Universitat de les Illes Balears

Teaching guide

Academic year	2011-12
Subject	20622 - Growth
Group	Group 40, 1S
Teaching guide	A
Language	English

Subject identification

Subject	20622 - Growth
Credits	2.4 attended (60 hours) 3.6 non-attended (90 hours) 6 total (150 hours).
Group	Group 40, 1S(Campus Extens)
Període d'impartició	1st semester
Teaching language	English

Lecturers

Lecturers	**Office hours for students**					
	Start time	**End time**	**Day**	**Start date**	**End date**	**Location**
José Luis Groizard Cardosa joseluis.groizard@uib.es	12:00h	13:30h	Thursday	26/09/2011	24/09/2012	DB-211
	12:00h	13:30h	Monday	26/09/2011	24/09/2012	DB-211

Degrees where the subject is taught

Degree	**Character**	**Course**	**Studies**
Degree in Economics	Compulsory	Third course	Degreee

Contextualisation

The subject Growth is part of the bundled of Macroeconomics courses offered to undergraduate students. It is devoted to study the long term determinants of economic prosperity from the point of view of nations as economic units. In previous Micro and Macro courses the student has been made familiar with some of the concepts and tools needed to follow a Growth subject. Instead of focusing on the role of money and the distinction between nominal and real variables, this course is centered in explaining the determinants of real output over the long run. This approach discard the study of business cycles although the analytical tools offered will be useful to future Macro courses devoted tu study economic fluctuations and fiscal and monetary policies.

Economic growth and economic development converge to the same subject when we restrict the analysis to study the steady state implications of the growth models. For this reason this course is devoted to ascertain the implications of growth theory to study the levels of economic development across countries. As a result the subject becomes an introduction to future courses on Development Economics. On the other hand, growth rates vary across countries as a result of long run economic forces that determine steady state growth rates; but also because each economy is in a different transition path towards its own steady state. Hence, the study of transition dymanics will be an important issue for the course content and for future advanced courses on Macroeconomics.

Requirements

Publication date: 29/07/2011

Our understanding of economic growth has made many progresses during the last thirty years. Most of the advances in research in growth have been published in scientific journals making this field one of the most active ones in economics. Traslating highly technical publications into an accessible level for undergraduate students is a challenge for the instructor.

This subject has a strong economic theory component and many topics will be developed using formal tools. Although, the focus is on the economics and technical details will be let aside, a minimum math knowledge is required. The bulk of the required mathematics is introduced with the Solow model in chapter 2 and the analysis in subsequent chapters barely uses the same tools over and over again.

The content is also applied, meaning that major predictions of economic models will be confronted with data. Analysis of data will require some technical knowledge from statistics and econometrics.

Essential

* Math (basic calculus)
* Optimization
* Statistics
* Econometrics (multivariate regression of cross-sectional data)

Recommended

Modern quantitative economics are intensive in using computer techniques. Sometimes economists run programs to simulate shocks in a certain economy to assess graphically the results. With this information we can explain better what are the consequences of changing a given exogenous parameter and produce nice charts. Most of the jobs available for young economists will demand a certain knowledge of these techniques. Below are some basic software to be familiar with:

* Excel (data analysis tools and macros)
* Mathematica
* Matlab (for advanced users)

Skills

Specific

1. To learn how to use theoretical models to interpret economic facts..
2. To apply appropriate scientific methodologies knowing its basis..
3. To use data tools to interpret economic models..

General

1. To be familiar with scientific texts..
2. To develop a synthetic and a knowledge integration capacity..
3. To make decisions, to solve problems and to develop new ideas..

Content

Publication date: 29/07/2011

This course addresses the economic growth by providing a theoretical and empirical approach. Through this course the student will understand what are the fundamental causes of why some economies are much richer than others and what causes are behind the huge increase that real incomes have experienced throughout history.

Thematic content

1. Economic Growth and Economic Development: Questions and Facts
   * Cross-country income differences
   * Income and welfare
   * Economic growth and income differences
   * Origins of today's income differences and world economic growth
   * Convergence
   * Correlates of growth
   * From correlates to fundamental causes

   There are very large differences in income per capita and output per worker today. In this chapter we are going to show how these differences are, looking at world distributions of these variables since 1960. Income is a key variable because summarize a great deal of welfare measures, we are going to show how income variables correlates with other welfare indicators. Differences in past rates of growth are seen very often as major explanations of today's income differences. We will show how rates of growth are distributed since 1960 and assess whether growth differences since 1960 are able to explain income differences today.

2. The Solow Growth Model: the Role of Capital Accumulation
   * The Solow with no technical progress
   * The Solow model with technical progress
   * The Solow model with human capital

   In the simplest theory of production output is obtained from using labor and a set of accumulable inputs, such as physical capital and technological knowledge (i.e. $Y=AF(L, K)$). In this chapter we will provide a powerful model to explain the dynamic of output over a long term horizon. Basically the so called Solow model introduces the basic features of a growing economy where firms accumulate new units of capital, K, thanks to savings, there are continous efficiency gains coming from (exogenous) technological progress and there are no externalities. The model can be easyly enriched to incorporate human capital (also accumulable) and other factors such as (non-renewable resources, fertility decisions) to study their implications.

   One major conclusion arising from the Solow model is that increasing the saving rate in a poor economy only affects the level of the per capita income while the rate of growth will only be affected temporaly. Over the long run the rate of growth is explained by the rate of technological progress, which is exogenous.

3. Growth and Development Accounting: the Role of Productivity
   * What is productivity?
   * Measurement issues
   * Growth accounting
   * Development accounting

   To what extent the Solow model is a good explaination of cross-country income differences? To what extent differences in capital accumulation across countries explain differences in growth rates? To answer those questions we will provide a set of techniques to decompose on the one hand income differences across countries (development accounting) in differences arising from inputs and differences coming from productivity; and on the other hand differences in income changes over time (growth accounting) arising from differences in rates of accumulation of inputs and in changes in productivity.

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These approaches pose the question whether the productivity (versus inputs) plays a major role in explaining world distributions of income and growth. A preliminary issue is to explain what is productivity.

4. The Technology Frontier: Innovation
   * What is technology?
   * The nature of technological progress
   * An R&D model without capital
   * An R&D model with capital
   * Scale effects and economic growth

   Neoclassical models are focused on modeling the accumulation fo physical and human capital. There is a prominent role of technological progress because is the source of growth. However, nothing can be said about how to spur long term economic growth because this process is exogenous. New technologies arrive continously at an exogenous rate, *g*. In this chapter, we will explore a more realistic model where firms produce new technologies looking to maximize profits. We will start describing why *ideas* are a special type of goods and why producing ideas entails various sort of externalities and a more complex market structure for innovative firms. The models will describe the functioning of an advanced economy and allow us to understand the consequences of R&D policies. Finally we will study the effect of size in economic growth.

5. The Diffusion of Technology: Imitation
   * Technology transfer
   * The cost of imitation
   * A simple model of technology transfer
   * Barriers to technology diffusion

   Previous models emphasize the role of endogenous capital accumulation (Solow) and endogenous technological progress (innovation) in economic growth. However, differences in technologies across countries are unexplained. In this chapter, we will introduce a two country model where a leading country creates new technologies while a follower adopt some of the newest technologies. Using this simple framework, we will analize why the follower has no incentives to do their own R&D and prefers technology adoption. We also investigate why from the pool of worldwide available technologies, just a few of them arrive to the backward countries.

6. Fundamental Determinants of Cross-Country Income Differences
   * Types of inefficiencies
   * Institutions
   * Geography, climate and natural resources
   * Culture

   Countries with similar resources produce different amount of output. Accounting for these differences yield that differences in efficiency levels are very important. Eficiency is related with many factors, such as the role of government, the role of geography and the role of culture. In this chapter we will understand why the government adopt measures that harm economic growth or why poor countries tend to have bad governments. We also provide some empirical evidence sustaining the view of the primacy of institutions over the other factors.

7. Topics of Economic Growth
   * Trade and growth
   * Inequality and growth
   * Environment ans growth
   * Structural change and growth

Publication date: 29/07/2011

In this final lecture, we will present in deep one of the above topics while the rest will be summarized not very sucintly.

Teaching methodology

This is a theory and applied course. In each lecture the professor will introduce the basic content of each chapter either using the blackboard or the slides. Each lecture topic will be linked to one or more practical activities such as problems set, computer simulations, data analysis or readings.

This subject is part of the Campus Extens project, addressed to facilitate the e-learning and the autonomous student work. Through the Moodle platform, the student will have available a straight comunication to the professor and classmates at distance and access to electronic documents such as slides, readings, etc.

Attended activities

Type	Name	G. type	Description
Theory classes	Pen, pencil and sildes lectures	Large group (G)	The aim of these lectures is to introduce the student into each topic. The professor will sequentially present each chapter with the help of blackboard and slides. The student can use the slides to prepare its own class notes. When the topic to present is highly mathematical the professor could use the blackboard to present the model instead.
Practical classes	Computer work	Medium group (M)	At the computer room, the professor will read the questions to address and explain basic issues related to the model's simulations and technical details regarding the use of Excel. The student must previously read and study the theory material needed (i.e. Solow model in discrete time).
Practical classes	Math tools	Medium group (M)	The Solow model and the following models require the use of a set of math tools. They are usually taugh in previous math courses. However, given the importance of them we will devote some time to revisit them.
Practical classes	Problems and doubts	Medium group (M)	After each topic the professor will devote some time to present and solve a problem or pose questions similar to the ones that will be required to be answered individually in the Problem Sets or in the Partial Exams belonging to the continous evaluation.
Assessment	Computer work	Medium group (M)	The student must explain the work done to solve the simulations. In particular, the student must be able to explain with rigour and clarity what were the expected results (using the theory), why and how has reached the presented results.
Assessment	Partial Exam I	Large group (G)	At mid term there will be a partial exam. It comprises all the course content until the date (classnotes, readings, problem sets, etc.). The exam could either be a multiple chioce test, a problem set or both. The duration will last less than 2 hours.
Assessment	Partial Exam II	Large group (G)	At end of the theory lectures there will be a second partial exam. It comprises all the course content until the date (classnotes, readings, problem sets, etc.) including the topics explained during the first lectures. The exam could either be a multiple choice test, a problem set or both. The duration will last less than 2 hours.
Assessment	Problem Set I	Medium group (M)	The problem set I will be solved (partially or totally) into the classroom after the due date.

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Type	Name	G. type	Description
Assessment	Problem Set II	Medium group (M)	The problem set II will be solved (partially or totally) into the classroom after the due date.

Non-attended activities

Type	Name	Description
Individual self-study	Problem Set I	To fully dominate the technical details of the models presented in the theory lectures the student must be able to solve two set of problems. Those problems will consist in answering questions regarding the same models studied or new models that are similars of the ones viewed.
Individual self-study	Problem Set II	To fully dominate the technical details of the models presented in the theory lectures the student must be able to solve two sets of problems. Those problems will consist in answering questions regarding the same models studied or new models that are similars of the ones viewed.
Group or individual self-study	Computer work	To better understand the Solow model (including some extensions) the student will perform some simulations using Excel.
Group or individual self-study	Hard study	The student must decide which strategy is better to afford the study of this subject. There is no rule but study hard.
Group or individual self-study	Readings	Each chapter will have a minimum of one reading related to the content of the topic. The reading consist mainly in an article or scientific text (i.e. working paper, report, etc.) written by a leading economist. The student must be familiar with technical papers as a methodology to address questions, economic reasoning and provide rigourous answers.

Workload estimate

In the following table we display the distribution of hours for the different tasks to be performed during the course lenght. The plan includes task to be done during the teaching hours and tasks to be done a part. It is useful to know that 1 ECTS is equivalent to 25 hours of work splitted between class attendance (10 hours per ECTS) and student work (15 hours per ECTS).

Type	Name	Hours	ECTS	%
Attended activities		**60**	**2.4**	**40**
Theory classes	Pen, pencil and sildes lectures	38	1.52	25.33
Practical classes	Computer work	2	0.08	1.33
Practical classes	Math tools	2	0.08	1.33
Practical classes	Problems and doubts	8	0.32	5.33
Assessment	Computer work	2	0.08	1.33
Assessment	Partial Exam I	2	0.08	1.33
Assessment	Partial Exam II	2	0.08	1.33
Assessment	Problem Set I	2	0.08	1.33
	Total	**150**	**6**	**100**

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Type	Name	Hours	ECTS	%
Assessment	Problem Set II	2	0.08	1.33
Non-attended activities		**90**	**3.6**	**60**
Individual self-study	Problem Set I	5	0.2	3.33
Individual self-study	Problem Set II	5	0.2	3.33
Group or individual self-study	Computer work	5	0.2	3.33
Group or individual self-study	Hard study	50	2	33.33
Group or individual self-study	Readings	25	1	16.67
	Total	**150**	**6**	**100**

At the beginning of the semester the subject schedule will be available to students through the UIBdigital platform. This schedule will at least include the dates for the continuous assessment exams and assignment deadlines. Furthermore, the lecturer will inform students as to whether the subject syllabus will be carried out according to the schedule or otherwise, including Campus Extens.

Student learning assessment

The competences set out in the course will be assessed by applying a series of procedures. The table of this section describes each evaluation procedure, the type (not recoverable (NR) means that there is no chance of recover it), the evaluation criteria and their weight in the overall grade of the subject.

Throughout this course the student will be continously assessed. To pass the subject the average performance must be above or equal 5.0 (out of 10). Note that, there is no final exam.

Computer work

Type	Assessment
Technique	Student internship dissertation **(Non-recoverable)**
Description	The student must explain the work done to solve the simulations. In particular, the student must be able to explain with rigour and clarity what were the expected results (using the theory), why and how has reached the presented results.
Assessment criteria	Precision, adequacy and clearity of the answers.

Final mark percentage: 10% for pathway A

Partial Exam I

Type	Assessment
Technique	Objective tests **(Non-recoverable)**
Description	At mid term there will be a partial exam. It comprises all the course content until the date (classnotes, readings, problem sets, etc.). The exam could either be a multiple chioce test, a problem set or both. The duration will last less than 2 hours.
Assessment criteria	Exactitude, reasoning and clearity.

Final mark percentage: 35% for pathway A

Publication date: 29/07/2011

Partial Exam II

Type	Assessment
Technique	Objective tests **(Non-recoverable)**
Description	At end of the theory lectures there will be a second partial exam. It comprises all the course content until the date (classnotes, readings, problem sets, etc.) including the topics explained during the first lectures. The exam could either be a multiple choice test, a problem set or both. The duration will last less than 2 hours.
Assessment criteria	Exactitude, reasoning and clearity.

Final mark percentage: 35% for pathway A

Problem Set I

Type	Assessment
Technique	Short-answer tests **(Non-recoverable)**
Description	The problem set I will be solved (partially or totally) into the classroom after the due date.
Assessment criteria	Exactitude, reasoning and clearity.

Final mark percentage: 10% for pathway A

Problem Set II

Type	Assessment
Technique	Short-answer tests **(Non-recoverable)**
Description	The problem set II will be solved (partially or totally) into the classroom after the due date.
Assessment criteria	Exactitude, reasoning and clearity.

Final mark percentage: 10% for pathway A

Resources, bibliography and additional documentation

There is a wide range of textbooks available for students of Economic Growth. Basic references are compulsory (must read) material. To get a overall feeling of what we have learnt over the last three decades of intensive research you should start with Helpman's book. This book is not a textbook properly, it is mostly devoted to the general public and not just to economists. The Jones book is a pure textbook addressed to undergraduate students. Follow it closely.

The student should also use the slides and handnotes provided to elaborate its own classnotes. It is important to have a clear and updated version of them.

Basic bibliography

* Helpman, E. (2004) *The Mystery of Economic Growth*, The Belknap Press of Harvard University Press, Cambridge.
* Jones, Ch. I. (1998) *Introduction to Economic Growth*, W. W. Norton & Company, New York.

Additional bibliography

* Acemoglu, D. (2008) *Introduction to Modern Economic Growth*, Princeton University Press, Princeton.

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* Weil, D. N. (2005) *Economic Growth*, Pearson Education, New York.

Other resources

Readings

During the course a list of readings will be provided. The student must read them **in advance** to the related topic. They are an important part of the course content and will be subject to a careful evaluation in the partial exams. The student must read the articles and working papers provided, summarize the main content and the results obtained. It is also important to have a clear idea about the methodology used by the author(s) to get the final results.