

Box 6

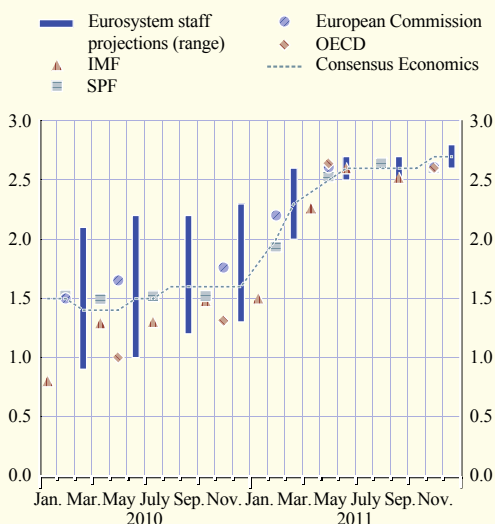
THE FORECAST BIAS FOR EURO AREA HICP INFLATION

Over the last few years forecasts for euro area headline HICP inflation, from both international organisations and private sector institutions, have frequently been revised upwards.¹ As can be seen from Chart A, which shows the evolution of HICP inflation forecasts for the calendar year 2011 from the IMF, the ECB Survey of Professional Forecasters (SPF), Consensus Economics, the OECD and the European Commission, as well as the corresponding Eurosystem staff projection ranges, the inflation outcome of 2.7% was underpredicted in all the forecasts. Chart B shows that forecasts for the calendar year 2012 have also been subject to significant upward revisions.

¹ For simplicity, the HICP predictions analysed in this box are typically referred to as “forecasts”, although technically they may be better described as “projections”.

Chart A Evolution of official forecasts for average annual euro area HICP inflation in 2011

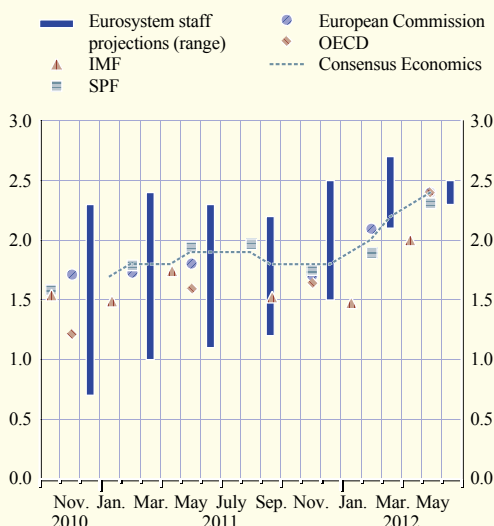
(average annual percentage changes)



Sources: IMF, ECB, Consensus Economics, OECD and European Commission.
Note: The x-axis refers to the date when the respective forecasts were finalised.

Chart B Evolution of official forecasts for average annual euro area HICP inflation in 2012

(average annual percentage changes)



Sources: IMF, ECB, Consensus Economics, OECD and European Commission.
Note: The x-axis refers to the date when the respective forecasts were finalised.

Taking a longer-term perspective, this box shows that official forecasts have tended to systematically underpredict euro area headline HICP inflation and discusses the sources of this bias.

Bias in HICP inflation forecasts over the period 2002-11

The following analysis is based on various forecasts for annual euro area headline HICP inflation over the period 2002-11. For each calendar year, four forecast rounds are separately evaluated, namely the spring and autumn rounds of the preceding and current year. For example, for 2011, the spring and autumn forecasts from 2010 and 2011 are considered. The forecast bias is understood as the average difference between the forecast and the final outcome. A systematic underprediction thus results in a negative bias. Chart C presents the bias in the forecasts by the five international organisations and private sector institutions mentioned above. Since the Eurosystem staff macroeconomic projections only provide ranges, the table reports the percentage of the rounds in which actual HICP inflation was either above the upper end or below the lower end of the range.

HICP inflation outside the Eurosystem staff projection ranges over the period 2002-11

(percentage of the rounds with actual inflation either above or below the published ranges)

	Next year		Current year	
	Spring round	Autumn round	Spring round	Autumn round
Above the range	50	30	0	0
Below the range	10	10	0	0

Source: ECB.

Across the forecasts considered, HICP inflation tended to be underpredicted for all forecast horizons. This is especially true for the earliest forecasts in the spring rounds for the next calendar year, i.e. around 20 months before the end of the forecast period. Moving closer towards the end of the forecast period, the bias in all the forecasts decreases in absolute terms, but remains sizeable. The bias is only negligible in the autumn forecasts for the current year, which are based largely on actual data (with only two to four months of HICP data missing to “close” the target period). The means of the inflation expectations collected by Consensus Economics, and in particular of those collected through the SPF², appear to have performed somewhat better in terms of bias than those of international organisations such as the IMF, OECD and European Commission. However, it should be noted that the results are not strictly comparable, as the corresponding forecasts were finalised at different points in time and based on different assumptions.

The usual measure of bias, which is based on point forecasts, cannot be derived for the Eurosystem staff projections. However, the results reported in the table also point to a downward bias: for 50% of the spring forecasts for HICP inflation for the next calendar year, actual HICP inflation was above the upper limit of the estimated ranges, while for the autumn forecasts for the next year this was true for 30% of the rounds. In both cases, actual inflation was below the lower end of the range in only one out of ten rounds. Notably, however, for all projections for the current year, which also had narrower ranges (from, on average, 1.2 percentage points in the spring forecast for the next year to 0.2 percentage point in the autumn forecasts for the current year), actual inflation was within the range.

Factors behind the forecast bias for HICP inflation

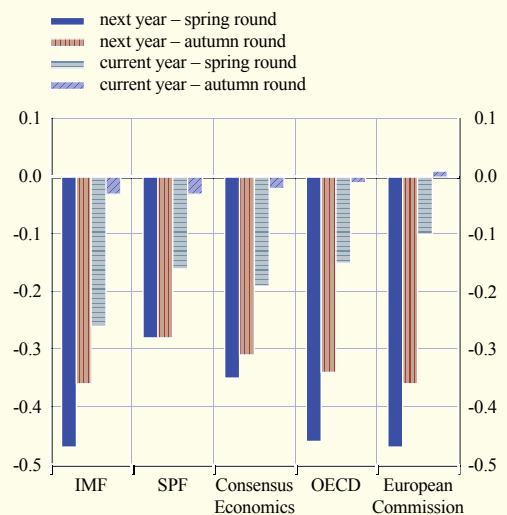
The period 2002-11 witnessed, on balance, large increases in commodity prices, in particular those for crude oil. In turn, the rising crude oil prices affected consumer prices, impacting significantly on energy prices and, in particular, consumer prices for oil products.³ Energy

2 The survey collects information on expectations for euro area inflation, real GDP growth and unemployment, on a quarterly basis, from experts affiliated with financial or non-financial institutions that are based in the EU. Data are available on the ECB’s website at <http://www.ecb.europa.eu/stats/prices/indic/forecast/html/index.en.html>.

3 See the box entitled “The evolution of consumer prices for oil products in 2011”, *Monthly Bulletin*, ECB, January 2012; and the article entitled “The development of prices and costs during the 2008-09 recession”, *Monthly Bulletin*, ECB, April 2012.

Chart C Forecast bias for euro area HICP inflation by various organisations and institutions over the period 2002-11

(percentage points)



Sources: European Commission Economic Forecasts April 2001 to November 2011; IMF World Economic Outlook, April 2001 to September 2011; OECD Economic Outlook, April 2001 to November 2011; Consensus Economics Forecasts, May 2001 to November 2011; the ECB Survey of Professional Forecasters, May 2001 to November 2011.

Notes: The forecast bias is defined as the average difference between the forecast and the final outcome. The forecasts considered are those described in the box entitled “Forecasts by other institutions” in the June and December issues of the *Monthly Bulletin* (in this box both the outcomes and the forecasts are rounded up to the first decimal point). In the earlier years of the period under review, the forecasts of some institutions referred to the personal consumption deflator or the CPI. The evaluation period corresponds to the outcomes and not to when the forecasts were performed. For example, the bias for the forecasts denoted “next year – spring round” would correspond to the spring 2001 exercise through to the spring 2010 exercise.

price inflation averaged 4.9% per annum and contributed, on average, 0.45 percentage point to headline inflation over the period 2002-11 (while the average weight of energy prices in the HICP basket was 9.1%). Hence, unexpected increases in crude oil prices may have been an important factor behind the bias in the forecasts for HICP inflation.

Indeed, private and institutional forecasts for consumer prices are often based on the assumption that oil prices will develop according to the path implied by oil futures prices (this is the case for the Eurosystem staff projections, for example), which is usually fairly flat over the forecast horizon. Consequently, in the event of large increases in spot prices, these assumptions can quickly become outdated and a downward bias in the HICP inflation forecasts may arise. Chart D gives an idea of the average deviation of actual oil prices from the technical assumptions

underlying the Eurosystem staff projections during the period under review. More precisely, it shows the average annual percentage deviation of the actual oil price from the assumed oil price, both in US dollar and euro terms. Oil prices for the next year were, on average, significantly higher than assumed, both in the spring and autumn rounds, with actual prices in US dollar terms being 23% and 17% higher respectively. As with the HICP inflation forecasts, the “bias” in the oil price assumptions improves for the current year, with, on average, a 3% deviation in the case of the spring forecasts and only negligible deviations, on average, in the autumn forecasts.

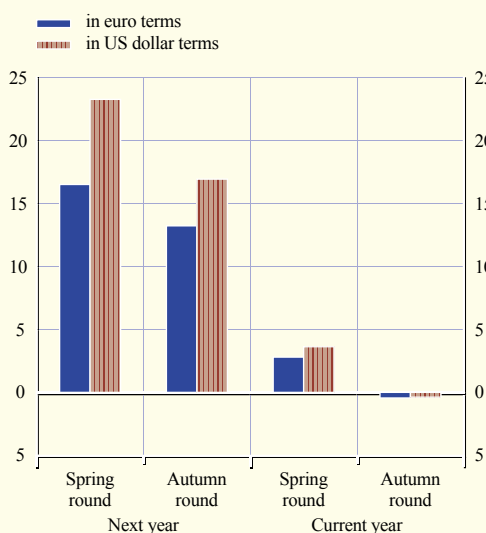
The deviations from the assumptions of the magnitude just described have clearly contributed to the forecast bias for headline HICP inflation. For example, the estimates available in the ECB’s 2010 Structural Issues Report, entitled “Energy markets and the euro area macroeconomy”, indicate that a 20% increase in crude oil prices, depending on the level of the oil price, has an overall impact of between 0.4 percentage point and 0.8 percentage point on headline HICP inflation through the direct effect that it has on the energy component of the HICP alone.

Another relevant factor behind the biases over the period 2002-11 is unanticipated increases in indirect taxes. Particularly recently, given the need for fiscal consolidation in many euro area countries, there have been several cases of unanticipated increases in indirect taxes, which have subsequently been passed through to consumer prices. A recent assessment of the impact of changes in indirect taxes on HICP inflation over the period 2006-11 shows that they had, on balance, a sizeable upward impact, amounting to $\frac{1}{4}$ percentage point in 2011, for example.⁴ The forecast bias can arise because there is either no or only limited information available on tax changes over the forecast period when forecasts are finalised. As forecasts typically only take into account

⁴ See the box entitled “The impact of recent changes in indirect taxes on the HICP”, *Monthly Bulletin*, ECB, March 2012; and the box entitled “Gauging the impact of indirect taxation on euro area HICP inflation”, *Monthly Bulletin*, ECB, March 2011.

Chart D Deviations from the technical assumptions for oil prices over the period 2002-11

(average annual percentage deviations)



Sources: ECB and IMF.

information on fiscal measures that have already been announced, the forecasts over the period under review tended to underestimate the impact of indirect taxes in recent years.

HICP projection bias and monetary policy implications

When making monetary policy decisions, the Governing Council of the ECB takes into account not only the baseline projections, but also the risks surrounding the available projections and forecasts. For example, upward risks related to oil price developments and increases in indirect taxes have often been mentioned as relevant risk factors by the ECB's Governing Council in its presentation of the Eurosystem staff macroeconomic projections.

In addition, the ECB's monetary policy strategy provides a comprehensive framework within which decisions on the monetary policy stance are taken. In particular, the ECB's approach to evaluating and cross-checking the information relevant for assessing the risks to price stability is based on both an economic analysis and a monetary analysis. The macroeconomic projections are an important part of the economic analysis. The monetary analysis focuses on money and credit, and more broadly on balance sheet developments, with a particular emphasis on monetary trends associated with price developments over the medium to longer term. Indeed, there is evidence that the monetary analysis has made the ECB's assessment more robust than it would have been had the focus been solely on the economic analysis.⁵

Conclusion

Overall, over the period 2002-11 inflation forecasts systematically underpredicted actual inflation outcomes, notably over longer horizons. The main reason for this forecast bias was large increases in crude oil prices, which were not reflected in the assumptions underlying the forecasts. These assumptions are often based on prices for futures contracts, which typically imply a fairly flat path for oil prices over the forecast horizon. In addition, increases in indirect taxes, which had a sizeable upward impact on HICP inflation, also contributed to a bias in inflation forecasts towards the end of the period under review.

The comprehensive monetary policy strategy of the ECB has prevented such a bias from translating into an excessively accommodative monetary policy stance. Indeed, over the last 13 years the average inflation rate in the euro area has remained very much in line with the aim of the Governing Council of the ECB to maintain inflation rates below, but close to, 2% over the medium term. This is explained by the fact that the Governing Council does not focus exclusively on baseline inflation projections, but also takes into account the risks surrounding the baseline projections, as well as the information from the monetary analysis. This more robust way of analysing and cross-checking information has been conducive to maintaining price stability in the euro area.

⁵ See, for instance, Fischer B., Lenza M., Pill H. and Reichlin, L., "Monetary analysis and monetary policy in the euro area 1999-2006", *Journal of International Money and Finance*, Vol. 28, No 7, 2009, pp.1138-1164.