

Box 3

TOOLS FOR CALCULATING AND INTERPRETING REAL INTEREST RATE DEVELOPMENTS IN THE EURO AREA

The analysis of spot and forward real interest rates plays an important role in central banks' assessments of information extracted from financial markets.¹ The purpose of this box is to present several methods used to extract measures of real forward interest rates.

Survey-based ex-ante measures of real interest rates

Ex-ante real interest rates can be constructed by discounting nominal interest rates, as observed in the government bond market, by survey-based inflation expectations. The computation of such ex-ante measures of real interest rates for various maturities makes it possible to derive real forward interest rates. A drawback of survey-based real interest rates is that they might be distorted by inflation risk premia potentially embedded in nominal interest rates.

¹ See the article entitled "Extracting information from financial asset prices" in the November 2004 issue of the Monthly Bulletin.

Yields on index-linked bonds

Yields on index-linked bonds provide a more direct measure of real interest rates in the sense that they do not rely on survey information and are not affected by inflation risk premia, although they may be affected by liquidity premia. On account of the limited number of index-linked bonds in issuance, however, it is not easy to estimate a real yield curve for the euro area. Instead, indicative real forward rates can be computed from individual index-linked bonds by combining real yields on bonds with different maturities on the basis of some simplifying assumptions.² Chart A presents real forward interest rates derived on the basis of yields on index-linked bonds of selected maturities.

Real interest rates based on swaps

The market for inflation-linked swap contracts in the euro area has expanded substantially in recent years. Market evidence suggests that, in notional terms, over €4 billion in euro area inflation-linked swaps have been traded in the past 12 months.³ This market is now deemed useful for the purpose of estimating a real yield curve for the euro area because trading activity has improved markedly and because inflation-linked swaps are traded in a wide maturity spectrum (the maturity structure of quoted zero coupon inflation-linked swap contracts ranges from two years to 30 years).

Inflation rates implied by inflation-linked swap contracts in conjunction with the nominal yield curve provide information on real interest rates and can therefore be used to estimate a real yield curve. The reasoning is that conventional interest rate swaps and inflation-linked swap contracts can be combined to calculate real yields at various maturities.

The real yield curve is estimated in three steps. First, a nominal yield curve based on EURIBOR swaps is estimated. Then, a profile of implied inflation rates based on inflation-linked swap rates is estimated. Finally, the real yield curve is computed as the difference between the nominal yield curve and the implied inflation rates. Forward real interest rates could therefore be derived from the real yield curve.

Despite the improvements in the liquidity of the inflation-linked swap market, the fact that the real curve is the result of the interpolation of the interest rate and inflation-linked swaps is reason for caution in interpreting the calculations for a particular date and for a particular maturity. In addition, the forward real curve is very sensitive to even modest changes in spot interest rates. It is therefore advisable to assess developments in forward rates over time periods spanning several years. For example, Chart B shows time series for real forward yields at short (two to five years ahead), medium (five to seven years ahead) and long-term horizons (seven to ten years ahead). It must be noted that these real forward yields are computed from constant maturity rates, while those in Chart A are calculated from bond yields with a fixed maturity date.⁴

2 In particular, the yields-to-maturity on individual index-linked bonds are assumed to represent zero-coupon yields, although – in practice – index-linked bonds are coupon-paying bonds.

3 See also the box on inflation-linked swaps in the September 2003 issue of the Monthly Bulletin.

4 In addition, since the duration of an index-linked bond is smaller than its maturity, real forward yields with identical maturities from Charts A and B are not directly comparable.

Chart A Euro area real forward yields based on index-linked bonds

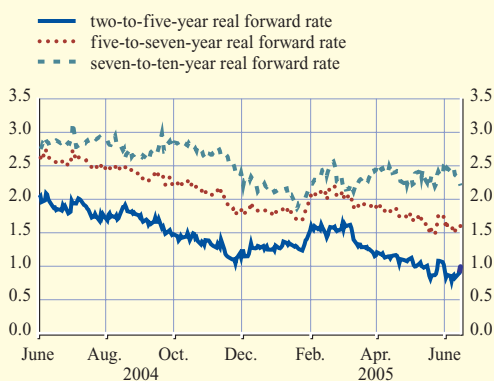
(percentages per annum)



Sources: Reuters and ECB calculations.
Note: Short-term real rates are measured by the 2008 index-linked bond yield. The implied forward index-linked bond yields 2008-14 and 2012-15 measure medium and long-term real interest rates respectively.

Chart B Euro area real forward rates based on interest rate and inflation-linked swap rates

(percentages per annum)



Sources: CDC-IXIS, Reuters and ECB calculations.

Recent movements in real forward rates

Recent developments in the various measures of real forward interest rates have been broadly similar. Short-term real forward rates have declined significantly over the past 12 months, whereas long-term real forward rates have remained somewhat more stable, at least over the past few months. This tends to support the idea that the recent decline in real yields, irrespective of how they have been measured, is related more to cyclical weakness than to lower long-term growth prospects for the euro area.⁵

However, when interpreting those results, it has to be taken into account that, in addition to the technical factors briefly mentioned earlier, namely liquidity and risk premia, but possibly also counterparty risk premia in the case of the swap data, the low level of real interest rates in the global markets seems to be affected by a number of factors that may not necessarily be related to growth expectations. To the extent that their effects cannot be conclusively quantified at this stage, this bond market-based outlook should be interpreted with caution.⁶

⁵ Ex-ante measures, not reported here, are also in line with these developments.

⁶ See the box entitled "Recent developments in long-term real interest rates" in the April 2005 issue of the Monthly Bulletin.