Econ. 1A.. Chapter 7. CPI and Cost of Living

1. **CPI (Consumer Price Index)**: A measure of the average of the prices paid by urban consumers for fixed market basket of goods and services. It tells us what has happened to the value of the money in our pocket.
2. Reading the CPI numbers:
   Reference base period: A period for which the CPI is defined to equal 100. Currently the reference base period is 1982-1984.
   Example 1:
   The reference base period: 1982-1984   CPI = 100.0
   July 2011   CPI = 225.4
   Inflation rate = [(225.4-100)/100]x100% = 125.4%
   " **The average of the prices paid by urban consumers for a fixed market basket of consumer goods and services was 125.4% higher in July 2011 than it was on the average during 1982 – 1984.**"
   Example 2.
   June 2011   CPI = 224.3
   July 2011   CPI = 225.4
   Inflation rate = [(225.4-224.3)/224.3]x100% = 1.1%.
   " **The average of the prices paid by urban consumers for a fixed market basket of consumer goods and services was increases by 1.1% in July 2011.**"
3. **Constructing the CPI is a large operation that involves three stages**:

(1) Selecting the CPI basket.
(2) Conducting the monthly price survey.
(3) Calculating the CPI.

4. **The CPI basket**
   The CPI basket contains the goods and services represented in the index and the relative importance attached to each of them. Currently, the CPI basket contains around 80,000 different goods and services arranged in the 8 large groups.

   The 8 groups in the CPI basket

Housing:	41.5%	Food and beverage	14.8%
Transportation	17.3%	Medical care	6.6%
Apparel	3.6%	Recreation	6.3%
Education and communication	6.4%	Other goods and services	3.5%.

5. **The monthly price survey**
   Each month, the Bureau of Labor Statistics (BLS) sends observers to check and record the prices of 80,000 goods and services in the CPI basket in 30 metropolitan areas.

6. **Calculating the CPI.**
To calculate CPI, it takes three steps:
(1) Find the cost of CPI basket at based-period prices;
(2) Find the cost of CPI basket at current-period prices;
(3) Calculate CPI for the based period and the current period.

7.
Example: a simplified calculation of CPI.
    (a) Base Period: 2005   Current Period: 2012
    (b)

Good	Q (2005)	P (2005)	PQ	P'(2012)	P'Q
Orange	10	$1.00	$10	$2.00	$20
Haircut	5	$8.00	$40	$10.00	$50

Cost of CPI basket:

Based period 2008: $\Sigma PQ = \$10 + \$40 = 50$.

Current period 2009: $\Sigma P'Q = \$20 + \$50 = \$70$

Formula: CPI = (cost of CPI basket at current period prices/ cost of CPI basket at base period prices)x100%
    CPI (2005) = ($50/$50) x 100% = 100% = 100
    CPI (2012) = ($70/$50) x 100% = 140% = 140.

8. Measuring inflation and deflation

Inflation Rate (π): The percentage change in the price level from one year to the next.
Formula: $\pi = $ [(CPI in current year – CPI in previous year)/CPI in previous year]x100%.

(a) **Inflation**: a situation in which the price level is rising and the inflation rate is positive.
Example:

	CPI.
2011	120
2012	140

Inflation rate (π) = [(140-120)/120]x100% = 16.7% > 0.

(1) We have inflation.
(2) The cost of living rises and the value of money decreases.

(b) **Deflation**: a situation in which the price level is falling and the inflation rate is negative.

Example:

	CPI .
2008	219.1
2009	214.8.

Inflation rate (π) = [(214.8-219.1)/219.1]x100% = - 2.0% < 0.

(1) We have deflation.
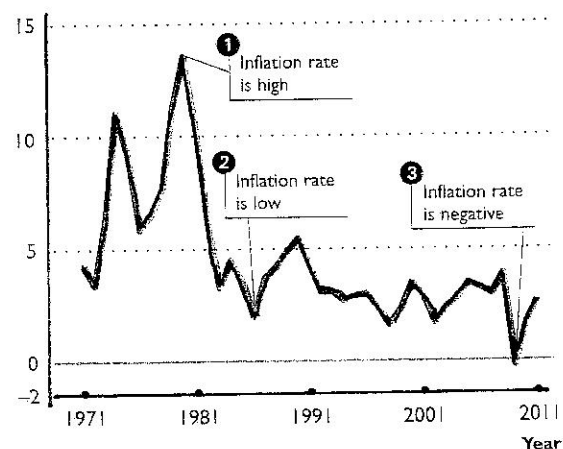**(2) The cost of living falls and the value of money increases.**

The CPI and the Inflation Rate: 1971–2011

CPI (1982-1984 = 100, ratio scale)
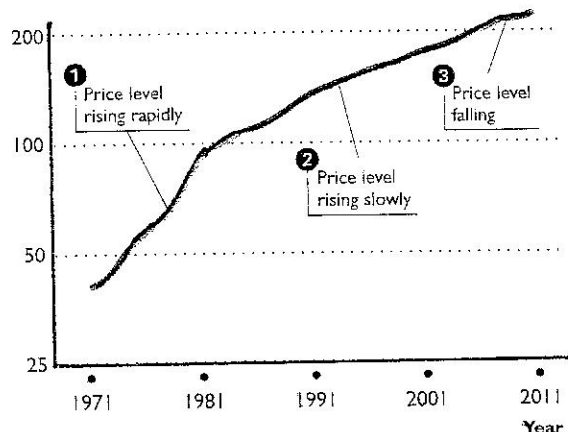
(a) CPI: 1971–2011

Inflation rate (percent per year)

(b) CPI inflation rate: 1971–2011

SOURCE OF DATA: Bureau of Labor Statistics.

❶ The price level in part (a) was rising rapidly during the 1970s and 1980s and the inflation rate in part (b) was high. ❷ The price level was rising slowly during the 1990s and 2000s and the inflation rate was low. ❸ In 2009, the price level fell and the inflation rate was negative.

9. The CPI is not a perfect measure of the price level and cost of living. But it is the best we have right now. The CPI may be biased. The main resources of bias are
(a) New goods bias; (b) quality change bias; (c) commodity substitution bias; (d) outlet substitution effect bias.

Notes:
(1) A Congressional Advisory Commission on the Consumer Price Index in 1996 pointed out that CPI overestimates inflation by 1.1%. i.e., if CPI inflation rate is 3.1% a year, most likely inflation is actually 2%.
(2) The bias in the CPI distorts private contracts and increases government outlays.
(a) Many private contracts, such as wage contracts, are linked to the CPI. For example, a firm and its workers might agree to a three-year wage deal that increases the wage rate by 2% plus the percentage change in the CPI. If the CPI is overestimated, such a deal ends up giving the workers more real income than the firm intended.
(b) Close to a third of federal government outlays, including Social Security checks, are linked directly to the CPI. If the CPI is over estimated, government outlays will be higher than the government intended.

10. **Alternative Price Index**
(a) GDP price index (GDP deflator) : An average of current prices of all goods and services included in GDP expressed as a % of base-year prices.
(b) Personal consumption expenditures (PCE) price index: An average of the current prices of the goods and services included in the consumption expenditure component of GDP expressed as % of base-year prices.
(c) PCE price index excluding food and energy (core CPI).

Nominal and Real Values

11. Comparison the cost of a good we pay at different dates

The cost of a good in current year = the cost of a good in previous year x (CPI in current year/CPI in previous year.)

	Price of stamp	CPI
1911	2c	9.8
2011	44c	225.4

1911's price of stamp in 2011 dollar = 2c x (225.4/9.8) = 46c.
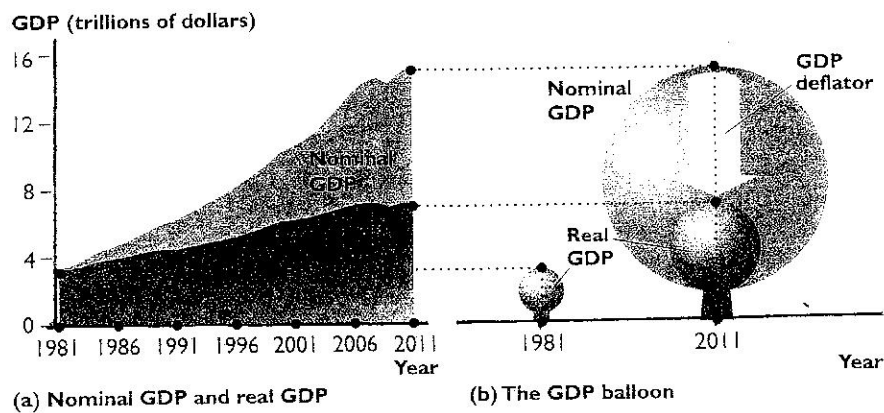
Nominal and Real Values in Macroeconomics

12. **Nominal GDP and RGDP**

$$RGDP = (NGDP/GDP \text{ price index}) \times 100$$

	GDP price index	NGDP(bi)	RGDP(bi)
2005	100.0	12,623	12,623
2010	111.0	14,527	13,088

Base year: 2005
Note that GDP price index is usually called **GDP deflator.**

(a) Nominal GDP and real GDP   (b) The GDP balloon

13. **Nominal Wage Rate**: The average hourly wage rate measured in current dollar.
    Real Wage Rate: The average hourly wage rate measured in the dollars of a given reference base period. It shows that the quantity of goods and services that an hour work can buy.
   **Real wage rate = (Nominal wage rate in current year/ CPI in current year) x 100%.**

	CPI	nominal wage rate	real wage rate
1984	100.0	8.48	8.48
2011	225.4	19.04	8.45

Nominal and Real Wage Rates: 1981–2011

The nominal wage rate has increased every year since 1981. The real wage rate decreased slightly from 1981 through the mid-1990s, after which it increased slightly again. Over the entire 30-year period, the real wage rate remained steady.
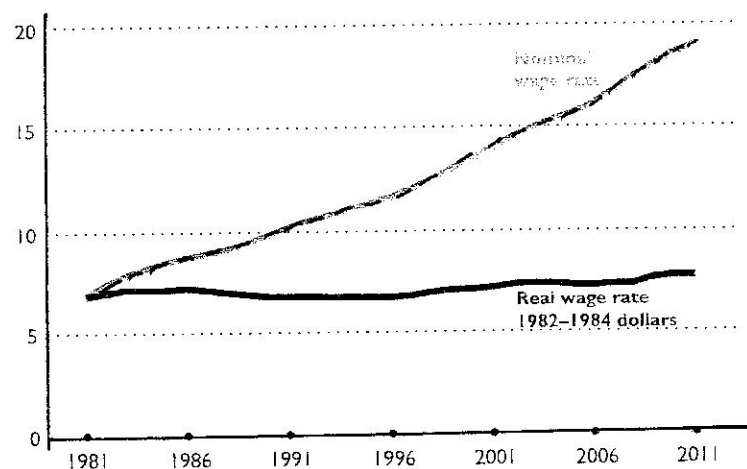

14. **Nominal Interest Rate (i)**: % return on a loan expressed in dollar.
    Real Interest Rate (r): % return on a loan expressed in purchasing power of money i.e., the nominal interest rate adjusted for the effects of inflation.
    Real interest rate = nominal interest rate – inflation rate.
    $$r = i - \pi.$$

Example:

(1) Suppose that you have $1,000 in a bank deposit – a loan by you to a bank – on which you receive **interest** of $50 a year. The nominal interest rate (i) = (50/1,000)x100% = 5%.

(2) A the end of one year your bank deposit has increased to $1,050 – the original $1,000 plus the $50 **interest**.

(3) Suppose that prices have increased by 3%, so now you need $1,030 to buy what $1,000 would have bought a year earlier. How much interest have you really received? The answer is $20, or a real interest rate (r) of 2% a year, i.e., r = 20/1,000 = 2%.

Using formula: $r = i - \pi = 5\% - 3\% = 2\%.$

Interest rate (percent per year)
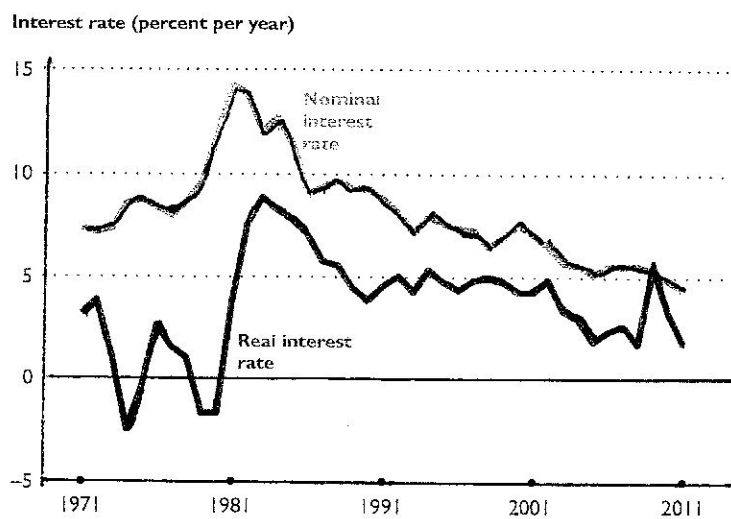
The interest rate shown here is that paid by the safest large corporations on long-term bonds (known as Moody's AAA). The real interest rate equals the nomi-nal interest rate minus the inflation rate. The vertical gap between the nominal interest rate and the real interest rate is the inflation rate. The real interest rate is usually positive, but during the 1970s, it became negative.