# Lecture 1
# Introduction and Overview

---

Macroeconomics EC417

Jane Olmstead-Rumsey

London School of Economics, Fall 2022

# Brief Introductions

**Who am I?**

# Brief Introductions

**Who am I?** When I don't teach I work on:

1. How do innovation and competition among firms affect economic growth?

2. How does the composition of households (occupations, incomes, family) affect employment outcomes and business cycles?

# Brief Introductions

**Who am I?** When I don't teach I work on:

1. How do innovation and competition among firms affect economic growth?

2. How does the composition of households (occupations, incomes, family) affect employment outcomes and business cycles?

**Who are you?** How many did economics undergraduate degree? How many did degree in UK?

# Brief Introductions

**Who am I?** When I don't teach I work on:

1. How do innovation and competition among firms affect economic growth?

2. How does the composition of households (occupations, incomes, family) affect employment outcomes and business cycles?

**Who are you?** How many did economics undergraduate degree? How many did degree in UK?

**Who is Adrien?** PhD student, LSE alum, and class teacher for this course

# We will cover 3 main topics

1. Workhorse of modern macro: neoclassical growth model(6 weeks)
    - = basis for later parts of course
    - tools: dynamic optimization in discrete and continuous time
    - "long-run facts": GDP growth across countries & over time

2. Household heterogeneity (3 weeks)
    - income and wealth distribution
    - household consumption behavior

3. Firm heterogeneity (1 week)
    - firm dynamics, entry, exit and firm-size distribution

# Admin

1. Lectures:
    - Wednesday 9:00-11:00 with 5-minute break in middle
2. Exam: in January, same format as past ones
3. Problem sets:
    - one most weeks, 7 or 8 in total
    - handed out on Wed, due before classes on following Tuesday
4. Office hours: Mondays, 9-10am, 32LIF 1.12 (use Student Hub)
5. Textbook? Unfortunately none. For intuition: Kurlat (2020). More math: Indicated chapters of Acemoglu (2007).
6. Anything else?

# What is macro?

Study of aggregates

- GDP, unemployment, inflation etc.
- as opposed to single markets, household, firms

Study *dynamics* of these variables

What makes macro different from many other fields in economics?

- presence of general equilibrium
    - exactly because we have questions about aggregates
    - need to account for how individual decisions affect one another
- poses a methodological challenge

# Macroeconomics

A separate field since at least Keynes (1930s)

"*For although the amount of his own saving is unlikely to have any significant influence on his own income, the reactions of the amount of his consumption on the incomes of others makes it impossible for all individuals simultaneously to save any given sums. Every such attempt to save more by reducing consumption will so affect incomes that the attempt necessarily defeats itself.*"

J.M.Keynes

- but ideas can easily be traced back farther

"*What is prudence in the conduct of every private family can scarce be folly in that of a great Kingdom.*"

A. Smith

# Macroeconomic sub-fields

Conceptually divided into two sub-fields

- long-run growth
- short-run business cycles

# Macroeconomic sub-fields

Do we care more about growth or business cycles (Lucas, 1987)?

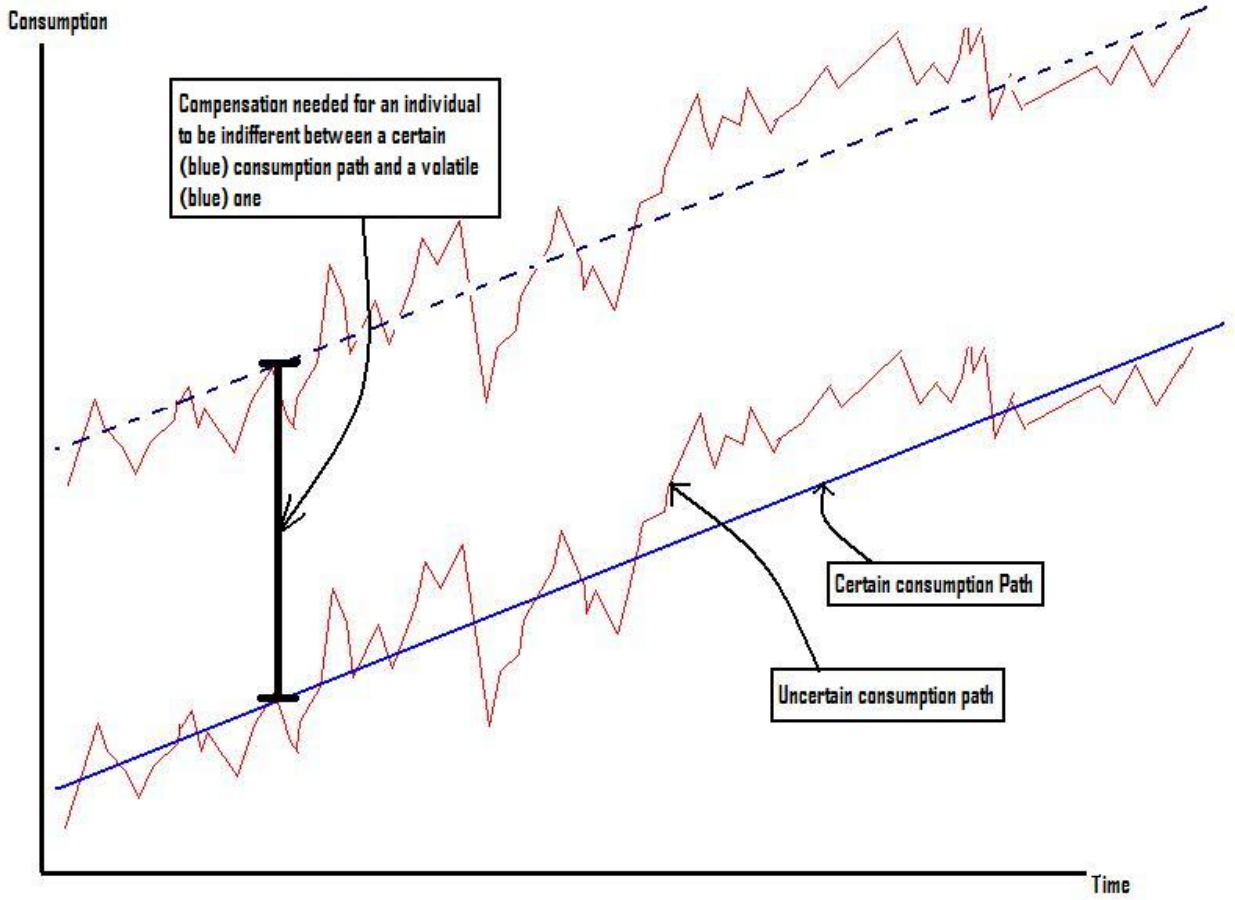
- suppose consumption evolves according to $c_t = Ae^{\mu t}e^{-1/2\sigma^2}\epsilon_t$
  - $\mu$ is average growth rate of consumption
  - $\ln \epsilon_t \sim N(0, \sigma^2)$, s.t. $\mathbb{E}[e^{-1/2\sigma^2}\epsilon_t] = 1$ and so $\mathbb{E}[c_t] = Ae^{\mu t}$

How much consumption would you be willing to pay

- to get rid of all business cycle fluctuations?

$$\mathbb{E}\sum_{t=0}^{\infty}\beta^t U\left(Ae^{\mu t}e^{-1/2\sigma^2}\epsilon_t\right) = \sum_{t=0}^{\infty}\beta^t U\left((1-\lambda)Ae^{\mu t}\right)$$

# Graphical Intuition




Source: `https://en.wikipedia.org/wiki/Welfare_cost_of_business_cycles`

Note: volatile path is shown in red, not blue as top figure label says

# Macroeconomic sub-fields

Assume log-utility $U(c) = \ln c$

$$\mathbb{E}\sum_{t=0}^{\infty}\beta^t[\ln \epsilon_t - 1/2\sigma^2] = \sum_{t=0}^{\infty}\beta^t \ln(1-\lambda)$$

$$\lambda \approx 1/2\sigma^2$$

So what are realistic estimates of $\sigma$?

$$\lambda \approx 0.00005$$

Estimated costs of business cycles of 0.005% of consumption!

- $\rightarrow$ forget about business cycles!
- changing growth, $\mu$, by a tiny amount is much better!

# Macroeconomic sub-fields

Of course things might not be so simple

$$\mathbb{E}\sum_{t=0}^{\infty}\beta^t U\left(Ae^{\mu t}e^{-1/2\sigma^2}\epsilon_t\right) = \sum_{t=0}^{\infty}\beta^t U\left((1-\lambda)Ae^{\mu t}\right)$$

1. Households may have different preferences $(U(c), \beta)$
2. Rep household assumption may be problematic
   - recession is not time when everyone's $c$ falls by 5%
   - instead, if consumption of 5% of people falls by 100%...
3. Perhaps there is an interaction of business cycles and growth
4. Stabilizing around average may be wrong thought experiment
5. ... see Kurlat Chap. 12.3 for good discussion of other reasons

- Either way, this term we will focus on long run issues
  - though tools we'll learn also applicable to short-run issues

# Another possible distinction between...

Representative agent vs Heterogeneous agent models

- rep agent models assume
  - all agents (e.g. firms/households) are "the same"
  - ... or that decision rules aggregate (Gorman agg, homotheticity,...)
  - ... or that some version of welfare theorems hold
  - 1st part of course
- het agent models have either
  - ex-ante or ex-post different households/firms
  - tougher, but more and more popular recently
  - 2nd part of course

# Why Macro with Heterogeneity? (2nd part)

- Approach: study macro questions in terms of distributions of micro variables rather than just aggregates
- Attractive for two reasons
  - conceptually: integrated approach to macro and distribution
  - empirically: integrated approach to micro and macro data

# Questions that require thinking about heterogeneity

1. What are the macro consequences of rising income and wealth inequality?
2. What are the redistributive and welfare effects of changes in the income tax code?
3. How is the size of fiscal multipliers affected by household heterogeneity?
4. What is the optimal degree of tax progressivity? Or the optimal quantity of government debt?
5. Does monetary policy have significant effects on the income and wealth distribution? Through which channels?
6. Are the macro effects of fiscal and monetary policy affected by the presence of nontrivial heterogeneity?

# Why heterogeneous agent models?

If you want to ask policy questions about whole economy, you will typically need a macro model (at least think through one)

- policy question = question about counterfactuals
- GE effects/spillovers typically key – think Keynesian cross
- estimates identified off macro variation hard to come by
- estimates identified off cross-sectional var in micro data (DiD, RCTs) silent on GE effects/spillovers ("missing intercept")
- (Robert) Lucas Critique: these estimates anyway depend on current policy

# Why should you be interested in this?

- ... apart from questions on previous slide being important...
- Fertile area of research, excellent research topics!
- Many open questions
- Economics is becoming more empirical, macro no exception

# Warning: you'll get your hands dirty

1. with micro data
2. with numerical solution of models using the computer

# Warning: you'll get your hands dirty

1. with micro data
2. with numerical solution of models using the computer

Simple rationale:

- part of modern (macro)economists' toolkit
- pencil-and-paper-only will severely limit your options
- just look at successful PhD job market papers of last five years

# Warning: you'll get your hands dirty

1. with micro data
2. with numerical solution of models using the computer

Simple rationale:

- part of modern (macro)economists' toolkit
- pencil-and-paper-only will severely limit your options
- just look at successful PhD job market papers of last five years

Reflected in problem sets for later parts:

- data work w Survey of Consumer Finances (SCF)
- numerical dynamic programming
- solve het agent model compare to SCF data

# Plan for rest of today

Move on to lecture notes 2

- the workhorse of modern macro: the growth model
- dynamic optimization in discrete time