

## 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	P <sub>x</sub>	Q <sub>x</sub>	P <sub>y</sub>	Q <sub>y</sub>	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	P <sub>x</sub>	Q <sub>x</sub>	P <sub>y</sub>	Q <sub>y</sub>	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	P <sub>x</sub>	Q <sub>x</sub>	P <sub>y</sub>	Q <sub>y</sub>	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	P <sub>x</sub>	Q <sub>x</sub>	P <sub>y</sub>	Q <sub>y</sub>	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