Dynamic Macroeconomic Analysis
— Course description —

Marcel Jansen

Universidad Autónoma de Madrid

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Personal details

**Name:** Marcel Jansen  
**Office:** X-308  
**Email:** marcel.jansen@uam.es  
**Web page:** www.uam.es/marcel.jansen

**Office hours:** *(prior appointment)*  
- Mondays 16:00 - 19:00  
- Tuesdays 11:00 - 14:00
Why dynamic macroeconomics?

Microfoundations

Macroeconomics I & II exploited static models to study the aggregate performance of the economy. The models’ building blocks were aggregates like aggregate consumption, investment or GDP.

However, in real life, decisions are taken by individual agents — consumers, workers, entrepreneurs. These individual decisions have to be the unit of analysis as in microeconomics. The difference is the emphasis on aggregate implications.

Also most relevant decisions involve inter-temporal tradeoffs and so we need models with several periods. This same feature brings to the forefront the role of uncertainty and expectations.

All these elements are part of the workhorse models in macroeconomics (DSGE).
Why dynamic macroeconomics?

The Lucas’ critique

The development of DGSE models with rational expectations have fundamentally changed the way we evaluate the effects of macroeconomic policies.

Traditionally, economists constructed their models using historical data and the effects of a policy change were calculated by changing the value of a policy variable, keeping the decision rules of the agents constant.

But this is obviously incorrect. The introduction of a new policy will change the expectations of the agents and the evaluation of the policy should take into account how this change affect agents’ decisions.

The latter explains why DGSE models are also part of the toolkit of applied economists at policy institutions like central banks.
Macroeconomics and finance

The recent financial crisis has created an interesting debate about the need to incorporate financial intermediation into our workhorse models in macro.

Financial market imperfections are commonly thought to have deepened the crisis. According to many economists they are even among the prime causes.

In this course we cannot address this issue as this requires too sophisticated techniques. In fact we abstract from money. Nonetheless, we will analyze various financial arrangements that improve the welfare of the agents in the model.

- **Risk pooling**: idiosyncratic risks are washed out at the aggregate (law of large numbers) allowing risk sharing;
- **Pension systems**: we’ll identify the conditions under which a pure PAYGO pension scheme generates a Pareto improvement.
A logical stepping-stone towards advanced macroeconomics

The primary objective of the course is to offer a rigorous introduction to dynamic macroeconomics.

Last year, the course emphasized the inter-temporal substitution of consumption and leisure — two mechanisms that play a prime role in modern business cycle theory.

Instead, this year the course will focus primarily on the long-term issue of economic growth.

The course starts out with the analysis of the Solow-Swan growth model and in later themes we construct genuine equilibrium models with overlapping generations and endogenous consumption and savings decisions that yield similar predictions.

As such the course provides a perfect stepping-stone to the advanced courses in macroeconomics.
Course objectives:

Principal objectives
A rigorous introduction to the study of dynamic macroeconomics based on models with micro-foundations.

Specific objetivos
- A primer in growth theory
- An introduction to dynamic optimization in two periods
- A rigorous analysis of OLG models with applications to
  - The theory of real business cycles (RBC)
  - Pension systems (pay-as-you-go vs capitalized systems)
  - The short- and long-run impact of taxation
Course philosophy

- Dynamic macroeconomics is intrinsically difficult, but at all times we try to avoid unnecessary complications.
- The various building blocks of the model are introduced sequentially. First, we consider optimization problems in one- or two-period settings and then we simulate an infinite-horizon economy with the help of an OLG model.
- The emphasis is on the fundamental aspects of inter-temporal decision making such as Euler equations.
- Whenever possible we will try to perform a welfare analysis.
- The course focuses on competitive equilibria with flexible prices.
Course outline

**Part I: Solow model**
Lecture 1. Data
Lecture 2. Solow model

**Part II: Microfoundations**
Lecture 3. Labour-leisure decision in a static setup.
Lecture 4. Consumption and savings decisions in a two-period setting.
Lecture 5. Competitive equilibrium in a two-period model with credit markets.

**Part II: Overlapping Generations**
6. Overlapping generations model with physical capital.

**Part III: Extensions**
7. The persistence of productivity shocks
8. The short- and long run impact of taxes
7. The economic analysis of pension systems
Prerequisites

The course requires a lot of work, but I'll make an effort to explain the basic intuitions and to reduce technicalities to a minimum.

- Basic notions of statistics and math (constrained optimization)
- Microeconomics I and II
- Macroeconomics I and II
The course is based on a self-contained set of slides available on my website. The references below contain the original material:


Additional references are available in the official course program.
Grading

The evaluation is based on a final exam, two mid-term exams and six problem sets. Problem sets are solved in class and have to be handed in at the start of class. Assistance to the problem set sessions is mandatory.

**Problem sets:** Students need to hand in complete solutions to at least 4 problem sets (10% of final grade)

**Mid-term exams:** October 18 and December 13 (30% of final grade)

**Final exam:** (60% of final grade)

The minimum requirements to pass are stated in the course syllabus.
Classes

Regular Classes (theory and problem sets):

- Tuesday 09:00 — 10:45
- Friday 10:45 — 12:00

Complementary activities (controls, tutorials, problem sets)

- Friday 12:30 — 14:00
Rules

1. After the start of classes no one is allowed to enter the class room.

2. Mobile phones have to be switched off at all times.

3. I expect active class participation from all students.

4. Mandatory attendance during problem set sessions.