

Macroeconomics A, EI056

Class 1

Introduction to macroeconomics

Cédric Tille

September 19, 2023

What you will get from today class

- Presentation of the course, and some logistics.
- What is macroeconomics about?
 - Some stylized facts: business cycles, inflation, financial markets.
 - Is policy intervention needed?
- How has macroeconomics evolved?
 - What are the current challenges?

Purpose of the course

- First of the two-course macroeconomics MIS sequence.
- Focus on major issues in a closed economy setting.
 - Open economy considerations taken in the spring.
 - Electives macro courses focus on selected issues (e.g. financial crises).
- Two aims, with a mix of intuition and tools.
 - Gain an overview of the main issues in macroeconomics.
 - Become familiar with the standard analytical tools (dry, but necessary).

The logistics

- Instructor: Cédric Tille, cedric.tille@graduateinstitute.ch
 - Office hours: Tuesday, 16:00-17:30 (email me if you need to meet at another time). **DO** make use of the office hours.
- Assistant: Greg Auclair, allan.auclair@graduateinstitute.ch, weekly review session.
- Before each course documents are posted on the Moodle course page:
 - Slides.
 - Technical appendixes as needed. For your reference, you **don't** need to go through it in details.
 - Quiz for self-evaluation of economic intuition, with answers posted shortly after.
 - Short problems for self-evaluation, focused on technical derivations to get you used to them in preparation of problem sets.

- Two problem sets, focused on technical aspects. Each counts for 15 % of the grade.
 - First given on October 3, due on October 17.
 - Second given on November 14, due on November 28.
 - You can work in groups of up to 3-4 people. But each person submits their own answers sheet, indicating also the names of the other members of the group.
- One midterm exam and one final exam, focused on intuition (with some light technicalities). Each counts for 35 % of the grade.
 - Midterm exam on October 31.
 - Final exam on December 19, with question - answer session before.

Adjustment of time slots

- To limit overlaps of problem sets and exams among micro / macro / econometrics, we moved the schedule around.

Microeconomics, Pr. Cédric Tille. Slot (unless indicated otherwise): Tuesday 10:15-12:00 room P2-S4
 Microeconomics, Pr. Yuan Zi. Slot (unless indicated otherwise): Thursday, 10:15-12:00 room P2-S4
 Econometrics, Pr. Julia Cajal Grossi. Slot (unless indicated otherwise): Monday 10:15-12:00 room P2-S3

	Week of	Monday	Tuesday	Wednesday	Thursday	Friday
1	Sept 18 - 22	Econometrics class 1	Macro class 1		Micro class 1	
2	Sept 25 - 29	Econometrics class 2	Macro class 2		Micro class 2	
3	Oct 2 - 6	Econometrics class 3	Macro class 3 Macro problem set 1 given		Micro class 3	
4	Oct 9 - 13	Econometrics class 4	Macro class 4		Micro class 4	
5	Oct 16 - 20	Econometrics class 5	Macro class 5 Macro problem set 1 due		Micro class 5	
6	Oct 23 - 27	Macro class 6 (econometrics class time slot)	Micro midterm exam (macro time slot)		Econometrics midterm exam (12:15-12:00 or 12:15-14:00)	
7	Oct 30 - Nov 3	Econometrics class 6	Macro midterm exam		Micro class 6	
8	Nov 6 - 10	Macro class 7 (econometrics class time slot)	Econometrics class 7 (macro time slot)		Micro class 7	
9	Nov 13 - 17	Econometrics class 8	Macro class 8 Macro problem set 2 given		Micro class 8	
10	Nov 20 - 24	Econometrics class 9	Macro class 9		Micro class 9	
11	Nov 27 - Dec 1	Econometrics class 10	Macro class 10 Macro problem set 2 due		Micro class 10	
12	Dec 4 - 8	Econometrics class 11	Macro class 11		Micro class 11	
13	Dec 11 - 15	Macro class 12 (econometrics class time slot)	Micro final exam (macro time slot)		Econometrics final exam (12:15-12:00 or 12:15-14:00)	
14	Dec 18 - 22	Econometrics class 12	Macro final exam		Micro class 12	

Plan of the course

- Simple models to get insights. Keynesian IS-LM & AS-AD model, and rule-based policy (Sept. 26, Oct. 3).
- Building the workhorse dynamic model.
 - Investment and growth (Oct. 10).
 - Intertemporal choice, volatility (Oct. 17-23).
 - Frictions and monetary policy (Nov. 6).
 - Heterogeneous agents, overlapping generation (OLG) (Nov. 14).
- Fiscal policy (Nov. 21).
- Money, inflation, and financial intermediaries (Nov. 28, Dec. 5).
- Labor market (Dec. 11).

WHAT IS MACRO ABOUT?

Aggregate - general equilibrium - dynamics

- **Entire economy**, instead of some consumers or firms (micro).
- Why? Many major questions are aggregate:
 - Output: long run growth, business cycles, crises.
 - Inflation, i.e. the increase in the overall price level.
- What is the role of **policy** – fiscal, monetary and financial?
- **General equilibrium**: how do agents and markets interact?
 - What is good in partial equilibrium can be bad in general equilibrium.
- **Dynamic analysis**: trade-offs between today vs. tomorrow (t subscripts, instead of i subscripts).
- **Expectations**: agents understand the model and the policies → adjust their behavior.

The proper use of models and data

- Models help us understand how the economy works: **exogenous** factors (fluctuations in demand) affect **endogenous** variables (growth and inflation).
- **No** model is absolutely right or wrong. It imposes discipline on the analysis, and clarifies the mechanisms.
 - Get the essential dimensions without being lost in secondary points.
 - **Never** use a model designed for an environment (business cycle with prices being set) in another one (long run growth).
- Confront models predictions to the empirical evidence.
- Macroeconomics is not so much about forecasting crises, but about knowing what to do when they happen.
 - Simple models can be enough to gain key insights.

SOME STYLIZED FACTS : GROWTH

National accounting: GDP

- Production of the economy in a given period (quarter, year).
- **Nominal** GDP: value of production. The various components can be added.
- **Real** GDP: volume (quantity). The components cannot literally be added (investment and consumption are different goods).
 - The data most often provide growth contributions (e.g. investment alone would have led GDP to grow by 1%) that can be added.
- Price **deflator**: ratio of nominal to real. The price at which the country “sells” its output. The price of consumption is (mostly) equal to the consumer price index.

Decomposing GDP

- **Expenditure** approach (nominal and real). What do we do with the GDP (Y) produced?
 - Private consumption (C), government consumption (G), investment (I) to produce capital, inventory accumulation (inv), net exports (NX):

$$Y = C + G + I + inv + NX$$

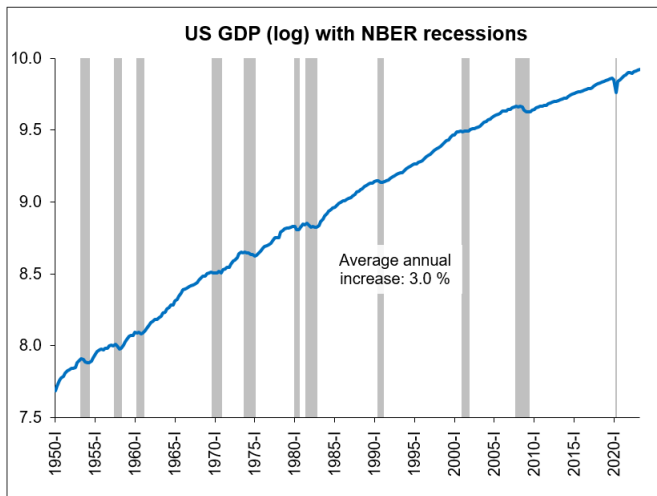
- **Inputs** approach (real). What inputs do we use to produce GDP?
 - Labor (L), capital services (K), productivity reflecting how good we are at using capital and labor (total factor or multifactor productivity).
- **Income** approach (nominal). Who gets paid to produce GDP?
 - Wages, corporate profits, income of non-corporate business, taxes and subsidies, depreciation (consumption of capital).
- **Sectoral** approach. Which sectors contribute to GDP (nominal and real)?

Trend growth and business cycles

- GDP grows (3 % per year since 1950 in the U.S.).
- The process is not smooth, with a succession of **recessions** and **booms**.
- What is a recession?
 - Technical definition: two consecutive quarters of negative growth (not very useful).
 - Broader (and better) definition: sustained decline in activity with rising unemployment. “Calling” the recession entails some judgment (NBER committee in the U.S.).
- Recessions lead to inefficiently low use of factors of production, i.e. unemployment.

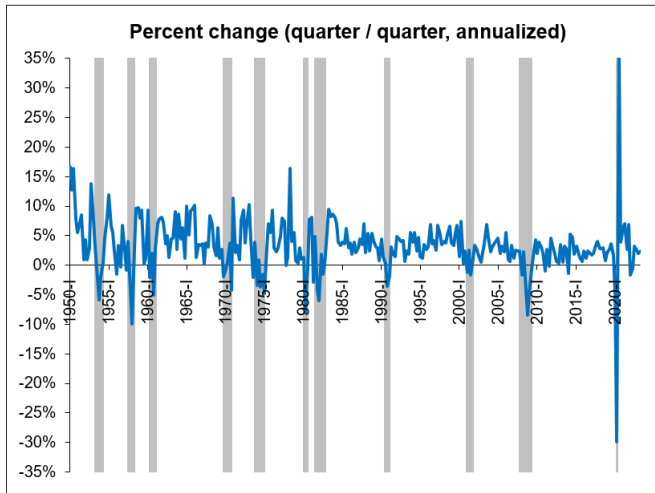
Uneven growth

- Express in logs, to think in percentage terms.



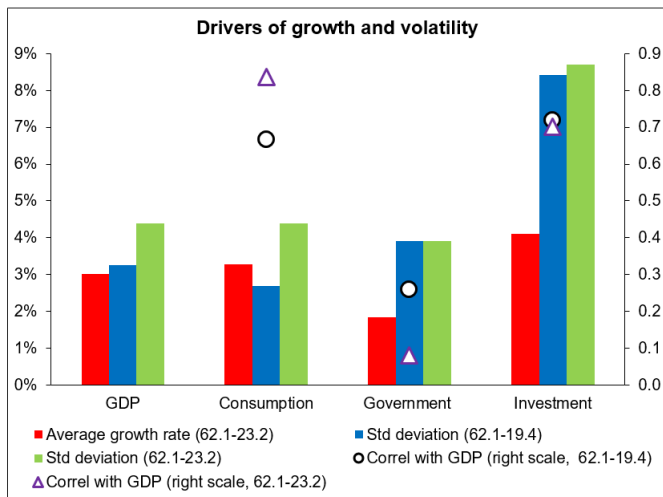
In terms of growth rates

- Change from one quarter to the next.



Investment is the most volatile component

- Average growth, volatility, and correlation with overall GDP growth.



Looking from the production side

- GDP (Y_t) from a **production function** using labor (L_t), capital (K_t), and productivity (A_t , total / multi factor productivity).
- Standard specification is the **Cobb-Douglas**, with $\alpha \in (0, 1)$ share of labor in production (empirically around 2/3).

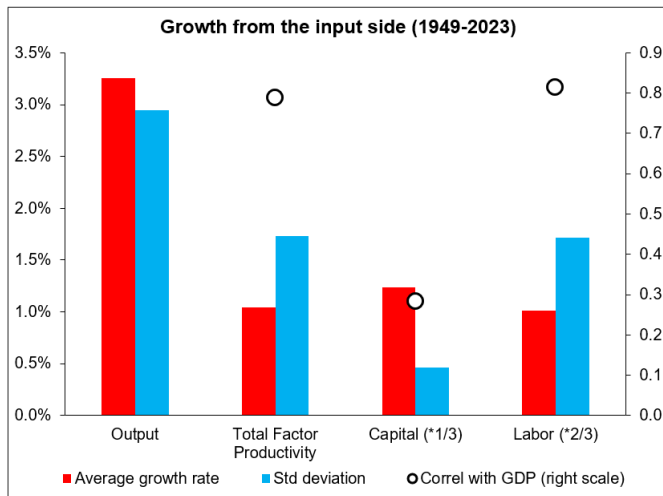
$$Y_t = A_t (K_t)^{1-\alpha} (L_t)^\alpha$$

- More inputs lead to more GDP, but...
 - **Constant** returns to scale **overall**: multiply labor **and** capital by $c \implies$ multiply output by c also: $A_t (c \cdot K_t)^{1-\alpha} (c \cdot L_t)^\alpha = c \cdot Y_t$. No loss of momentum in the long run.
 - **Decreasing** returns for **each** input: multiply labor **only** by $c \implies$ multiply output by less than c : $A_t (K_t)^{1-\alpha} (c \cdot L_t)^\alpha < c \cdot Y_t$.
- Split growth rate of GDP, $g(Y_t)$, across growth rates of inputs:

$$g(Y_t) = g(A_t) + (1 - \alpha)g(K_t) + \alpha g(L_t)$$

Which factors move most?

- Labor and productivity are similarly volatile and pro-cyclical.

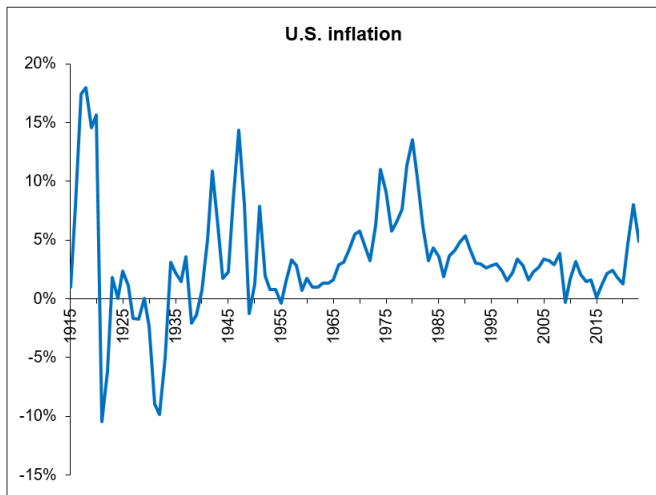


SOME STYLIZED FACTS : INFLATION, MONEY, FINANCE

- Inflation: increase in the **aggregate price** level (not a movement of the relative prices of different goods).
- Volatile until 1945, but zero on average (periods in inflation and deflation).
- Positive on average since 1945, high in the 1970's.
- Less volatile over the last 20 years (as GDP growth, the “great moderation”).
- Sharp increase in 2022, gradually coming down.

Inflation

- Contrasted phases of trend and volatility.



- **Quantity theory**: long-run inflation reflects the **money quantity**: more money chasing a given amount of goods.

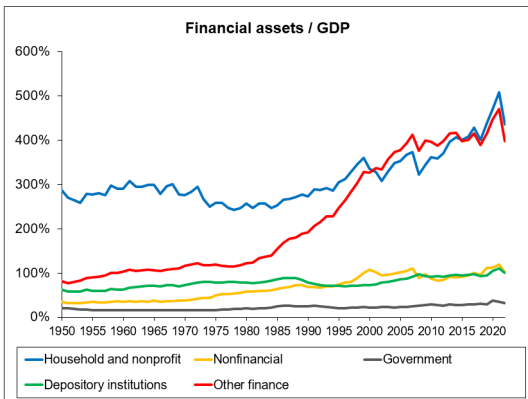
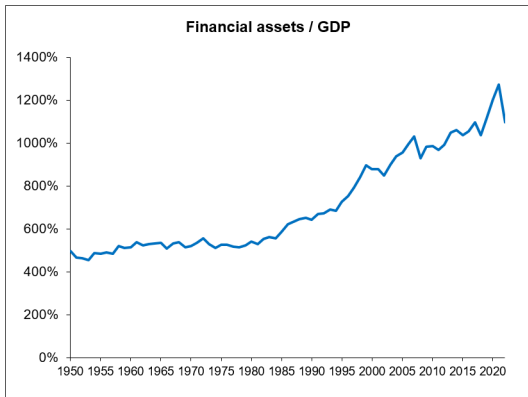
$$PY = MV$$

- Accounting identity: view nominal GDP as price (P) x quantity (Y), or through the associated transactions, quantity of money (M) x speed (**velocity**) of circulation (V).
- Higher M leads to higher P **only if** Y and V are constant. But V can fall in a financial crisis.
- Inflation and money move broadly in step, but not since 2008 as velocity has dropped.

The rising financial sector

- **Financial deepening** since the 1980s: higher value of financial wealth (cash, bonds, stocks) relative to GDP.
 - Rise in asset prices, financial innovation which has increased the ability to issue assets backed by real wealth (mortgage finance).
 - Financial sector matters for macroeconomics: financial crises have real effects.
 - Boom-bust moves in assets prices, such as house prices.
- Financial intermediation is all about **information** issues, to make sure that the borrower will repay (monitoring and/or collateral).
- Information problems can lead to **panics**.
- **Collateral** prices (e.g. housing) affect economic activity (the “balance sheet” channel of monetary policy).

- Size of financial holdings (% GDP).



DO WE NEED POLICY?

What should policy do, and how?

- GDP moves may reflect volatile fundamentals. **Efficient** cycles: if productivity goes down, don't waste time producing (real business cycle).
 - Policy should focus on ensuring efficiency (e.g. limit monopoly powers).
- **Frictions** in adjustment (“sticky” instead of flexible prices) make fluctuations inefficient: GDP does not move as it should.
 - Policy should **limit inefficient movements** of activity (but not necessarily movements per se).
- Beware of **expectations**. If policy can boost output, can it **systematically** do so?
 - If policy **always** tries to boost GDP, agents understand it.
 - Expectations change, agents adjust (**Lucas critique**), this affects the effectiveness of policy.
- Phillips curve: can some inflation reduce unemployment?
 - Yes for a while, but not systematically once the agents adjust.
 - Need for **rule-based** policy.

Macro policy: monetary and fiscal

- Central banks set a short term interest rate. Real activity affected by **real interest rate** (nominal interest rate minus expected inflation):
$$r_{t+1}^{\text{ex ante}} = i_{t+1} - \pi_{t+1}^e.$$
 - Central banks have reduced the interest rate i_{t+1} a lot since 2008.
 - “Zero-lower bound” problem as i_{t+1} cannot be negative (much).
 - Alternative policies: quantitative easing (large balance sheets), forward guidance to raise expectations π_{t+1}^e .
- Fiscal policy (tax and spending) is another tool.
 - Limited use before the crisis. **Ricardian equivalence**: if we temporarily cut taxes but agents save the money, GDP does not change.
 - Sizable use in the beginning of the crisis. Effective, but led to higher public debts.

HOW HAS MACRO EVOLVED?

- Before the Great Depression (1929-1936):
 - **Monetary** theory: long-run neutrality of money. Debate between gold or silver standard.
 - **Business cycle** theory: descriptive approach of fluctuations. Several key ingredients, lack of formalism limits progress.
 - Regular financial crises and panics, creation of central banks as lenders of last resort.
- Great Depression: **persistent** underutilisation of productive factors can happen.
- Keynes: integrated **general equilibrium** approach across markets (goods, labor, financial).
 - **Static** simultaneous determination of variables (formalized in the IS – LM framework).
 - Effect of policies, but abstracts from expectations.
 - Macro refocuses on demand management (e.g. exploiting the Phillips curve).

Rational expectations and its impact

- Empirical breakdown of the Phillips curve in the 1970's (high inflation + unemployment: stagflation),
 - Rational endogenous expectations. Correlation in the data is not structural, policy may not be able to exploit it.
- **Micro-foundations**: macroeconomic model based on agents' optimization, instead of ad-hoc rules.
 - How far can we get without frictions (Real Business Cycles).
 - New Keynesian: micro-founded models (dynamic stochastic general equilibrium - **DSGE** - models) with imperfections (sticky prices).
- In the 1980's-2000's: policy with modeling of expectations.
 - **Inflation targeting** (inflation around 2 %) as the main long run goal. Respond to recessions in the short run.
 - Labor markets frictions (efficiency wages) to explain persistent high unemployment.
 - Financial market frictions: **financial accelerator** that amplifies cycles.

- **Financial market frictions** had been wrongly set aside before.
 - Abstraction from non-linear events such as banking panics.
 - “Mathiness”: excessive emphasis on technical bells and whistles at the expense of insights.
- (Re) emergence of pathologies.
 - **Liquidity trap**: interest rates stuck at zero.
 - Persistent weakness of demand, “secular stagnation”.
- Other policies needed when monetary policy is running out of options.

Recent developments and challenges

- Models with **financial frictions** and role for financial stability policy.
 - Earlier literature focused on firms, more recent considers frictions for households and financial intermediaries.
 - Crises with self-fulfilling expectations.
- Models with **heterogeneous** agents, some cannot access financial markets.
- Unorthodox policy toolkit in presence of the zero lower bound.
 - Quantitative easing: increase of the money supply.
 - Forward guidance: management and steering of expectations.
- Combining policies. **Fiscal policy** especially powerful when interest rates are low.
- Covid: sectoral heterogeneity with some sectors shut down.
Demand-Supply classification subtle.
- The return of **inflation** and supply shocks since 2021.