

Advanced Macroeconomics I (20.851)

Degree/study: ADE/ECO

Course: Third and fourth year

Term: Second

Number of ECTS credits: 5

Hours of student's dedication: 125

Language or languages of instruction: English

Professor: Andrea Caggese (andrea.caggese@upf.edu) – office 20.220. Office hour: Tuesday 12-13)

1. Presentation of the subject.

The course focuses on models of medium and long run macroeconomic dynamics and their empirical implications.

2. Competences to be attained

General Competences

1. To read, understand and interpret academic texts in English an appropriate and reasoned manner.
2. To be able to justify positions with consistent arguments, as well as to defend them publically.
3. To be able to communicate proficiently, both orally and in writing, in English, to expert and non-expert audiences.
4. To be able to work in teams, actively participating in tasks and negotiating until reaching a consensus.
5. To develop the capacity to reason critically about controversial subjects.

Specific competences

1. To develop the capability to solve and analyze basic dynamic economic models.
2. To apply these models to understand the dynamics of the evolution of economies over time and their empirical implications.
3. To improve the ability to search information independently on key macroeconomic variables, to organize them and to relate them to the theories studied.

3. Contents

The structure of the course is based on the following four themes:

- I. The Solow Model
- II. Economic Growth with Endogenous Savings
- III. Economic Growth with Human Capital and Externalities
- IV. R&D and Economic Growth

Detailed Outline

I. THE SOLOW MODEL

A. WHY THE SOLOW MODEL?

1. Focus on the accumulation of physical capital
2. Capital accumulation and savings alone cannot explain long-run growth
3. A dynamic general equilibrium model
4. Still, many things are left out of the Solow model

B. STATIC AND DYNAMIC GENERAL EQUILIBRIUM MODELS

1. A GE model is simply a model of the economy as a whole
2. Static GE models
3. Capital
4. The snapshot of an economy with capital as a production factor
5. From the static to the dynamic model

C. THE SOLOW MODEL AT A MOMENT IN TIME

1. A model of output and factor prices given factor stocks
 1. Preferences
 2. Production (constant returns, decreasing returns, and Inada; labor-augmenting technological progress)
 3. Market structure and equilibrium
2. The static equilibrium
 1. Labor market
 2. Rental market for capital
3. Summarizing the static equilibrium

D. SAVINGS, INVESTMENT AND THE CREDIT MARKET EQUILIBRIUM--OR FROM THE RENTAL PRICE OF CAPITAL TO THE REAL INTEREST RATE

1. Investment and savings meet in the credit (also loan) market
2. The rent or buy decision
 1. The user cost of capital definition in discrete time
 2. The user cost in one-sector growth models (which includes, among many, the Solow model)
3. The credit/loan market equilibrium
4. Summarizing the credit market equilibrium
5. The credit market equilibrium and the link between present and future (or the capital accumulation equation in equilibrium)

E. THE DYNAMICS OF THE SOLOW MODEL

1. The dynamics of capital accumulation
2. From capital accumulation to growth of output per worker
3. Real wage growth and changes in the real interest rate

F. THE EFFECTS OF AN INCREASE IN SAVINGS ON INCOME

1. Growth in the long run (in the balanced growth path)
2. Output per worker in the long run (in the balanced growth path)

G. QUANTITATIVE IMPLICATIONS OF THE SOLOW MODEL

1. Effect of savings on long run income
2. The speed of convergence
3. Income per capita versus output per worker

H. EMPIRICAL APPLICATIONS

1. Growth accounting
 1. Output and TFP growth of the Asian “Tigers”
 2. US versus EU growth: when did the EU stop to catch up (and why)?
2. Productivity level accounting

3. Convergence
 1. Definition and mechanisms
 2. Was there convergence among today's rich countries?
 3. Convergence among regions
 4. Convergence world-wide after WW-II
 1. Cross-country convergence in the Solow model
 2. Conditional convergence
 5. Forecasting growth of the BRICS
 1. The who?
 2. Forecasts

II. ECONOMIC GROWTH WITH ENDOGENOUS SAVINGS

A. HOUSEHOLD SAVINGS BEHAVIOR

1. Keynesian theory
 1. The Keynesian consumption function
 2. Conceptual and empirical limitations
2. Permanent income theory
 1. Basic idea and two-period model
 2. Closed form solution in a simple case
 3. 3 and more periods
3. Optimal consumption and (savings) in continuous time
 1. Finite horizon decision problem in continuous time
 2. Intertemporal budget constraint
 3. Rate of time preference (time discount rate)
 4. First-order condition (optimality between adjacent points in time)

5. Closed-form solution in simple case
6. Deriving the continuous time first-order condition

B. THE RAMSEY-CASS-KOOPMANS MODEL

1. Equilibrium growth with infinite-horizon households
 1. Technology and capital market
 2. Household behavior with infinite horizon
 3. Dynamic equilibrium system
2. Equilibrium growth and optimality
3. Applications of the RCK model
 1. Government spending, consumption, and interest rates
 2. Bond versus tax financed government spending

C. THE DIAMOND MODEL

1. Overlapping generations models
2. Equilibrium growth
 1. Technology
 2. Household behavior
 3. Dynamic equilibrium system
3. Equilibrium growth and optimality
4. Applications of the Diamond model
 1. Government spending, consumption, and interest rates
 2. Bond versus tax financed government spending

III. ECONOMIC GROWTH WITH HUMAN CAPITAL AND EXTERNALITIES

A. THE IMPORTANCE OF THE ROLE PLAYED BY CAPITAL IN PRODUCTION

1. Decreasing returns to capital
2. Convergence
3. The effect of savings on long run income

B. A SIMPLE MODEL OF ENDOGENOUS GROWTH

1. The AK model
2. The AK model and capital income shares

C. EXTERNALITIES AND ENDOGENOUS GROWTH

1. Capital income shares and the effect of capital on output
2. Rivalry, excludability, and externalities
3. Aggregate implications of capital externalities

D. HUMAN CAPITAL AND ENDOGENOUS GROWTH

1. Human capital and “broad capital”
 1. Similarities with physical capital
 2. Important differences
2. Human capital externalities
 1. Empirical applications (externalities in cities; aggregate and individual return to human capital)
3. Human capital and technological progress

IV. RESEARCH&DEVELOPMENT AND ECONOMIC GROWTH

A. A FRAMEWORK FOR ANALYZING GROWTH WITH RESEARCH AND DEVELOPMENT

1. Framework
2. The “Idea production function”

B. THE CASE WITHOUT CAPITAL

1. Equilibrium dynamics
2. The balanced growth path and stability

C. THE CASE WITH CAPITAL

1. Framework
2. Capital accumulation
3. Equilibrium dynamics and balanced growth paths

D. APPLICATION: IDEAS AND POPULATION GROWTH

1. Population growth since 1 Million B.C
2. Population growth and subsistence; The Malthusian hypothesis
3. Exogenous technological change and population growth
4. Kremer’s explanation for accelerating population growth

4. Assessment

Course evaluation will be based on the following criteria.

1. Continuous evaluation (January-March 2012):

Problem sets and seminars: 25% awarded according to the following scheme:

- Handing in handwritten solutions before the deadline (see point 7 below). The professors of the seminars will grade the problem sets as: A: Excellent; B: Decent; C: Poor. You can work in groups but should end up writing up your own solution. Solution must be **HANDWRITTEN**. Please be aware that I think your chance of passing this course is almost zero if you do not try and solve the problems yourself. You can work in groups, but I want separate (handwritten!) solutions for everybody. **(10%)**
- Attendance to seminars and active participation in the seminar discussion of exercises and problems. IMPORTANT: STUDENTS MUST ATTEND SEMINARS IN THE

SUBGROUP TO WHICH THEY ARE ASSIGNED, OTHERWISE NO POINT WILL BE AWARDED. (10%)

- Solution of one problem at the blackboard. Students can volunteer during the seminar to solve problems at the blackboard. In case more than one student volunteers, the professor will choose randomly among those that did not do it yet. IMPORTANT: STUDENTS MUST SOLVE PROBLEMS IN THE SEMINARS IN THE SUBGROUP TO WHICH THEY ARE ASSIGNED, OTHERWISE NO POINT WILL BE AWARDED. (5%)

Final exam: 75 %.

- The final exam at the end of the quarter will cover all the contents of the course: the material presented in class, the problems discussed in seminars, and the recommended readings.
- To pass the course a minimum of 3.5 over 10 in the final exam is required (otherwise the grade of the final exam will also be the grade of the course, and problem sets/seminars will not be taken into account).

2. September evaluation (September 2012):

Problem sets and seminars: 10 %

Final exam: 90 %

5. Bibliography and teaching resources

5.1. Basic bibliography

Advanced Macroeconomics, by David Romer, 3rd edition (the most relevant chapters are 1-3).

5.2. Additional bibliography

Lectures on Macroeconomics, Olivier Jean Blanchard and Stanley Fischer, MIT press (1989)

Macroeconomics, Gregory Mankiw, 7th edition (2010)

5.3. Teaching resources

My lectures are based on slides, which will be made available on Moodle.

6. Methodology

The course will last 10 weeks. The professor will teach 20 classes of theory for the entire group. In addition there will be 6 seminars in smaller subgroups dedicated to deepening understanding of the class material and to discuss solutions to the problem sets assigned, with the students' active participation.

7. Activities Planning

WEEK 1	Lecture	9-Jan	
	Lecture	10-Jan	
WEEK 2	Lecture	16-Jan	
	Lecture	17-Jan	
WEEK 3	Lecture	23-Jan	
	Lecture	24-Jan	
WEEK 4	Lecture	30-Jan	
	Lecture	31-Jan	
WEEK 5	Lecture	6-Feb	Problem set 1, hand in by 6-Feb at 10.30
	Lecture	7-Feb	
	Seminars	6-10-Feb	Discuss Problem set 1
WEEK 6	Lecture	13-Feb	Problem set 2, hand in by 13-Feb at 10.30
	Lecture	14-Feb	
	Seminars	13-17-Feb	discuss Problem set 2
WEEK 7	Lecture	20-Feb	Problem set 3, hand in by 20-Feb at 10.30
	Lecture	21-Feb	
	Seminars	20-24-Feb	discuss Problem set 3
WEEK 8	Lecture	27-Feb	Problem set 4, hand in by 27-Feb at 10.30
	Lecture	28-Feb	
	Seminars	27-2-Mar	discuss Problem set 4
WEEK 9	Lecture	5-Mar	Problem set 5, hand in by 5-Mar at 10.30
	Lecture	6-Mar	
	Seminars	5-9-Mar	discuss Problem set 5
WEEK 10	Lecture	12-Mar	Problem set 6, hand in by 12-Mar at 10.30
	Lecture	13-Mar	
	Seminars	12-16-Mar	discuss Problem set 6