

# Lecture 2. GDP, Unemployment, and the Inflation rate

Reading: Blanchard, Chapter 2 except for Section 2-4.

# In the last class...

- What is Macroeconomics about?

- 1) Economic growth (the Long Run)

- 2) Business cycles (the Short and Medium Run)

- Monetary policy

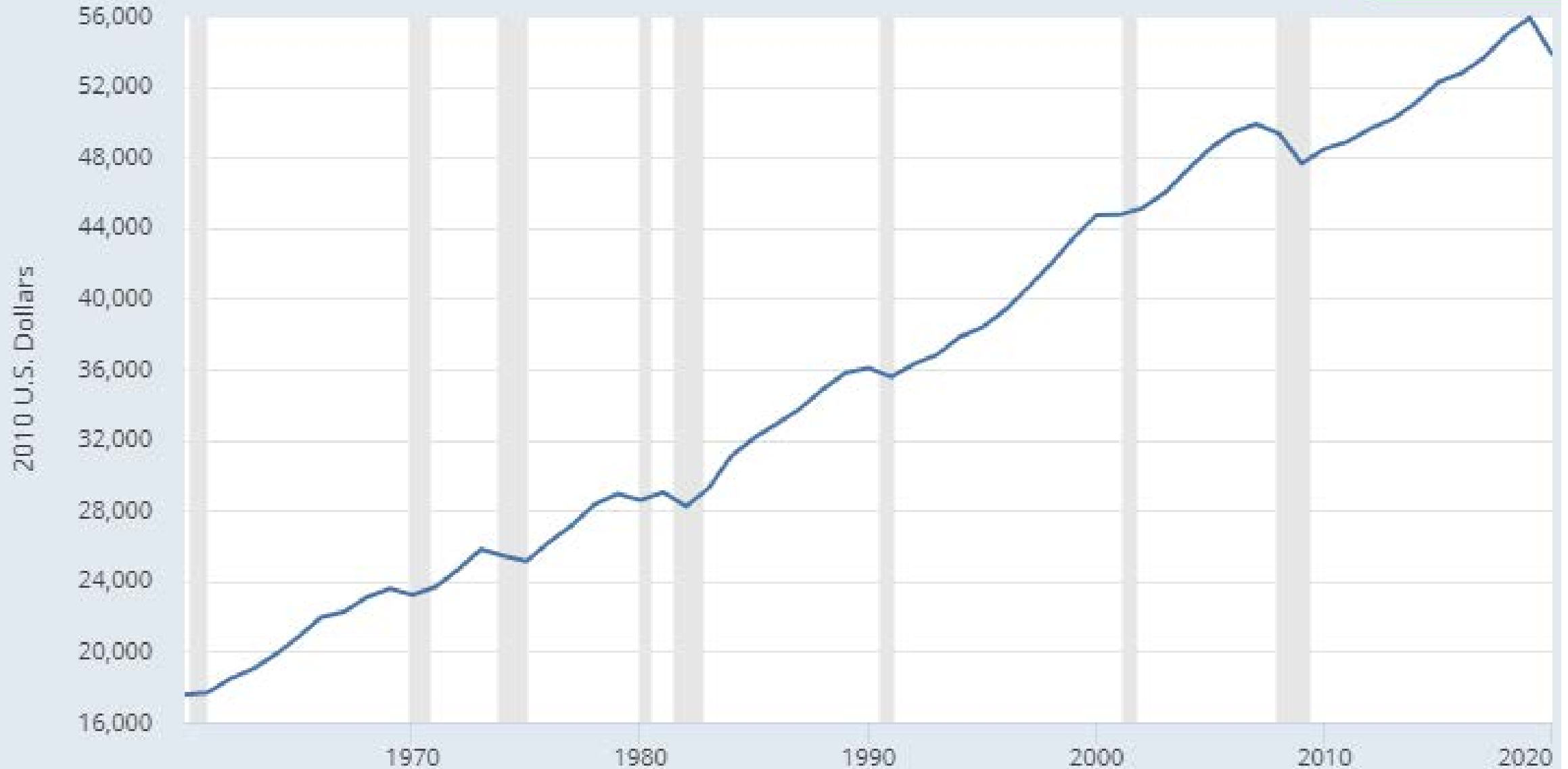
- Central bank, interest rate

- Fiscal policy

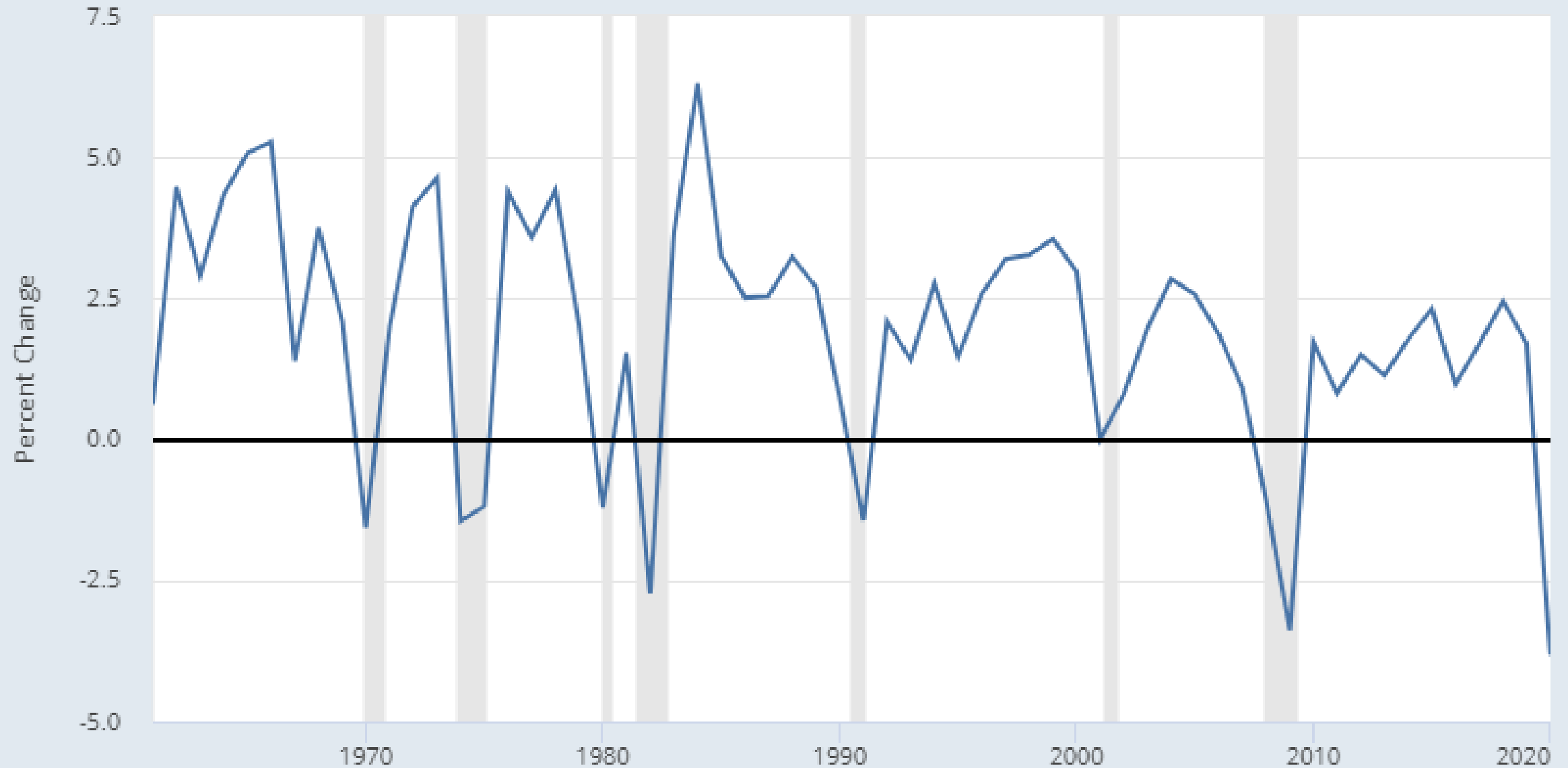
- Government, government spending, taxes / transfers

- Open economy

- Exchange rate, export, import, trade balance



- Source: <https://fred.stlouisfed.org/series/NYGDPPCAPKDUSA>



- Growth rates of real GDP per capita

# Outline

- Measure of Aggregate Output (nominal / real GDP)
  - GDP = gross domestic product
- The Unemployment Rate
- The Inflation Rate

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# Motivation: the Great Depression

- In the U.S. from 1929 to the late 1930s.
- The U.S. economy was not good. Everyone knew that.
- ...But no one knew how bad it was exactly.

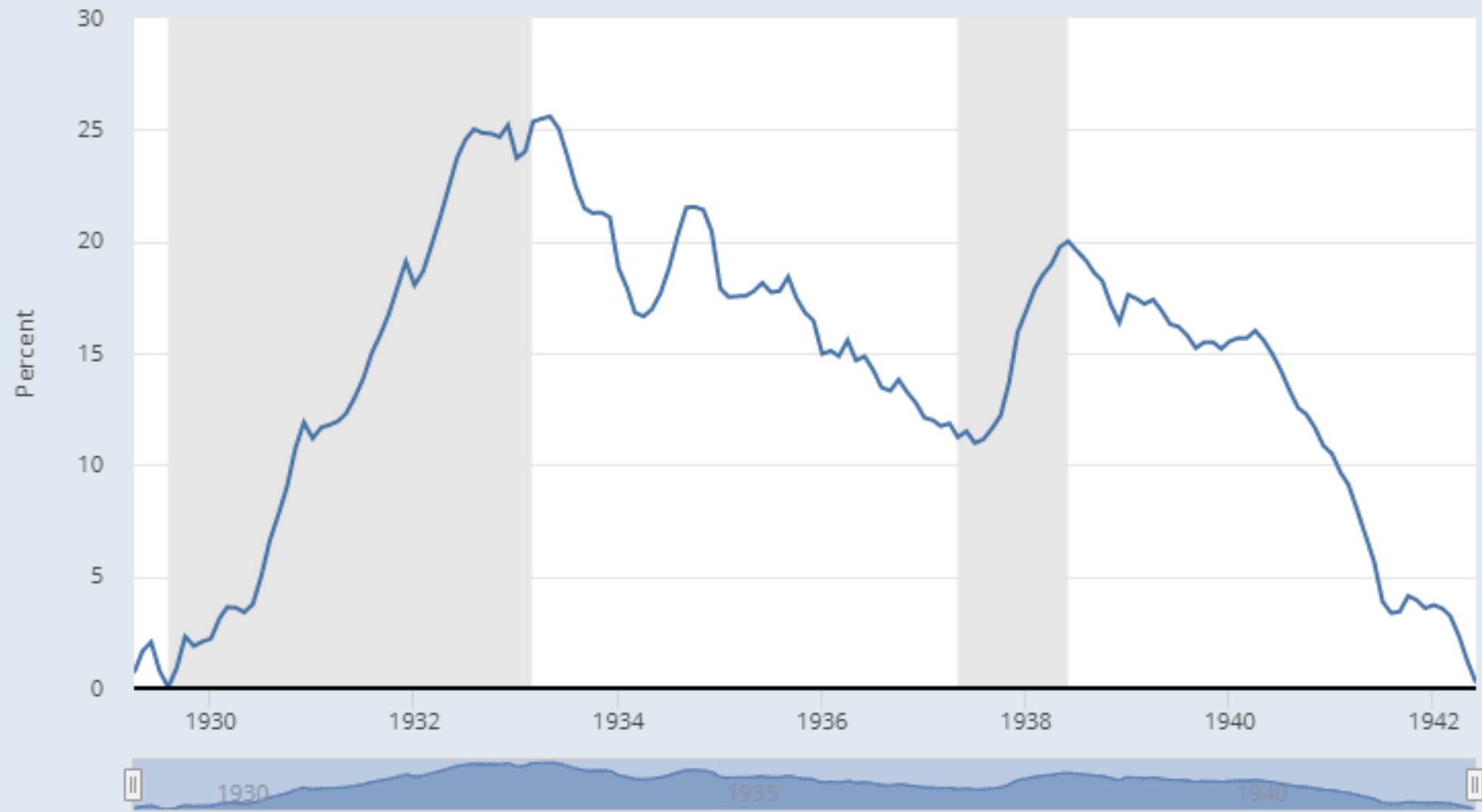


- Source:  
<https://www.pbs.org/wgbh/americanexperience/features/dustbowl-great-depression/>





- Source:  
<https://sites.google.com/site/bwimperialamerica12/home/the-great-depression>



Shaded areas indicate U.S. recessions

Source: National Bureau of Economic Research

fred.stlouisfed.org

- Source: <https://fred.stlouisfed.org/series/M0892AUSM156SNBR>

# But no one knew how bad it was exactly...

- “One reads with dismay of Presidents Hoover and then Roosevelt designing policies to combat the Great Depression of the 1930s on the basis of **such sketchy data** as stock price indices, freight car loadings, and incomplete indices of industrial production. The fact was that comprehensive measure of national income and output did not exist at the time.”
- Froyen, R. (2005), *Macroeconomics: Theories and Policies*, New Jersey: Prentice Hall.

# National Income and Product Accounts (NIPA)

- Designed by Simon Kuznets for the US and Richard Stone for the UK.
- Thanks to them, e.g., in the US, measures of aggregate output have been published since 1947.
- The size of an economy can be measured in terms of  
1) , 2) , and 3) .

# Gross Domestic Product (GDP) from the production side 1

- - market value: prices are used to compare the values of different products
  - final: no intermediate goods
  - goods and services: cell phone and haircut
  - produced: no used products are counted
  - in the economy: anything produced in HK by foreigners is in HK GDP.
- cf) Gross National Product

# An Example

## Steel Company (Firm 1)

Revenues from sales	\$100
Expenses	\$80
Wages	\$80
Profit	\$20

## Car Company (Firm 2)

Revenues from sales	\$200
Expenses	\$170
Wages	\$70
Steel purchases	\$100
Profit	\$30

- Intermediate good?
- Final good?
- GDP?
- What if Firm 1 is in a foreign country and the steel is imported?

# GDP from the production side 2

- the sum of value added in the economy during a given period.
- the value added by a firm
  - = the value of
  - the value of

# An Example

## Steel Company (Firm 1)

Revenues from sales	\$100
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- The value added by Firm 1?
- The value added by Firm 2?
- GDP?



# GDP from the income side

- the sum of incomes in the economy during a given period.

# An Example

## Steel Company (Firm 1)

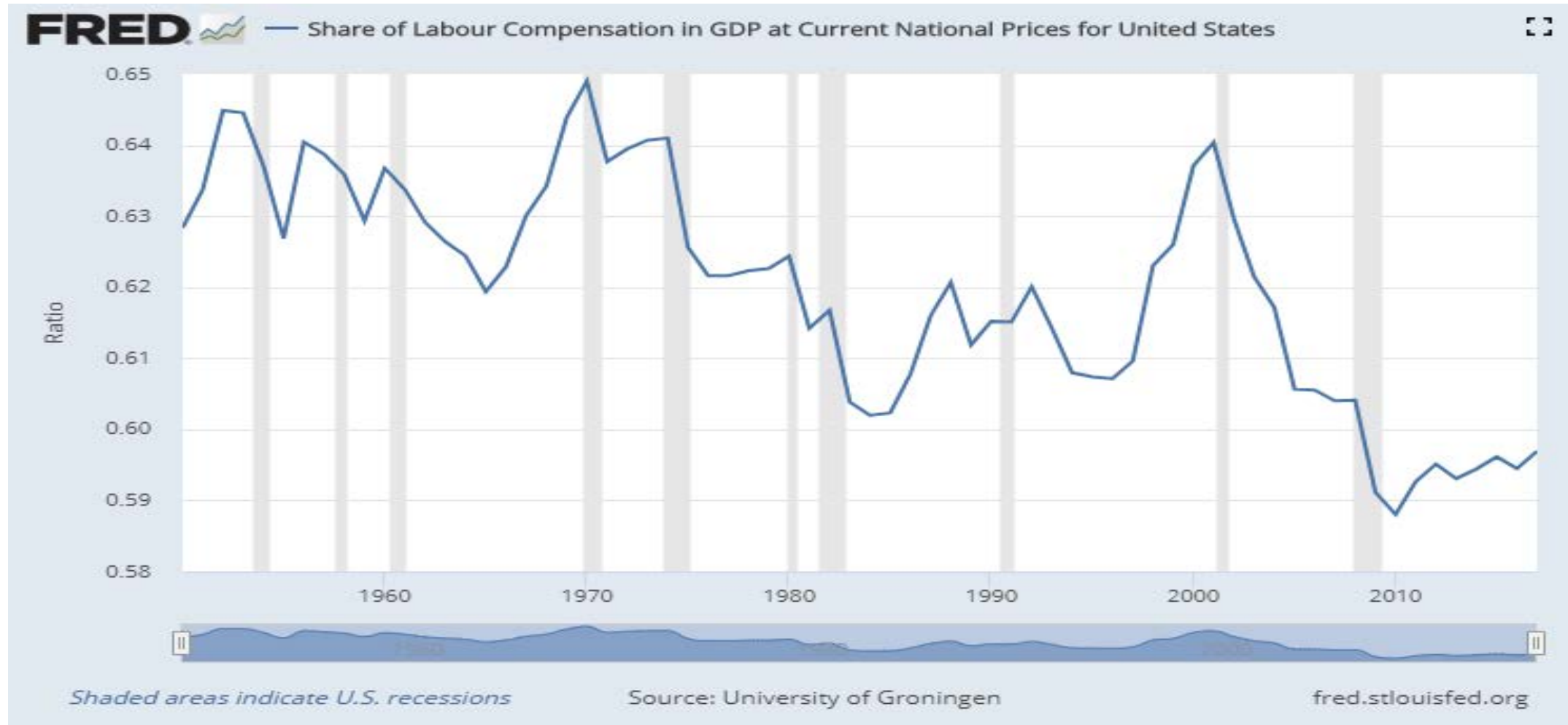
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- Labor income?
- Capital income (or profit)?
- GDP?
- Labor's share of income?

# Labor's share of income ↓ since the 1980s



- Source: <https://fred.stlouisfed.org/series/M0892AUSM156SNBR>

# GDP from the expenditure side

- What is produced is purchased and used by either a consumer, a firm, the government, or a foreign agent.
- So we can recover GDP by looking at how much people spend.
- We will come back to this point in Chapter 3.1.

# Nominal and Real GDP

- Nominal GDP in year  $t = \$Y_t =$ 
  - Depends on both prices and quantities.
  - dollars
- We want to construct a measure which reflects only the quantities (i.e., the size) produced in the economy.
- Real GDP in year  $t$  in year  $t_0$  'dollars'  $= Y_t =$ 
  - Base year
  - dollars

## Nominal GDP in Year 0 and in Year 1.

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

- Nominal GDP in year 0 and 1?
- Real GDP in year 0 prices?
- Real GDP in year 1 prices?
- 
-

# Why Chain-Type Indexes?

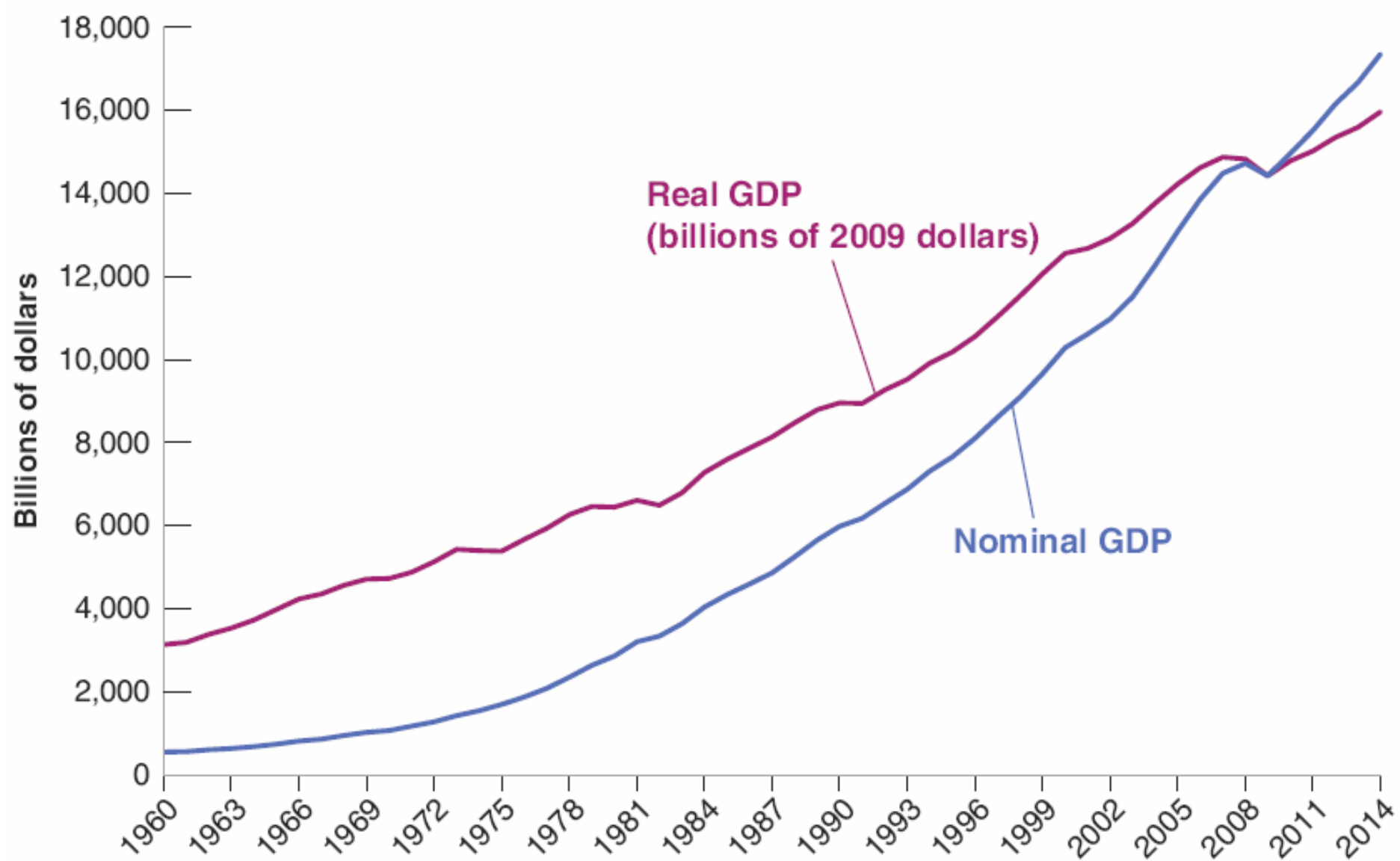
- Old relative prices may not reflect the true current values of different goods.
- Some goods may not even exist in the base year.
- So, the base year should be updated.
- Then, everything should be re-calculated. The growth rate of real GDP will change, and so on.

# 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			
		Year 1	
	Quantity	\$ Price	\$ Value
Potatoes (pounds)	15	1	15
Wine (bottles),	5	3	15
Nominal GDP			

- $\bar{g}_{RGDP,t} = \sqrt{\frac{\sum P_{i,t-1} Q_{i,t}}{\sum P_{i,t-1} Q_{i,t-1}} \frac{\sum P_{i,t} Q_{i,t}}{\sum P_{i,t} Q_{i,t-1}}} - 1$
- RGDP in chained (year 0) dollars:
- RGDP in chained (year 1) dollars:





- From 1960 and 2014, nominal GDP increased by a factor of 32. Real GDP increased by a factor of about 5.

# Why should we care about GDP?

- It is a measure of aggregate output i.e., the size of an economy.
- Anything out of the formal market is not included.
  - Home production, black market, negative impact of pollution
- It does not directly take “happiness” into account by construction.
- However, ...  
(Focus: Does Money Buy Happiness? pp. 224-225.)



# Outline

- Measure of Aggregate Output (nominal / real GDP)
  - GDP = gross domestic product
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# The Unemployment Rate

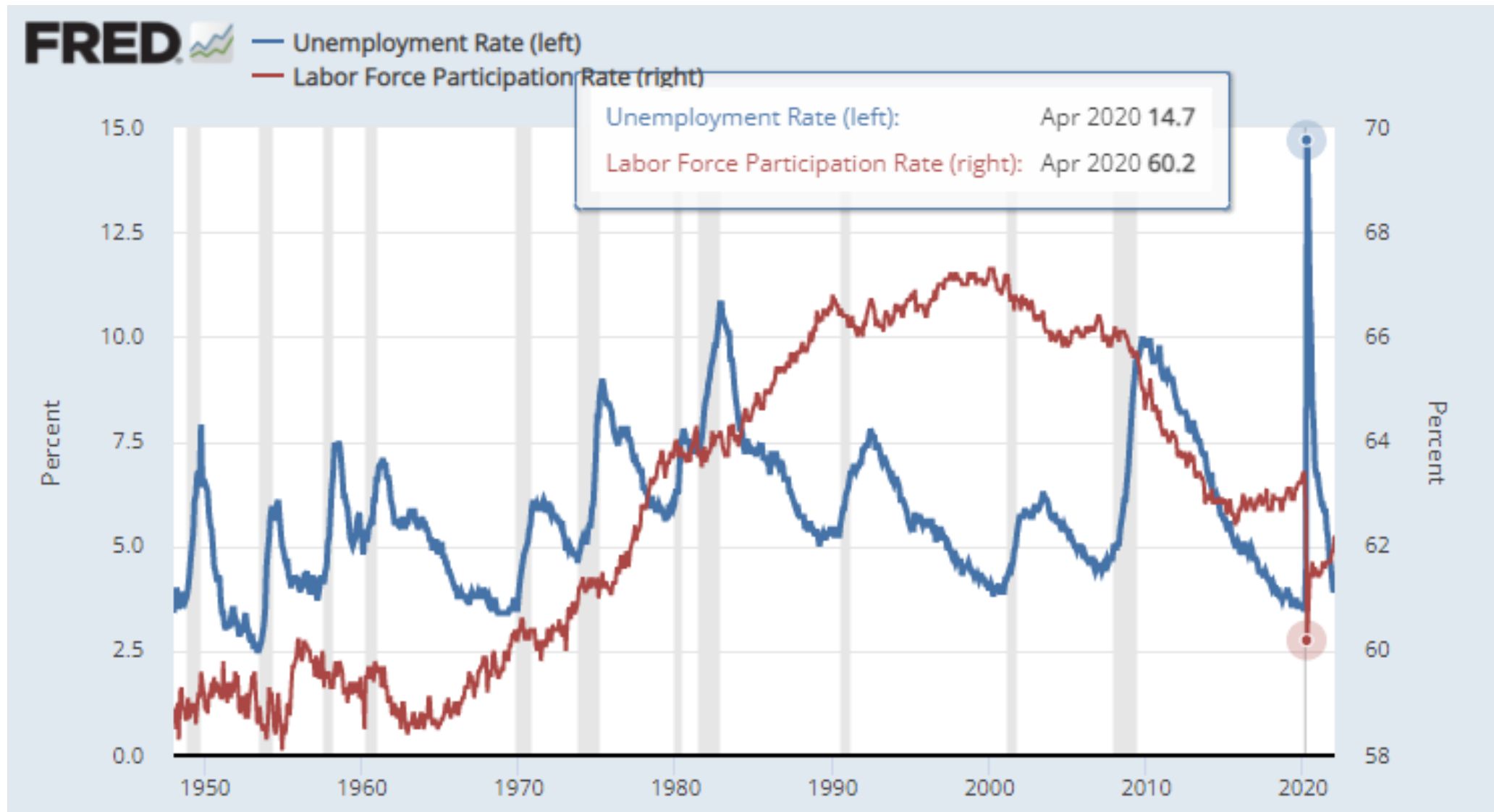
- $L = N + U$   
= employment + unemployment
- $N$  = # of people who have a job
- $U$  = # of people who do not have a job but are looking for one
- $u = \frac{U}{L}$   
unemployment rate = unemployment /

# The Participation Rate

- = unemployed workers who gave up searching for a job
- They do not show up in the unemployment rate.

- Participation rate = 
$$\frac{\text{Labor Force}}{\text{Total Population of Working Age}}$$

# US data:



# Why should we care?

- The unemployment rate is a good measure of the current status of an economy in terms of business cycles. If the rate is too high, the economy is not utilizing human resources efficiently.
- It matters for “welfare” or happiness.





- Focus: Unemployment and Happiness, p. 48.
- Unemployment is painful.

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# The Inflation Rate

- $\pi_t$  = growth rate of  $P_t$  =

The inflation rate = growth rate of the price level

- $\pi_t > 0$ : ,  $\pi_t < 0$ :
- How can we define the price level representing the entire economy?
  - 1) The GDP deflator
  - 2) The Consumer Price Index (CPI)

# 1) The GDP Deflator

- $P_t = \frac{\$Y_t}{Y_t} =$
- Or, equivalently,  $Nominal\ GDP_t = P_t \times Real\ GDP_t$
- What is the value of GDP deflator in the base year of the real GDP?
  - The GDP deflator is an index number.
  - $\pi_t$  has an economic interpretation, but  $P_t$  does not.

# An Example

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

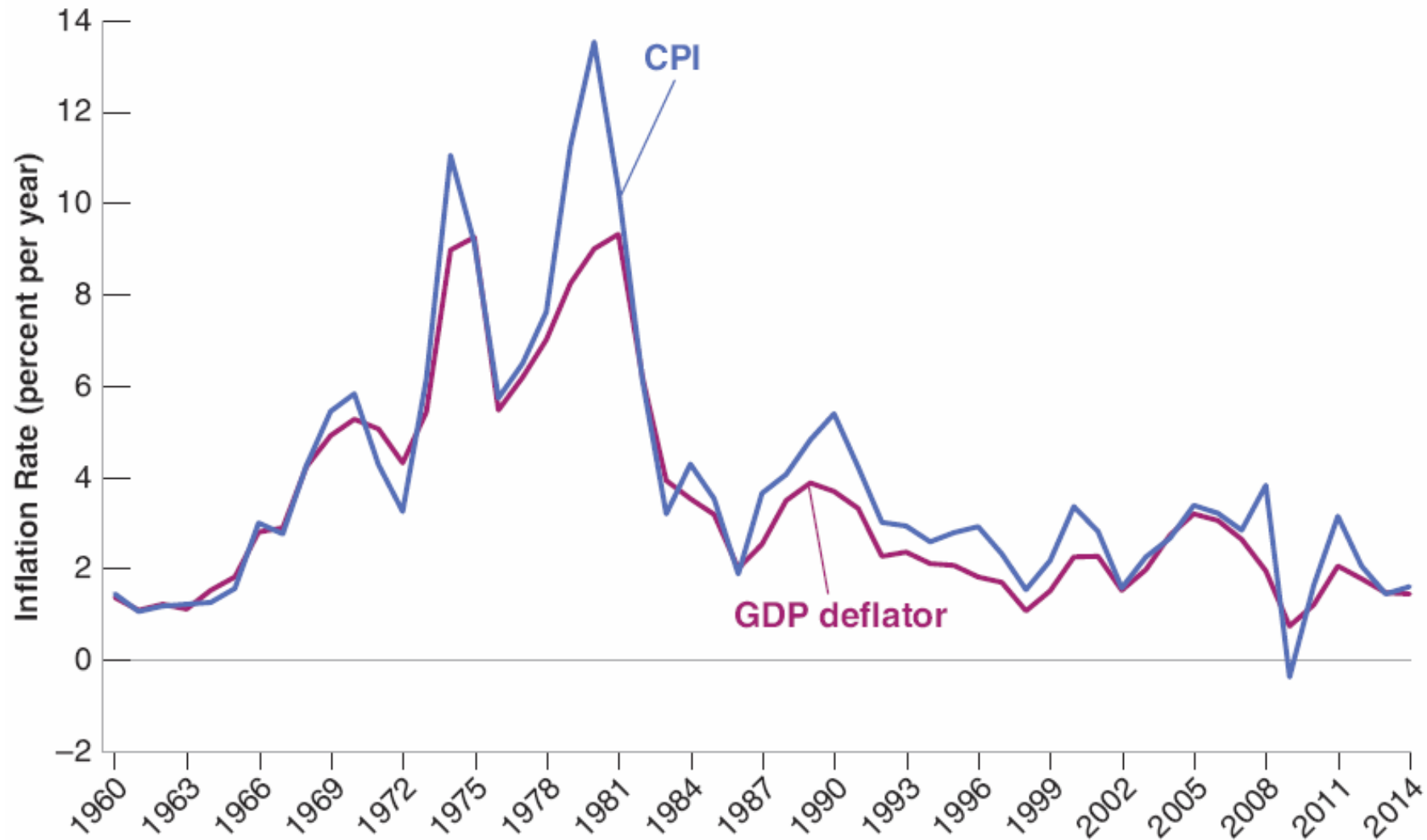
- Consider an economy producing only cars.
- Fill in the blanks.
- Calculate the GDP deflator.

## 2) The Consumer Price Index (CPI)

- It represents the cost of living.
- Step1) Fix the basket: Determine the list of goods and services bought by a typical consumer
- Step2) Find the prices
- Step3) Calculate the basket's cost
- Step4) Choose a base year and compute the index
- $$P_t = \frac{\text{Price of the basket in year } t}{\text{Price of the basket in the base year}}$$

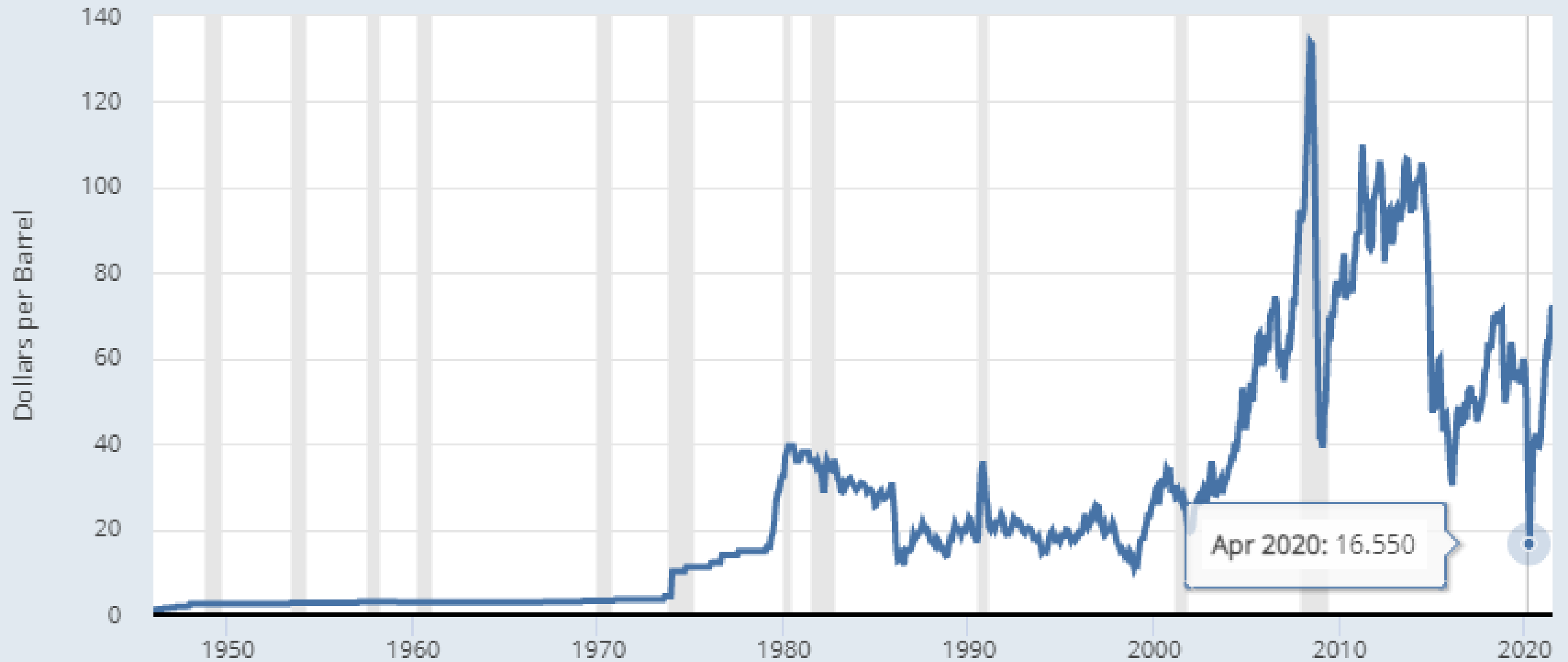
# GDP deflator vs. CPI

- The consumption basket does not include some products sold to firms, to the government, or to foreigners.
- ex) Do you care about the price of tower cranes? How about F-22?
- The consumption basket includes some goods that are imported.
- ex) Oil in a non-oil-producing country



- Inflation Rate, Using the CPI and the GDP Deflator, 1960–2014
- In general, both index induce similar rates of inflation.
- Great inflation / oil prices





- Source: <https://fred.stlouisfed.org/series/WTISPLC#0>

# Why should we care?

- Pure inflation: if all prices move proportionally, relative prices would be unaffected.
- However, prices of individual goods and services are rigid (or sluggish or sticky): therefore, inflation generates distortions in relative prices.

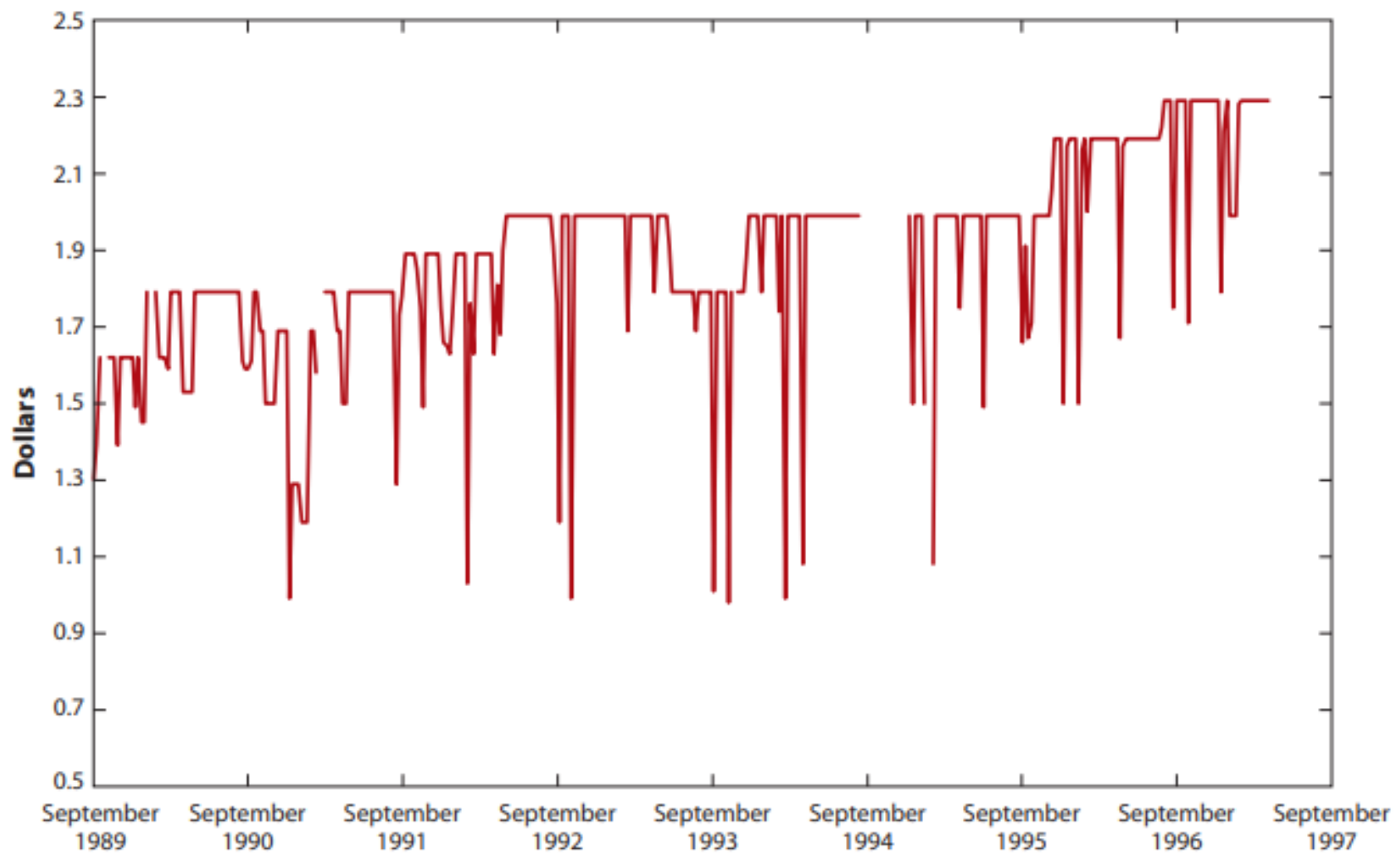


Figure 2

Price series of Nabisco Premium Saltines (16 oz) at a Dominick's Finer Foods store in Chicago.

- Source: Nakamura, E. and J. Steinsson (2014), Price Rigidity: Microeconomic Evidence and Macroeconomic Implications.

# In the next class...

- We will look at an equilibrium in the goods market and the determination of output. We focus on the interaction among demand, production, and income.
- Blanchard, Chapter 3.