Macroeconomics I

Introduction

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About the Course

Main Objectives

- Build the "macro" foundation for the upcoming courses.
  - (i) Foundations of dynamic general equilibrium models: equilibrium, optimality, uncertainty.
  - (ii) Intertemporal optimization, and dynamic programming.
  - (iii) "Core" macro models: Neoclassical growth model, Overlapping generations, etc.
- **Not** going to discuss papers on the frontier.

Books and References

(i) **Azzimonti, M., P. Krusell, A. McKay, and T. Mukoyama (and many others), 2024**: *The PhD Macro Book.*

(ii) **Acemoglu, 2009**: *Modern Economic Growth.*

(iii) **Krueger, 2021**: *Macroeconomic Theory.* (Lecture notes)

(iv) **Ljungqvist and Sargent, 2004**: *Recursive Macroeconomic Theory.*

(v) **Stockey and Lucas (with Prescott), 1989**: *Recursive methods in economic dynamics.*

Evaluation

- Problem sets (30%):
  - 6 problem sets. Every student should hand his/her own solution, but you are encouraged to discuss the solutions among yourselves.
- Midterm exam (20%):
  - **Content:** Everything up to dynamic programming. Date: week of May, 14-19 (tentative).
- Final exam (50%):
  - **Content:** Everything. Date: Last week of the quarter.

Computational Exercises

- Some exercises will be solved on the computer.
- **I will not** teach programming.
  - The exercises will not be too complicated, and it is possible to learn by "doing", but it's good to learn the basics before the lists arrive (open the software and perform simple operations).
- You are free to choose your programming language. Some suggestions:
  - MATLAB, Python, R, Julia, Fortran.
- Try to choose a language that suits your needs.
- If you don't know which programming language to use, or where to start, talk to me.
- It's very important that more experienced students help the less experienced ones.
- I'll upload some codes and references to get started.

Methodology in Macroeconomics

What is Macroeconomics?

- The study of aggregate variables:
  - GDP, consumption, savings, investment, government spending.
  - Inflation, unemployment, income, interest rates, wages, etc.
- Stabilization policies of aggregate variables: fiscal policy, monetary policy.
- Economic growth: short and long term.
- What else?

Pre-Lucas Macroeconomics:

- Primitive market of goods and services:
  - Consumption function (aggregate): $C = c_0 + c_1(Y - T)$.
  - Investment function (aggregate): $I = I_0 - bi$.
- Aggregate demand: $Y = C + I + G$.
- IS curve: $Y(1 - c_1) = c_0 - c_1 T + I_0 - bi + G$
  - Primitive parameters determine the aggregate relationships.
  - That is, once we find c_0, c_1, b, etc., we can determine the model's relationship.
  - The parameters are invariant to policy!

Modern Macroeconomics

What is missing?

1. Budget constraints of agents and government?
2. How do agents respond to economic policies?
   - **Example:** What is the effect of a tax cut today? Do households increase consumption?
   - **Example:** What is the effect of an increase in firing costs on firms' hiring decisions?
3. Expectations? Are agents' decisions consistent with their expectations?
4. Agents look to the future when making decisions in the present.
   - **Example:** Does reducing retirement benefits increase or decrease the economy's saving rate?

Modern Macroeconomics

- Modern macroeconomics is centered on individual decisions (not aggregated equations) $\Rightarrow$ Macro is micro.
- The aggregate economy is basically the sum of decisions from all individuals (families, firms, etc.).
  - Brazil: 50+ million families (+200 million individuals).
  - How to aggregate decisions from very different families? Extremely complex problem.
  - To solve this problem, we need to make some (many!) assumptions. Some are first-order.
- We will study models that are built from individual decisions.
- The individual agents will interact in markets $\Rightarrow$ price is the result of these interactions.
  - Primitive parameters are agents' preferences, technology they have access to, their resources, etc.

HPE Macro

- For those interested in History of Economic Thought Macro, two references:
- **De Vroey, 2015**: A History of Macroeconomics from Keynes to Lucas and Beyond.
- **Snowdon and Vane, 2005**: Modern Macroeconomics: Its Origins, Development And Current State.
- I recommend reading if you want to do research in macro!

And the Data?

- Nowadays, economics is extremely empirical.
- **The Credibility Revolution**:
  - Increased availability of data, particularly administrative records.
  - Research Design based on identification strategies. Diff-in-Diff, RDD, IVs, RCT, many others.
- Great impact on micro.
- For obvious reasons, it's much more difficult to apply these strategies in a macro context.
  - Can't do RCTs on monetary policy.
  - General equilibrium effects tend to be very important.
- Traditionally, macro:
  - Relies much more on theory.
  - Used aggregate data (e.g., time series) to motivate/estimate/calibrate models. But this is changing!

And the Data?

TABLE 10
ECONOMETRIC METHODS AND DATA TYPES OVER TIME

	Methods		Data				
Year	Time series	Applied micro	Micro data	Time series	Cross section	Panel	Proprietary
1980	75	25	22	89	8	3	13
1990	62	38	28	70	14	16	32
2000	58	42	28	54	8	38	30
2006–10	46	54	41	42	13	45	41
2016–18	35	65	56	34	10	56	52

Notes: The figures are the shares, expressed as percentages, of econometrics-based articles in the *JME* and *JMCB*, plus the E-designated articles in the five general-interest journals. The method and data attributes are defined in section 3.2. The 2006–10 figures use data from 2006, 2008, and 2010; and the 2016–18 figures use data from 2016, 2017, and 2018.

Source: Glandon et al (2023, JEL): Macroeconomic Research, Present and Past.

And the Data?

- Unfortunately, we won't have time to discuss empirical macro.
- Extremely relevant! Nowadays it's very complicated to write purely theoretical papers.
- High-level science involves a symbiosis between theory and empirical:
  - Theory serves as a filter for data. It organizes your thinking when you're looking at the messy world of data.
  - Data serves to test and reject theories. How useful is a theory that is not consistent with the real world?
- For a good discussion of identification in macro see Nakamura and Steinsson (2018).

The State of Current Macroeconomics

Some *Job Market Papers* from the best PhD programs around the world:

- *The Geography of Unemployment*
- *Leisure-Enhancing Technological Change*
- *Consumption, Savings, and the Distribution of Permanent Income*
- *Market Concentration and the Productivity Slowdown*
- *Networks, Phillips Curves and Monetary Policy*
- *Robot Adoption and Labor Market Dynamics*
- *Monetary Policy and the Redistribution Channel*