

Christian Groth,
Department of Economics,
University of Copenhagen
chr.groth@econ.ku.dk
Course website:
<http://www.econ.ku.dk/okocg/VV/VV-2011/>

May 23, 2011
(with typos corrected July 25, 2011)

Course plan for Economic Growth

Spring 2011

Lectures: Wednesdays 8-10, CSS 2.1.24

Class exercises (Niklas Brønager): Mondays 8-10, CSS 2.1.18

Textbook:

Daron Acemoglu, *Introduction to Modern Economic Growth*, Princeton Univ. Press, 2009. The chapters are referred to as Ch. x.

In addition, some lecture notes (denoted LN) and supplementary articles, see syllabus below.

Lecture plan (final)

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

- A. Facts about growth and world income distribution. Average compound rate of growth. Different concepts of convergence: Ch. 1. LN 1. Cursory: Jones and Romer (2010).
- B. The Solow model in continuous time. Types of neutral technical progress. Terminology of the course: Ch. 2.1, 2.4-6; LN 2-3.
- C. Basic balanced growth theorems. Comparative dynamics: Ch. 2.7-8; LN 4.
- D. Growth accounting vs. sources of growth. Speed of (within-country) convergence: Ch. 3.1-2; LN 5-6.
- E. Persistence of technology differences, technology transfer, catching-up: Bernard & Jones (1996); Exercise Problem IV.1.
- F. Knowledge, population, and aggregate economies of scale. Fundamental determinants of differences in economic performance: Ch. 4.1-2; Ch. 4.3-4; Kremer (1993) §I-III (IV-V cursory); cursory: Ch. 4.3-8.

II. Basic macro-dynamic frameworks

- A. Brush-up of the Ramsey model (basic representative agent model) with exogenous technical progress; transitional dynamics: Ch. 8.1-5, 8.7-9.
- B. Brief brush-up of Diamond's OLG model; life-cycle approach to human capital formation; Separation Theorem: Ch. 9.2, only cursory; Ch. 10.1-2; LN 6.
- C. The Nelson-Phelps perspective on human capital (ability to catch-up): Exercise Problem IV.2.

III. Accumulation-based endogenous growth

- A. The simplest AK model: Ch. 11.1.
- B. Reduced-form AK models.
 - 1. Physical and human capital: Ch. 11.2.
 - 2. Learning-by-investing models: Arrow's version vs. Romer's version: LN 7; Ch. 11.4-5.
- C. Semi-endogenous vs. fully endogenous growth: LN 7-8.
- D. Empirics on learning. Embodied technical change. Weak and strong scale effects. Static comparative advantage vs. dynamics of learning by doing. Resource curse?: LN 8.

IV. Innovation-based endogenous growth

A. Modeling technical change: Ch. 12.1-2 and 12.5.

B. Horizontal innovations: expanding-input varieties.

1. The lab-equipment model. Social planner. Implementation of social planner's solution: Ch. 13.1; LN 9-10.

2. The knowledge-spillover model: Romer's version vs. Jones' version: Ch. 13.2-3.

3. Jones' semi-endogenous growth model. Weak vs. strong scale effects: Ch. 13.3; cursory: Jones (1995) (excl. § 4-5) cursory.

(C. Horizontal innovations: expanding consumer good varieties: Ch. 13.4, not part of syllabus.)

D. Very brief summary on vertical innovations: expanding input quality and creative destruction (quality ladder models): Ch. 13.5 and 14.5, all cursory.

V. Natural resources, environment, and sustainable economic growth

A. Sustainable development; renewable resources; non-renewable resources; the CES function applied as description of preferences and technology: LN 11.

B. Social discounting. Macroeconomic cost-benefit analysis of the climate change problem: LN 12 and Arrow (2007), all cursory.

In order to go in for the final written exam (three hours, closed book) at the end of the semester it is required that *two* "homework assignments" have been handed in and accepted.

Syllabus for Economic Growth (final) Spring 2011

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.

Jones, Charles I., 1995, R&D-based Models of Economic Growth, *Journal of Political Economy* 103 (excl. §4-5). Cursory.

Jones, C. I., and P. M. Romer, 2010, The new Kaldor facts: Ideas, institutions, population, and human capital, *American Economic Journal: Macroeconomics*, vol. 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 (§IV-V only cursory).

Lecture Notes 1-12 (12 only cursory).

Apart from the Acemoglu book, all the texts are downloadable for 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 in question. The mathematical

tools that you are supposed to master (because they are central to dynamic macroeconomic analysis and problem solving) have been underlined in the lectures and the exercise class.

Before the exam. Before the exam it is recommended that you refresh your memory of the exercise problems solved in class (not only those problems mentioned in the course plan above) and the two homework assignments discussed during the semester.

It is also recommended that you go through the *afterthoughts* page on the course website. These afterthoughts contain follow-ups on the lectures. Finally, check the *correction list* that will appear on the course website at the end of teaching and which lists typos etc. in the textbook, lecture notes, articles, and exercise problems.

Supplementary textbooks

Easy going:

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

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

Weil, D., 2009, *Economic Growth*, 2nd ed., New York: Pearson. 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., 2006, *Handbook of Economic Growth*. Vol. 1A-1B. Amsterdam (a voluminous handbook for researchers; also many useful things for students).

Barro and Sala-i-Martin, 2004, *Economic Growth*, second ed., MIT Press.

Supplementary articles

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.

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 U-S. 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., 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).

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