

Course plan for Economic Growth. Spring 2016
Lectures: Fridays 8-10, CSS 2-1-12
Class (Niklas Brønager): Wednesdays 8-10, CSS 4-1-36

Main texts:

Jones, C. I., and D. Vollrath, 2013, *Introduction to Economic Growth*, 3rd ed., Norton: New York.
Selected chapters. Section y in Chapter x referred to as Jones x.y.

Groth, 2016, *Lecture notes in Economic Growth* (mimeo). Referred to as LN x.y.

As cursory reading we use a few sections from:

Acemoglu, D., *Introduction to Modern Economic Growth*, Princeton Univ. Press, 2009. Referred to as DA x.y.

Complete syllabus, see p. 3.

Lecture plan (final)

I. Setting the stage (and establishing a common language) (12/2 -4/3)

A. Facts about growth and world income distribution. DA Ch1. Jones Ch1. Cursory: Jones and Romer (2010).

B. Refresher on basic concepts.

1. Average compound rate of growth. Concepts of income convergence. LN Ch1.
2. Glossary concerning technology, technical change, embodied vs. disembodied. LN Ch2.1-2.
3. Continuous time modeling. LN 3; Jones, Appendix A.
4. Factor income shares and elasticity of factor substitution. The CES production function. LN Ch 2.5-7.

C. Neutral vs. biased technical change. Skill-biased technical change. Basic balanced growth theorems. LN Ch4.

D. Income differences over time and across countries.

1. Growth accounting vs. causes of growth. Transitional dynamics and speed of (within-country) convergence. Jones Ch2.4; LN Ch5 and Ch6.1-3. Cursory: DA Ch3.1-2.
2. Technology differences across countries. Catching-up. Transitional dynamics. Jones Ch3. The theme is continued at point IV.B and C.

II. The economics of ideas and the engine of growth (11/3-18/3)

A. Ideas versus objects. Increasing returns to scale. Jones Ch4.1-2.

B. Population and ideas. Kremer's population-breeds-ideas model. The end of the Malthusian era. Jones Ch4.3-4; LN Ch7. Cursory: Kremer (1993).

C. Proximate vs. fundamental determinants of differences in economic performance; the importance of institutions (socio-economic infrastructure). Cursory: DA Ch4.1 and Ch4.3-8.

D. Data on ideas. Jones Ch4.5-6.

III. Innovation-based endogenous growth (1/4-15/4)

- A. The Romer-Jones model (horizontal innovations: expanding input varieties; specialization and increasing division labor). The Romer case vs. the Jones case. Jones Ch5.1-3. Short Note 2.
- B. "Fully-endogenous" vs. "semi-endogenous" growth. Weak vs. strong scale effects. Short Note 1.
- C. The Schumpeterian model (vertical innovations, creative destruction). The fully-endogenous vs. the semi-endogenous growth case. Jones Ch5.4. Cursory: Short Note 3.
- D. Externalities and policy. Dilemmas in patent design. Jones Ch5.5-6. Section 6 of Short Note 3.

IV. Human capital, technology adoption, and infrastructure (29/4-13/5)

- A. Life-cycle approach to human capital formation. What the Mincer equation is and is not. LN Ch9 (p. 171 middle-174 only cursory).
- B. The Nelson-Phelps perspective on human capital: technology transfer, ability to catch-up. Jones Ch6.1-2, p. 171 middle-174 only cursory. Exercise Problem VII.15 (= V.3).
- C. More on technology diffusion, foreign direct investment, and globalization. Jones Ch6.3-5.
- D. Socio-economic infrastructure and long-run economic performance. Jones Ch7.

V. Alternative and complementary theories of endogenous growth (13/5-20/5)

- A. AK models and reduced-form AK models. Jones Ch9. LN Ch11.1-2 (11.3 on consumption taxation cursory).
- B. The learning-by-investing model. The Arrow case vs. the Romer case. LN Ch12, p. 203-217 (p. 208-212 only cursory).
- C. Growth policy. Social planner and implementation in a Ramsey setup. LN Ch12, p. 217-221.
- D. Empirics on learning by doing/learning by investing. LN Ch13, up to and including p. 239.

VI. Natural resources, environment, and sustainable economic growth (20/5-27/5)

- A. Sustainable development; classification of means of production; CES preferences. Renewable resources and the sustainability issue. LN Ch16.1-3. Jones Ch10.3-4 and 6, only cursory.
- B. Non-renewable resources and the sustainability issue.
 - 1. The DHSS model. LN Ch16.4.
 - 2. A simple two sector R&D-based model. LN Ch16.5 until line 5 of p. 315.

Syllabus, see next page.

Syllabus for Economic Growth (final) Spring 2016

Acemoglu, D., 2009, *Introduction to Modern Economic Growth*, Princeton Univ. Press. A few selected sections, cursory, see lecture plan.

Groth, C., 2016, Lecture Notes in Economic Growth (mimeo). Selected chapters, see lecture plan.

Jones, C. I., and D. Vollrath, 2013, *Introduction to Economic Growth*, 3rd ed., Norton: New York. Selected chapters, see lecture plan.

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 notes:

Short Note 1. Robustness issues and scale effects.

Short Note 2. The Romer-Jones horizontal innovations model.

Short Note 3. A Schumpeterian model of vertical innovations.

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 emphasized 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 or exercise problems, plus possible errata to exercise problems, lecture notes, etc.

Supplementary textbooks

Easy going:

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 informative 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.
- De la Croix, D., and P. Michel, 2002, *A Theory of Economic Growth. Dynamics and Policy in Overlapping Generations*, Cambridge University Press.
- Galor, O., 2011, *Unified Growth Theory*, Princeton University Press.

Supplementary articles and similar

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