

## Box 5

### Sources of short-term volatility in HICP inflation

In the short term, HICP inflation is expected to follow a somewhat erratic path. This can largely be explained by intrinsic volatility in the prices of some items included in the basket of goods and services. This box aims to explain and illustrate the sources of the expected volatility in HICP inflation in the period ahead.

#### General sources of volatility in inflation

Volatility is generally a fairly vague concept which is rather difficult to define. For the purposes of this box, volatility in inflation is defined as short-term changes in the annual rate of inflation over time which are not related to underlying trends. Importantly, given that the focus of the analysis is on annual inflation rates, it is worth remembering that the change in the annual growth rate in prices from one month to the next depends on both the most recent monthly change and the monthly change 12 months previously (the so-called base effect). While base effects, therefore, cannot be considered a separate source of volatility, volatility produces base effects.

Inflation volatility can result from various fundamental factors: (1) *irregular seasonality* – the prices of some items, such as fresh food or package holidays, display a strong and fairly regular seasonal pattern over the course of the year, which does not affect the annual rate of change. However, irregular seasonal movements, related to weather factors in the case of food prices or to the timing of holidays in the case of package tour prices, will not be smoothed out by annual rates of change; (2) *volatility in commodity markets*, which might be

related to changes in and uncertainty about supply and demand, can play a strong role in commodity prices, such as those of oil; (3) *short-term fluctuations in the euro exchange rate* can also cause volatility, as these changes tend to have an immediate impact on euro-denominated prices of imported commodities; (4) *shocks* not related to weather or markets but to other factors, such as the BSE crisis or the oil price spike before the Iraq war, may also be viewed as a source of volatility; (5) *government measures*, such as increases in indirect taxes or administered prices, as well as deregulation, may affect price developments; (6) *statistical factors* – some movements in the HICP are merely statistical “noise”, for example rounding, and do not reflect economic factors. Moreover, methodological changes in the production of the HICP may also introduce some erratic movements, particularly when the historical data have not been fully revised.

A simple but insightful way to measure the volatility of HICP items is to compute the standard deviation of the monthly change in the annual inflation rate. This measure is preferable to the simple standard deviation of the annual rate of change, as it is not affected by strong trends or regular cyclical fluctuations in the inflation rate. The table below presents the standard deviations for the eight most volatile HICP items, calculated over the period February 1996-July 2003, covering as long a period as possible given the availability of disaggregated HICP data. It shows that the volatility in overall HICP inflation stems mainly from a small proportion of items, with a total weight of around 10%. Volatility in these items is at least eight times greater than that of the eight least volatile items and at least five times greater than in overall HICP inflation.

### Volatile HICP items

(standard deviation of change in the annual percentage change, February 1996-July 2003)

| HICP item                                      | Standard deviation<br>(percentage points) | HICP weight<br>(%) | Standard deviation<br>× HICP weight<br>(percentage points) |
|--|---|--------------------|--|
| Liquid fuels                                   | 7.2                                       | 0.7                | 0.05   |
| Package holidays                               | 3.6                                       | 1.5                | 0.06   |
| Vegetables                                     | 3.1                                       | 1.5                | 0.05   |
| Petrol <sup>1)</sup>                           | 2.8                                       | 3.7                | 0.10   |
| Passenger transport by sea and inland waterway | 2.4                                       | 0.1                | 0.00   |
| Passenger transport by air                     | 1.8                                       | 0.5                | 0.01   |
| Fruit  | 1.7                                       | 1.1                | 0.02   |
| Oils and fats                                  | 1.6                                       | 0.5                | 0.01   |
| <i>Memo items:</i>                             |   |                    |  |
| Garments                                       | 0.7                                       | 5.6                | 0.04   |
| Overall HICP                                   | 0.3                                       | 100.0              |  |
| HICP excluding unprocessed food and energy     | 0.3                                       | 84.2               |  |
| Eight least volatile items                     | 0.2                                       | 4.6                |  |

Sources: Eurostat and ECB calculations.

1) The term “petrol” is used to refer to the COICOP (Classification of individual consumption by purpose) item “Fuels and lubricants for personal transport equipment”.

While it is not surprising that four of these items belong either to the unprocessed food (vegetables and fruit) or energy (liquid fuels and petrol) categories, the other highly volatile items are contained in components of the HICP excluding unprocessed food and energy. In terms of items which are part of the services component, package holidays in particular has been one of the most volatile, partly owing to irregular seasonality but also to statistical changes. Prices of passenger transport by sea and air, which are likely to be influenced by movements in euro-denominated oil prices and also by irregular seasonality, are even more volatile than fruit prices. While garments (clothing), included under non-energy industrial goods, is not among the eight most volatile items (assessed over the whole period from February 1996 to July 2003), it has become more volatile in recent times, partly as a result of statistical factors and also, possibly, a change in the seasonal pattern.

Moreover, when considering the standard deviation weighted by the importance of the items in the HICP, garments is the fifth most important volatile item after petrol, package holidays, liquid fuels and vegetables.

### Items possibly inducing volatility in HICP inflation in the near future

Looking at the items expected to affect HICP inflation in the short term, first is energy prices, in particular those of liquid fuels and petrol, which are likely to be affected by recent developments in euro-denominated oil prices. The profile of the annual rate of change in the energy component will also be influenced by base effects stemming from the sharp energy price movements in the first half of 2003. For example, the sharp rise in the energy index between December 2002 and March 2003, reflecting the rise in oil prices in the run-up to the Iraq war, will drop out of the year-on-year rate of change, leading to a significant decline in the contribution of energy prices to overall HICP inflation in the first quarter of 2004. However, this decline will be fairly short-lived, as the base effects associated with developments in energy prices between March and June 2003 will lead to a renewed rise in the energy contribution in the second quarter of 2004.

Some volatility may also arise in the near term from developments in food prices, reflecting irregular seasonality due to this year's exceptional weather conditions. Although the impact of the latter on euro area food prices has so far been limited, there is still a risk that seasonal food prices will rise considerably over the coming months and/or that processed food prices will also be affected. Notwithstanding this, any weather-related food price shock should unwind rather quickly.

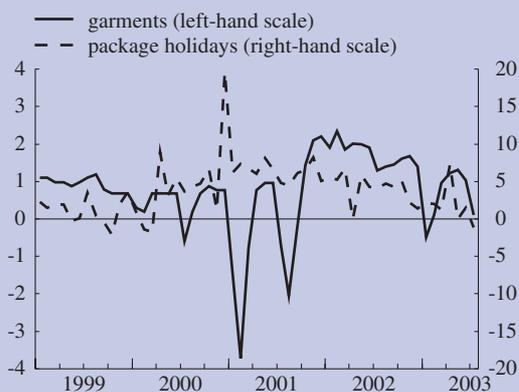
Movements in clothing prices may further contribute to fluctuations in HICP inflation through their impact on the non-energy industrial goods component. The annual rate of change in clothing prices declined strongly between December 2002 and January 2003 (see chart) as a result of a steeper than usual price decline in the context of the winter 2003 sales. This decline was reversed during the spring when clothing prices returned to their "normal" levels. It appears that this pattern has been repeated during the summer 2003 sales, with a substantial decline in clothing prices in July but a possible reversal towards the autumn.

With regard to services items, movements in package tour prices have dominated the pattern of services price inflation for most of this year and may continue to cause some volatility. For example, a rather unusual seasonal pattern in package holiday prices owing to the timing of Easter this year led to a significant rise in services price inflation between March and April (see chart). In July package holiday prices did not increase as much as usual, possibly as

a result of a different timing of the summer holidays, leading to a decline in the annual rate of change in services prices. However, this decline might be, at least partly, reversed in the following months.

### Garments and package holiday prices

(annual percentage changes)



Source: Eurostat.