short Note 1; DA Ch. 2.1, 2.4-6.

C. Neutral vs. biased technical change. Skill-biased technical change. Basic balanced growth theorems. Comparative dynamics. DA Ch. 2.7-9; LN Ch. 4.

D. Growth accounting and levels accounting.

1. Growth accounting vs. causes of growth. Speed of (within-country) convergence; Barro regressions. DA Ch. 3.1-2; LN Ch. 5 and 6.

2. Levels accounting (technology differences across countries). DA Ch. 3.5; Bernard & Jones (1996) cursory; Exercise Problem III.6.

E. Knowledge, population, and aggregate economies of scale. DA Ch. 4.2; LN Ch. 7; Kremer (1993) cursory.

F. Proximate vs. fundamental determinants of differences in economic performance. DA Ch. 4.1, 4.3-8.

II. Basic macro-dynamic frameworks (9/3-30/3)

A. Brush-up of the Ramsey model (basic representative agent model) with exogenous technical progress.

1. The model. Phase diagram and transitional dynamics. Saddle-point stability. DA Ch. 8.1-2, 8.4-5, 8.7-12. Alternative reading: Groth (2014) Ch. 9.4-5 and 10 (see below).

2. A social planner. Optimal capital accumulation. Choice of social discount rate.

Application: social cost-benefit analysis in climate change mitigation. DA Ch. 8.3; LN Ch. 8; Arrow (2007) cursory.

B. Brief brush-up of Diamond's OLG model. DA Ch. 9.2 cursory.

C. Human capital.

1. Life-cycle approach to human capital formation. Separation Theorem. What the Mincer equation is and is not. DA Ch. 10.1; LN Ch. 9.
2. A simple balanced growth framework with human capital and R&D. LN Ch. 10; Exercise Problem V.7 and V.8.

D. The Nelson-Phelps perspective on human capital (technology transfer, ability to catch-up). DA Ch. 10.8. Exercise Problem V.3.

III. Accumulation-based endogenous growth (13/4-20/4)

A. The simplest AK model. DA Ch. 11.1.

B. Reduced-form AK models.

1. Physical and human capital. Consumption taxation. DA Ch. 11.2; LN Ch. 11.
2. Learning-by-investing models. Arrow's version vs. Romer's version; semi-endogenous vs. fully endogenous growth. LN Ch. 12; DA Ch. 11.4-5.
3. Productive government services. Exercise Problem VI.4.

C. Empirics on learning. Embodied technical change. Static comparative advantage vs. dynamics of learning by doing. Resource curse? Weak and strong scale effects. LN Ch. 13.

IV. Innovation-based endogenous growth (4/5-11/5)

A. Modeling technical change. DA Ch. 12.1-2 and 5, all cursory.

B. Horizontal innovations: expanding input varieties.

1. The lab-equipment model. Social planner. Implementation of social planner's solution. DA Ch. 13.1; LN Ch. 14.
2. Stochastic erosion of monopoly power; dilemmas in patent design. LN Ch. 15.
3. The knowledge-spillover model: Romer's version vs. Jones' version. DA Ch. 13.2-3, cursory; Jones (1995) (excl. § 4-5). Exercise Problem VII.6.

C. Brief summary on:

1. More on horizontal innovations: expanding consumer good varieties. DA Ch. 13.4, cursory.
2. Vertical innovations: expanding input quality and creative destruction (quality ladder models). DA Ch. 13.5 and 14.5, all cursory.

V. Natural resources, environment, and sustainable economic growth (18/5)

Sustainable development; renewable resources; non-renewable resources; the CES function applied as specification of preferences and technology. LN Ch. 16, cursory.

**Syllabus for Economic Growth (final)
Spring 2015**

Acemoglu, D., 2009, *Introduction to Modern Economic Growth*, Princeton Univ. Press. Selected chapters, see lecture plan.

Arrow, K. J., 2007, Global Climate Change: A Challenge to Policy, *The Economists' Voice* 4, Iss. 3, Article 2, 1-5. cursory.

Bernard, A. B., and C. I. Jones, 1996, Technology and Convergence, *Economic Journal* 106, 1037-1044. cursory.

Groth, C., 2015, Lecture Notes in Economic Growth (mimeo), Chapter 1-16.

- Jones, C. I., 1995, R&D-based Models of Economic Growth, *Journal of Political Economy* 103 (excl. §4-5).
- Jones, C. I., and P. M. Romer, 2010, The new Kaldor facts: Ideas, institutions, population, and human capital, *American Economic Journal: Macroeconomics*, 2 (1), 224-245. Cursory.
- Kremer, M., 1993, Population Growth and Technological Change: One Million B.C. to 1990, *Quarterly Journal of Economics* 108, no. 3. Cursory.

Short Note 1: The functional distribution of income.

Short Note 2: Saddle-point stability.

Alternative to Acemoglu's Ch. 8.1-2, 8.4-5, 8.7-9 concerning the Ramsey model:

Groth, C., 2014: Lecture Notes in Macroeconomics (mimeo), Ch. 9.4-5 and 10 (link at course website).

Apart from the Acemoglu book, all the texts can be reached by students with access to the course pack at the course website.

Cursory reading

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 whereas you do not have to master the technicalities unless they are also part of the non-cursory syllabus. The mathematical tools that you are supposed to master (because they are central to dynamic macroeconomic analysis and problem solving) are underlined in the lectures and the exercise class.

Exercise class. The exercises are an integral part of the course.

Midterm paper. In order to go in for the final written exam (three hours, closed book) at the end of the semester it is required that one homework assignment (a medium-term paper) has been handed in and accepted.

During the course. Check the course website at least once every week for follow-ups to lectures and other information, including possible small changes in the plan for lectures and exercises, plus possible errata to exercise problems, textbook, lecture notes, and articles.

Supplementary textbooks

Easy going:

Jones, C., 2002, *Introduction to Economic Growth*, 2nd ed., Norton: New York. A very clear exposition of the basics of endogenous growth theory.

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

Weil, D., 2013, *Economic Growth*, 3rd ed., Pearson: New York. Contains a lot of data.

More demanding texts:

- Aghion, P., and P. Howitt, 1998, *Endogenous Growth Theory*, MIT Press.
- Aghion, P., and P. Howitt, 2009, *The Economics of Growth*, MIT Press.
- Aghion, P., and S. N. Durlauf, eds., 2005, *Handbook of Economic Growth*, vol. 1A-1B. Amsterdam (a voluminous handbook for researchers; also many useful things for students). Online at university library.
- Aghion, P., and S. N. Durlauf, eds., 2014, *Handbook of Economic Growth*, vol. 2, Amsterdam.
- Barro, R., and X. Sala-i-Martin, 2004, *Economic Growth*, 2nd ed., MIT Press.
- Galor, O., 2011, *Unified Growth Theory*, Princeton University Press.

Supplementary articles and similar

- 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.
- Cho and Graham, 1996, The other side of conditional convergence, *Economics Letters*.
- 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.
- Islam, Nazrul, 2003, What have we learnt from the convergence debate? *Journal of Economic Surveys* 17, 3, 309-362.
- Jones, Charles I., 2002, Sources of US Economic Growth in a World of Ideas, *American Economic Review* 92, 1, 220-239. Cursory.
- Jones, Charles I., 2007, A simple Mincerian approach to endogenizing schooling. Working paper.
- Perotti, R., 1996, Growth, Income Distribution, and Democracy: What the Data Say, *Journal of Economic Growth* 1, 149-87.
- Rodrik, D., 2005, Growth Strategies. Chapter in *Handbook of Economic Growth*, vol. 1B, ed. by P. Aghion and S. Durlauf, Elsevier: Amsterdam. Online at the library. PDF version of the chapter available at the course website.
- Smulders, S., 1995, Entropy, Environment, and Endogenous Economic Growth, *International Tax and Public Finance* 2, 319-340.

Recommended math manual

- K. Sydsæter, A. Strom and P. Berck, *Economists' Mathematical Manual*, 4th ed. (or later), Springer Verlag, 2004, or later.

Useful dictionary of economics

- The New Palgrave Dictionary of Economics (online via the university library).
