CPI calculation -- The Basics

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Consider an economy with only two goods, X and Y.

The base year for the CPI in that economy is 1980.

Prices and quantities of the two goods are given in the following table

YEAR	Px	Qx	Py	Qy	CPI	Inflation rate
1980	$ 20	50	$ 10	50		
2000	$ 25	80	$ 30	50		
2001	$ 25	100	$ 35	40		
2002	$ 30	120	$ 40	50		

Note that although you can calculate all CPI values, the inflation rate can only be calculated for certain years (which years and why?)

Computation is easier if we first compute that price of the base year basket at current prices.

YEAR	Px	Qx	Py	Qy	Price of base year basket at current prices
1980	20	50	10	50	20(50) + 10(50) = $ 1500
2000	25	80	30	50	25(50) + 30(50) = $ 2750
2001	25	100	35	40	25(50) + 35(50) = $ 3000
2002	30	120	40	50	30(50) + 40(50) = $ 3500

Since the CPI is the price of the base year basket at current prices divided by the price of the base year basket at base year prices, we divide each number in the final column by $ 1500 to arrive at the CPI.

YEAR	CPI	Inflation rate
1980	1500/1500 = 1.00	Unknown; no data for 1979
2000	2750/1500 = 1.833	Unknown; no data for 1999
2001	3000/1500 = 2.000	2.00 - 1.833 / 1.833 = 9.11 percent
2002	3500/1500 = 2.333	2.33 - 2.00 / 2.00 = 16.67 percent

GDP deflator calculation

Consider an economy with only two goods, X and Y.

The base year for the GDP deflator in that economy is 1980.

Prices and quantities of the two goods are given in the following table

YEAR	Px	Qx	Py	Qy	GDP deflator	Inflation rate
1980	$ 20	50	$ 10	50		
2000	$ 25	80	$ 30	50		
2001	$ 25	100	$ 35	40		
2002	$ 30	120	$ 40	50		

Note that although you can calculate all GDP deflator values, the inflation rate can only be calculated for certain years (which years and why?)

Computation is easier if we first compute real GDP = value of current quantities at base year prices, and also nominal GDP = value of current quantities at current prices

YEAR	Px	Qx	Py	Qy	Real GDP	Nominal GDP
1980	20	50	10	50	20(50) + 10(50) = $ 1500	$ 1500
2000	25	80	30	50	20(80) + 10(50) = $ 2100	25(80) + 30(50) = $ 3500
2001	25	100	35	40	20(100) + 10(40) = $ 2400	25(100) + 35(40) = $ 3900
2002	30	120	40	50	20(120) + 10(50) = $ 2900	30(120) + 40(50) = $ 5600

Since real GDP = nominal GDP / GDP deflator, we can calculate the GDP deflator as nominal GDP divided by real GDP.

YEAR	GDP deflator	Inflation rate
1980	1500/1500 = 1.00	Unknown; no data for 1979
2000	3500/2100 = 1.67	Unknown; no data for 1999
2001	3900/2400 = 1.625	- 2.5 percent (a deflation rate of 2.5 percent)
2002	5600/2900 = 1.931	+ 18.83 percent