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)
   Tuesdays 11:00 - 14:00
   Wednesdays 16:00 - 19:00
Why dynamic macroeconomics?

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, entrepeneurs. These individual decisions have to be the unit of analysis as in micro. The difference is the emphasis on aggregate implications.

Second, 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 Dynamic General Stochastic Equilibrium (DGSE) models, the workhorse in macroeconomics.
Why dynamic macroeconomics?

The Lucas’ critique

One field in which these models are very useful is the evaluation 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.
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.

In this course we cannot address this issue as this requires too sophisticated techniques. Nonetheless, you’ll see various examples of 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.

- **Fiat money**: In fact, we’ll analyze a stylized example in which the introduction of fiat money has similar implications.
A logical stepping-stone towards advanced macroeconomics

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

But the essential building blocks of the model serve equally well for a study of long-term growth.

In fact, during the course we study the process of convergence to what is known as a steady state equilibrium. Once the economy reaches this state, it tends to replicate itself over time. This part of the material is almost isomorphic to the analysis of the Solow growth model.

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 dynamic optimization (two periods)
- A first encounter with standard inter-temporal optimization problems
- A rigorous analysis of OLG models with applications to
  - The theory of real business cycles (RBC)
  - The role of money as an asset
  - Pension systems (pay-as-you-go vs capitalized systems)
Course outline

Part I: Microfoundations
1. Labour-leisure decision in a static setup.
2. Consumption and savings decisions in a two-period setting.
3. Competitive equilibrium in a two-period model with credit markets.

Part II: Overlapping Generations
4. Money as an asset.
5. Overlapping generations model with physical capital.

Part III: Topics
5. The persistence of productivity shocks
6. Money as an asset
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.