

## 1 GDP

1. A country produces 100 cars in a given year. Each is sold for \$10,000. In addition, the country produces 800 tyres with a price of \$100. 400 of these are used in the production of cars. The others are exported. Calculate the country's GDP.
2. How do you think the following events would affect real GDP? Explain your answers. In some cases, there may be offsetting effects.
  - (a) A hurricane hits Florida.
  - (b) The stock market experiences a rally.

### 1.1 Answer: GDP

1. Easy.
2. Shocks and GDP:
  - (a) Hurricane: Some businesses close and don't produce output for some time (negative effect). Additional demand for reconstruction (positive effect).
  - (b) Stock market rally: no effect. Capital gains are not part of GDP. Of course, there would be indirect effects (more consumption demand) that would likely stimulate GDP.

## 2 Real and nominal GDP

### 2.1 Inflation and real GDP

Take as given the following figures. Year 1:

Good	Quantity	Price
Computers	20	\$1,000
Bread	10,000	\$1

Year 2:

Good	Quantity	Price
Computers	25	\$1,500
Bread	12,000	\$1.10

1. Calculate nominal GDP in both years.
2. Calculate real GDP in year 2 with year 1 prices and vice versa. Calculate real GDP growth for both cases.
3. Imagine that computers are twice as productive in year 2 compared with year 1. How might you revise your estimates of real GDP and inflation?

### 2.1.1 Answer: Inflation and real GDP

The results are summarized in the following table:

	Good	Date 1	Date 2	Growth rate
Prices	C	1000	1500	50.0%
	B	1	1.1	10.0%
Quantities	C	20	25	25.0%
	B	10000	12000	20.0%
Nominal GDP		30000	50700	69.0%
Real GDP				
Base year 1		30000	37000	23.3%
Base year 2		41000	50700	23.7%
GDP deflator = Nominal GDP / real GDP				
Base year 1		1.00	1.37	37.0%
Base year 2		0.73	1.00	36.7%

1. Nominal GDP: Year 1: 30,000. Year 2: 50,700.
2. Real GDP: Base year 1: \$30,000 and \$37,000. Growth rate: 23.3%. Base year 2: \$41,000 and \$50,700. Growth rate 23.7%.
3. If computers are twice as productive, we might double the quantity of computers and cut the price in half. Now the table looks like this:

	Good	Date 1	Date 2	Growth rate
Prices	C	1000	750	-25.0%
	B	1	1.1	10.0%
Quantities	C	20	50	150.0%
	B	10000	12000	20.0%
Nominal GDP		30000	50700	69.0%
Real GDP				
Base year 1		30000	62000	106.7%
Base year 2		26000	50700	95.0%
GDP deflator = Nominal GDP / real GDP				
Base year 1		1.00	0.82	-18.2%
Base year 2		1.15	1.00	-13.3%

## 2.2 Tuition

At the University of Trinidad and Tobago, tuition in 1972 was \$15 per credit hour and in 1999 it was \$77 per credit hour. The consumer price index for Trinidad and Tobago was 26.1 in 1972 and 110.9 in 1999.

1. Calculate the annual inflation rate between 1972 and 1999.
2. What was 1999 tuition in 1972 dollars?
3. What was 1972 tuition in 1999 dollars?
4. What was the real (inflation-adjusted) percentage increase in tuition per credit hour between 1972 and 1999?

### 2.2.1 Answer: Tuition

1972 tuition in 1999 dollars can be derived by taking 1972 tuition and multiplying by the percentage increase in the consumer price index between 1972 and 1999. Thus:  $\$15 \times (110.9/26.1) = \$63.74$ . The 1972 tuition level, expressed in 1999 dollars, was thus \$63.74 per credit hour. The 1999 tuition level (also in 1999 dollars) was \$77 per credit hour. The real increase in tuition between 1972 and 1999 was therefore \$13.26 (in 1999 dollars) per credit hour, or 20.8 percent ( $13.26/63.74$ , which are both in 1999 dollars and thus inflation adjusted).

We can also express 1999 tuition in 1972 dollars by multiplying by the 1999 nominal value by the ratio of the 1972 price index to the 1999 price index. Thus:  $\$77 \times (26.1/110.9) = \$18.12$ . So the 1999 tuition in 1972 dollars was \$18.12 per credit hour.

Note that the real increase can also be computed by comparing the 1972 tuition to the 1999 tuition in 1972 dollars. Such a comparison also indicates that the real increase amounted to 21 percent between 1972 and 1999:  $18.12/15 = 1.21$ , or a 21 percent increase.