Inflation

Measuring the Cost of Living

Outline

1. (Changes in) Price Level
2. Core Inflation
3. Nominal vs Real Distinction

- Textbook Readings: Ch. 9

Measuring the Cost of Living

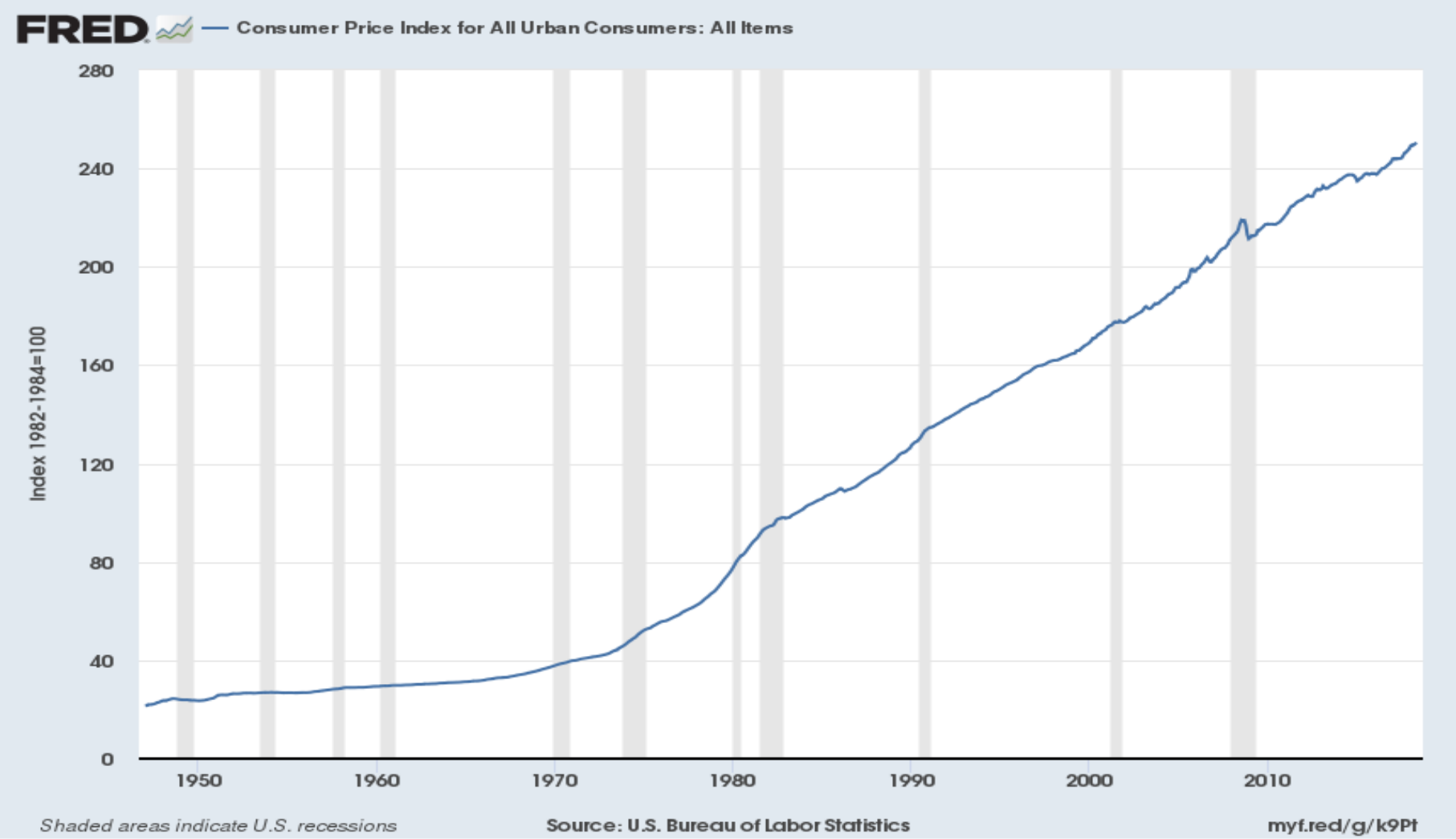
- One dollar today does not buy as much as it did 18 years ago
- The cost of almost everything has gone up
- How economists measure changes in the cost of living?

Measuring Inflation

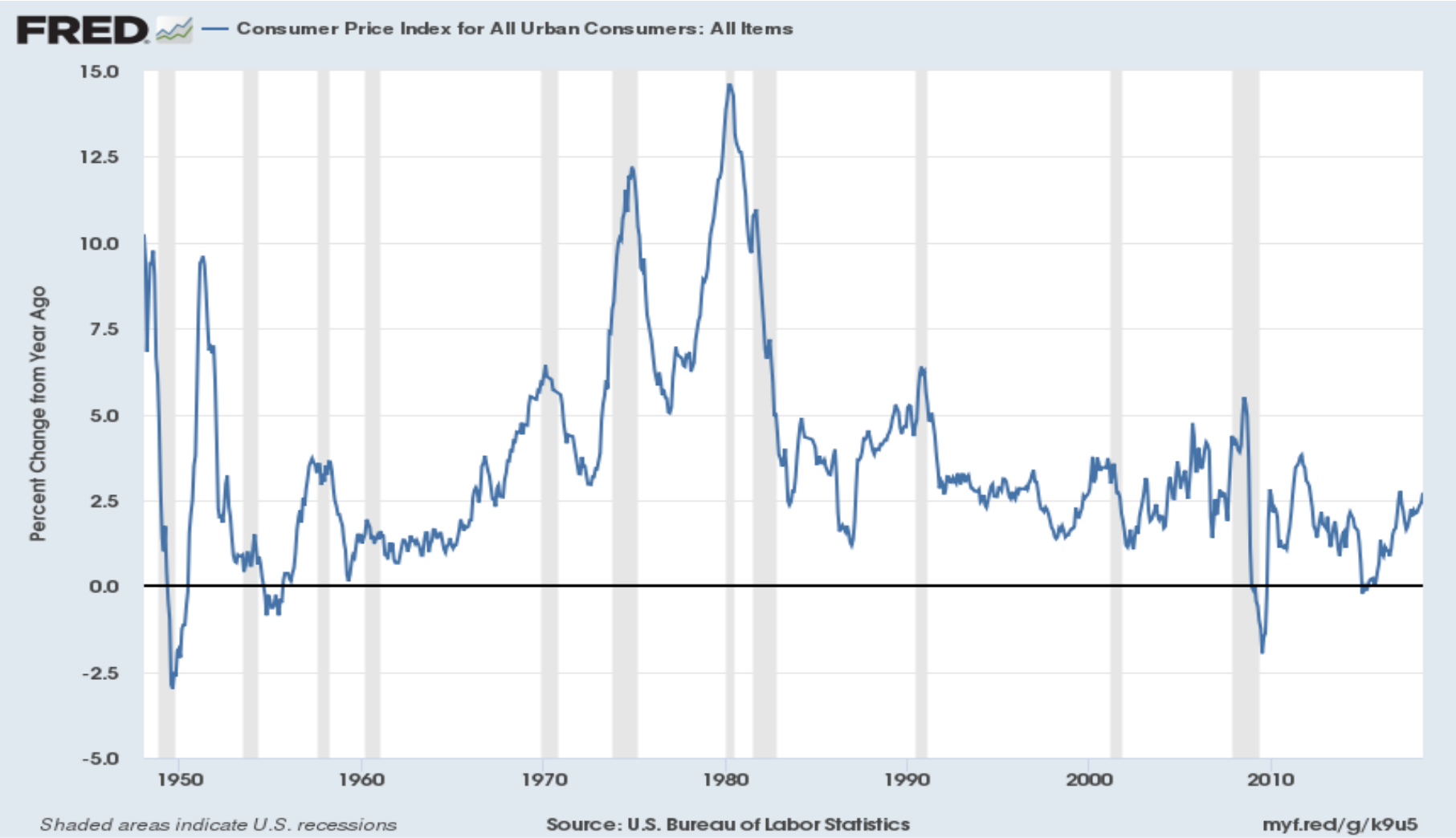
- **Price level**: Measure of the *average prices* of G&S in the economy
  - Consumer Price Index (**CPI**): Average prices faced by **typical consumer**
  - Producer Price Index (**PPI**): Average prices faced by **producers**
  - Personal Consumption Expenditure (**PCE**) Deflator: From **C** in GDP
  - GDP Deflator: From **nominal** and **real** GDP

- **Inflation rate**: *Percentage change* in the price level between two periods
  - Speed at which the economy's overall price level is rising

Price Level


FRED
Consumer Price Index for All Urban Consumers: All Items
Index 1982-1984=100
280
240
200
160
120
80
40
0
1950
1960
1970
1980
1990
2000
2010
Shaded areas indicate U.S. recessions
Source: U.S. Bureau of Labor Statistics
myf.red/g/k9Pt

Inflation: Percent Changes in the Price Level

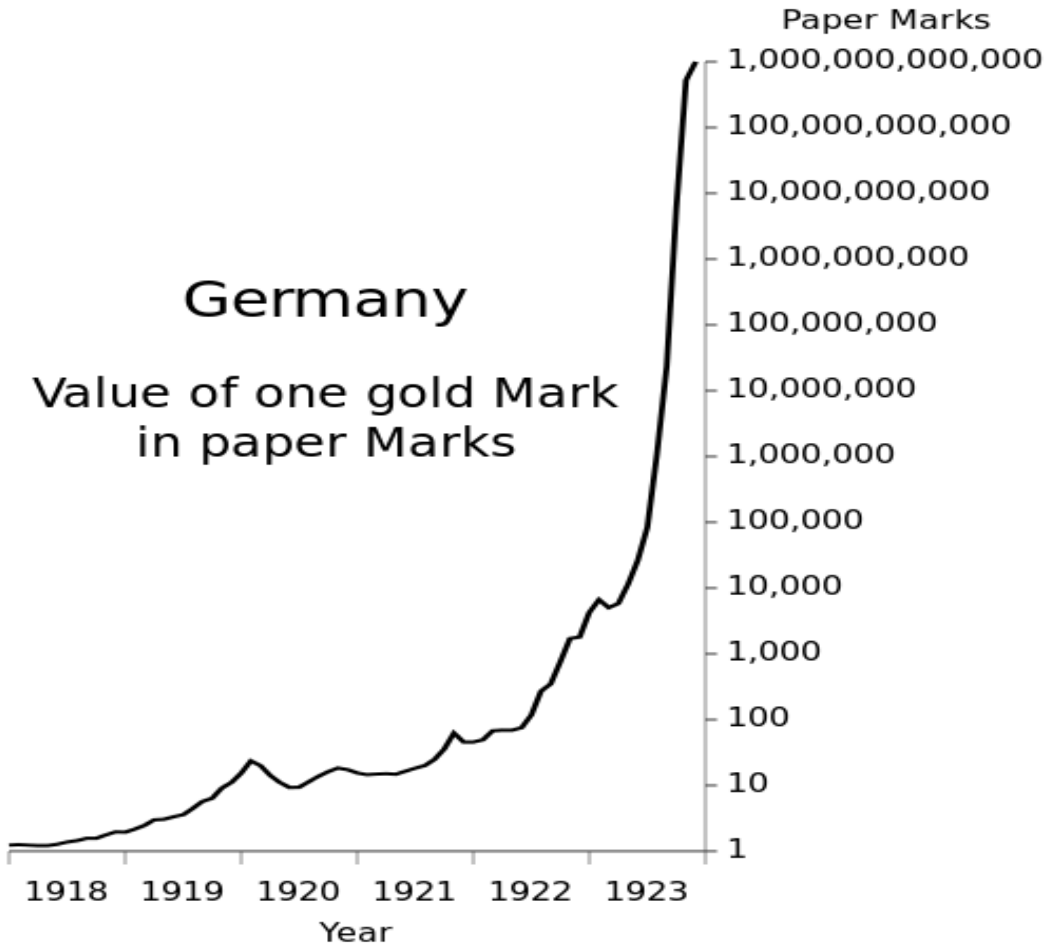


Changes in the Price Level

- **Inflation**: A percentage **increase** in the price level
  - If the price index *rises* in 2020, by 4%, **inflation** was 4%
- **Deflation**: A **decrease** in the price level
  - If the price index *falls* in 2020, by 2%, **deflation** was 2%
- **Disinflation**: If *inflation* **slows**, from one year to the next
  - If inflation was 4% in 2020 and 1% in 2021
- An **explosive** rise for the price index? **Hyperinflation**
  - Germany 1923, Zimbabwe 2008 & 2017, Venezuela Ongoing

Germany 1918-1923

- From 1 to 1 trillion paper Marks for 1 gold Mark



Three Uses for the Price index

1. We use a price index to **separate** price changes from output shifts

2. We use a price index to guard against **accelerating inflation pressures**

3. We use a price index to guard against **deflationary pressures**

- We attempt to keep the overall price level rising at a **slow but steady rate**

The Consumer Price Index (CPI)

- To calculate the CPI in a given year we need:
  - A **basket** of goods and services
  - The cost to purchase the basket of goods and services in a **base year**
  - The prices in the **current year**

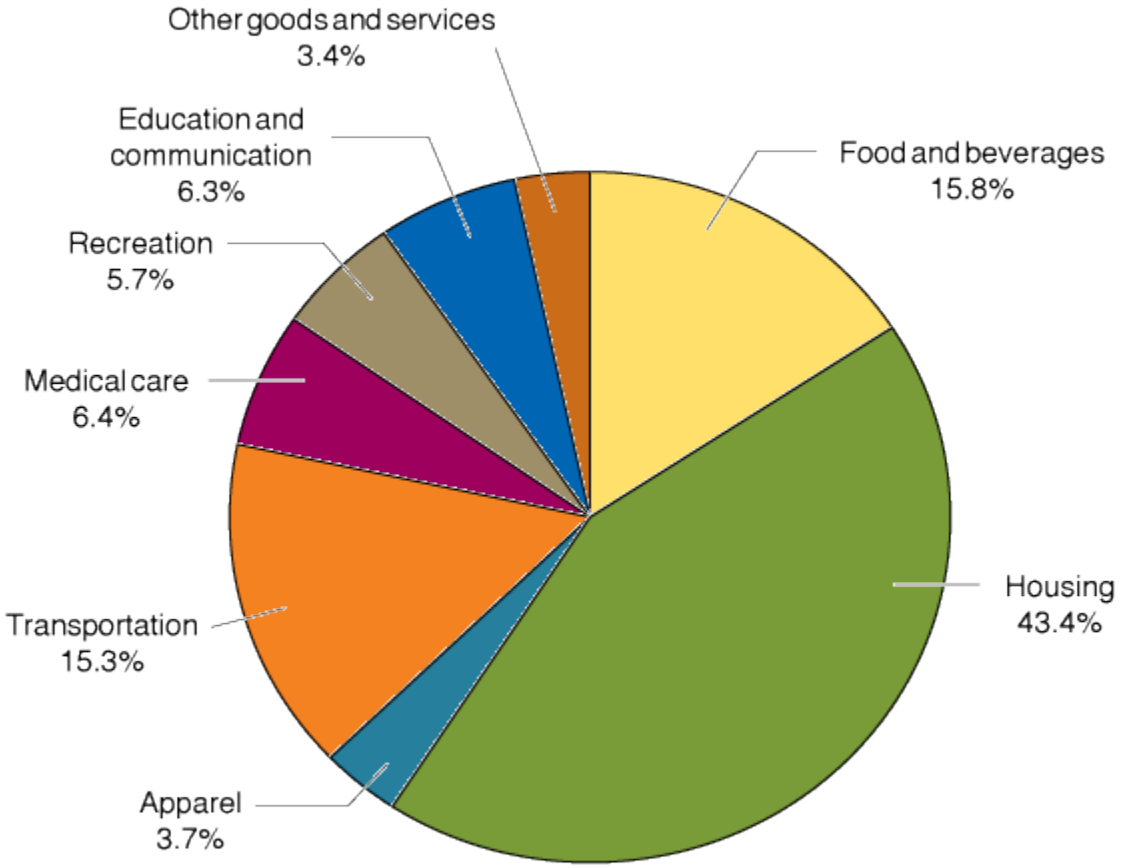
- CPI in the current year: Cost to purchase the basket of G&S this year divided by the cost in the base year
  - By convention we adjust the index level so that CPI in base year is 100

- **Assumption**: Quantities bought are **fixed**
  - Spending increases **only** reflect price changes

The Consumer Price Index (CPI)

The CPI Market Basket, 2008

The Bureau of Labor Statistics surveys 14,000 households on their spending habits. The results are used to construct a *market basket* of goods and services purchased by the typical urban family of four.



CPI Example

	BASE YEAR (2002)			2017		2018	
PRODUCT	QUANTITY	PRICE	EXPENDITURES	PRICE	EXPENDITURES (ON BASE-YEAR QUANTITIES)	PRICE	EXPENDITURES (ON BASE-YEAR QUANTITIES)
Eye examinations	1	$50.00	$50.00	$100.00	$100.00	$85.00	$85.00
Pizzas	20	10.00	200.00	15.00	300.00	14.00	280.00
Books	20	25.00	500.00	25.00	500.00	27.50	550.00
TOTAL			$750.00		$900.00		$915.00

FORMULA	APPLIED TO 2017	APPLIED TO 2018
$\text{CPI} = \frac{\text{Expenditures in the current year}}{\text{Expenditures in the base year}} \times 100$	$\left(\frac{\$900}{\$750}\right) \times 100 = 120$	$\left(\frac{\$915}{\$750}\right) \times 100 = 122$

$$\text{CPI-measured inflation rate in 2018} = \left(\frac{122 - 120}{120}\right) \times 100 = 1.7\%$$

Adjusting for the Effects of Inflation Using Price Indexes

- How do we compare the purchasing power of a variable, say income, across different years?

$$\text{Value in 2014 dollars} = \text{Value in 1984 dollars} \times \left(\frac{\text{CPI in 2014}}{\text{CPI in 1984}} \right)$$

Is the CPI Accurate?

- Four **biases** cause CPI changes to **overstate** the true inflation rate
  - Substitution bias
  - Increase in quality bias
  - New product bias
  - Outlet bias

Headline vs Core Inflation

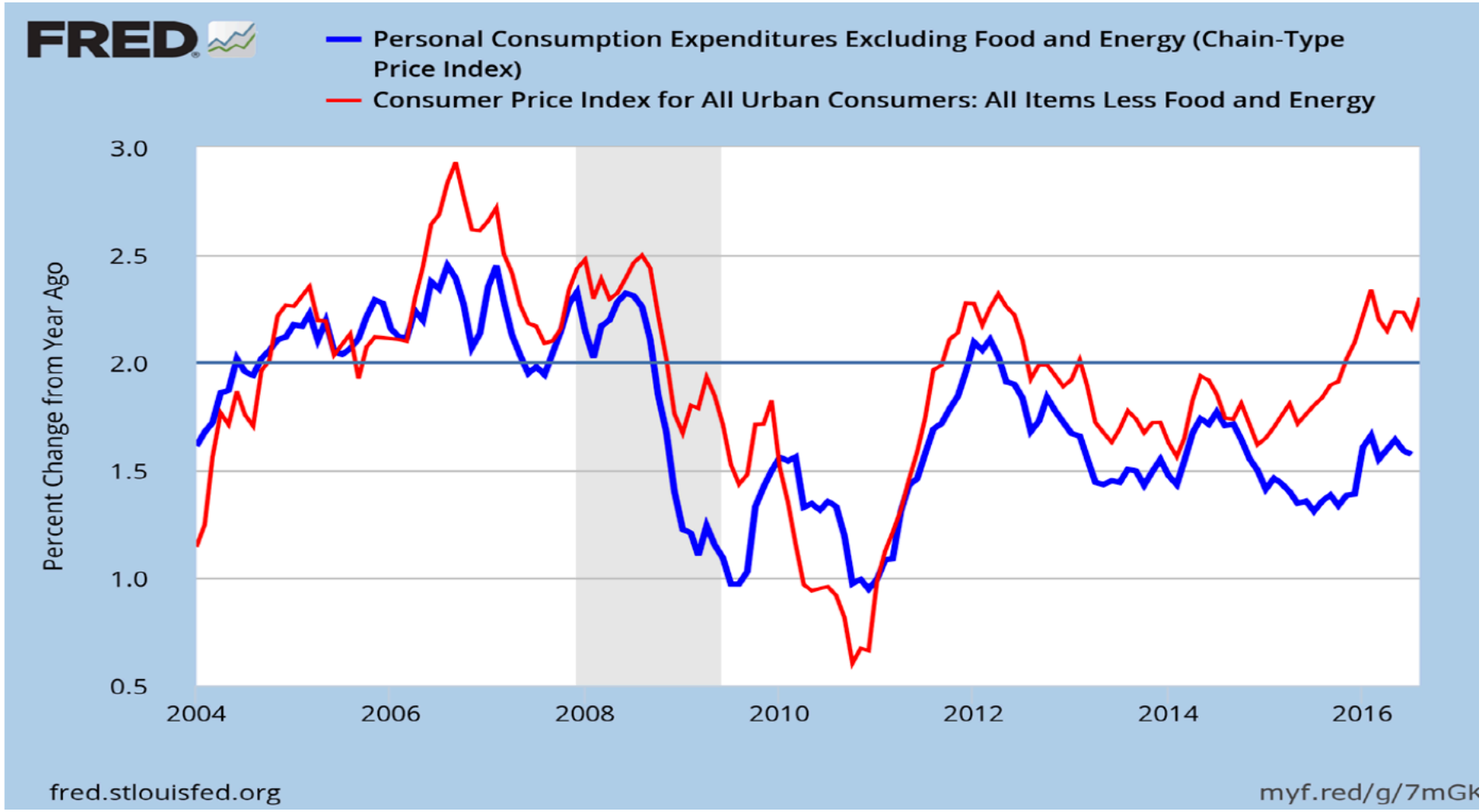
- Sub-indices for CPI and PCE are available
- **Core inflation** *excludes* food and energy products
- Why exclude food and energy prices?
  - In many instances, **very volatile**
  - Subject to **sector-specific pressures**
  - **Independent** of the pulse of the global economy
- Does that mean we can ignore food and energy swings?

Weights Used in the August 2018 CPI Report

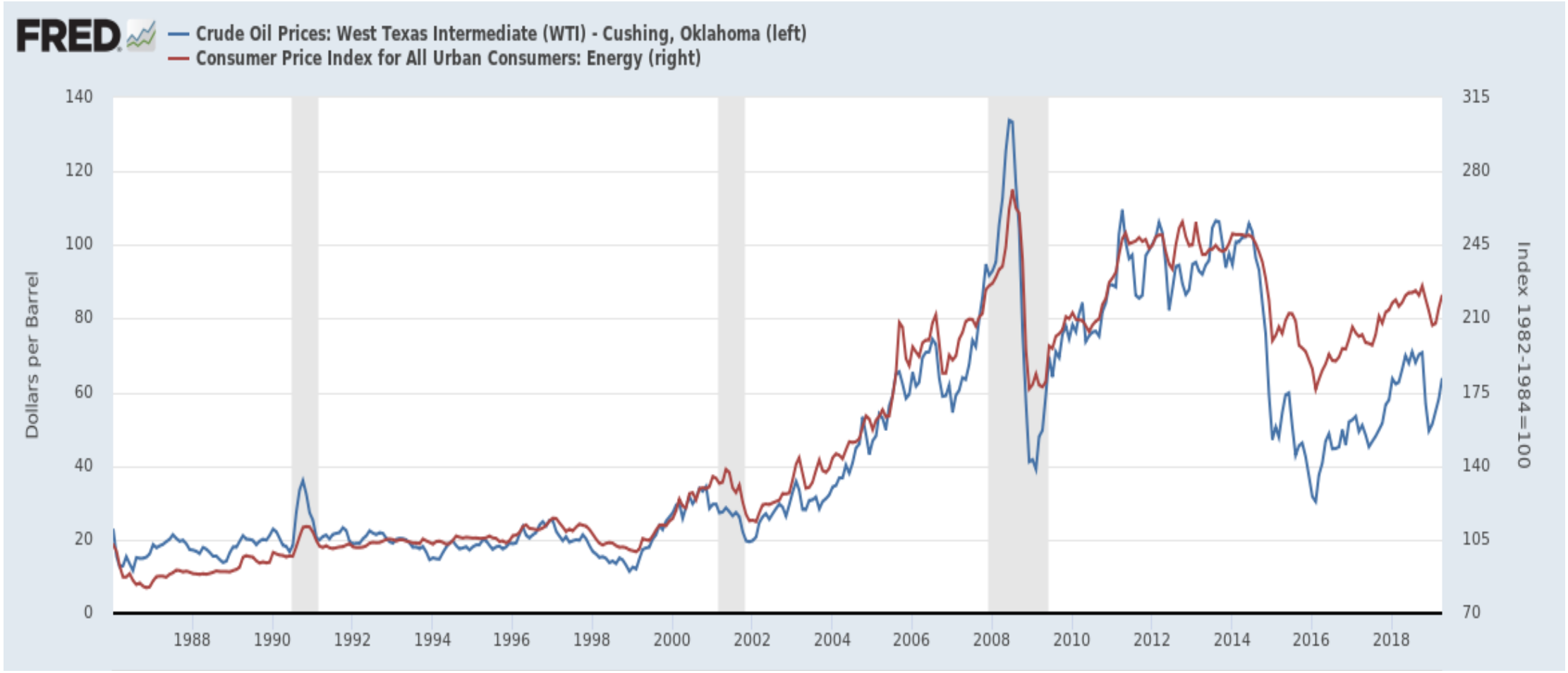
- Items organized into sub-categories

Food	**13%**
Energy	**8%**
Core (exc. Food and Energy)	**79%**
Goods exc. Food and Energy	20%
Core Services	35%
Owner's Equivalent Rent	24%
All Items	**100%**

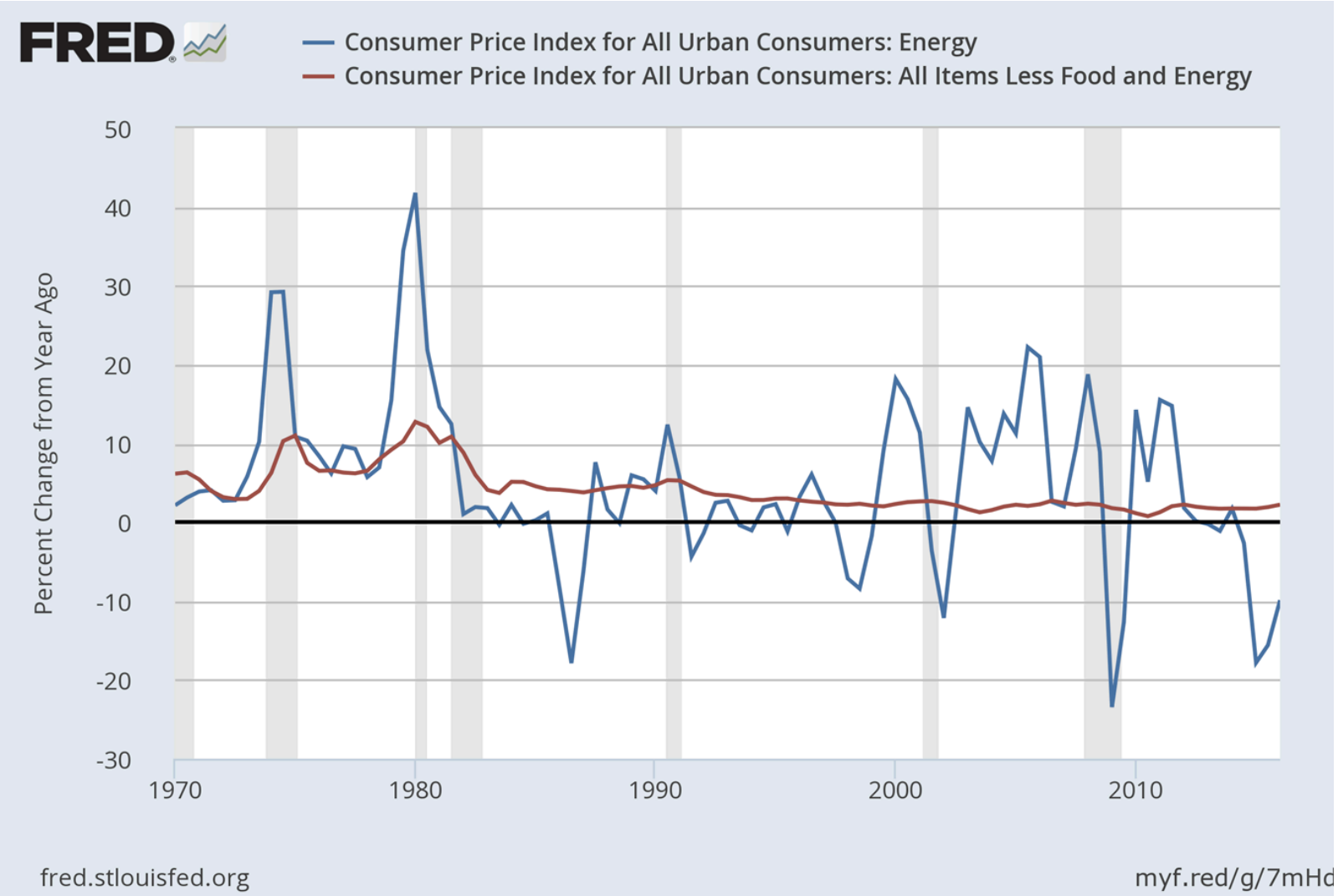
Core CPI vs Core PCE Deflator



Oil Prices Drive CPI Energy

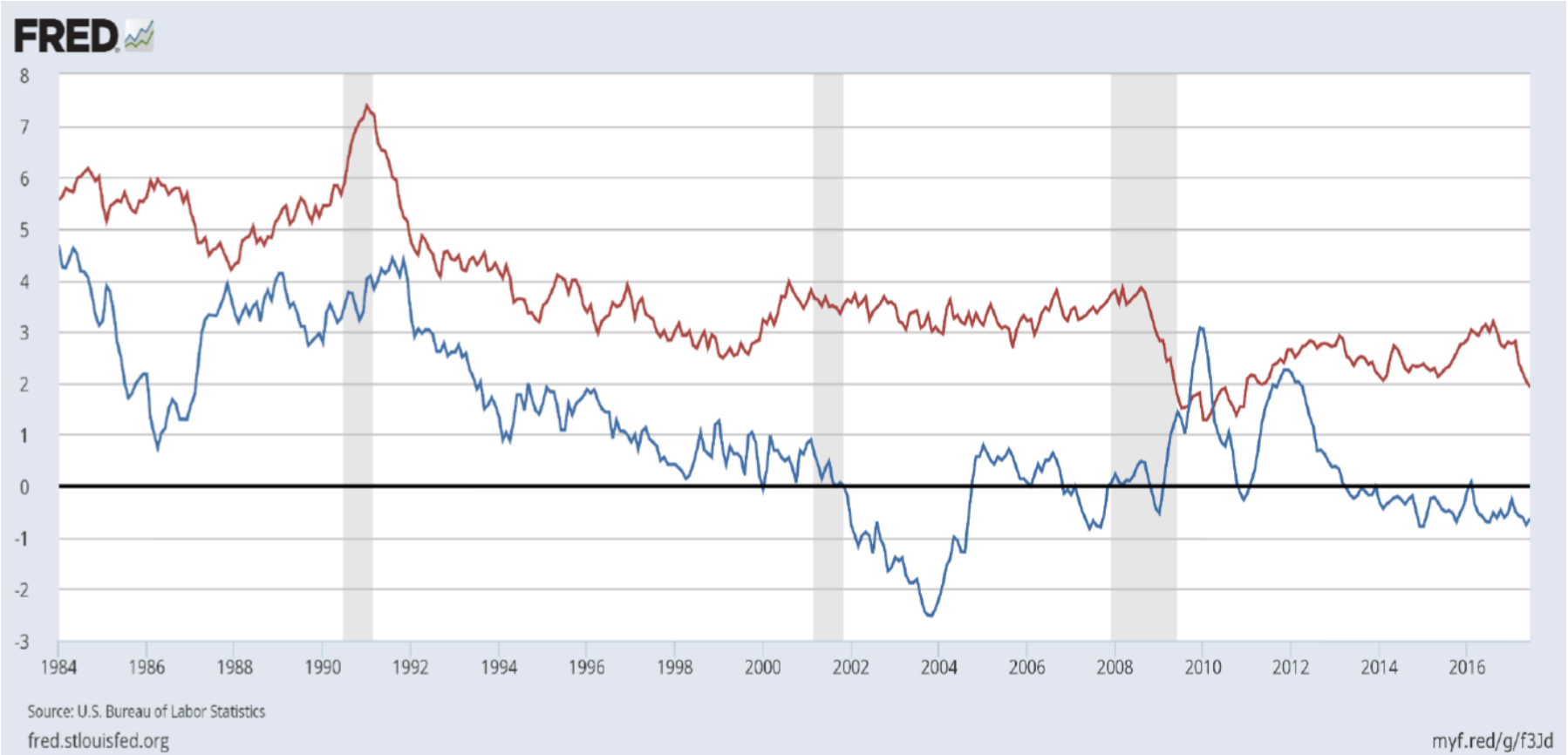


Contrast CPI Energy (YoY) with Core CPI (YoY)



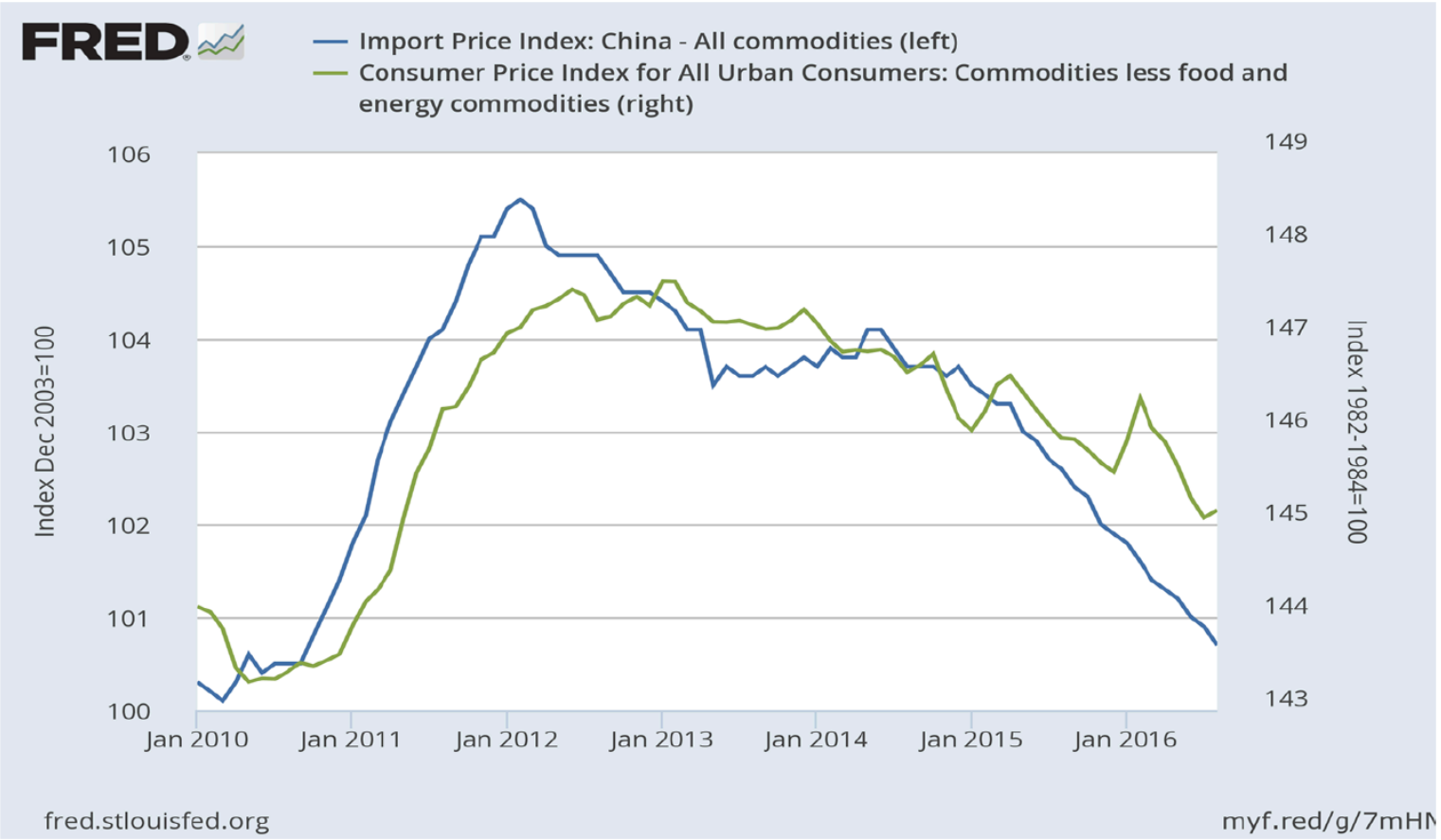
Core Goods vs Core Services

- **Core Goods** (20% of CPI) affected by China, while **Core Services** (35% of CPI) by US dynamics



Core Inflation and Imported Goods

- Price of imported products from China are a growing influence on U.S. core goods prices



The Three "Prices" of Money

1. Price relative to **all G&S**
   - Aggregate price level
2. Price relative to **time**
   - Interest Rate
3. Price relative to a **foreign currency**
   - Exchange rate

- Recall: Price index helps to separate price changes from output changes

Nominal vs Real **GDP**

$$Nominal\ GDP = Real\ GDP \times Aggregate\ Price\ Level$$

- Nominal GDP rises by 4.25%
- Inflation of 2.05%
- Roughly speaking, real GDP rose by 2.2%

Nominal vs Real **Interest Rates**

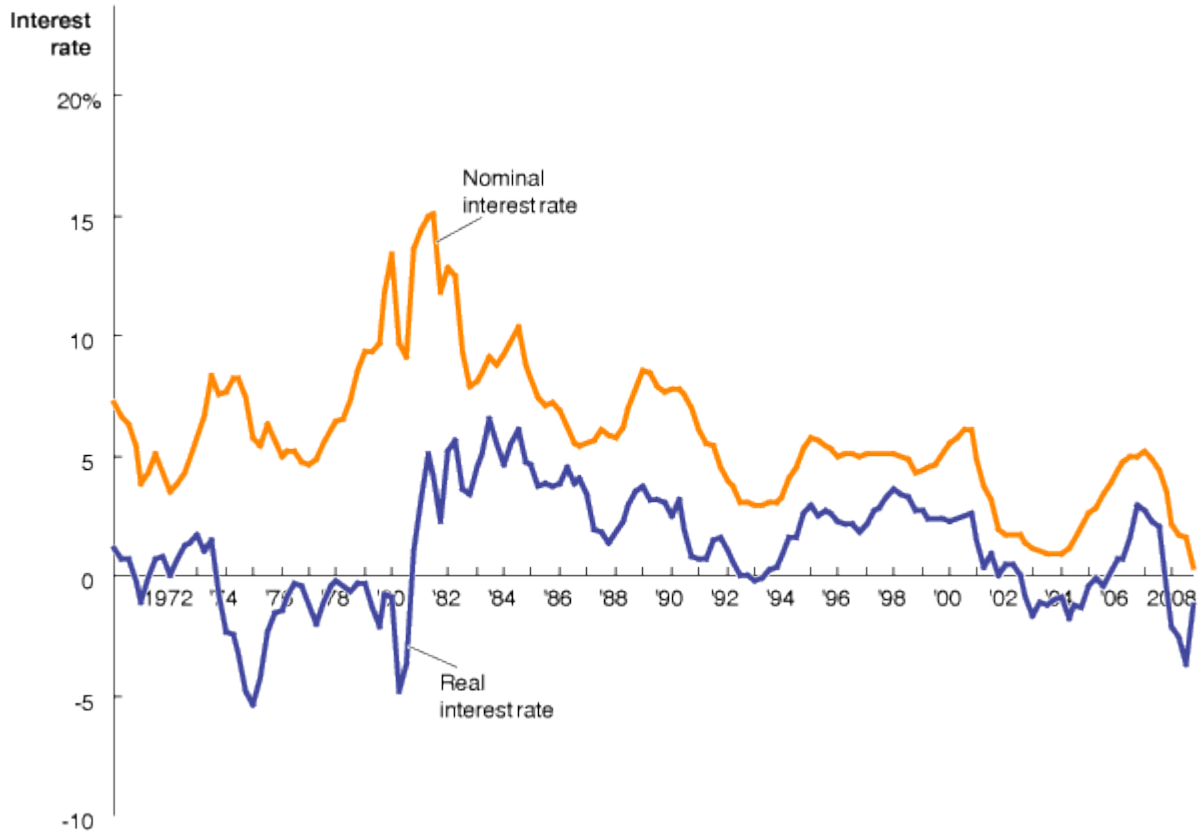
- **Nominal** interest rate: The stated interest rate on a loan
- **Real** interest rate: The nominal interest rate adjusted for inflation

$$\text{Real Interest Rate} = \text{Nominal Interest Rate} - \text{Inflation Rate}$$

- Intuition of real interest rate?
  - How much purchasing power goes up

Nominal vs Real Interest Rates

Nominal and Real Interest Rates, 1970–2008



Question

The stated interest rate on a loan is:

a) The nominal interest rate.

b) The real interest rate.

c) The rate of inflation.

d) Neither the nominal nor the real rate of interest envisioned by economists.

Question

Which interest rate provides a better measure of the true cost of borrowing and the true return to lending?

a) The nominal interest rate.

b) The real interest rate.

c) The interest rate on three-month U.S. Treasury bills.

d) All of the above.

Nominal vs Real Distinction

- So far we have made a nominal vs real distinction for **GDP** and **interest rates**
  - The distinction between nominal and real can also be applied to **exchange rates**
- **Nominal** variables are expressed in **dollar** terms
- **Real** variables are expressed in **quantity** terms (inflation adjusted)

Questions

	2000	2018
Pizza	$10	$12
Income	$90	$114

- Did your purchasing power increase or decrease?
  - By how much?
  - Are pizzas cheaper or expensive relative to income?

Jeremy Horpedahl 🍍🍞 @jmhorp · May 6

And here are the actual data

White bread 🍞 per pound
1977: $0.405
2019: $1.333
Incr: 229.1%

Median personal income 💰, age 25-34
1977: $9,336
2017: $35,455
Incr: 279.8%

So rather than being 6x as expensive (!), 🍞 is ~15% cheaper relative to income

And see my SOURCES below

> **Jeremy Horpedahl** 🍍🍞 @jmhorp
> The sad thing isn't that someone on Twitter made this obvious mistake. The sad thing is it has 45,000 retweets twitter.com/akkitwts/statu…
> Show this thread

Does Inflation Impose Costs on the Economy?

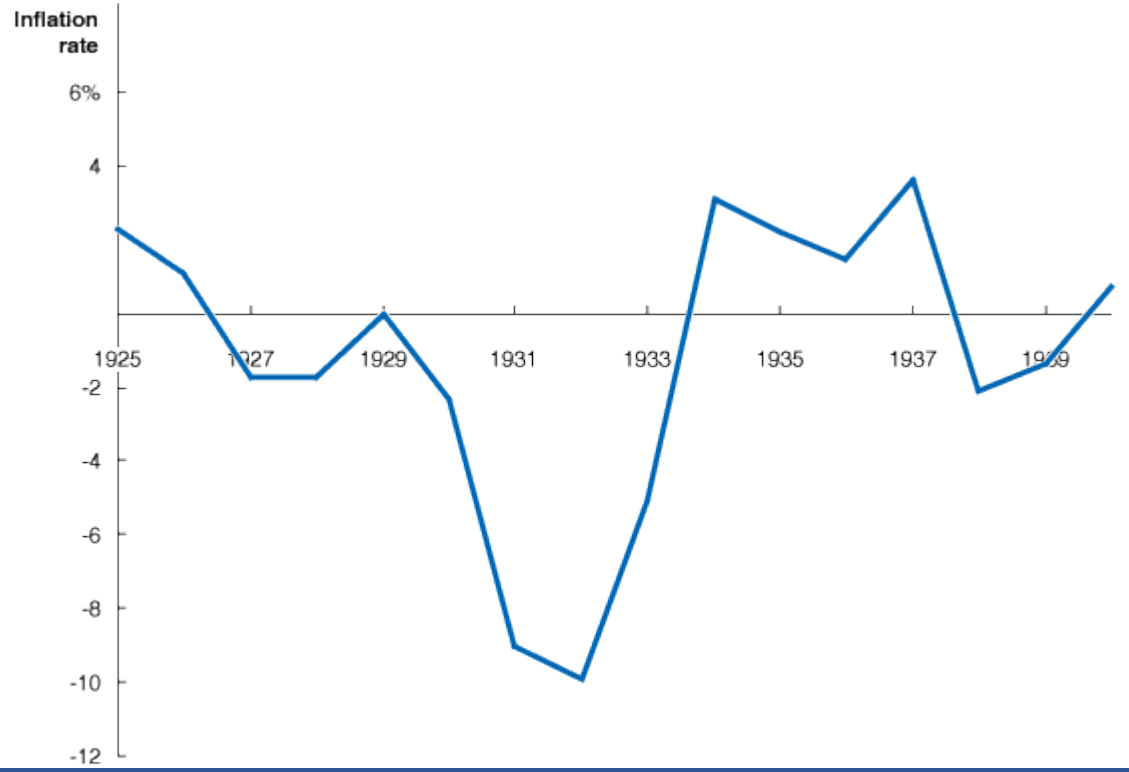
- Inflation affects the **distribution of income**
  - The extent depends in part on whether it is anticipated or unanticipated

- The problem with **anticipated** inflation
  - **Menu costs**: The costs to firms of changing prices
  - **Shoe leather costs**: The cost of time and effort (going to bank)

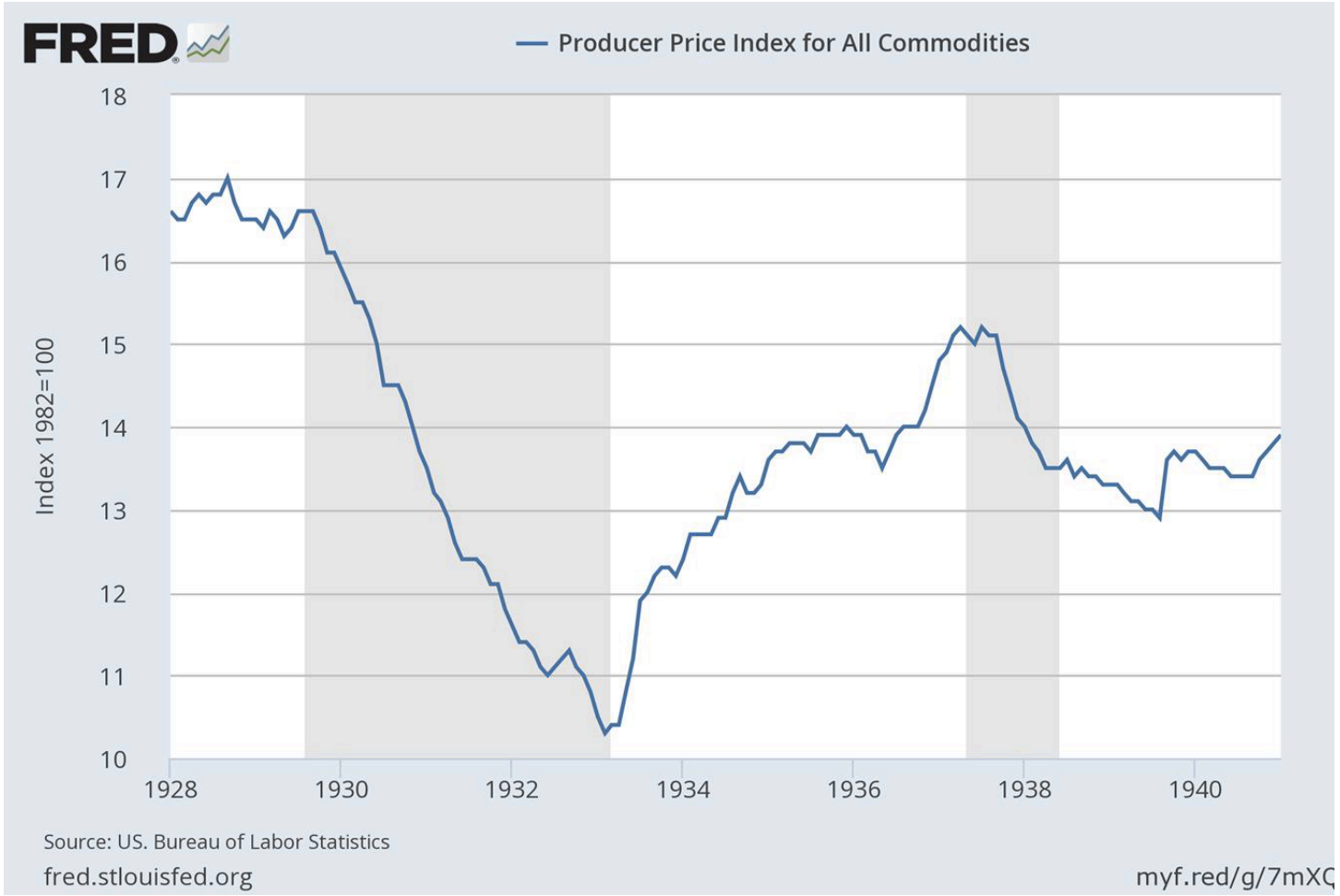
- The problem with **unanticipated** inflation
  - When the *actual* inflation rate turns out to be very different from the *expected* inflation rate, **some people gain and other people lose**

What's So Bad about Falling Prices?

	1929	1930	1931	1932	1933
Nominal interest rate	5%	5%	5%	5%	5%
Change in the consumer price level	0	-2.3	-9.0	-9.9	-5.1
Real interest rate	5	7.30	14.00	14.90	10.10



Deflation During the Great Depression



- Prices fell by 37%, and bankruptcies soared