



# Measuring the Cost of Living

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# Overview

- Consumer Price index (CPI) : measuring the living cost
- Difference between CPI and GDP deflator
- inflation+ interest rate

# The Consumer Price Index

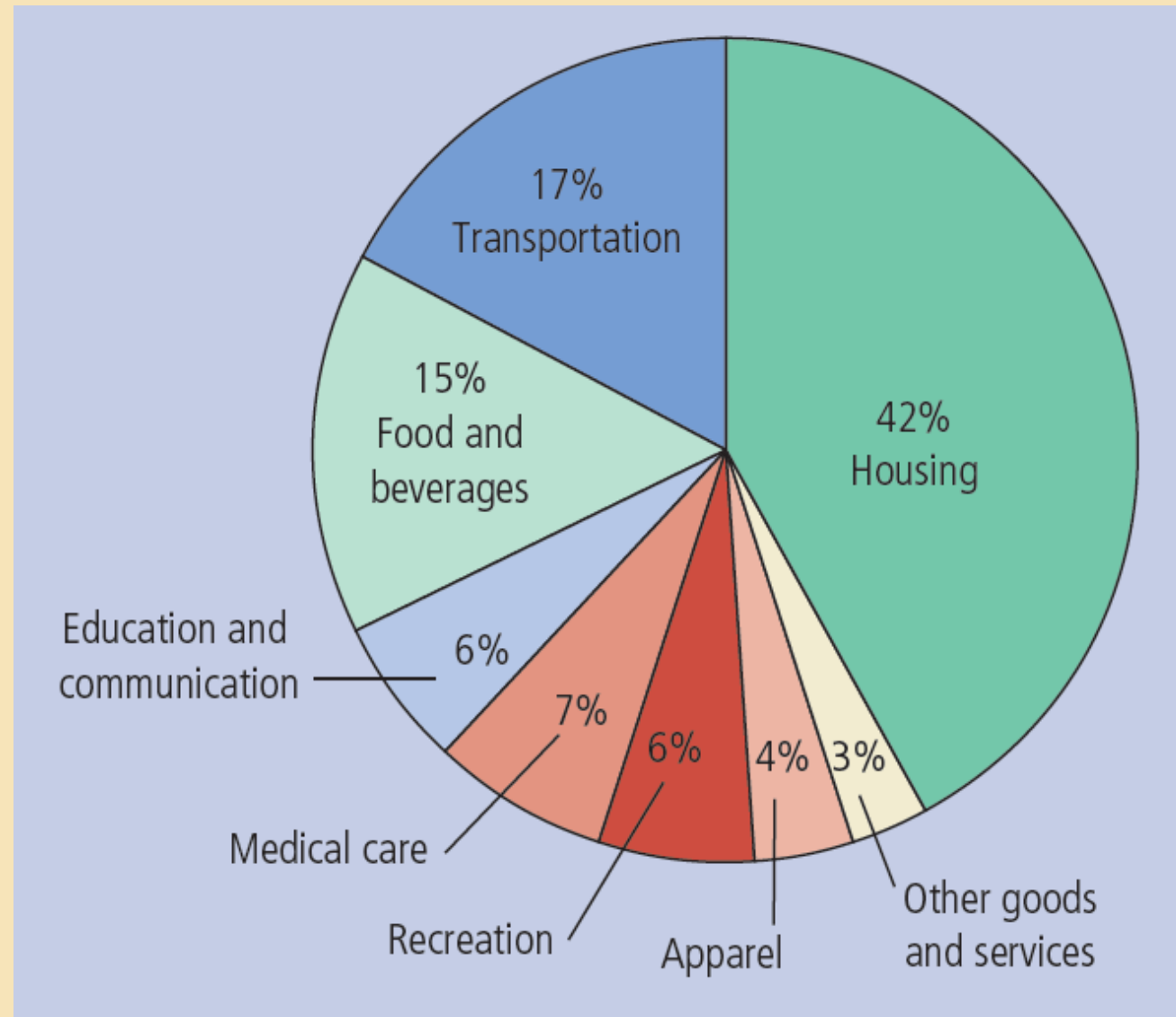
- **Consumer price index (CPI)**
  - One measure of the overall level of prices
  - Measure of the overall cost of goods and services
    - Bought by a typical consumer
  - Bureau of Labor Statistics, released monthly
  - For China, released by National Bureau of Statistics 国家统计局, monthly, quarterly, annually

# Some insight about CPI

- CPI reflect mainly urban consumers' consumption habit
- CPI needs to **define a "basket"**
- The CPI market basket is developed from detailed expenditure information provided by families and individuals on what they actually bought.
- What goods and services does the CPI cover? Weight?

# Figure 1

## •The Typical Basket of Goods and Services



•This figure shows how the typical consumer divides spending among various categories of goods and services. The Bureau of Labor Statistics calls each percentage the “relative importance” of the category.

# Calculating CPI

## 1. Fix the basket

- Which good are most important to the typical consumer
- Different weights

## 2. Find the prices

- At each point in time

## 3. Compute the basket's cost

- Same basket of goods
- Isolate the effects of price changes

# Calculating CPI

## 4. Chose a base year and compute the CPI

- Base year = benchmark
  - Price of basket of goods & services in current year
  - Divided by price of basket in base year
  - Times 100

## 5. Compute the inflation rate

$$\text{Inflation rate in year 2} = \frac{\text{CPI in year 2} - \text{CPI in year 1}}{\text{CPI in year 1}} \times 100\%$$

# Table 1

## •Calculating the Consumer Price Index and the Inflation Rate: An Example

### Step 1: Survey Consumers to Determine a Fixed Basket of Goods

Basket = 4 hot dogs, 2 hamburgers

### Step 2: Find the Price of Each Good in Each Year

Year	Price of Hot Dogs	Price of Hamburgers
2010	\$1	\$2
2011	2	3
2012	3	4

### Step 3: Compute the Cost of the Basket of Goods in Each Year

2010	$(\$1 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$2 \text{ per hamburger} \times 2 \text{ hamburgers}) = \$8 \text{ per basket}$
2011	$(\$2 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$3 \text{ per hamburger} \times 2 \text{ hamburgers}) = \$14 \text{ per basket}$
2012	$(\$3 \text{ per hot dog} \times 4 \text{ hot dogs}) + (\$4 \text{ per hamburger} \times 2 \text{ hamburgers}) = \$20 \text{ per basket}$

•This table shows how to calculate the consumer price index and the inflation rate for a hypothetical economy in which consumers buy only hot dogs and hamburgers.



# Table 1

## •Calculating the Consumer Price Index and the Inflation Rate: An Example

### Step 4: Choose One Year as a Base Year (2010) and Compute the Consumer Price Index in Each Year

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2010	$(\$8 / \$8) \times 100 = 100$
2011	$(\$14 / \$8) \times 100 = 175$
2012	$(\$20 / \$8) \times 100 = 250$

### Step 5: Use the Consumer Price Index to Compute the Inflation Rate from Previous Year

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2011	$(175 - 100) / 100 \times 100 = 75\%$
2012	$(250 - 175) / 175 \times 100 = 43\%$

•This table shows how to calculate the consumer price index and the inflation rate for a hypothetical economy in which consumers buy only hot dogs and hamburgers.

# The Consumer Price Index

- **Inflation rate**

- Percentage change in the price index from the preceding period

- **Producer price index, PPI**

- Measure of the cost of a basket of goods and services bought by firms
- Changes in PPI are often thought to be useful in predicting changes in CPI

# The Consumer Price Index

- **Problems in measuring the cost of living**
  - Substitution bias (fixed basket)
    - Prices do not change proportionately
    - Consumers substitute toward goods that have become relatively less expensive
  - Introduction of new goods
    - More variety of goods (cannot capture)
  - Unmeasured quality change
    - Changes in quality

# GDP deflator versus CPI

- GDP deflator

- Ratio of nominal GDP to real GDP
- Reflects prices of all goods & services produced domestically

- CPI

- Reflects prices of goods & services bought by consumers

# Difference

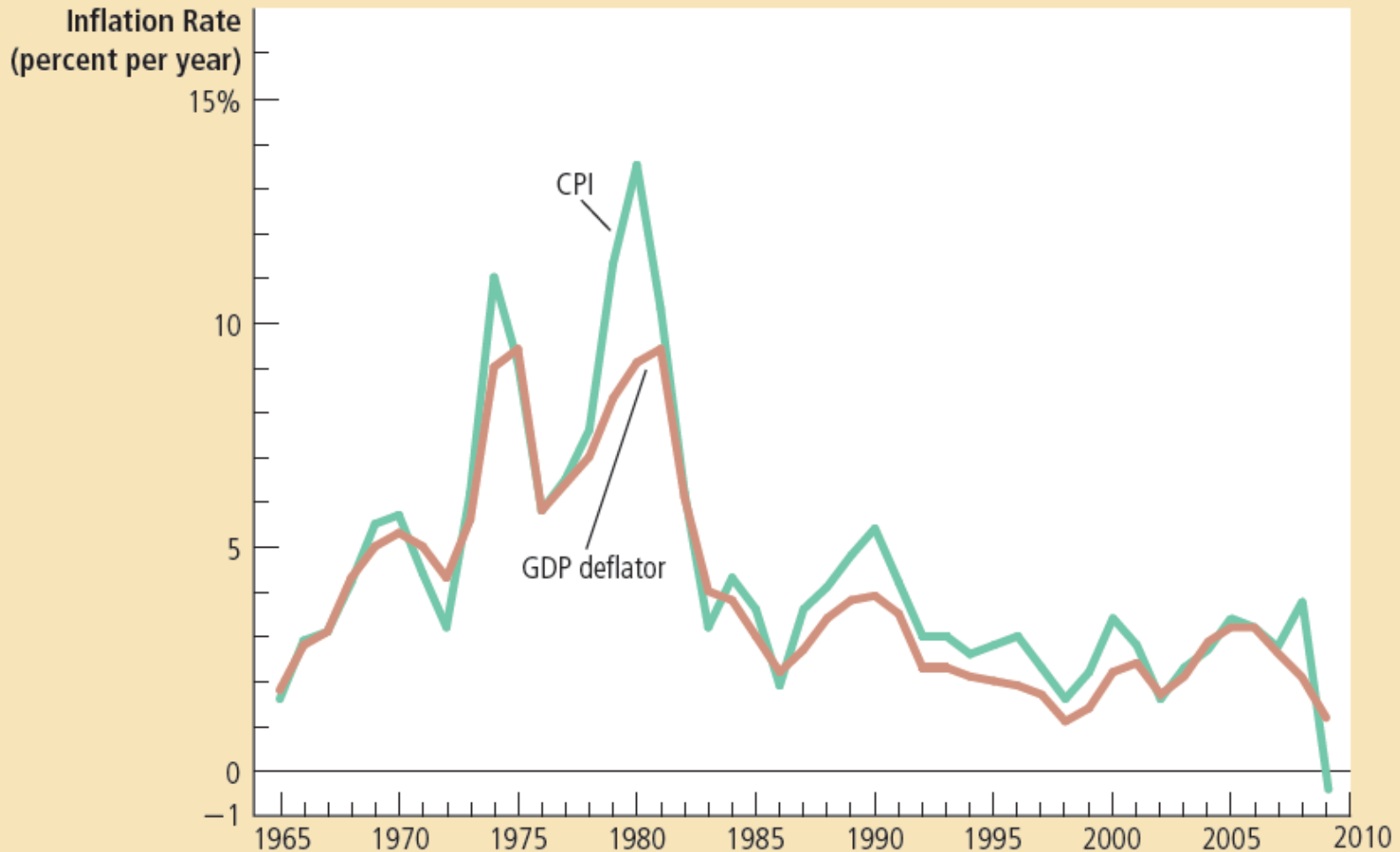
- The GDP deflator reflects the prices of all goods produced domestically.
- the CPI reflects the prices of all goods consumed domestically.
- Question: if price of an imported car rises
  - GDP deflator: the same or ambiguous, it depends.
  - CPI: rises for sure.

# Difference (con'td)

- The GDP deflator is based on the prices of goods currently produced.
- CPI : a fixed basket!
- When the prices of different goods and services change by different amount, change in CPI and GDP deflator might be different.

# Figure 2

## •Two Measures of Inflation



•This figure shows the inflation rate—the percentage change in the level of prices—as measured by the GDP deflator and the consumer price index using annual data since 1965. Notice that the two measures of inflation generally move together.

# Past exam question:

- Why does GDP deflator gave a different rate of inflation than CPI?



# Correcting Economic Variables

- Dollar figures from different times

Amount in today's dollars =

$$= \text{Amount in year T dollars} \times \frac{\text{Price level today}}{\text{Price level in year T}}$$

- Indexation

- Automatic correction by law or contract
- of a money amount
- for the effects of inflation
- E.g. COLA --- Cost of living allowance

# Real and Nominal Interest Rates

- **Nominal interest rate**

- Interest rate as usually reported
- Without a correction for the effects of inflation

- **Real interest rate**

- Interest rate corrected for the effects of inflation
- = Nominal interest rate – Inflation rate**

# Interest rates in the U.S. Economy

- **Nominal interest rate**

- Always exceeds the real interest rate
- U.S. economy has experienced rising consumer prices in every year

- **Inflation is variable**

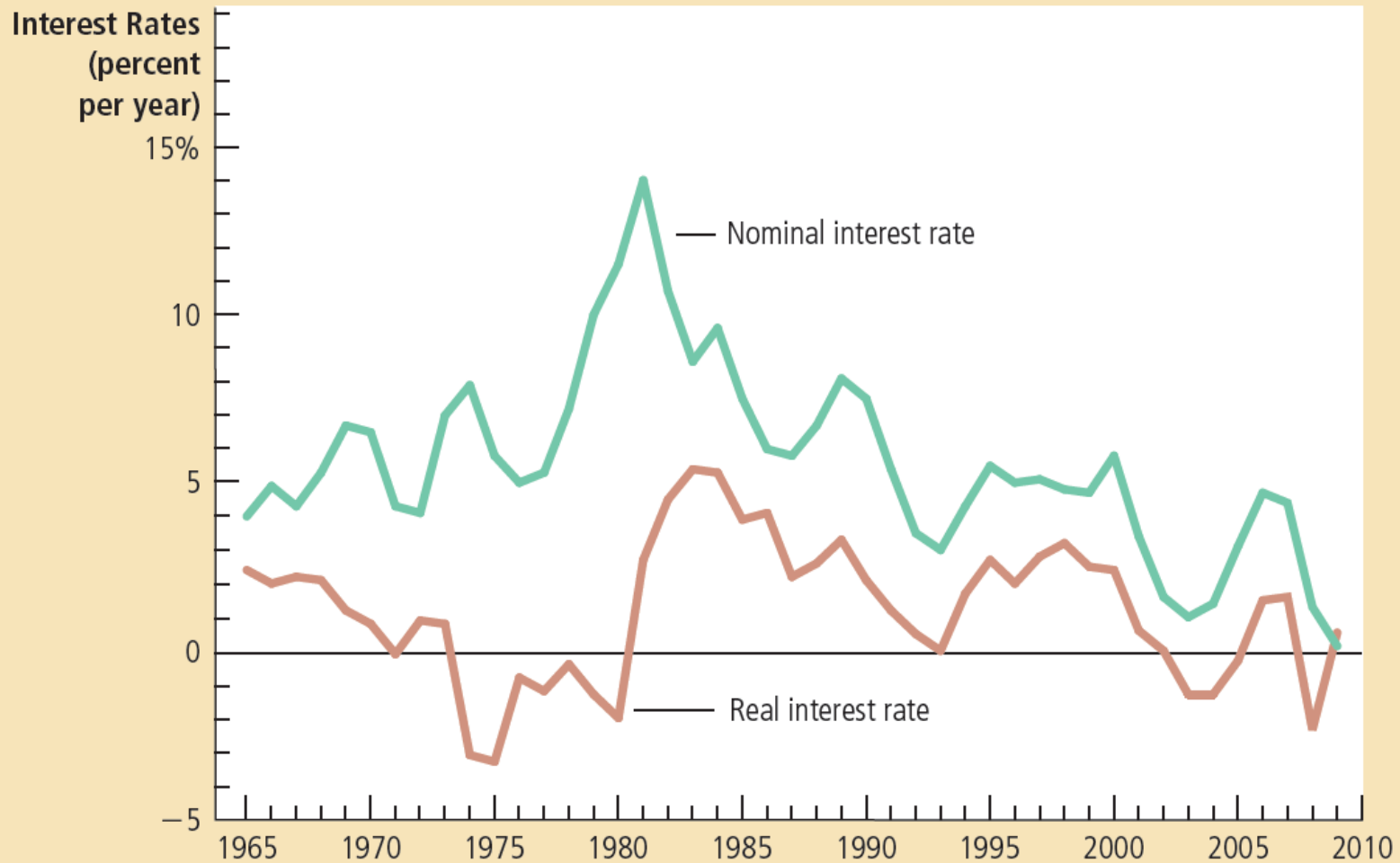
- Real and nominal interest rates do not always move together

- **Periods of deflation**

- Real interest rate exceeds the nominal interest rate

# Figure 3

## •Real and Nominal Interest Rates



•This figure shows nominal and real interest rates using annual data since 1965. The nominal interest rate is the rate on a 3-month Treasury bill. The real interest rate is the nominal interest rate minus the inflation rate as measured by the consumer price index. Notice that nominal and real interest rates often do not move together.



# 谢谢!

# THANK YOU!

