INTERMEDIATE MACROECONOMICS

1 - INTRODUCTION & DEFINITIONS

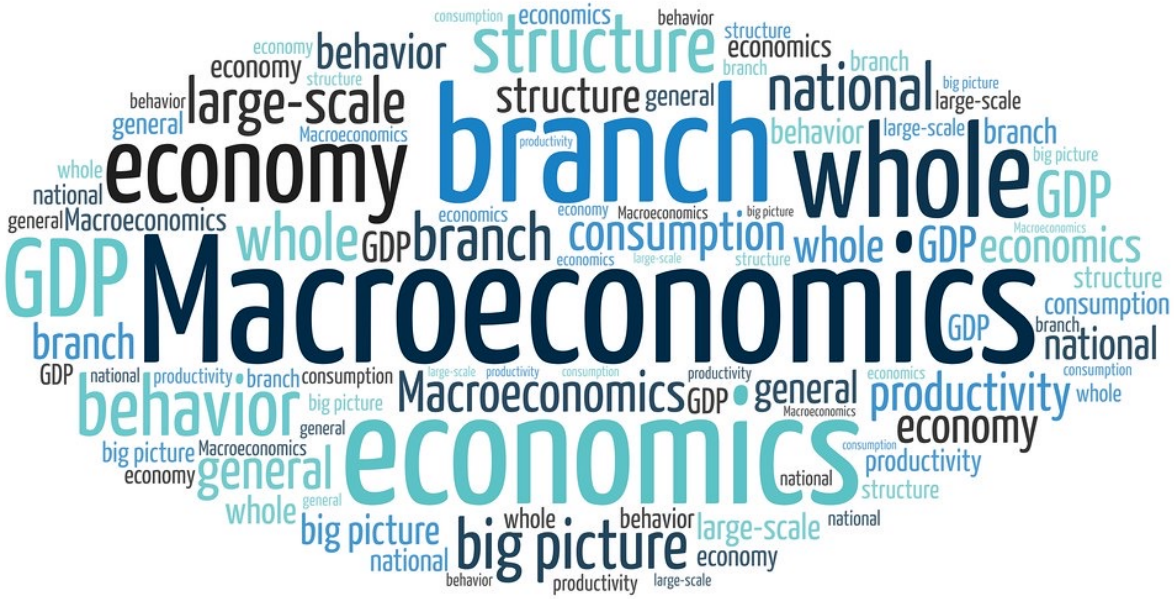
University of Massachusetts Amherst

Write down 3 things you remember from Tuesday's class

(If you weren't here on Tuesday, name 3 things that come to your mind when you think "Macroeconomics")

1 – Introduction & Definitions

- What is macroeconomics?
- What is it for?
- How do we measure and monitor the economy?



Section 1: The roadmap

1. What is Macroeconomics?
2. Measuring aggregate output.
3. Measuring the labor market.
4. Measuring inflation.
5. Okun's law & the Phillips Curve

Section 1: The main ideas

- Macro studies the economy as a whole and focuses on some key aggregate variables.
- Real GDP measures aggregate production.
- Unemployment rate = share of workforce that can't find a job.
- Inflation is the rate at which prices increase.
- There tends to be systematic relations between these 3 variables (Okun's law & Phillips curve).

1.1 WHAT IS MACROECONOMICS?

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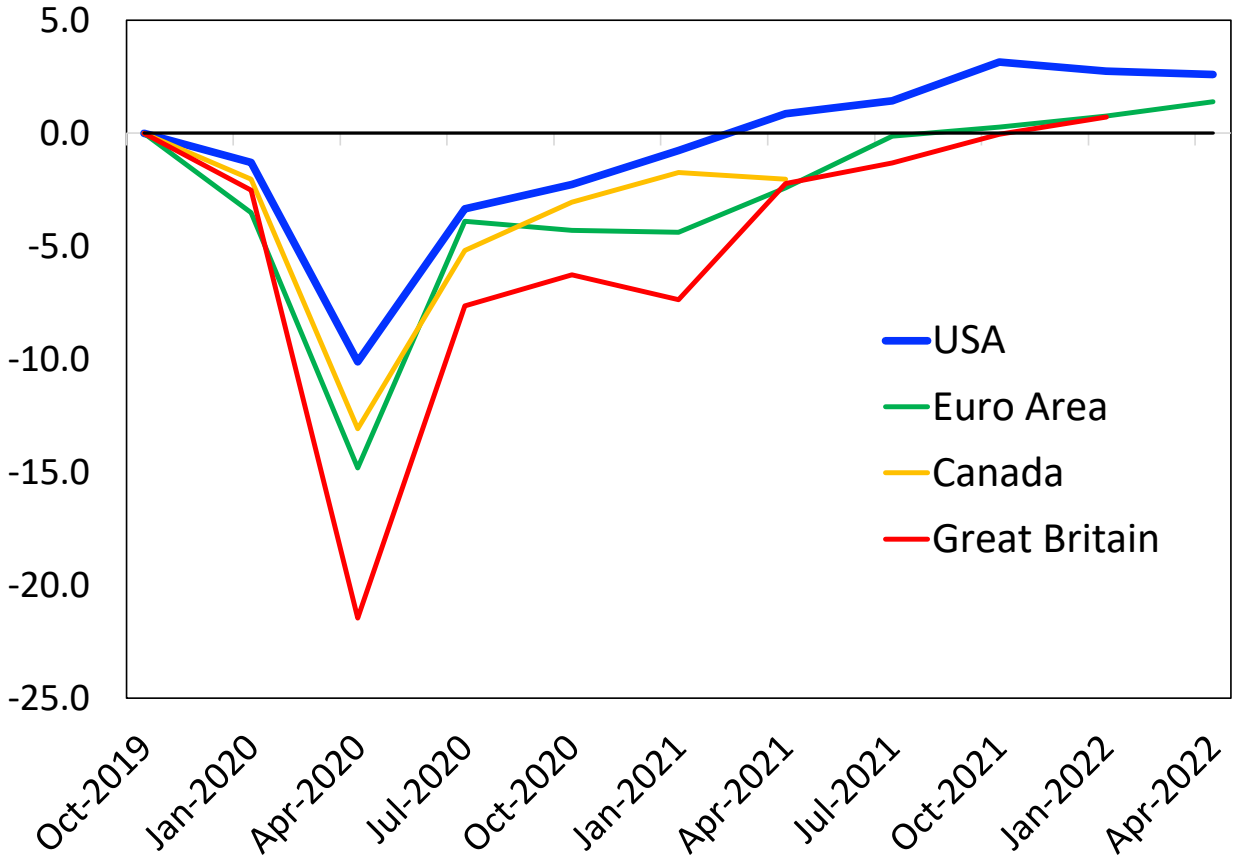
Instructor: Daniele Girardi

What is Macroeconomics?

- *Macroeconomics* studies the behavior of the economy taken as a whole.
- It tries to explain the evolution of some key *aggregate* variables that describe the state of the economy.
  - ✓ output (GDP).
  - ✓ employment and unemployment.
  - ✓ wages.
  - ✓ inflation.
  - ✓ interest rates.

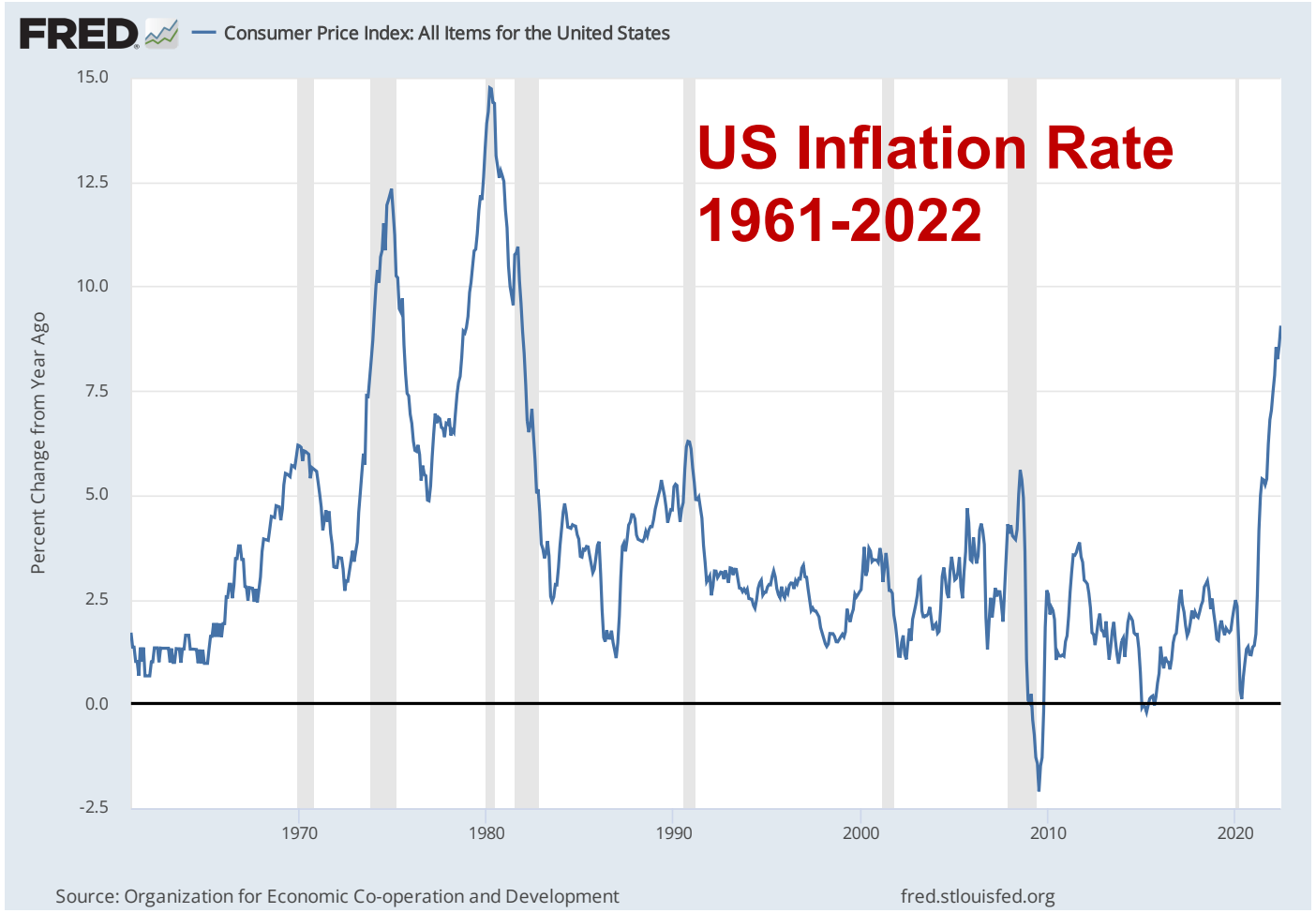
Facts that we would like Macro to explain

The US economy has done better than other rich economies during the Covid-19 pandemics.

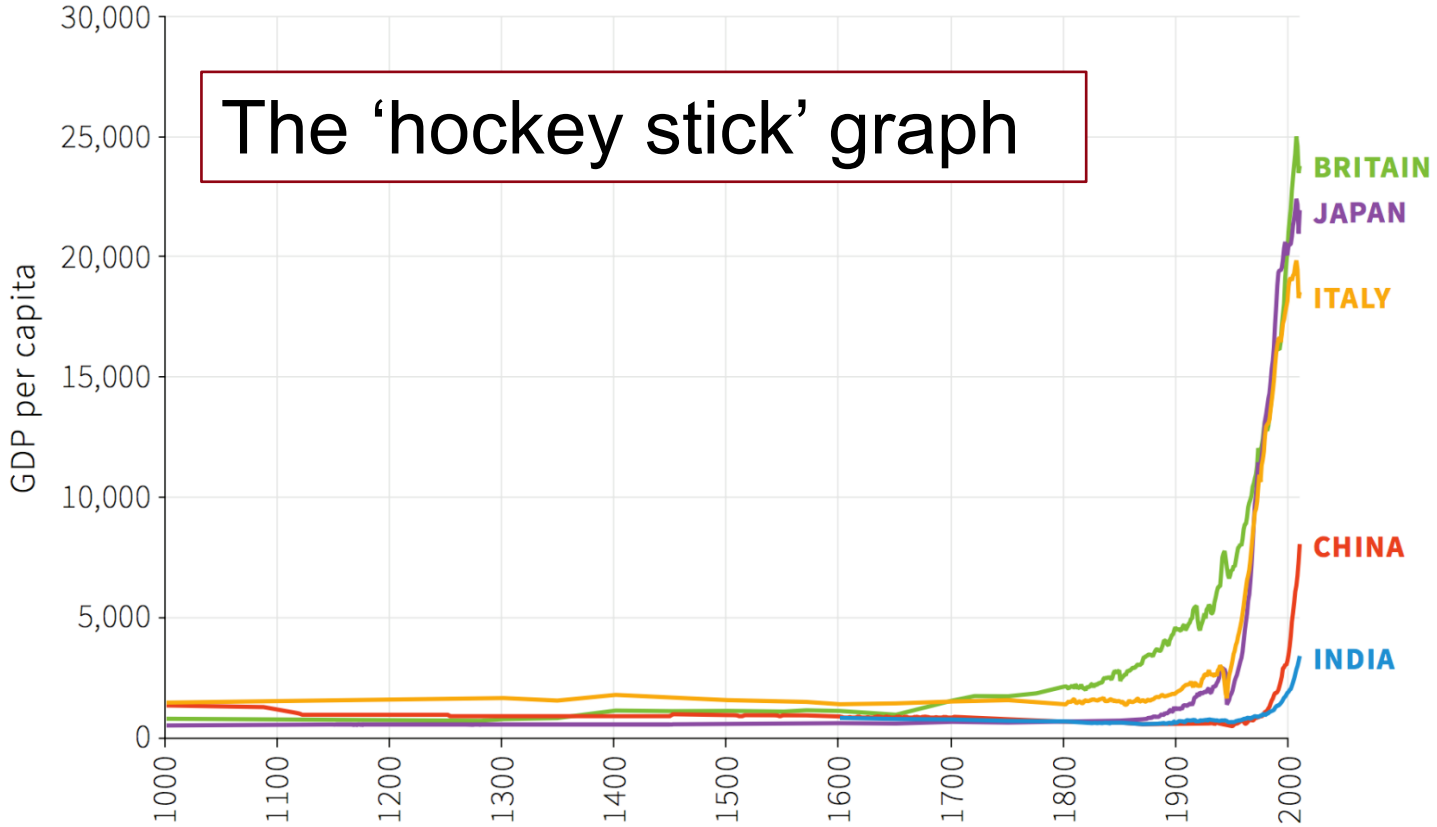


Facts that we would like Macro to explain

Inflation is making a comeback.



What this course will *not* attempt to explain.

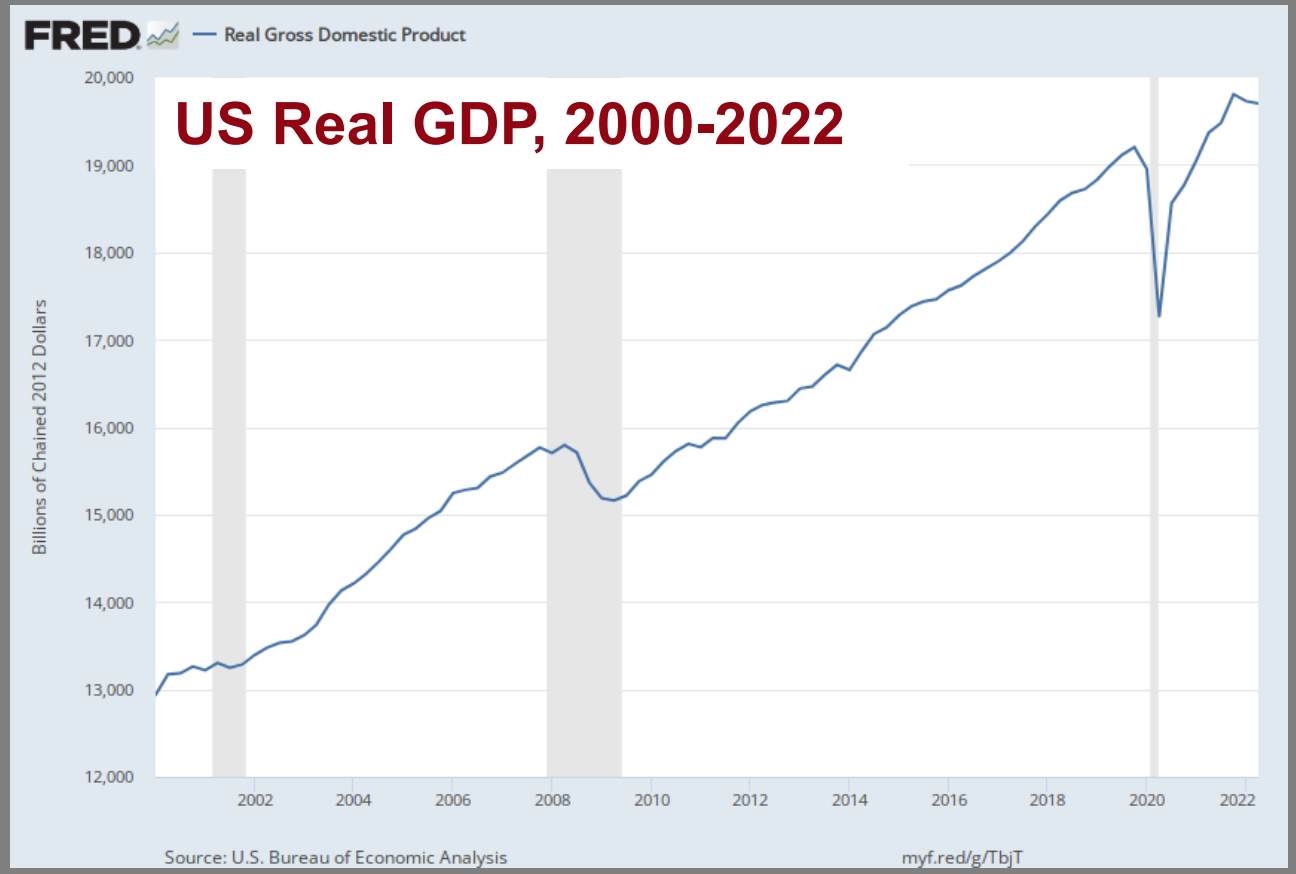


- Emergence of capitalism.
- Industrial revolution.
- Structural change (from agrarian to industrial).
- We will take for granted an industrialized market economy.

What do macroeconomists do?

- *Private sector*: help firms or banks assess the macroeconomic context and what it means for them.
- *Government or international institutions:* make macroeconomic forecasts, help design & evaluate macroeconomic policies.
- *Academia*: research & teaching.

1.2 MEASURING AGGREGATE OUTPUT



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GDP: A measure of aggregate output

- Gross domestic product (GDP).
- Calculated since 1948
    - National Income and Product Accounts (NIPA)
- How would *you* define aggregate output in the economy?

An economy with just 2 firms:

Steel Company (Firm 1)			Car Company (Firm 2)		
Revenues from sales		$100	Revenues from sales		$200
Expenses		$80	Expenses		$170
Wages	$80		Wages	$70	
			Steel purchases	$100	
Profit		$20	Profit		$30

- How do we sum up quantities of different goods?
- Is GDP the sum of values of all goods produced ($300)?
- Or just the value of cars ($200)?
- Steel = *intermediate* good, Car = *final* good.

Three equivalent definitions of GDP:

1. The value of final goods and services produced in the economy during a given period.
2. The sum of value added in the economy during a given period.
3. The sum of all incomes earned in the economy during a given period.

1. GDP is the value of final goods and services produced in the economy during a given period.

- We want to count only *final* goods, not intermediate goods.
- GDP in the steel & car economy is just the value of cars ($200)

⇢ production-side GDP is $200.

2. GDP is the sum of value added in the economy during a given period.

- The value added (VA) by each firm equals:

$$value\ of\ final\ production\ -\ value\ of\ intermediate\ goods\ used\ up$$

- Steel company VA: $\$100$
- Car company VA: $\$200\ -\$100 = 100\$$
- Aggregate VA: $\text{Steel company}\ VA\ +\ Car\ company\ VA\ =\ \$200$

⇢ Value added-based GDP is $200.

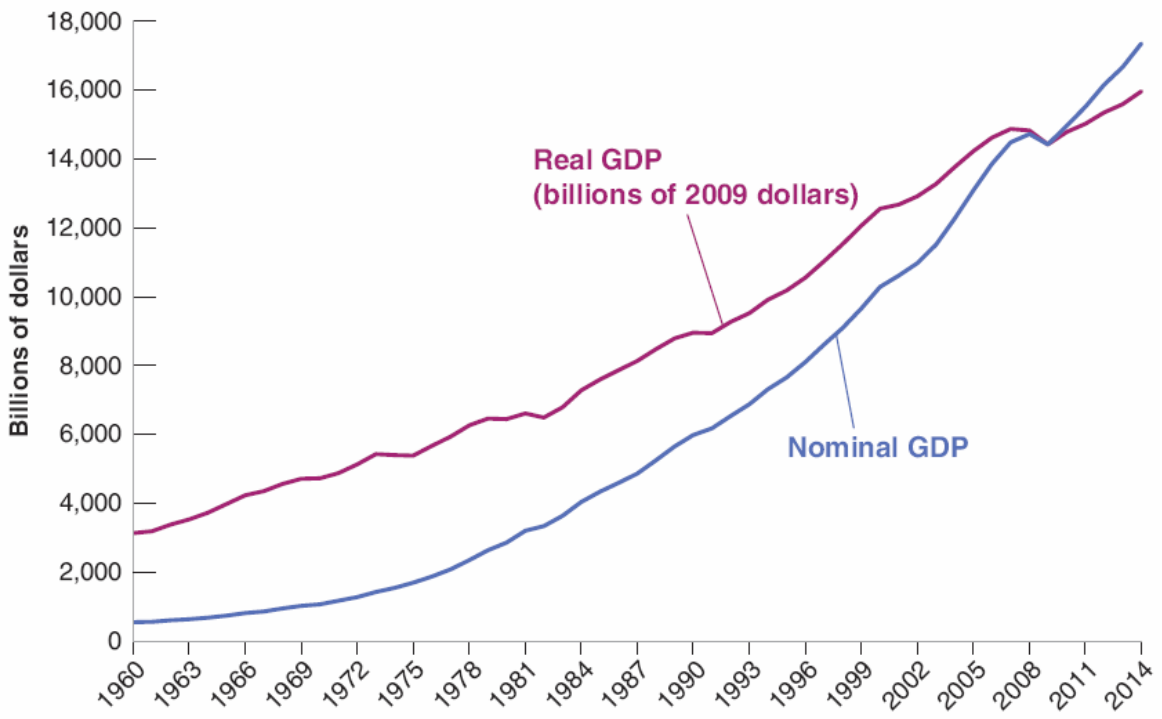
3. GDP is the sum of all incomes earned in the economy during a given period.

- In the two-firms example:

labor income ($150) + *profit* income ($50) = tot. income ($200).

⇢ GDP from the income side is $200.

Nominal GDP and Real GDP



- Nominal GDP:
  quantities produced x *current* prices.
- But prices can change over time!
- Real GDP:
  quantities produced x *constant* prices.

Nominal GDP and Real GDP

Example: Real and Nominal GDP in a one-good economy

Year	Quantity of Cars	Price of Cars	Nominal GDP	Real GDP (in 2009 dollars)
2008	10	$20,000	$200,000	$240,000
2009	12	$24,000	$288,000	$288,000
2010	13	$26,000	$338,000	$312,000

Nominal GDP and Real GDP

With many goods?

- Can still use the prices of a given year as weights.
  - Real GDP in 2009$ dollars
  - Real GDP in 2010$ dollars
  - Real GDP in 2011$ dollars
  - ….

Nominal GDP and Real GDP

- Example: an economy producing wine & potatoes.
- Your turn! Calculate:
  1. Nominal GDP growth
  2. Real GDP growth in Year 0 dollars
  3. Real GDP growth in Year 1 dollars.

Nominal GDP in Year 0 and in Year 1.

	Year 0		
	Quantity	$ Price	$ Value
Potatoes (pounds)	10	1	10
Wine (bottles),	5	2	10
Nominal GDP			20
	Year 1		
	Quantity	$ Price	$ Value
Potatoes (pounds)	15	1	15
Wine (bottles),	5	3	15
Nominal GDP			30

Clicker questions

What is nominal GDP growth in the 'wine & potatoes' economy?

A. 10% C. 25%
B. 20% **D. 50%**

What is real GDP grov

A. 10% **C. 25%**
B. 20% D. 50%

- Problem: Real GDP *and real GDP growth* depend on the year chosen.
- Solution: Chained Real GDP.

What is real GDP growth in constant year 1 dollars?

A. 10% C. 25%
B. 20% D. 50%

Chained Real GDP

Computed in 4 steps:

1. Compute Real GDP growth between two years in two ways:
   a. Using prices from year *t* as the set of common prices
   b. Using prices from year *t+1* as the set of common prices
2. Real GDP growth between *t* and *t+1* = average of (a) and (b)
3. Build a real GDP index:
   a. set it equal to 100 in a base year;
   b. then apply the growth rates of step 2 to obtain values for the other years.
4. Multiply this index by nominal GDP in the *base year.*

→ Chained Real GDP still depends on the base year, *but its growth rate doesn't*

Chained Real GDP in the 'wine & potatoes' economy

Your turn!

Calculate Chained Real GDP for the wine & potatoes economy.

Use year 0 as the base year.

Nominal GDP in Year 0 and in Year 1.

	Year 0		
	Quantity	$ Price	$ Value
Potatoes (pounds)	10	1	10
Wine (bottles),	5	2	10
Nominal GDP			20
	Year 1		
	Quantity	$ Price	$ Value
Potatoes (pounds)	15	1	15
Wine (bottles),	5	3	15
Nominal GDP			30

Clicker question

What is *Chained Real GDP growth* in the 'wine & potatoes' economy?

A. 15.8%

B. 22.5%

C. 25.5%

D. 40.0%

Clicker question

What is *Chained Real GDP growth* in the 'wine & potatoes' economy?

A. 15.8%

B. 22.5%

C. 25.5%

D. 40.0%

Real GDP and quality improvements

- How about changes in the *quality* of goods?
- Principle of *Hedonic pricing*
  - treat goods as providing a collection of characteristics/services.
- Keeping price fixed, a quality improvement means you get more 'services' at the same price.
- So we can treat a quality improvement as a decrease in the unit price (of the services/characteristics that the good provides).

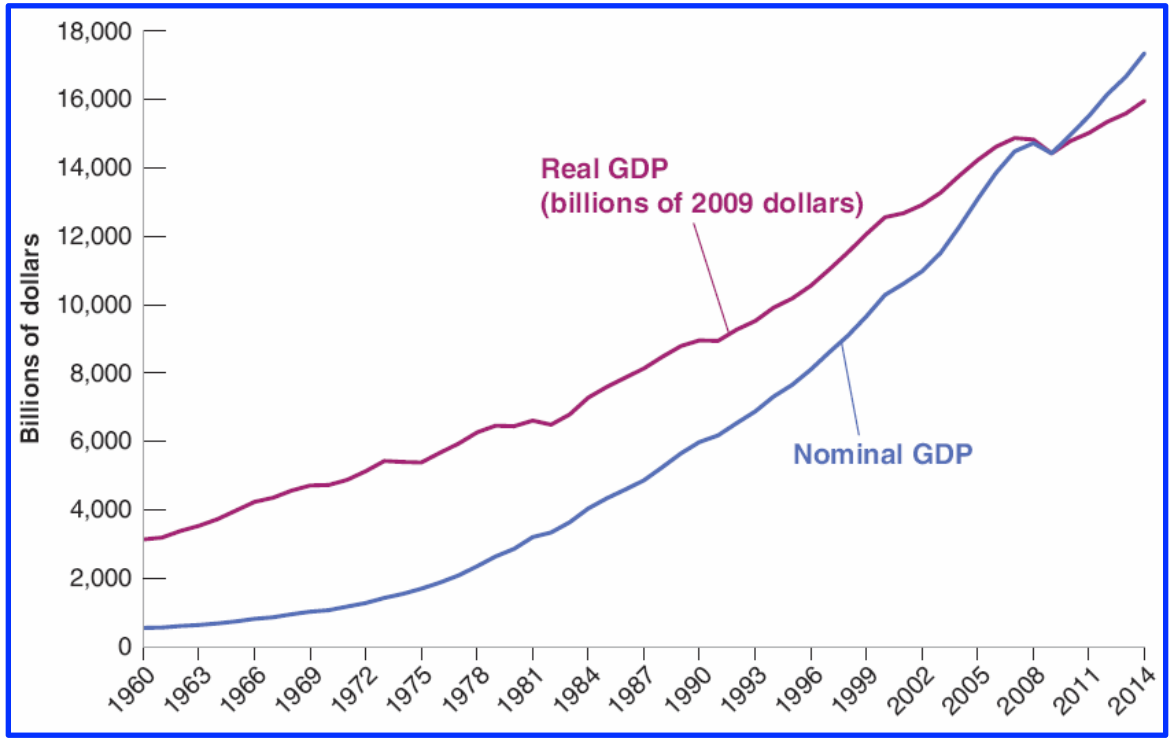
Real GDP and quality improvements: the case of laptops

- Quality of new laptops increased by 18% a year since 1995.
- Dollar price of typical laptop declined by about 7% a year.

⇢ laptops' quality-adjusted price has fallen at an average rate of 18% + 7% = 25% per year.

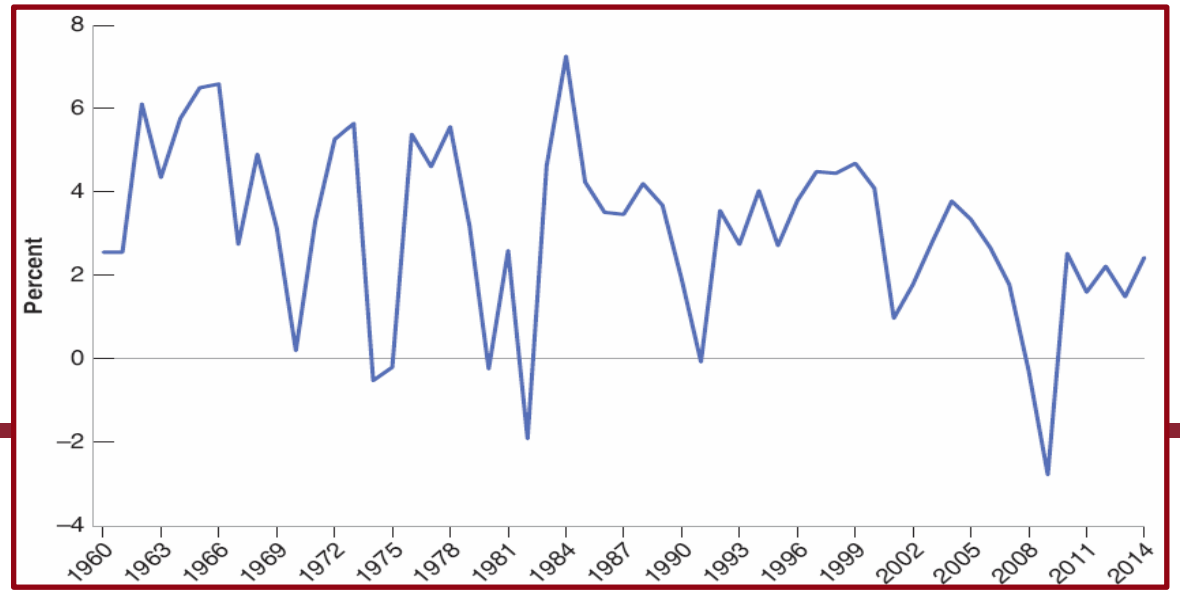
Previously on Econ 204…

- A brief tour of the US economy and its recent dynamics.
- What is Macroeconomics and what it focuses on.
- Measuring aggregate output: GDP
  - Definitions of GDP
  - Real vs. Nominal GDP
  - Chained Real GDP



Nominal and Real US GDP (*level*)

Yearly *growth rate* of Real US GDP



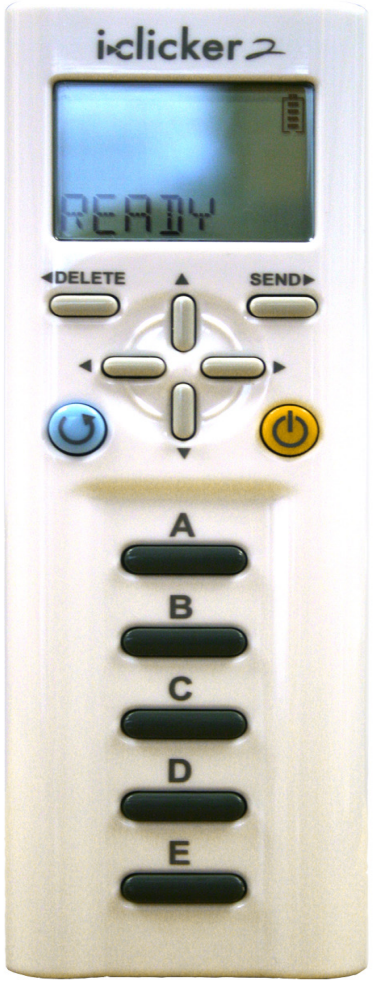
Get your iClicker working

- Press the start button
- It should say "ECON 204"
  - ➢ If it doesn't, try to change frequency: press the start button for some seconds and then write AA.

1st Clicker question

Does your clicker work?

A. Yes
B. Yeah!



Clicker question

Which of the following is *not* a correct definition of GDP?

A. The value of final goods and services produced in the economy.

B. The sum of value added by all firms in the economy.

C. The sum of the profits obtained by all firms in the economy.

D. The sum of all incomes earned in the economy.

1.3 MEASURING THE LABOR MARKET

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Measuring the labor market: The key numbers

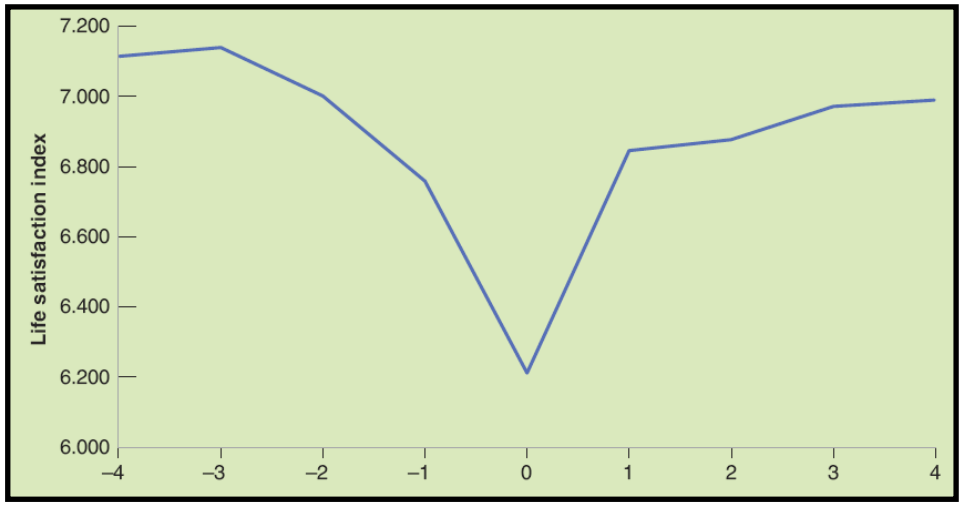
- Employment (N).
- Unemployment (U).
- Labor force (L = N + U).
- Working-age population (Pop).

Measuring the labor market: The key rates

- Unemployment rate $= \frac{unemployment}{labor\ force}$
  - $u = \frac{U}{L}$
- Employment rate $= \frac{employment}{working\text{-}age\ population}$
- Participation rate $= \frac{labor\ force}{working\text{-}age\ population}$

Why we care about unemployment?

- Unemployment generates poverty and unhappiness.
- Unemployment is a waste of economic potential.



- Too low unemployment can also cause problems.
  - Labor shortages → shortages of goods/inflation.
  - Workers' bargaining power may become so strong that firms stop making profits.

How do we actually measure unemployment?

- Surveys of households.
- In the US: The Current Population Survey (CPS)
  - 60,000 US households interviewed each month.
- Unemployed = does not have a job *and* has been looking for a job in the last four weeks.

Shortcomings of the unemployment rate

- It usually underestimates unemployment.
  - *discouraged* workers.
  - *underemployment*.
    - …and the problem gets worse in bad times.
- Does not tell good jobs from bad jobs.
- Bottom line: look at a broader set of indicators!

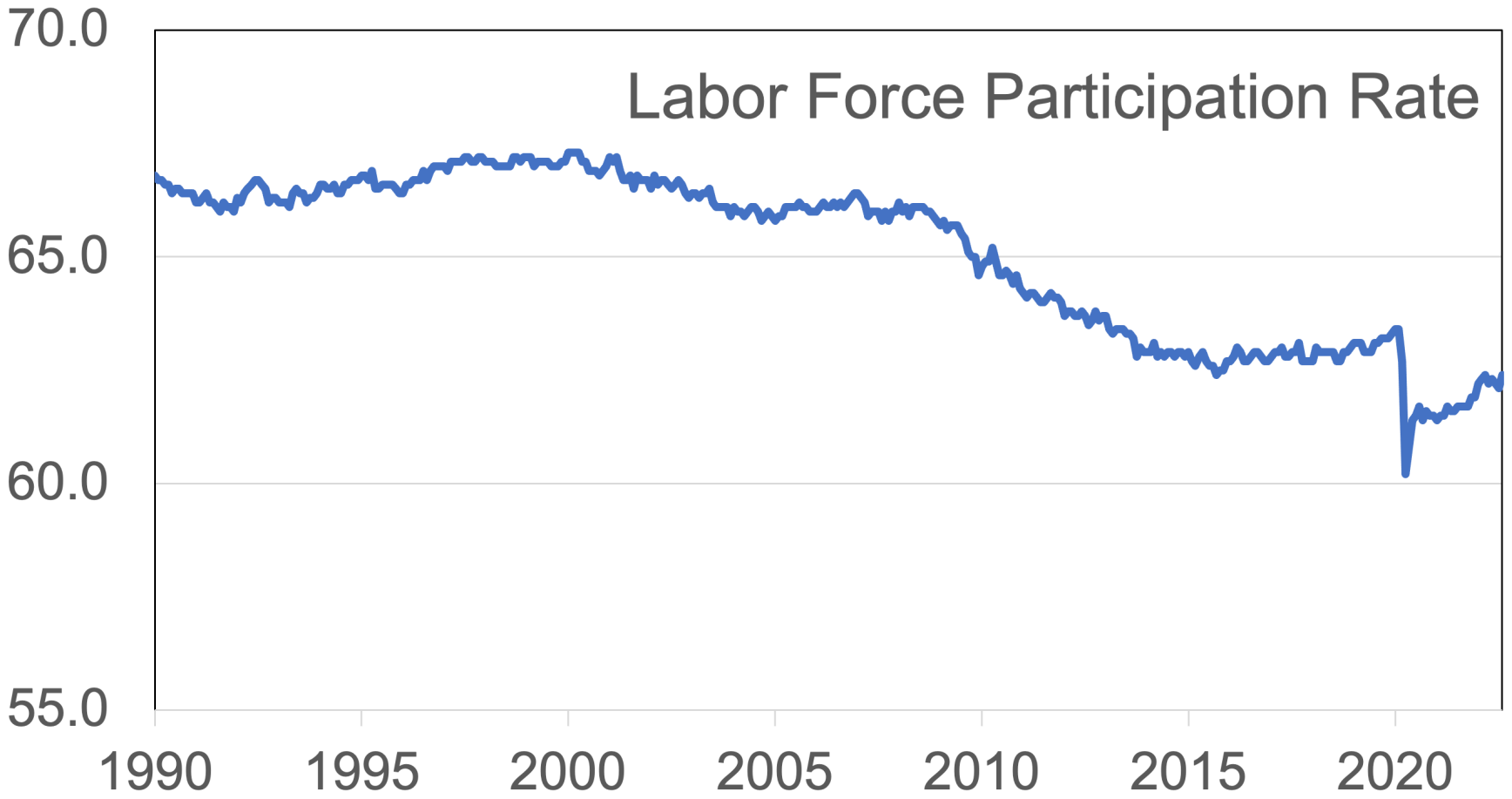
The US labor market: Unemployment rate

- Goes up in recessions.
- Goes down during expansions.
- Currently at a historical low: best labor market in recent history?

The US labor market: Employment rate

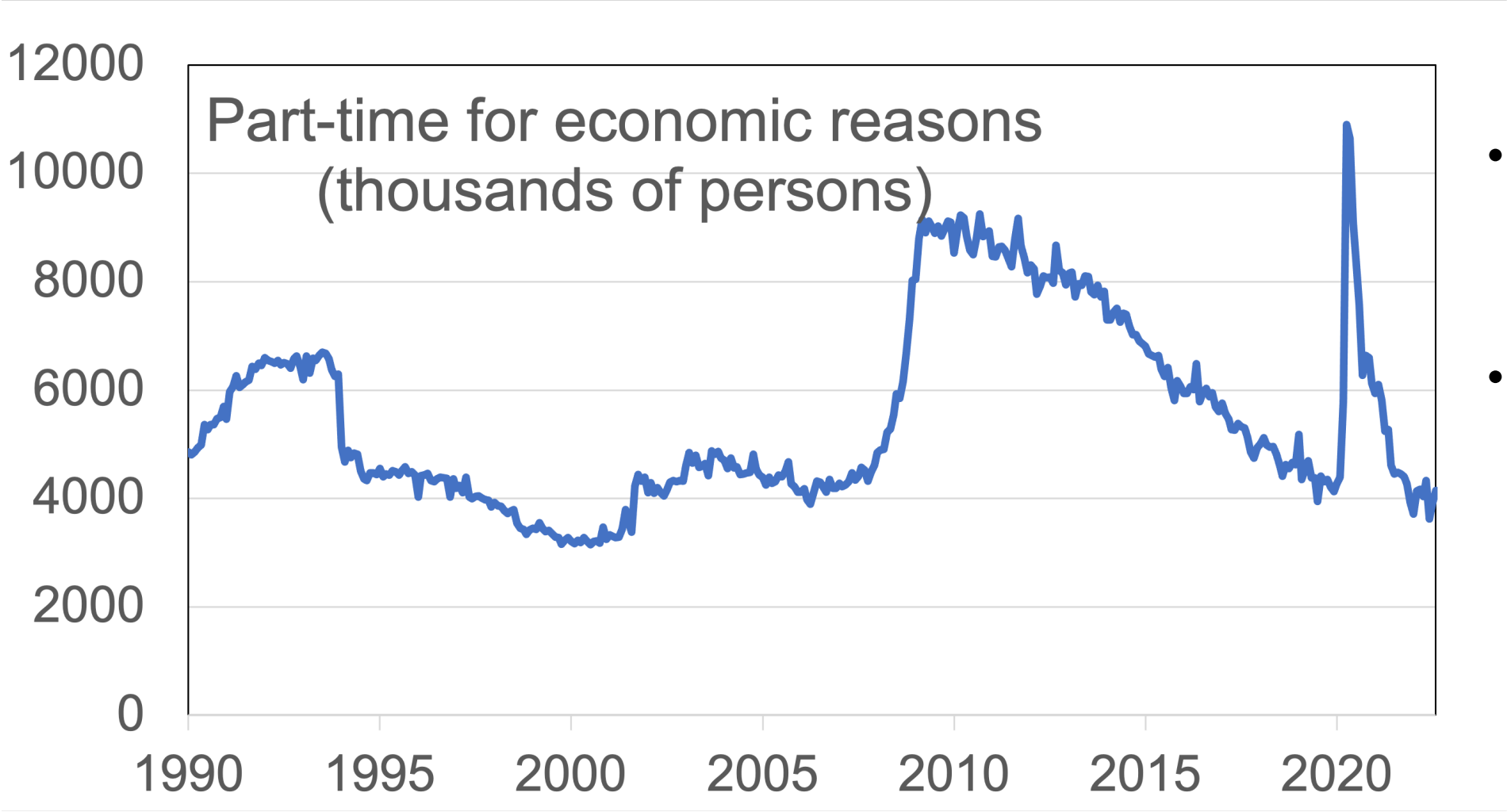
- Down in recessions, up in expansions
- Tells a partially different story:
- Has almost fully recovered from Covid-shock
- But below the 1990-2007 levels.

The US labor market: Labor force participation rate



- Underlying decreasing trend (demographic factors).
- But also influenced by the economy.
- Has not recovered fully from the covid shock.

The US labor market: Underemployment



- Around 4 million Americans are underemployed.
- Can increase to 8-10 millions during a recession!

Clicker question

"When the unemployment rate is high, the participation rate is also likely to be high"

A. True.

B. False.

C. Not possible to say.

1.3 MEASURING INFLATION

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Inflation: Key concepts

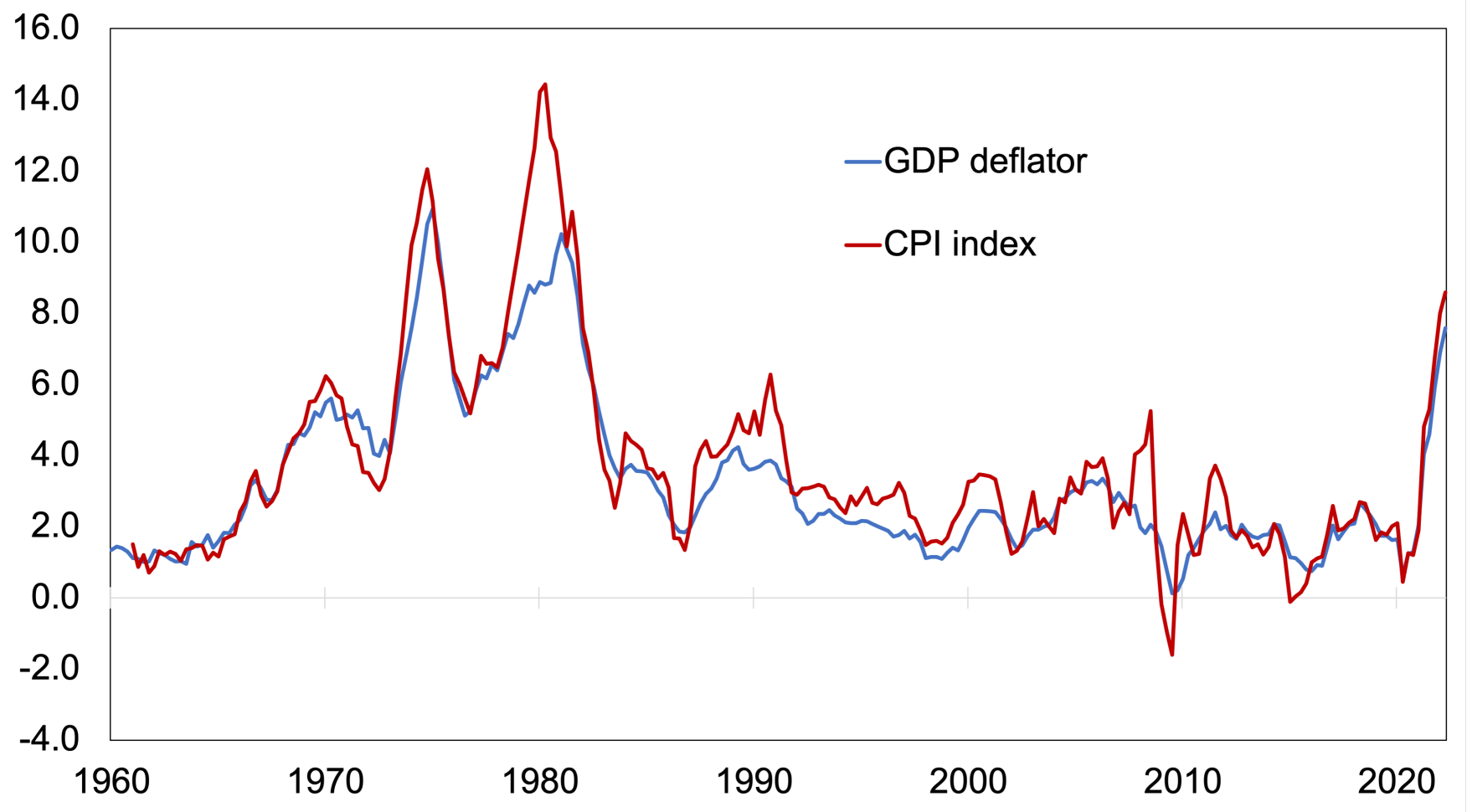
- Price level (P).
- Inflation rate (π_t)
  - $\pi_t = (P_t - P_{t\text{-}1})/P_{t\text{-}1}$
- Deflation

How do we measure inflation?

Two main empirical measures of P_t:

1. **GDP deflator**
   - Measures P_t of domestically produced goods & services.
   - $= \frac{Nominal\ GDP_t}{Real\ GDP_t} = \frac{\$Y_t}{Y_t}$
2. **Consumer price index (CPI)**
   - Measures P_t of goods & services bought by consumers.
   - = dollar cost of a 'typical' basket of goods & services.

Inflation in the US

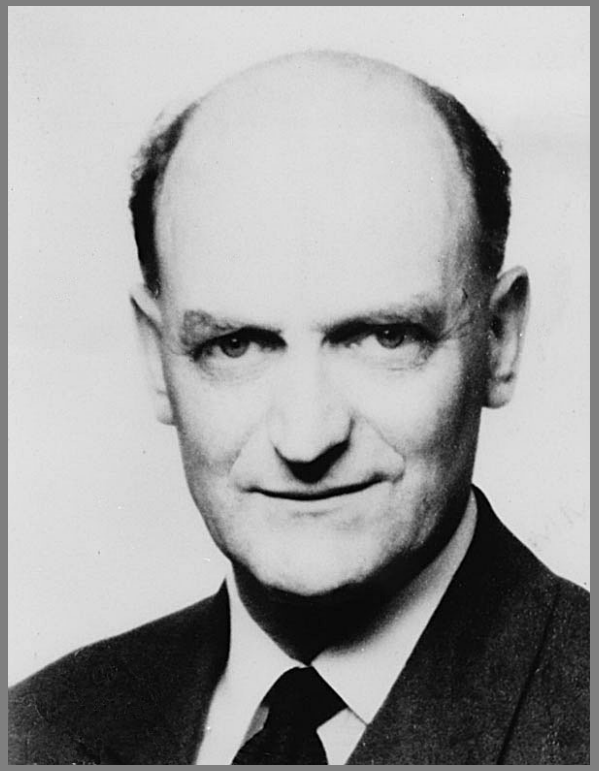


- CPI and GDP deflator have generally moved together.
- Exception: when the price of imported goods rises much faster than that of domestically produced goods.
- In the current inflation surge, CPI and GDP deflator are behaving similarly.

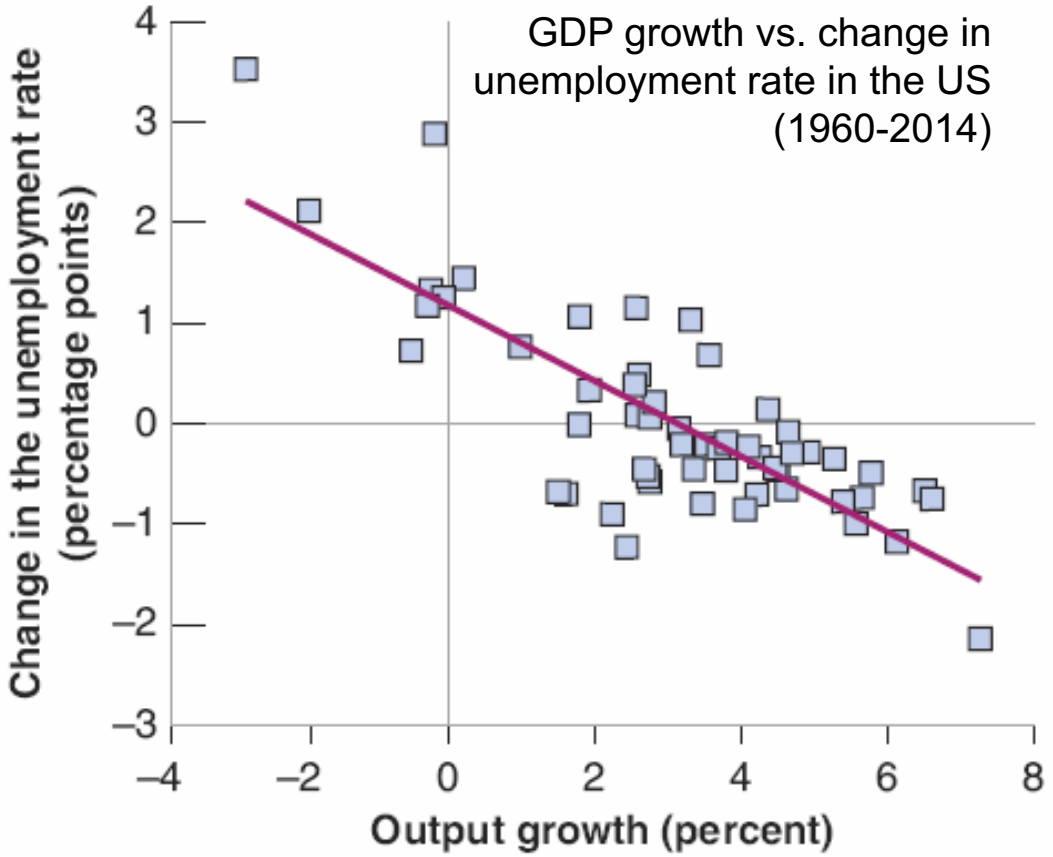
Why do we care about inflation?

- Tends to redistribute income arbitrarily.
- Creates uncertainty and instability in relative prices and real wages.
- Decreases competitiveness of exports.
- Deflation is also bad, though:
  - increases real values of debts.
  - makes monetary policy less effective.
  - makes people postpone spending.
- In general, we would want inflation to be low & stable.

1.4 OKUN'S LAW & PHILLIPS CURVE

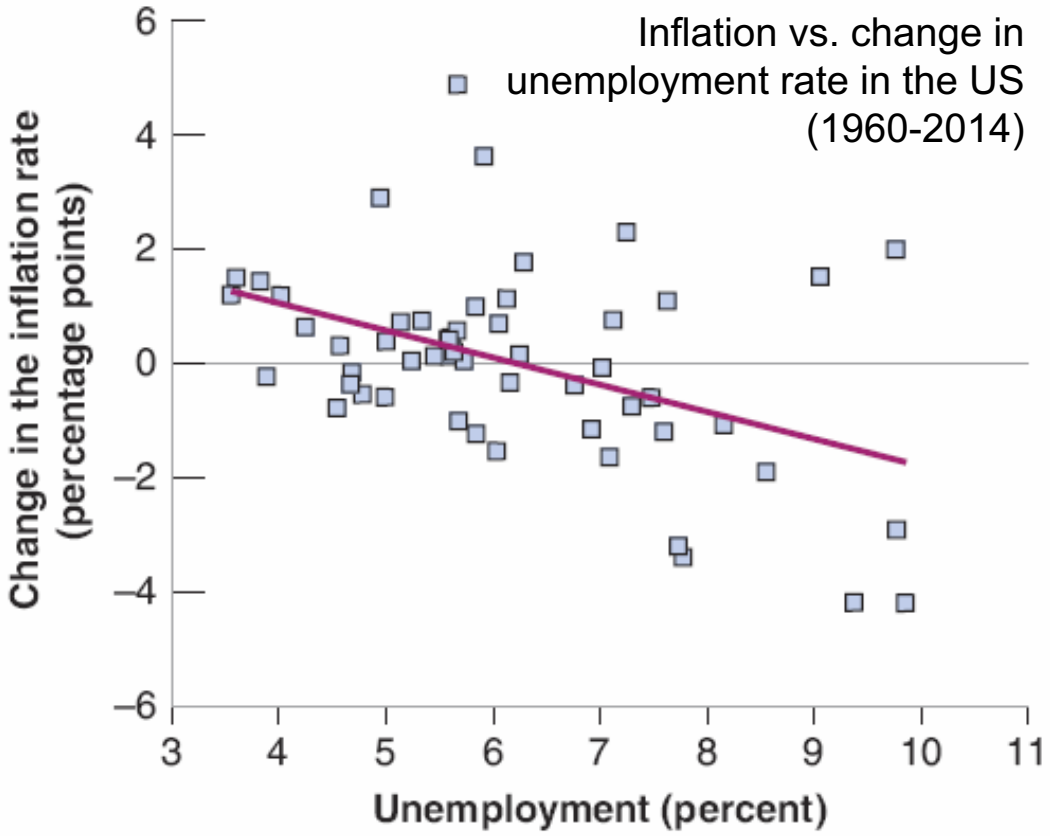


Okun's law



- Inverse relation between GDP growth rate and the change in the unemployment rate.
- In US data, slope is around -0.4.
- The line crosses the horizontal axis where output growth is 3%.
- Strong & stable relation.

Phillips Curve



- Inverse relation between inflation and unemployment.
- The line crosses the horizontal axis where unemployment is 6%.
- Not very strong relation, and definitely not stable.

QUESTIONS & ANSWERS

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