Year 2013-14

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: Thursday 18:30-19.30)

1. Presentation of the subject.

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

2. 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

3. Assessment

Course evaluation will be based on: A) Continuous Evaluation; B) Final Exam. C) Recovery Exam.

A. Continuous evaluation (January-March 2013):

Students need to choose between two types of continuous evaluation:
Track 1: problem sets only.
Track 2: problem sets and seminar participation.

Track 1 of continuous evaluation
Students need to hand in the handwritten solutions to all problem sets, before the deadline (see below the detailed instructions on problem sets). For students in this track, the continuous evaluation counts for up to 10% of the final mark, while the final exam counts for up to 90%.

Track 2 of continuous evaluation
A) Students need to hand in the handwritten solutions to all problem sets, before the deadline (see below the detailed instructions on problem sets). This part counts for 10% of the final mark.
B) Students need to ACTIVELY participate to seminars. This part counts for 25% of the final mark. Please note that just attending the seminar gives no points. It is the participation that matters. See below the explanation of what "Active" participation means.

Therefore, for students in this track, continuous evaluation counts for up to 35% of the final mark, and the final exam counts for up to 65%.

IMPORTANT NOTE:
Students attending less than two seminars are automatically assigned to Track 1, and CANNOT choose Track 2.
Students attending two or more seminars are automatically assigned to Track 2 and CANNOT choose Track 1.

DETAILED INSTRUCTIONS ON PROBLEM SETS, BOTH FOR STUDENTS IN TRACK 1 AND TRACK 2 OF THE CONTINUOUS EVALUATION.

- Solutions to problem sets must be HANDWRITTEN. They have to be scanned and uploaded (in PDF format) in Moodle, in the page of your seminar group.
- The only allowed format is PDF, and it has to be one single file for each problem set. Multiple files submitted as one single zipped file are not allowed.
- Solutions sent by email are not allowed in any circumstance. 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.
- The grades are awarded as follows:
    1. A: Excellent. This grade is given if at least 80% of the answers are correct, or if at least 40% of the answers are correct plus the student shows a good amount of effort in trying to solve all the problems.
    2. B: Sufficient. This grade is given if at least 40% of the answers are correct, or if in any case the student shows a good amount of effort in trying to solve all the problems.
    3. C: Insufficient. This grade is given in all other cases.
- Note on the questions: some questions are denoted as “DIFFICULT”. These are often theoretical questions, and are typically a bit more difficult and different in format than the typical exam question. Please note two things:
    - You still need to solve these questions. But we only require you to try and make some effort, not necessarily to get the answer right.
    - The fact that they are not the typical exam questions, DOES NOT MEAN that they are not useful for the final exam.

DETAILED INSTRUCTION ON THE ACTIVE PARTICIPATION TO SEMINARS, ONLY FOR STUDENTS IN TRACK 2 OF THE CONTINOUS EVALUATION.

A maximum total of 25 points (or 25% of the final mark) is awarded for active class participation according to the following rules:

A maximum of 10 POINTS for solving at least 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.
- To get 10 points you need to correctly solve the problem, need to clearly explain what you are doing, and need to be able to answer questions from the professors and from the other students.
- IMPORTANT: STUDENTS MUST SOLVE PROBLEMS IN THE SEMINARS IN THE SUBGROUP TO WHICH THEY ARE ASSIGNED, OTHERWISE NO POINT WILL BE AWARDED

A maximum of 15 POINTS for active participation in the seminars. Active participation means to:

- Ask meaningful questions
- Answer questions from the professors in a meaningful way
- Correct the solutions of problems or suggest different solution methods
- Volunteer to solve at the blackboard more than once.
- In general participating to the discussion in the seminar class with meaningful interventions.
- IMPORTANT: STUDENTS MUST ACTIVELY PARTICIPATE TO SEMINARS IN THE SUBGROUP TO WHICH THEY ARE ASSIGNED, OTHERWISE NO POINT WILL BE AWARDED. You can only attend the seminars in which you are registered. This is very important. Seminars only work if the right number of people attends them.

B. Final Exam (March 2013):

- The final exam at the end of the quarter will cover all the contents of the course: the material presented in class, the problem sets, and the recommended readings.

- To pass the course a minimum of 4 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).

C. Recovery exam (April 2013):

- You can participate to an extra recovery exam in April if you fail the course (in other words, if your final mark of exam plus continuous evaluation is less than 5 over 10). Please note that the recovery exam is generally more difficult than the normal exam, because students taking it have the advantage of having more time to prepare the topics.

5. Bibliography and teaching resources

5.1. Basic bibliography

Advanced Macroeconomics, by David Romer, 4th 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	Problem set 1, hand in by 27-January at
	Lecture	31-Jan	
	Seminars	27-28 Jan	Discuss Problem set 1
WEEK 5	Lecture	6-Feb	Problem set 2, hand in by 3-February at 12.30
	Lecture	7-Feb	
	Seminars	3-4-Feb	Discuss Problem set 2
WEEK 6	Lecture	13-Feb	Problem set 3, hand in by 10-Feb at 12.30
	Lecture	14-Feb	
	Seminars	10-11 Feb	discuss Problem set 3
WEEK 7	Lecture	20-Feb	Problem set 4, hand in by 17-Feb at 12.30
	Lecture	21-Feb	
	Seminars	17-18 Feb	discuss Problem set 4
WEEK 8	Lecture	27-Feb	
	Lecture	28-Feb	
WEEK 9	Lecture	6-Mar	Problem set 5, hand in by 4-Mar at 12.30
	Lecture	7-Mar	
	Seminars	4-5-Mar	discuss Problem set 5
WEEK 10	Lecture	13-Mar	Problem set 6, hand in by 11-Mar at 12.30
	Lecture	14-Mar	
	Seminars	11-12-Mar	discuss problem set 6