

## Course plan for Economic Growth Spring 2013

Lectures: Tuesdays 12-14, CSS 22.0.19

Class exercises (Niklas Brønager): Thursdays 8-10, CSS 25.01.53

Textbook:

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

In addition, 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: Ch. 1. Cursory: Jones and Romer (2010).
- B. Refresher on basic concepts.
  - 1. Average compound rate of growth. Different concepts of income convergence: LN 1.
  - 2. Terminology concerning technology. Continuous time modeling. The Solow model in continuous time. Types of neutral disembodied technical progress: Ch. 2.1, 2.4-6; LN 2.
- C. Basic balanced growth theorems. Comparative dynamics: Ch. 2.7-9; LN 3.
- D. Growth accounting and levels accounting.
  - 1. Growth accounting vs. sources of growth. Speed of (within-country) convergence; Barro regressions: Ch. 3.1-2; LN 4, LN 5.
  - 3. Levels accounting (technology differences across countries): Ch. 3.5.1-2; Bernard & Jones (1996) cursory; Exercise Problem III.6 and III.7.
- E. Knowledge, population, and aggregate economies of scale: Ch. 4.2; LN 6; Kremer (1993) §I-III (IV-V cursory).
- F. Proximate vs. fundamental determinants of differences in economic performance: Ch. 4.1, 4.3-8.

#### II. Basic macro-dynamic frameworks

- A. Brush-up of the Ramsey model (basic representative agent model) with exogenous technical progress.
  - 1. The model. Phase diagram and transitional dynamics: Ch. 8.1-2, 8.4-5, 8.7-12. Alternative reading: Groth (2012) Ch. 9.4 and 10.
  - 2. A social planner. Choice of social discount rate. Application: social cost-benefit analysis in climate change mitigation. Ch. 8.3 or Groth (2012) Ch. 10.5; LN 7; Arrow (2007) cursory.
- B. Brief brush-up of Diamond's OLG model. Ch. 9.2 cursory.
- C. Human capital.
  - 1. Life-cycle approach; Separation Theorem: Ch. 10.1.
  - 2. Human capital formation: a simple case: LN 8, Ch. 10.2 cursory, Exercise Problem V.7.
- D. The Nelson-Phelps perspective on human capital (technology transfer, ability to catch-up): Ch. 10.8. Exercise Problem V.3.

### **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; LN 9.

2. Learning-by-investing models: Arrow's version vs. Romer's version; semi-endogenous vs. fully endogenous growth: LN 10; Ch. 11.4-5.

3. Productive government services. Exercise Problem VI.4.

C. Empirics on learning. Embodied technical change. Weak and strong scale effects. Static comparative advantage vs. dynamics of learning by doing. Resource curse?: LN 11 (§ 1-3 and 5 only cursory).

### **IV. Innovation-based endogenous growth**

A. Modeling technical change: Ch. 12.1-2. cursory: Ch. 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 12.

2. The knowledge-spillover model: Romer's version vs. Jones' version: Ch. 13.2-3; Jones (1995) (excl. § 4-5).

3. Stochastic erosion of monopoly power; dilemmas in patent design. LN 13.

C. Brief summary on:

1. More on horizontal innovations: expanding consumer good varieties: Ch. 13.4, cursory.

2. 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**

Sustainable development; renewable resources; non-renewable resources; the CES function applied as description of preferences and technology: LN 14.

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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 has been handed in and accepted.

## **Syllabus for Economic Growth (final) Spring 2013**

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.

Jones, Charles 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 (§IV-V only cursory).

Lecture Notes 1-14 (see course website).

Alternative to Acemoglu's Ch. 8.1-2, 8.4-5, 8.7-9 on the Ramsey model:  
Groth, C., 2012: *Lecture Notes in Macroeconomics*, Ch. 9.4 and 10 (see course website).

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 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.

**During the course.** Check the course website at least once every week to see the selected exercise problems for next class and other new information concerning both lectures and class exercises.

**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 homework assignment.

It is also recommended that you check *errata* on the course website where typos etc. in the textbook, lecture notes, articles, and exercise problems are listed during the semester.

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### **Supplementary textbooks**

#### *Easy going:*

Jones, C., and D. Vollrath, 2013, *Introduction to Economic Growth*, 3rd 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. 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., 2006, *Handbook of Economic Growth*. Vol. 1A-1B.

Amsterdam (a voluminous handbook for researchers; also many useful things for students). Online at Faculty Library of Social Sciences.

Barro and Sala-i-Martin, 2004, *Economic Growth*, 2nd ed., MIT Press.

Galor, O., 2011, *Unified Growth Theory*, Princeton University 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.
- 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 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.

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