

## Box 5

## SEASONAL PATTERNS AND VOLATILITY IN THE EURO AREA HICP

Annual HICP inflation rates are unaffected by seasonal patterns, as long as these patterns remain stable over time. Any irregularities and changing seasonal patterns will, however, also affect movements in the annual rate of change. Knowledge about the seasonal pattern in prices of the goods and services included in the HICP is therefore crucial when judging, for instance, whether an increase in the annual HICP inflation rate means that inflationary pressures have increased, or whether it is just a result of irregular or changing seasonal patterns. In this box the seasonal and higher volatility in the HICP in recent years is highlighted, and can be partly explained by a more significant seasonal pattern in some components of the HICP.

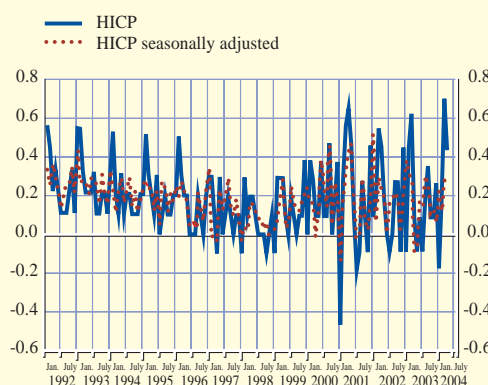
Furthermore, it is sometimes useful to supplement the analysis of developments in the annual rate of change with the analysis of short-term dynamics in the HICP. The most important reason for this is that the annual rate for a given month reflects development in prices over a period of 12 months. Changes in the annual rate are therefore affected not only by the most recent price dynamics, but possibly also by so-called base effects. Analysis of rates of changes for shorter periods than a year requires seasonally adjusted time series. The quality of such a series, however, is dependent on how regular and stable the seasonal patterns are over time, as seasonal adjustment can only correct for the regular movements in a time series occurring every year during the same period and to a comparable extent.

In its analysis of price developments in the Monthly Bulletin, the ECB usually focuses on data for the overall HICP and a breakdown into five main components (energy, unprocessed food, processed food, non-energy industrial goods and services). For the purpose of analysing short-term developments, the ECB also regularly calculates a seasonally adjusted HICP for the euro area (see Table 5.1 in the Euro Area Statistics section). The seasonally adjusted HICP is compiled as the aggregate of seasonally adjusted series for unprocessed food, processed food, non-energy industrial goods and services and the unadjusted series for energy, since no clear seasonal pattern could be found in the energy component.

Chart A shows the evolution of the monthly changes in the overall rate of HICP inflation in the euro area in both seasonally adjusted and unadjusted terms. From the chart, a clear increase in the amplitude of the seasonal variation is evident in the unadjusted series since the beginning of 2001. To help quantify the evidence of this greater volatility, the table below reports the standard deviation in the monthly rates of change over different periods since 1996 for both the unadjusted and the seasonally adjusted series. The standard deviation provides a useful measure of historical variability that captures the average

**Chart A Monthly rate of change in the HICP and in the seasonally adjusted HICP**

(monthly percentage changes)



Sources: Eurostat and ECB calculations.  
Note: Data before 1996 are estimates based on the non-harmonised national CPIs.

## Standard deviation of the monthly rate of change of sub-components in the euro area HICP

(seasonally adjusted series in brackets)

	Weight 2004 (%)	Standard deviation (percentage points) 1996-2000	Standard deviation (percentage points) 2001-2004
HICP	100	0.14 (0.09)	0.25 (0.14)
Energy	8.1	0.83 (-)	1.43 (-)
Unprocessed food	7.7	0.74 (0.41)	0.86 (0.58)
Processed food	11.8	0.12 (0.09)	0.23 (0.19)
Non-energy industrial goods	31.0	0.26 (0.06)	0.69 (0.12)
Services	41.3	0.28 (0.09)	0.37 (0.12)

Sources: Eurostat and ECB calculations.

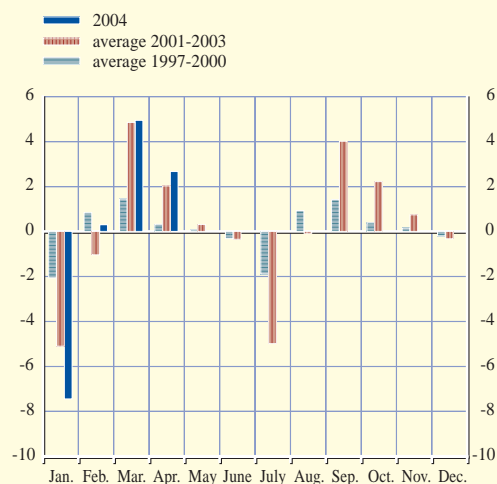
departure of a single month's rate of change from the average rate during the chosen period. The shift in 2001 is also reflected in an increased standard deviation in both the original and the seasonally adjusted series from 2001 onwards.

Analysis of the components in the HICP seems to indicate that there are two main factors that can help explain the higher volatility in recent years. The first factor is that developments in the euro area HICP have been significantly influenced by movements in its more volatile components in recent years, in particular energy and unprocessed food prices. This is partly due to different shocks affecting prices of meat, fruit, vegetables and oil (see also the box entitled "Sources of short-term volatility in HICP inflation" in the September 2003 issue of the Monthly Bulletin). A second explanation is that statistical factors together with changes in indirect taxation and administrative prices may have led to a more significant seasonal pattern in some components of the HICP. More specifically, at least four factors can be highlighted.

- Some countries, such as Italy and Spain, introduced sales prices in their respective HICP measures as from 2001. This factor is most significant for non-energy industrial goods, since the main contributors to the seasonal pattern in this group are prices of clothes and shoes, which are usually subject to substantial end-of-season sales. In addition to this methodological change, seasonal sales in many euro area countries seem to have become larger since 2001, with more substantial price discounts during sales periods being followed by higher price increases in subsequent months. As an example, prices of clothes and shoes showed a monthly rate of increase of 4.9% in March 2004. This is in line with the pattern in recent years, but a great deal higher than the historic average for the period from 1997 to 2000 (see Chart B). Looking forward over the year, we should expect to see high negative price changes in July and high positive price changes in September, in line with the new seasonal pattern.

Chart B Prices of clothes and shoes

(monthly percentage changes)



Sources: Eurostat and ECB calculations.

- A new method for measuring prices of package holidays was introduced in some countries' HICP as from 2000. In the German HICP, for example, the new method implied that prices of holidays booked for the Christmas holidays were affecting the index in December. This has affected the seasonal pattern in the service component.
- Increases in indirect taxes on tobacco have led to higher-than-usual price changes on tobacco in recent years. This has affected the seasonal pattern in the processed food component, given high price changes in January, when changes in indirect taxes are typically introduced.
- In recent years effects from administered prices on the euro area HICP have gained importance (see, for example, the box entitled "The impact of developments in indirect taxes and administered prices on inflation" in the January 2004 issue of the Monthly Bulletin). Since administered prices often change in January, this could also be a factor behind the altered seasonal pattern.

Overall, the combined effect of the above factors is a more significant seasonal pattern in recent years. Shifting seasonal patterns suggest a need for caution when analysing year-on-year changes and seasonally adjusted data, particularly around the period when the shift occurs.