

Box 1

Harmonised Index of Consumer Prices – Easter effects and improved seasonal adjustment

This box explains the improvements that have been made to the ECB's seasonal adjustment of euro area HICPs following a recent review and the introduction of a calendar adjustment. Because month-on-month HICP inflation rates are affected by seasonality and calendar constellations, short-term inflation analyses benefit from seasonal adjustment. Calendar constellations may also have an impact on annual inflation rates, especially in periods affected by moving holidays. The ECB estimates that the year-on-year growth rate of the euro area HICP for services in March 2016 was elevated by 0.1 percentage point because Easter was in March, while it was in April in 2015.

Seasonal fluctuations are infra-year movements which appear in the same period of a calendar year and have a similar impact on a time series; the size of such fluctuations may evolve over time. Seasonality can be caused by weather conditions; events related to administrative measures, such as the dating of school holidays; and habits and traditions, such as Christmas shopping. Conventions in the compilation of the HICP may also play a role, for example the coverage of prices for goods and services whose price changes exhibit a seasonal pattern. Calendar effects are related to calendar constellations which may change every year, such as the dating of Easter. Examples of seasonal effects in HICPs include seasonality in price indices for fresh fruit and vegetables, winter and summer package holidays, and clothing and footwear. Seasonal fluctuations in the euro area HICP have become more pronounced over time, in particular due to the gradual harmonisation of statistical concepts and methods related to prices that exhibit seasonality. For example, comprehensive coverage of sales prices for clothing and footwear was introduced in 2001.

The ECB started compiling seasonally adjusted euro area HICPs in 2000, with the aim of broadening the analytical toolbox beyond the data provided by statistical institutes.¹ The seasonally adjusted total HICP for the euro area is compiled indirectly by aggregating the seasonally adjusted sub-indices for processed food, unprocessed food, and industrial goods excluding energy and for services, and the unadjusted series for energy. This procedure has now been reviewed and improvements to the seasonal adjustment of HICPs for services and for non-energy

¹ Traditionally, most statistical institutes do not calculate price indices in a seasonally adjusted format. The ECB's approach to seasonal adjustment of the euro area HICP is described in the 2000 report entitled "Seasonal adjustment of monetary aggregates and HICP for the euro area". For additional information, see the box entitled "Analysis of HICP developments based on seasonally adjusted data", *Monthly Bulletin*, ECB, January 2001.

industrial goods will be implemented.² The “processed food” and “unprocessed food” components will be broadly unaffected, while the HICP for energy continues to show no identifiable seasonality.

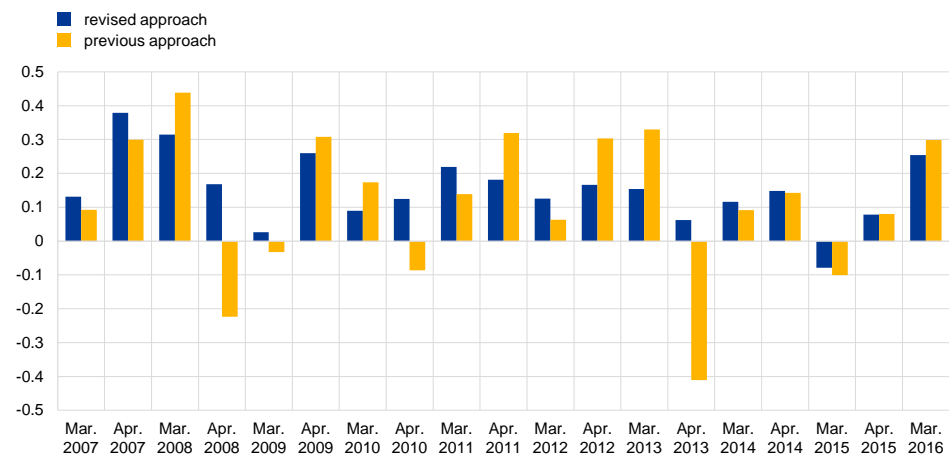
Estimation of Easter effects in the HICP for services

Before the review, the euro area HICP and its components were not adjusted for calendar effects. While the number of working or shop-opening days typically causes pronounced calendar effects on GDP, industrial production and retail trade, different constellations of week and weekend days do not affect consumer prices. However, the dating of Easter may substantially affect the level of prices for services in March and April, particularly for package holidays, accommodation services and airfares, since the prices of these services are recorded in HICPs when the service is provided, e.g. when the package holiday starts. An examination of Easter effects for euro area countries shows that a reliable estimate of their impact is feasible.³ Chart A shows that after the ECB’s recent review, negative month-on-month growth rates in the last ten years which were recorded in April in years in which Easter fell in March (e.g. 2008 and 2013) or early April (e.g. 2010 and 2015) were changed considerably by the introduction of a calendar adjustment. The adjustment for the Easter effect resulted in a reduction in the standard deviation of month-on-month growth rates, which fell from 0.13 percentage point to 0.08 percentage point, with the most pronounced decrease in month-on-month growth rates recorded in April 2013 (from -0.41% to 0.06%).

Chart A

Euro area HICP for services in March and April

(month-on-month rates of change; percentages; seasonally adjusted)



Sources: Eurostat and ECB calculations.

² The corresponding data in the statistics section of the Economic Bulletin will be available according to the new methodology from mid-May 2016.

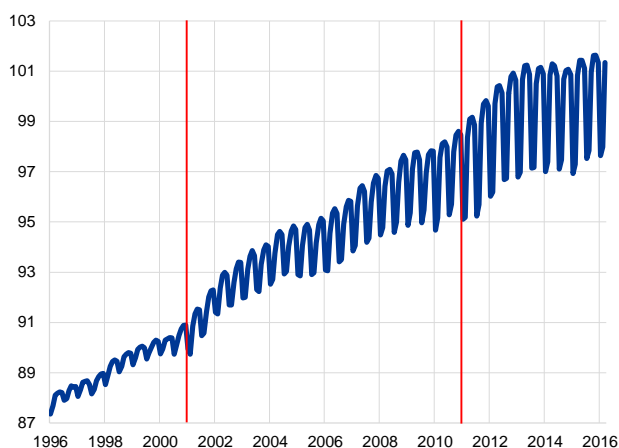
³ The estimation of Easter effects in the euro area HICP for services is based on the date of Catholic/Protestant Easter. The complex and pronounced Easter effect in Germany is calculated separately and provided by the Bundesbank.

Improvements in the HICP for non-energy industrial goods

The seasonal adjustment of non-energy industrial goods has been improved through an explicit treatment of several statistical breaks (see Chart B). One of these breaks was caused by the introduction of a harmonised treatment of price reductions⁴ in EU Member States in 2001.⁵ As of 2001 sales prices for clothing and footwear have been covered comprehensively in the HICPs of euro area countries, typically resulting in drops during the traditional sales periods at the end of the winter and summer seasons. Another break was due to the introduction of the HICP Regulation on the treatment of seasonal products in 2011.⁶ This resulted in more pronounced seasonal patterns, mainly related to the statistical treatment of out of season clothing, for which the carry-forward of prices was abandoned.

Chart B
Euro area HICP for non-energy industrial goods

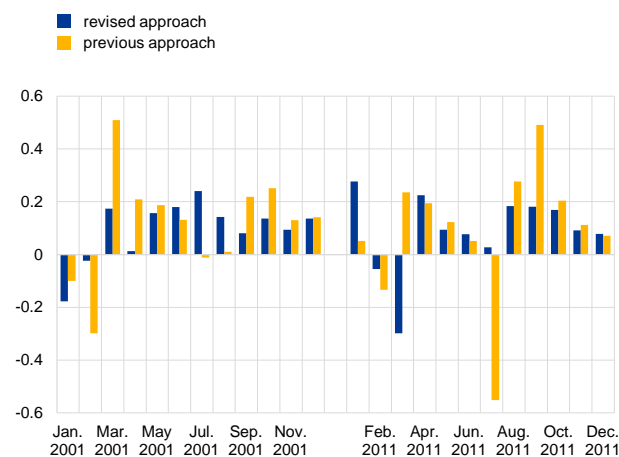
(2015=100; non-adjusted)



Source: Eurostat.
Note: The vertical lines refer to the years of major methodological changes.

Chart C
Euro area HICP for non-energy industrial goods after the breaks in 2001 and 2011

(month-on-month rates of change; percentages; seasonally adjusted)



Sources: Eurostat and ECB calculations.

Without adjustment for breaks, the seasonally adjusted euro area HICP for non-energy industrial goods exhibited unwanted volatility in periods before and after the breaks. The seasonal adjustment has been improved by splitting the time series into three time segments: up to December 2000, from January 2001 to December 2010, and from January 2011.⁷ Chart C shows that the improved adjustment avoids distortions in the seasonally adjusted data in periods before and after the breaks.

⁴ Commission Regulation (EC) No 2601/2000.

⁵ From 2000 in Belgium, Spain and Italy.

⁶ HICP Regulation No. 33/2009 on the treatment of seasonal products. For details, see the box entitled "Methodological changes in the compilation of the HICP and their impact on recent data", *Monthly Bulletin*, ECB, April 2011.

⁷ The statistical institute of Spain back-calculated the HICP for non-energy industrial goods to 2010. The reviewed ECB seasonal adjustment therefore treats the HICP for non-energy industrial goods for Spain separately.

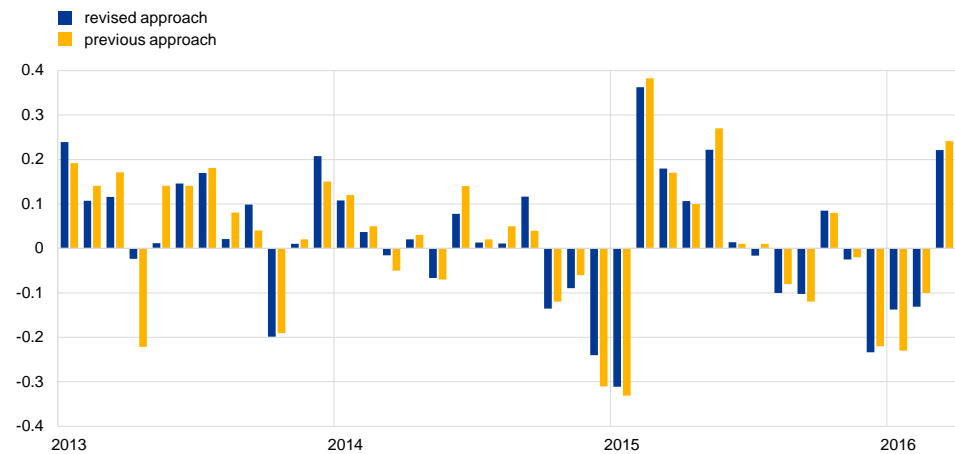
Combined effect on total HICP

The review of the seasonal adjustment approach and the introduction of an Easter adjustment have resulted in seasonally adjusted euro area HICPs which are more useful for analytical and forecasting purposes. Appropriately estimated seasonal and calendar effects are an important input into the monitoring of short-term inflation developments and can reduce the uncertainty in forecasting HICP inflation that is affected by such effects. The introduction of an Easter adjustment and an explicit treatment of statistical breaks has improved the statistical quality of the adjusted indices. Nonetheless, the differences in month-on-month growth rates of the total HICP between the approaches used before and after the review are moderate (0.04 percentage point on average in absolute terms). The largest differences are concentrated around Easter (see Chart D).

Chart D

Total HICP for the euro area

(month-on-month rates of change; percentages; seasonally adjusted)



Sources: Eurostat and ECB calculations.