Box 4

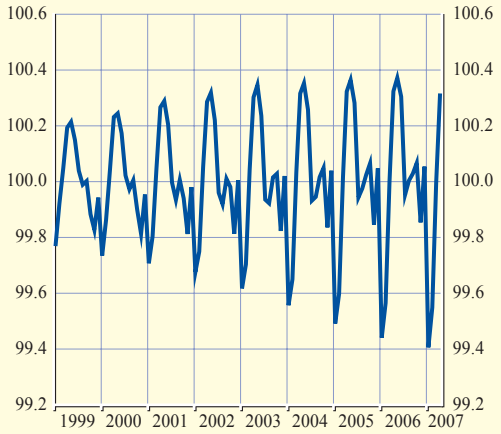
SEASONALITY IN BREAK-EVEN INFLATION RATES

Break-even inflation rates (BEIRs) derived from inflation-linked government bonds have achieved benchmark status for measuring market participants' inflation expectations in the euro area. However, BEIRs are no direct measure of inflation expectations but also include, among other things, inflation risk premia. This box discusses another "distortion" in the use of BEIRs as indicators of market participants' expectations about future inflationary trends stemming from seasonality in the euro area HICP (excluding tobacco), which is the standard reference index for government bonds linked to euro area inflation.[1]

1 Seasonality generally affects bonds linked to seasonally unadjusted price indices, including, among others, US Treasury Inflation-Protected Securities (TIPS) or UK inflation-linked gilts. For a discussion of other caveats in relation to BEIRs, see, for example, the article entitled "Measures of inflation expectations in the euro area" in the July 2006 issue of the Monthly Bulletin. Moreover, note that although the ECB's quantitative definition of price stability refers to all-items HICP, compliance with French regulations on the issuance of inflation-linked instruments has led to the choice of euro area HICP (excluding tobacco) as the reference index. For the practical purpose of assessing long-term inflation expectations, the difference between HICP (all-items) and HICP (excluding tobacco) is negligible.

Chart A Seasonality in euro area HICP (excluding tobacco)

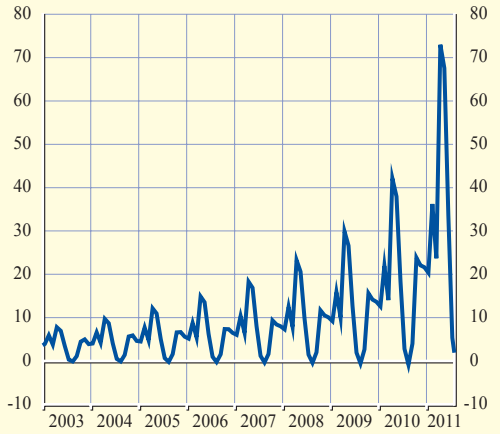
(index ratio; monthly data)



Source: Eurostat and ECB calculations.

Chart B Seasonal distortions in the 2012 break-even inflation rate

(basis points; monthly data)



Source: ECB calculations.

Seasonality in euro area HICP (excluding tobacco) and break-even inflation rates

The euro area HICP (excluding tobacco) shows a pronounced pattern of seasonality[2] (see Chart A). In particular, in January consumer prices are generally lower as compared with the trend in the price level over the year, whereas in May prices tend to be high relative to the price trend. Another striking feature of HICP seasonality is the gradual increase in its magnitude over time.[3]

The influence of HICP (excluding tobacco) seasonality on BEIRs stems from the fact that the remaining maturity of traded inflation-linked government bonds shortens over time. Most of the time, therefore, the remaining maturity will not be a full number of years, but rather a full number of years plus a fraction of a year. The inflation compensation corresponding to this residual fraction of a year can be highly seasonal. This also implies that the shorter the maturity of the bond, the stronger the impact of seasonality. The relationship between the effect of seasonality and maturity is illustrated in Chart B using the French 2012 inflation-linked government bond as an example. The chart shows distortions from seasonality expressed in basis points.[4] In the first few years after issuance, the remaining maturity of this bond was long enough to effectively mute the impact of seasonality. However, in parallel with the gradual decline in the remaining maturity, the impact of seasonality on the BEIR of this particular bond has become considerably stronger, and will further increase in the future. For example, in May 2011, when the remaining maturity of the bond will be reduced to about 1.25 years, the extracted BEIR will show inflation expectations which are 70 basis points higher than the seasonally adjusted figures, all else being equal.

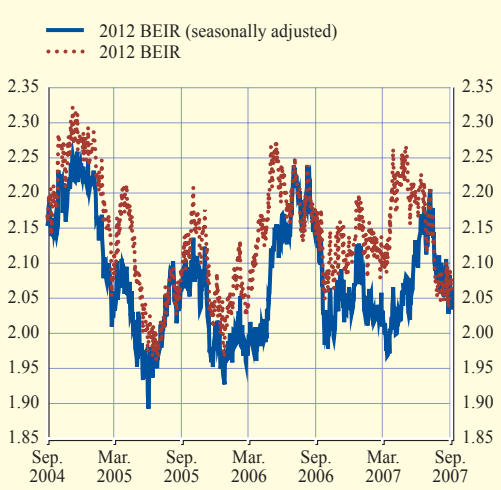
2 The seasonal factors shown in Chart A are computed as the ratio between the HICP (excluding tobacco) compiled by Eurostat and the same price index seasonally adjusted by the ECB. More details on the underlying X-12 ARIMA method can be found in: "Seasonal adjustment of monetary aggregates and HICP for the euro area", ECB, August 2000.

3 More details on seasonal patterns in the euro area HICP can be found in Box 5, entitled "Seasonal patterns and volatility in the euro area HICP", in the June 2004 issue of the Monthly Bulletin.

4 In constructing the chart, it is implicitly assumed that the seasonality remains constant beyond December 2006.

Chart C Adjusted and unadjusted 2012 break-even inflation rates

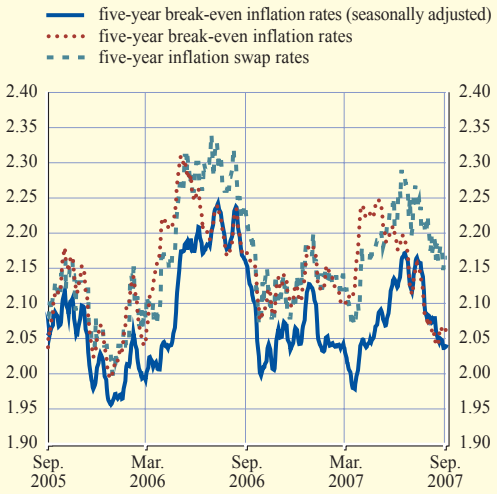
(percentages per annum; daily data)



Sources: Reuters and ECB calculations.

Chart D Adjusted and unadjusted five-year constant maturity break-even inflation rates and inflation swap rates

(percentages per annum; daily data)



Sources: Reuters and ECB calculations.

Seasonality in break-even inflation rates can affect the interpretation of movements in inflation expectations

Chart C shows break-even inflation rates extracted from inflation-linked bonds maturing in 2012 in both seasonally adjusted and unadjusted terms. The chart demonstrates that, at certain times, seasonal effects tend to become rather important for a proper interpretation of BEIRs as indicators of inflation expectations and inflation risk premia. For example, seasonally adjusted and unadjusted 2012 break-even inflation rates behaved rather differently over the three months from April to July 2007. Unadjusted break-even inflation rates declined somewhat over this period. However, this decline was mainly driven by the unwinding of a strong seasonal increase between February 2007 and April 2007. Indeed, BEIRs corrected for seasonality increased gradually throughout the whole period from February to July. Another noteworthy feature of the chart is that the distortionary effects from seasonality on this particular BEIR tends to be most pronounced in April and May of each year.

Unlike standard seasonal adjustments, the adjustment for seasonality in BEIRs is usually not symmetric in the sense that the cumulated adjustments do not cancel out over the year.[5] The adjustment factor, which is applied to the prices of inflation-linked bonds in order to correct BEIRs for seasonality, is the ratio of two seasonal factors. The numerator of this ratio changes day by day, whereas the denominator reflects the seasonal factor corresponding to the maturity of the bond and thus remains fixed.[6] For example, in the case of French inflation-linked bonds, which mature (and pay coupons) on 25 July, the seasonal factor at maturity is the one

5 As an example, note that a bond which pays coupons (and principal) at a time of year where prices are seasonally high, will – unless it has a full number of years of remaining maturity – embed inflation expectations which are higher than the trend of inflation over the year. The unadjusted BEIR of this bond will thus, on average, be higher than the corresponding seasonally adjusted BEIR.

6 The daily seasonal factors are interpolated linearly from estimated monthly seasonal factors. This interpolation is completely analogous to the interpolation made between monthly HICP releases for the purpose of calculating the daily inflation accrual on inflation-linked bonds.

corresponding to 25 April owing to the three-month indexation lag. Because the April seasonal factor for the euro area HICP (excluding tobacco) is higher than the average seasonal factor, adjusted BEIRs based on the French bonds will, for most of the year, be lower than unadjusted rates. The converse is true for the German 2016 inflation-linked bond, which is indexed to the (seasonally low) January price level.

The comparability of break-even inflation rates and inflation swap rates

Inflation swap rates – which in principle provide similar information to that of break-even inflation rates – are quoted for full-year maturities, such that the inflation-indexed leg of such contracts is linked to year-on-year increases in the HICP (excluding tobacco). Inflation swap rates are therefore generally much less affected by seasonal variations in the consumer price level. Hence, any comparison between inflation swap rates and unadjusted BEIRs extracted from inflation-linked bonds is subject to seasonality effects.

Chart D illustrates the importance of adjusting, in particular, shorter-term BEIRs for seasonality in order to derive consistent messages about inflation expectations (and related risk premia) from both inflation-linked markets. The chart depicts the adjusted and unadjusted five-year constant maturity BEIRs together with the five-year inflation swap rate.[7] The seasonally adjusted BEIR moves very closely with the inflation swap rate, with the spread between the two displaying broad stability over time. By contrast, seasonality often produces relatively wide and volatile gaps – sometimes of opposite signs – between the unadjusted BEIR and its counterpart from the inflation swap market.

The distortion in BEIRs induced by seasonality in consumer price indices implies that, when assessing inflation expectations and related premia from inflation-linked bonds, it is preferable to focus on longer-term forward BEIRs – which are much less affected by seasonality – or apply an appropriate seasonal adjustment. Therefore, the ECB will publish seasonally adjusted BEIRs for the euro area starting with this issue of the Monthly Bulletin.

7 Details on computing constant maturity break-even inflation rates can be found in Box 3, entitled "Estimation of constant-maturity index-linked bond yields and break-even inflation rates", in the July 2006 issue of the Monthly Bulletin.