

## Course plan for Economic Growth

Spring 2010

Wednesdays 13-15: CSS 2.0.24

Thursdays 8-10: CSS 2.0.42

Brief description of syllabus:

Selected chapters from Barro, R. J., and X. Sala-I-Martin, *Economic Growth*, 2. ed., MIT Press 2004, henceforth B & S.

In addition, journal articles and a two kinds of lecture notes: chapter drafts from a collection of lecture notes (below referred to as Groth Ch. x) and short lecture notes (below referred to as LN x).

### Lecture plan (final)

Author names refer to items in the detailed syllabus list below.

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

- A. Some facts about growth and world income distribution. Compound rates of growth: B & S's Introduction: LN 1-2. Cursory: Jones and Romer (2009).
- B. Terminology of the course; neutral technical change: B & S 23-30, 51-56, Groth Ch. 1.2.2 + Ch 2.1-2.3.
- C. The concepts of  $\sigma$  convergence and  $\beta$  convergence: B & S 50-53, 462. LN 3.
- D. Persistence of technology differences, technology transfer, catching-up: Bernard & Jones (1996). LN 4.
- E. Adjustment speed: B & S 54-59 or LN 5 (§ 3-4 only cursory).
- F. Basic balanced growth theorems: LN 6.

#### II. Applying the Ramsey model with exogenous technical change

- A. Brush-up of the Ramsey model (basic representative agent model); transitional dynamics. B & S 85-111 (108-110 cursory). Alternative text: Groth Ch. 7 (except 302-304).
- B. Household heterogeneity and dynamics of wealth distribution: B & S pp. 118-121. LN 7.

#### 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 8. Cursory: B & S 212-220.
- C. Empirics on learning. Embodied technical change. Scale effects. Static comparative advantage vs. dynamics of learning by doing. Resource curse?: LN 9.
- D. Productive government services: B & S 220-225, § 4.4.2 only cursory. LN.10, § 4 only cursory.
- E. Necessary conditions for fully endogenous growth in a one-sector model: B & S 232-235. Discussion. LN 12.
- F. Income distribution, political economy and growth: Alesina & Rodrik (1994). LN 11. Cursory: Perotti (1996).

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<sup>1</sup> This is identical to Course plan as of May 19, except for two minor changes: 1) at IV.A "all cursory" now reads "cursory"; 2) at VII.A "§ IV only cursory" now reads "§ III and IV only cursory".

#### **IV. Different approaches to intentional human capital formation**

- A. A Mincerian (life-cycle) approach to human capital: Jones (2007). LN 14.  
Combination with accumulation of physical capital and knowledge: A model of U.S. growth in a world of ideas: Jones (2002) (cursory).
- B. The B & S approach: Treating human capital as similar to physical capital.
  - 1. The degenerate case (same technology in both sectors): B & S 239-243. LN 13.
  - 2. Different technologies in the two sectors. LN 13.

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

- A. Horizontal innovations: increasing-variety models.
  - 1. A simple model: B & S pp. 285-300. LN 15-16.
  - 2. Erosion of monopoly power; a dilemma in patent design: B & S pp. 305-309. LN 17.
  - 3. An extended Romer 1990 model: Alvarez & Groth (2005) cursory.
- B. Jones' semi-endogenous version. Knife-edge problems. Weak vs. strong scale effects: Jones (1995) (excl. § 4-5).
- C. Vertical innovations: increasing product quality and creative destruction (quality ladder models): Groth (2010), § 1, 4, and 5 are only cursory.

#### **VI. Natural resources, environment, and economic growth**

- A. General aspects. The CES function applied as preference description or technology description: Groth (2007), only § 1, 3, and 4. LN 18. Cursory: Smulders (1995), § 1.
- B. Social discounting: LN 19.
- C. Macroeconomic cost-benefit analysis of the climate change problem: Arrow (2007) plus LN 20.

#### **VII. Further theoretical and empirical issues**

- A. Population and technical change. Kremer (1993) (§ III and IV only cursory) (short version in D. Romer, 2006, *Advanced Macroeconomics*, § 3.7).
- B. Growth accounting vs. sources of growth: B & S pp. 433-447, 457-460.

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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 *two* of the three “homework assignments” have been accepted.

### **Syllabus for Economic Growth (final) Spring 2010**

- 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 Lecture Plan.
- Bernard, A. B., and C. I. Jones, 1996, Technology and Convergence, *Economic Journal* 106, 1037-44.

- 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 (only § 1, 3, and 4).
- Groth, C. 2010, A review of innovation-based growth models. Working paper. (§ 1, 4, and 5 only cursory).
- Groth, C., Lecture Notes on Macroeconomics, Dept. Econ., Univ. of Copenhagen. Selected Chapters.
- Jones, Charles I., 1995, R&D-based Models of Economic Growth, *Journal of Political Economy* 103 (excl. § 4 and 5).
- 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.
- Jones, C. I., and P. M. Romer, 2009, The new Kaldor facts: Ideas, institutions, population, and human capital. Working paper. Cursory.
- Kremer, M., 1993, Population Growth and Technological Change: One Million B.C. to 1990, *Quarterly Journal of Economics* 108, no. 3, § III and IV cursory.
- Perotti, R., 1996, Growth, Income Distribution, and Democracy: What the Data Say, *Journal of Economic Growth* 1, 149-87. Cursory.
- Smulders, S., 1995, Entropy, Environment, and Endogenous Economic Growth, *International Tax and Public Finance* 2, 319-340. Only § 1.

Lecture Notes 1-20.

Apart from the B & S book, all the texts will be downloadable for students with access to the course pack at the course website.

*Texts eliminated from syllabus* (but recommended reading anyway - non scholae sed vitae):

Islam, Nazrul, 2003, What have we learnt from the convergence debate? *Journal of Economic Surveys* 17, 3, 309-362. 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).

### *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. Not everything in the texts is equally important. A text may be part of the curriculum because it deals with key concepts and points of view that you are supposed to know. And perhaps the text also contains a mathematical tool of analysis you should master. At the same time there may be other technicalities in the text that you don't have to master. The mathematical tools that you are supposed to master (because they are central to macroeconomic analysis and problem solving) will be underlined in the lectures and the exercise class.

## **Homework (or “workshop”) assignments**

See course website.

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**Before the exam.** Before the exam it is recommended that you refresh your memory of the exercise problems and homework assignments discussed during the semester.

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

Before the exam preparation meeting in Week 21 you are most welcome to send me e-mails with questions.

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### ***Supplementary textbooks***

Easy going:

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

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

Weil, D., *Economic Growth*, 2<sup>nd</sup> ed., New York: Pearson.

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).

Acemoglu, D., 2009, *Introduction to Modern Economic Growth*, Princeton University Press.

### **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)