Box

The impact of base effects on the annual inflation rate

The annual inflation rate is one of the most frequently resorted to statistical measures for the analysis of price developments, also used by the National Bank of Romania to set the inflation target. According to the calculation method, this indicator cumulates the monthly inflation rates over the past 12 months, implying that its path is determined based on both current and previous year developments. The impact of atypical price changes in the previous year on the annual inflation rate is called base effect.

The annual inflation rate at a certain point in time t (π_t) ris the percentage change in the fixed-base price index at the moment t (P_t) versus $t - 12$, which can be approximated by:

$$\pi_t = \left(\frac{P_t - P_{t-12}}{P_{t-12}} \right) \cdot 100 \simeq \left[ln(P_t) - ln(P_{t-12}) \right] \cdot 100$$

The change in the annual inflation rate in the current month versus the preceding month is nearly equal to the difference between the monthly inflation rate in the current month and the monthly inflation rate recorded in the same year-ago period, so that:

$$\pi_t - \pi_{t-1} \simeq \left[ln(P_t) - ln(P_{t-1}) \right] \cdot 100 - \left[ln(P_{t-12}) - ln(P_{t-13}) \right] \cdot 100$$

Although base effects refer to the contribution of price movements in the same year-ago period ($[ln(P_{t-12}) - ln(P_{t-13})]$), to the change in the annual inflation rate, they are relatively difficult to identify in practice as only the atypical price changes in the previous year must be taken into account. Usually, price changes are deemed atypical when they deviate significantly from the pattern seen during a certain period and reflected by the historical average, to which add the impact of seasonal factors and the upward/downward trend, as the case may be.

An example of favourable base effect is associated with the 13.9 percent hike in tobacco prices in January 2010, as a result of the rise in excise duties, which pushed down the annual inflation rate on this segment, from 26.3 percent in December 2010 to 11.9 percent in January 2011, despite the price increases in January 2011 versus the prior month.

CPI for tobacco products

monthly change, percent

Jan.10	Feb.10	Mar.10	Apr.10	May 10	Jun.10	Jul.10	Aug.10	Sep.10	Oct.10	Nov.10	Dec.10	Jan.11
13.87	0.60	0.01	0.04	0.02	0.02	9.47	0.52	0.02	0.02	0.01	0.10	0.85

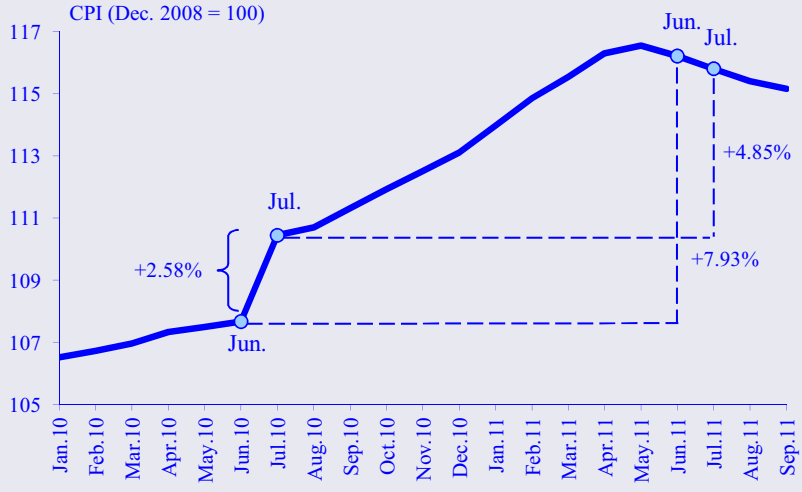
Annual rate in December 2010: 26.3 percent

Annual rate in January 2011: 11.9 percent

An example of unfavourable base effect is anticipated in the latter part of 2012 in the case of vegetables, as the months from June to September 2011, when deflation stood significantly above the historical average, are eliminated from the calculation period of the annual inflation.

A strong favourable base effect on the CPI annual inflation rate was manifest in July 2011, after July 2010, when prices rose considerably due to the VAT rate hike was eliminated from the calculation period. Hence, about 77 percent of the drop in the annual inflation rate from 7.93 percent in June 2011 to 4.85 percent in July 2011 is estimated to stem from the base effect associated with the VAT rate hike.

VAT Rate Hike-driven Base Effect on the CPI



Source: NIS, NBR calculations.