Intermediate Macroeconomics

Econ 4021, Washington University in St. Louis

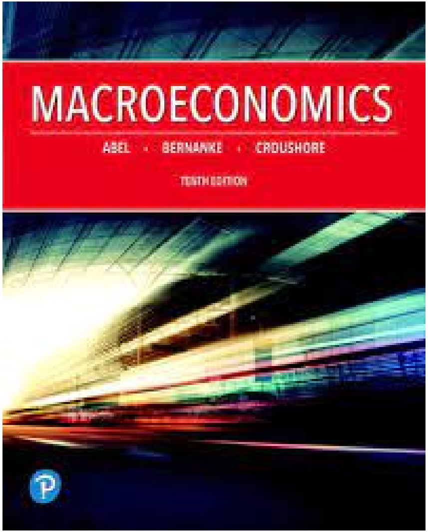
Miguel Faria-e-Castro
Federal Reserve Bank of St. Louis

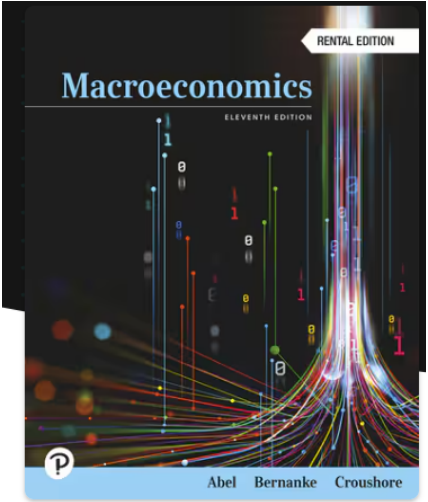
January 2025

This Course: Essential Info

- Econ 4021, Intermediate Macroeconomic Theory
- Lectures: Mondays and Wednesdays, 4:00-5:20pm, McMillan G052
- 27 lectures, including this one, one review class, and two in-class midterm exams
- **Assistants in Instruction**: Alejandro Gonzalez & Yudong Rao
- **Textbook**: *Macroeconomics, 11th Edition* (Abel, Bernanke & Croushore), Pearson

Textbook: very low resolution pictures of the cover





This Course: Essential Info

- **Grading**: 10 homeworks (approximately weekly) + 2 midterms

$$\text{Grade} = 0.6 \times \text{Homeworks} + 0.4 \times \text{Midterms}$$

  - Homeworks cover roughly one chapter of the book
  - Assigned on Wednesdays, due the following Wednesday at 4:00 PM
  - First homework drops on January 22
  - Collaboration allowed, but individual submissions required
- **Midterms**
  - Scheduled for March 5 and April 23 (closed-book, calculators only)
  - Location: in-class, 16:00-17:20
  - Let me know at least a week before if you cannot make it

This Course: Essential Info

- **Office Hours**
  - Alejandro: Thursday 2-3pm, Seigle 374, `alejandro.g@wustl.edu`
  - Yudong: Friday 1:45-2:45pm, Seigle 372 `rao.y@wustl.edu`
  - Miguel: by appointment, `fmiguel@wustl.edu`
- **Prerequisites**
  - Econ 1021 and Econ 4011
  - I assume you are familiar with elementary algebra and differential calculus
  - It may be a plus if you are familiar with:
    - Basic statistics
    - Optimization
- All of this info (and more) in the syllabus available on Canvas

Course Plan

1. Measurement (Chs. 1, 2)
2. Theory (Chs. 4, 5, 6, 7) - Midterm 1
   - Productivity, Output, and Employment
   - Consumption, Saving, and Investment
   - Growth
   - Assets, Money, and Prices
3. Analysis (Chs. 8, 9, 10, 11, 12, 14, 15) - Midterm 2
   - Business Cycles
   - A general macro model
   - Classical analysis
   - Keynesian analysis
   - Unemployment and inflation
   - Monetary policy
   - Fiscal policy

Learning Objectives

By the end of this course you should (I hope):

1. Have a good grasp of what the main macroeconomic aggregates are and how they are measured
   - i.e., GDP, inflation, government spending, interest rates, labor force participation
2. Understand the meaning of changes in those aggregates
   - i.e., "real GDP grew by an annualized 3% this quarter", "year-on-year inflation was 5.4% last month", "labor force participation fell to an historic low of 61% during the COVID-19 pandemic"
3. Critically evaluate macroeconomic issues using real-world data
4. Apply macroeconomic models to interpret and understand how the economy responds to shocks and policies
   - What are the effects of government stimulus checks on the inflation rate?
   - Does it make sense for the Fed to raise rates right now?
   - What does this imply for output growth?

Learning Objectives

By the end of this course you should be able to understand what is going on in this figure, from a Deutsche Bank market research report that explains why inflation picked up after the COVID-19 pandemic

Figure 1: Present equilibrium is slightly deflationary - the supply curve has shifted and become vertical but the demand curve has shifted more

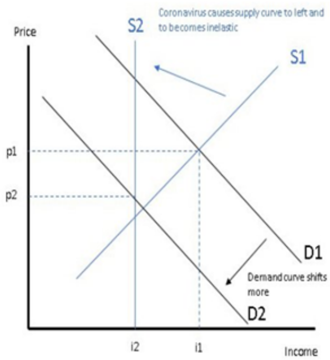
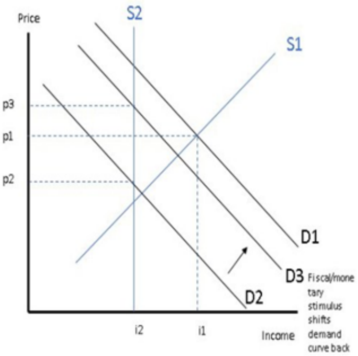


Figure 2: But fiscal and monetary stimulus will shift demand curve back towards pre coronavirus position, pushing up prices



Resources

- Wall Street Journal, Financial Times, Bloomberg News
- FRED: `https://fred.stlouisfed.org/`
- OECD: `https://data.oecd.org/`
- Eurostat: `https://ec.europa.eu/eurostat`
- Penn World Table: `https://www.rug.nl/ggdc/productivity/pwt/?lang=en`

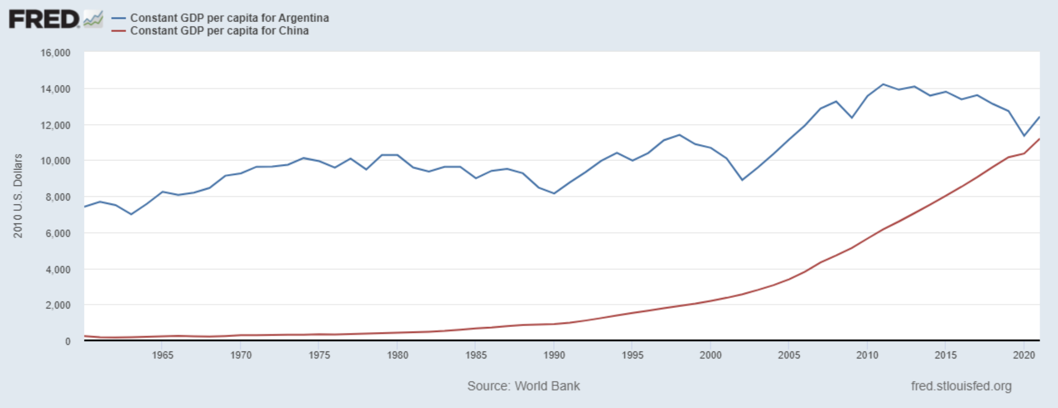
What is Macroeconomics?

$$\text{Economics} \simeq \text{Microeconomics} + \text{Macroeconomics}$$

- Why $\simeq$ instead of $=$?
  - Economics includes some fields and areas of study that are hard to classify
  - Macroeconomics increasingly overlaps with microeconomics
- Textbook definition: "the study of the structure and performance of national economies and of the policies that governments use to try to affect economic performance"
- Classical definition: macroeconomics encompasses the study of growth (long-run) and fluctuations (short and medium-run) of aggregate economies
- Easier to define it based on the questions it tries to answer:

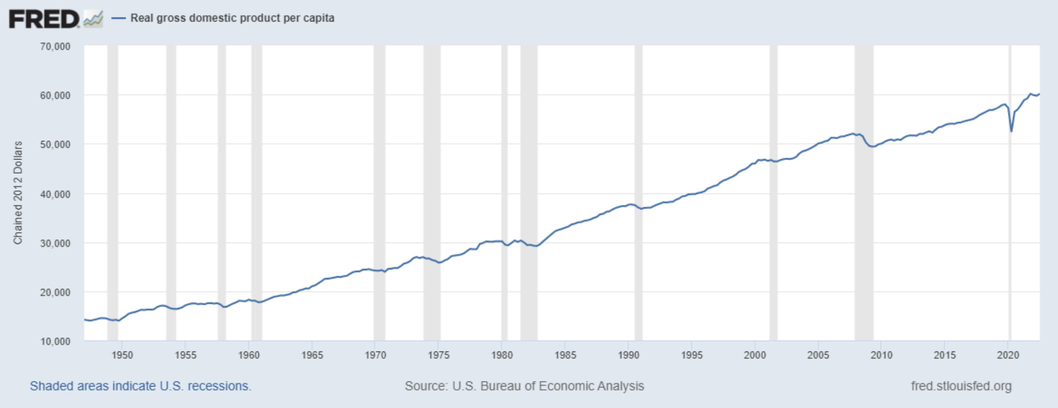
Why do some countries grow so fast?

...while others stagnate?



Why do economies experience business cycles?

...and what determines their length and intensity?



Real gross domestic product per capita

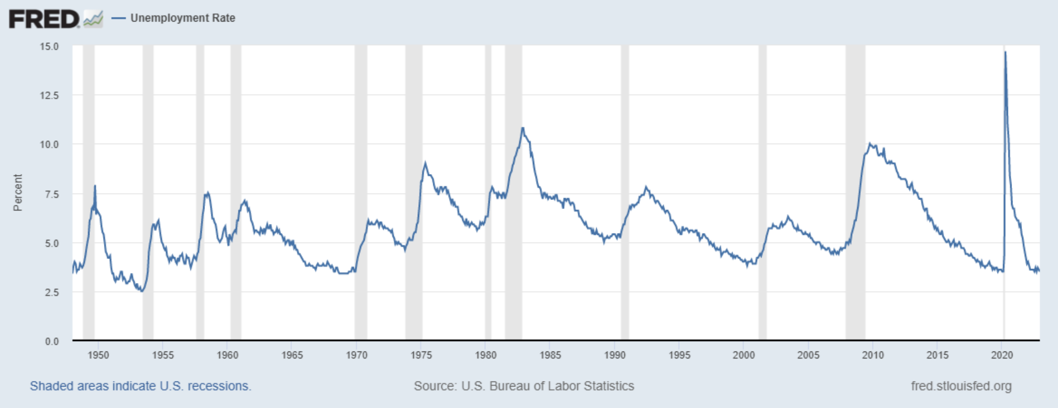
$$y_t = \frac{P_t Y_t}{P_{2012} N_t}$$

where

- P_t = price level in year t
- Y_t = real GDP in year t
- $P_t \times Y_t$ = nominal GDP in year t
- P_{2012} = price level in 2012
- N_t = population in year t
- Measure of domestic production per person that is comparable over time, as it adjusts for changes in the price level.

Why are there unemployed people?

...even during expansions?



Unemployment Rate

$$u_t = \frac{U_t}{N_t} = \frac{U_t}{U_t + E_t}$$

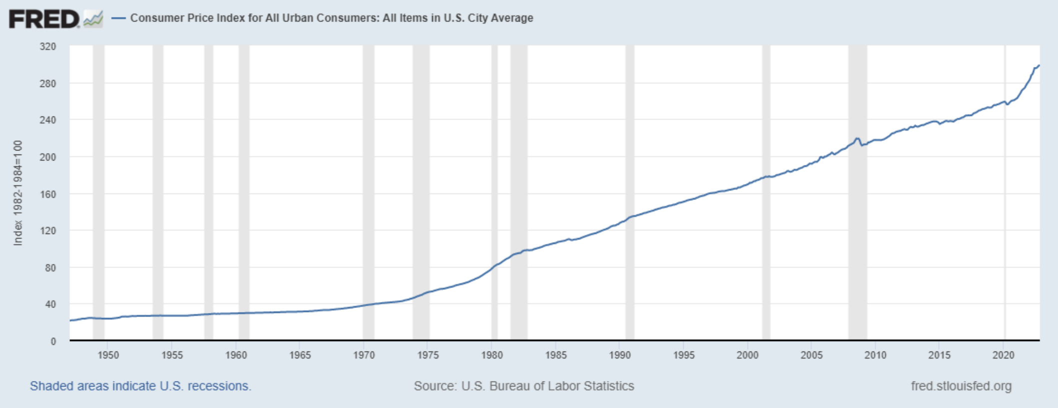
where

- U_t = number of unemployed people, people who are looking for a job and don't have one
- E_t = number of employed people
- $U_t + E_t$ = **labor force**, total number of people who want to work
- Not everyone is in the labor force: children, retirees, military, full-time students, people not looking for a job, etc.
- Labor force participation rate:

$$LFPR_t = \frac{\text{Labor Force}_t}{\text{Population}_t}$$

Why do prices rise?

...and do they ever go down?



Consumer Price Index

$$P_t = \sum_{i=1} \omega_i P_{it}$$

where

- P_{it} = price of good i in period t
- ω_i = consumption weight of good i
- ω_i does not depend on t: allows us to compare the general price level of a fixed set of goods over time (in practice it is a bit more complicated than that!)

Inflation (month on month)

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Inflation (year on year)

$$\pi_t^{yoy} = \frac{P_t - P_{t-12}}{P_{t-12}}$$

Can the government do anything about inflation and unemployment?

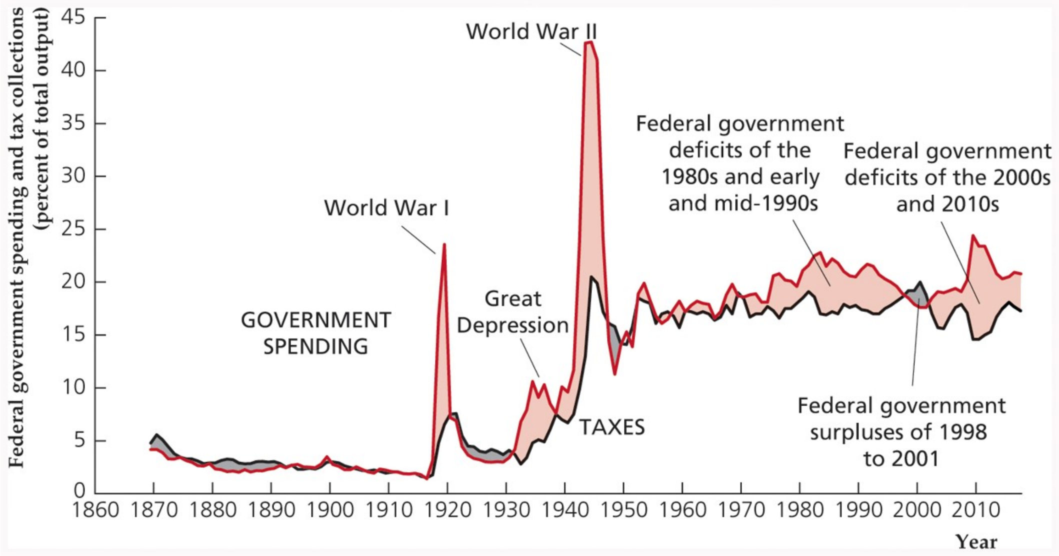
Fiscal Policy

- Relates to government spending, taxation, and the national debt
- Determined by the federal government, as well as state and local governments

Monetary Policy

- Relates to the money supply and interest rates
- Determined by the central bank
- The central bank of the United States is the Federal Reserve System (Fed)

US Government Spending and Revenue



Aggregation

- Aggregation underpins the key difference between microeconomics and macroeconomics
- Microeconomists traditionally study the individual decisions of economic agents, and in the equilibrium of individual markets
- Macroeconomics studies the aggregate effects of all such decisions, and how different markets are interconnected

Aggregation

- We will often talk about "aggregate output" or "aggregate consumption"

$$C_t = \sum_{i=1}^{N} c_{it}$$

- Aggregate consumption is the sum of individual consumption by all agents i in the economy

$$c_{it} = \sum_{j=1}^{J} c_{jit}$$

- Individual consumption of agent i is the sum of consumption in all products and services j

What do macroeconomists do?

- Analysis
  - Private sector: financial institutions, consulting companies, technology companies, other large corporations, etc.
  - Public sector: Congressional Budget Office, White House Council of Economic Advisors, Federal Reserve, World Bank, International Monetary Fund, etc.
- Data development: Bureau of Economic Analysis, Bureau of Labor Statistics, Bureau of the Census, etc.
- Forecasting both in the public and private sectors
- Research
  - Universities
  - Policy institutions
  - Think tanks

Positive vs. Normative Economics

Key distinction in economics, source of much disagreement among different schools of thought

- **Positive economics** (or descriptive) tries to describe reality as it is, developing and testing statements about the economy that are objective and verifiable
  - What are the effects of a tax cut on output?
  - What determines the demand for healthcare services?
  - What are the effects of a rise in interest rates on inflation?
  - Does a change in tariffs affect imports?
- **Normative economics** is based on prescriptive statements, developing statements that cannot be tested as they depend on someone's opinion
  - Should the government cut taxes?
  - Should the government provide free healthcare to all citizens?
  - Should the Fed raise interest rates?
  - Should the US impose tariffs on China?

Disagreement in Macro

Important schools of thought:

- Classicals: focus on long-run equilibrium and self-correcting markets.
- Keynesians: emphasize market failures and frictions that affect equilibrium in the short-run, rationale for government intervention
- Neoclassical Synthesis: combines elements of both, Keynesian in the short-run and Classical in the long-run $\Rightarrow$ <u>approach followed in this course</u>
- Heterodox: include Marxian, Austrian, Modern Monetary Theory (MMT), etc.