Measuring The Cost of Living (The Price Level)

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Lesson Objectives

In this lesson, your will be able to answer the following questions:

- What is the Consumer Price Index (CPI)? How is it calculated? What's it used for?
- What are the problems with the CPI?
- How does the CPI differ from the GDP deflator?
- How can we use the CPI to compare dollar amounts from different years? Why would we want to do this, anyway?
- How can we correct interest rates for inflation?

What is the CPI and How It Is Calculated

Consumer price index (CPI) is a measure of the overall prices

Steps in calculating CPI are:

1. Fix the "basket:"
2. Find the prices.
3. Compute the basket's cost in the given year.

How the CPI Is Calculated (cont'd)

4. **Choose a base year and compute the index as:**

$$\frac{\text{cost of basket using a given year prices}}{\text{cost of basket using base year prices}} \times 100$$

5. **Compute the inflation rate as:**

$$\frac{\text{Current year's CPI} - \text{Last year's CPI}}{\text{Last year's CPI}} \times 100\%$$

Computing CPI

basket: {4 pizzas, 10 lattes}

Year	Price of Pizza	Price of Latte	Cost of Basket
2007	\$10	\$2.00	
2008	\$11	\$2.50	
2009	\$12	\$3.00	

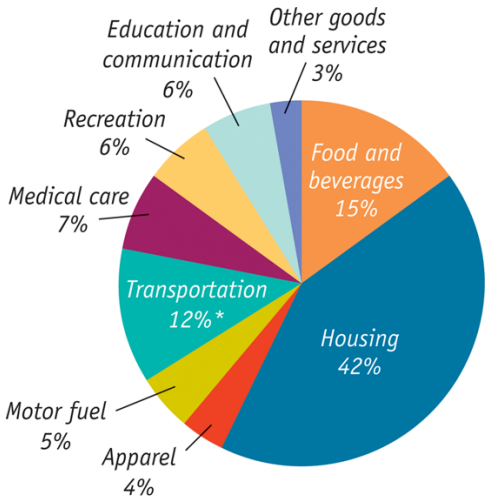
Compute CPI in each year, 2007 = 100 and then Inflation rate:

2007:

2008

2009:

CPI Basket



ACTIVE LEARNING: Calculate the CPI and Inflation

CPI basket:
{10 lbs beef, 20 lbs chicken }

2004= 100

	price of beef	*price of chicken*
2004	$4	$4
2005	$5	$5
2006	$9	$6

A. Compute the CPI in 2005:

B. What was the CPI inflation rate from 2005-2006?

Problems With the CPI

CPI overstates the inflation rate because of

1. Substitution bias
2. Ignoring new goods
3. Ignoring quality improvements

2. The GDP Deflator

- The GDP deflator is a measure of the overall level of prices (those goods and services producer in a given year) and is given by:

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

- One way to measure the economy's inflation rate is to compute the percentage increase in the GDP deflator from one year to the next.

Example: Calculating GDP deflator

year	Nominal GDP	Real GDP	GDP Deflator	Inflation
2005	$6000	$6000		
2006	$8250	$7200		
2007	$10,800	$8400		

- Compute the GDP deflator in each year:

2005:

2006:

2007:

Contrasting the CPI and GDP deflator

Imported consumer goods:
- included in CPI
- excluded from GDP deflator

Capital goods:
- excluded from CPI
- included in GDP deflator (if produced domestically)

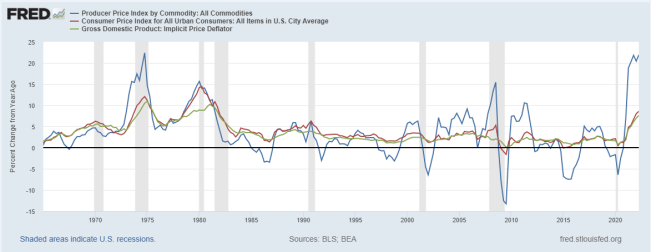
The basket:
- CPI uses fixed basket
- GDP deflator uses basket of currently produced goods & services

This matters if different prices are changing by different amounts.

3. The Producer Price Index

- PPI measures the cost of a typical basket of goods and services that are used by producers (such as steel, electricity, coal, etc)
- Sometimes called Wholesale Price Index
- Regarded as an early warning signal of changes in the inflation rate.

Three Measures of Inflation, 1965-2022



ACTIVE LEARNING: CPI vs. GDP deflator

In each scenario, determine the effects on the CPI and the GDP deflator.

A. Starbucks raises the price of Frappuccinos.

B. Caterpillar raises the price of the industrial tractors it manufactures at its Illinois factory.

C. Armani raises the price of the Italian jeans it sells in the U.S.

Comparing dollar figures from different times

$$\begin{array}{c}\text{Amount}\\ \text{in today's}\\ \text{dollars}\end{array} = \begin{array}{c}\text{Amount}\\ \text{in year T}\\ \text{dollars}\end{array} \times \frac{\text{Price level today}}{\text{Price level in year T}}$$

EXERCISE 1: The High Price of Gasoline?

- Price of a gallon of regular unleaded gas:

$1.42 in 1981

$2.50 in 2019

- CPI for 1981 was 90.93 when the CPI for 2019 was 237.0
- Is gas more expensive today than in 1981?

EXERCISE 2: Salaries Exercise

- 1980: CPI = 90, avg starting salary for econ majors = $24,000
- Today: CPI = 180, avg starting salary for econ majors = $50,000
- Are econ majors better off today or in 1980?

Correcting Variables for Inflation: Indexation

- A dollar amount is **indexed** for inflation if it is automatically corrected for inflation by law or in a contract.

For example, the increase in the CPI automatically determines

- the COLA in many multi-year labor contracts
- the adjustments in Social Security payments and federal income tax brackets

Correcting Variables for Inflation: Real vs. Nominal Interest Rates

The nominal interest rate (i):

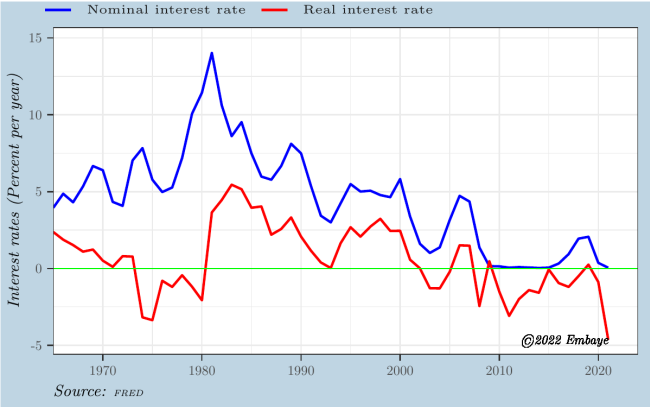
- the interest rate not corrected for inflation
- the rate of growth in the dollar value of a deposit or debt

The real interest rate (r):

- corrected for inflation
- the rate of growth in the purchasing power of a deposit or debt

$$r = i - \text{inflation rate}$$

Real and Nominal Interest Rates in the U.S., 1960-2019



Active Learning: Nominal and Real Variables

Suppose you have a deposit of \$1000 in a bank which pays 10% interest rate in a year. The price of bread this year is \$2/loaf which means the real value (purchasing power) of your deposit today is 500 loaves of bread. Suppose the price of bread increases by 6% next year

a. what is the total dollar value (nominal value) of your deposit next year? How many loaves of break can you buy next year?

b. What are the percentage changes in the total value of your deposit in nominal and real terms from (a)?

SUMMARY

- The Consumer Price Index is a measure of the cost of living. The CPI tracks the cost of the typical consumer's "basket" of goods & services.
- The CPI is used to make Cost of Living Adjustments, and to correct economic variables for the effects of inflation.
- The real interest rate is corrected for inflation, and is computed by subtracting the inflation rate from the nominal interest rate.