

Box 2

THE INFORMATION CONTENT OF EURO AREA LONG-TERM FORWARD INTEREST RATES

From a monetary policy perspective, long-term government bond yields contain useful information about market participants' expectations of future economic activity and inflation over the time to maturity of the bonds concerned. Generally, long-term nominal bond yields can be broken down into three parts: the expected real interest rate, which is often regarded as being closely linked to expectations of average economic growth, the expected long-term rate of inflation, and risk premia. Of the risk premia, the most important are related to the uncertainty regarding future developments in inflation and real interest rates, and therefore in real economic growth. It is not straightforward to identify which factors move bond yields over time: movements may stem from re-evaluated economic growth expectations or inflation expectations, or from changes in risk premia. In addition, it is not clear from looking at long-term bond yields only at which horizon market participants revise their growth and/or inflation expectations.

The main purpose of this box is to briefly describe how forward interest rates derived from bond yields can be used to analyse such information.¹ The focus is on the implied forward overnight interest rate ten years ahead extracted from the term structure of zero-coupon government bond yields. In the absence of term premia, implied forward overnight rates could be interpreted as market participants' expectations of short-term interest rates at some point in the distant future and as such are linked to the expectations for long-term growth and inflation in ten years' time. In the chart below, the implied forward rate is calculated on the basis of data on German government bonds, for which relatively long time series are available. Given the rather small and relatively stable spreads between government bond yields within the euro area since 1999, German bond yields can be regarded as providing a fairly sound illustration of interest rate developments in the euro area over the last couple of years.

One way to address the problem of identifying the specific factors driving the implied forward overnight interest rate is to compare yields with developments in measures of the private sector's long-term real growth and inflation expectations.² If one assumes, for the sake of simplicity, that bonds are priced according to these expectations,³ the difference between their sum (expected long-term nominal growth) and the long-term forward rate should reflect the risk premia embedded in bond yields.

The chart below shows the implied forward overnight rate ten years ahead on a monthly basis since 1973, together with bi-annual (April and October) Consensus Economics forecasts for long-term real GDP growth and inflation (i.e. six to ten years ahead), available from 1990 onwards. The data refer both to Germany and to the euro area as a whole (aggregating data for France, Germany, Italy, the Netherlands and Spain).

1 See the article entitled "The information content of interest rates and their derivatives for monetary policy" in the May 2000 issue of the Monthly Bulletin for a comprehensive description of how to extract market expectations from fixed-income securities.

2 Information extracted from break-even inflation rates and inflation-linked swaps could also be useful in this context. See, for example, the box entitled "Recent developments in the market for index-linked bonds in the euro area" in the December 2003 issue of the Monthly Bulletin. Unfortunately, these data series are relatively short.

3 For instance, the assumption that in the long-run the real interest rate equals real economic growth is a simplification, since, according to standard theoretical models, economic agents' time preferences and population growth may also determine real interest rates over the long run. However, if these factors are considered to be stable, the risk premia embedded in the difference between long-term bond yields and long-term nominal growth expectations will only be adjusted accordingly by a constant term.

The chart illustrates that there has been an overall downward shift in forward rates since 1990. In addition, the forward rates seem to have been less volatile since the introduction of the euro in 1999. The chart suggests that this is to a large extent due to reduced risk premia as measured by the difference between expected nominal GDP growth and forward rates. Indeed, these seem to have declined substantially in the late 1990s.

The chart can therefore be regarded as illustrating the fact that the market has perceived the introduction of the euro as contributing to a significantly more stable macroeconomic environment. It may reflect not only the fact that since 1999 market participants have expected long-term price stability to be maintained, but also the fact that, in their view, longer-term uncertainty about economic developments has also declined.

Implied forward overnight interest rate ten years ahead and Consensus Economics forecasts for long-term¹⁾ nominal GDP growth

(percent, annually compounded)



Source: Consensus Economics, Deutsche Bundesbank, ECB calculations.

Note: The vertical line indicates the introduction of the euro in January 1999. Consensus forecasts are calculated as the sum of real GDP growth and inflation expectations. Euro area data calculated as a weighted average of data for France, Germany, Italy, the Netherlands and Spain. The time series for German nominal growth expectations are not shown for the period after the introduction of the euro. Due to the high degree of internal integration of the euro area government bond market, German government bond yields should reflect euro area rather than domestic economic developments since then.

1) The long-term forecasts reported are the six to ten years ahead Consensus forecasts.