

Box I

Key issues for the analysis of real interest rates in the euro area

A real interest rate is defined as a nominal interest rate corrected for a measure of expected inflation; therefore, it measures the anticipated real return of an investment. This Box addresses some issues that arise in the measurement of real interest rates and presents a description of the evolution of real rates in the euro area in the past.

In constructing real interest rates, one difficult measurement issue is how inflation expectations, which are not observable, are computed. The simplest approach, which may work well over shorter horizons, is to assume that expectations simply reflect past developments, so that the best forecast of future inflation is its most recent level. However, for horizons longer than a few months the difference between current and future inflation may not be negligible. When calculating long-term real interest rates, this distortion is likely to be severe. Therefore, a forward-looking approach is typically used in an attempt to estimate long-term inflation expectations, e.g. through simple statistical models of inflation or larger-scale econometric models that take into account information regarding the whole economy. Surveys of inflationary expectations can also be used. In addition, for backward-looking historical analyses over long periods of time, another approach often pursued is to subtract the level of current actual inflation (rather than estimates of expected inflation) from the nominal interest rate, on the assumption that ex post expectations are on average in line with actual outturns.

Regardless of whether an ex ante or ex post approach is adopted, measures of real interest rates are also sensitive to the selection of the price index used to construct them. For the euro area economy, a natural choice for the calculation of the real interest rate is the HICP. However, it is sometimes argued that a measure of (HICP) inflation excluding some of the most volatile components, such as energy prices, is preferable in this context, as it eliminates components of the HICP whose impact on price developments may be transitory. Furthermore, it has also been claimed that a producer price index (PPI) should be used rather than a CPI.

Comparing the industrial PPI (for which a standardised series from January 1991 is available for the euro area) with the evolution of a euro area weighted average of national CPIs (which is strongly correlated with the HICP, but for which a longer series is available than for the HICP), the average CPI inflation rate since 1991 has been equal to 2.9%, while that of the PPI has been 1.3%. In December 1998 the PPI recorded an annual decline of 2.5%, reflecting the fall in commodity and energy prices in 1998. By contrast, HICP inflation was 0.8%. Therefore, average real interest rates constructed using the PPI are higher than those constructed using the HICP, especially at present but also to some extent when computed over the period since 1991.

The argumentation put forward in favour of using the PPI is that it may be more relevant for investment decisions, since it captures the price of firms' output. Investment is often believed to be the most interest rate-sensitive component of aggregate demand and, therefore, an important element of the transmission mechanism. However, there are several reasons why using the PPI is not an appropriate way to construct a measure of the real interest rate. First, the PPI is usually more strongly affected by the price of imported commodities and energy prices than is the HICP. These imported commodities and energy are often important inputs. The profitability of an investment project depends, however, not only on the price of the firm's output, but also on the price of its inputs. Second, the PPI only covers the industrial sector, and thus excludes services. The services sector is a large (and growing) component of the euro area economy. Therefore, the PPI may be unrepresentative of price developments relevant for investment in the area-wide economy as a whole. Finally, consumption demand is also interest-sensitive to some extent. A real interest rate measured using the CPI rather than the PPI is clearly a better measure to use when investigating and assessing individuals' consumption and saving decisions, since it reflects the intertemporal price of consumer goods.

The current level of the *short-term real interest rate* (measured as the difference between the average three-month EURIBOR during February 1999 (3.1%) and the latest outcome for HICP inflation (0.8% in January 1999)) is equal to 2.3% (see first table below). Employing a measure of HICP inflation that excludes energy prices yields a real rate of 1.8%. Using a more sophisticated measure of inflation expectations, namely the latest (December 1998) IMF and OECD inflation forecasts for 1999, leads to a short-term real interest rate equal to 1.7% in 1999.

Measures of the current short-term real interest rate for the euro area

(percentages per annum)

Using most recent headline HICP ¹⁾	2.3
Using most recent HICP excluding energy prices ¹⁾	1.8
Using IMF / OECD (December 1998) projections ²⁾³⁾	1.7

1) *Short-term nominal interest rate during February 1999 minus inflation rate in January 1999.*

2) *Short-term nominal interest rate during February 1999 minus 1999 average forecast inflation. IMF forecast taken from the World Economic Outlook. OECD forecast taken from the Economic Outlook.*

3) *Consumer price deflator.*

The current level of short-term real interest rates in the euro area can be compared with its evolution in the past and with the level in other major industrial countries (see table below). The euro area average over the 1990s – a figure which is affected, inter alia, by exchange rate risk premia and excessive fiscal deficits – is almost twice as high (4.5%) as the current level (2.3%). The current euro area short-term real interest rate is also lower than the German average for both the 1990s (3.2%) and the entire period from 1960 to 1998 (2.8%). Finally, it is also lower than in the United States, where the average level in February 1999 was 3.2%.

Historical short-term and long-term real interest rates ¹⁾

(percentages per annum)

Period	Short-term real interest rate			Long-term real interest rate		
	euro area	Germany	United States	euro area	Germany	United States
1960-69	.	2.2	2.8	.	4.2	2.4
1970-79	.	1.9	0.9	.	3.2	0.5
1980-89	.	3.9	5.0	.	4.8	5.5
1990-98	4.5	3.2	2.3	5.2	4.1	3.9
1960-98	.	2.8	2.8	.	4.1	3.1
Current level ²⁾	2.3	-	3.2	3.2	-	3.3

1) *Short-term real interest rates are calculated by subtracting the contemporaneous 12-month CPI inflation rate from the nominal three-month interest rate. Long-term real interest rates are calculated by subtracting the contemporaneous 12-month CPI inflation rate from the 10-year government bond yield. The HICP inflation rate is used for current euro area data.*

2) *Average of daily observations of the nominal interest rate during February 1999 minus the inflation rate in January 1999.*

. not available - not applicable

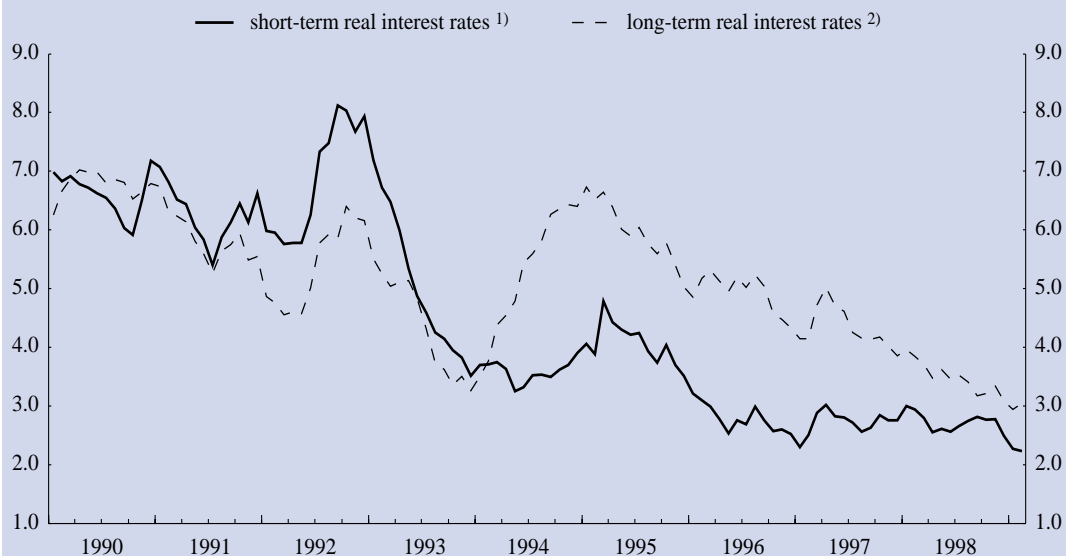
Turning to the *long-term real interest rate* for the euro area (using yields on 10-year government bonds), the average value for February 1999 was 3.2% (see table above). As evidenced by the real yield on a French

CPI-indexed 10-year Treasury bond, market expectations at the beginning of March 1999 point in the direction of a 3% real interest rate over the next 10 years (see Box 2 on page 16 of the February 1999 issue of the Monthly Bulletin). The average euro area long-term real rate in February 1999 was approximately 200 basis points lower than the average over the 1990s (5.2%) and also considerably lower than the average for Germany over the past 30 years (4.1%). In the United States the average level of the long-term rate in February 1999 was 3.3%, slightly higher than that of the euro area. The average real interest rate associated with price level-indexed US Treasury bonds of a 10-year maturity in February 1999 was around 3.8%. All this evidence confirms that real rates in the euro area can be regarded as relatively low, both in historical and in international terms.

The chart below shows the development of the short-term and long-term real interest rates for the euro area in the 1990s. The fall in real interest rates observed in recent years may be related to some extent to the cyclical situation. It is notable, however, that real interest rates are currently lower than they were in the mid-1990s, when capacity utilisation in the manufacturing sector was at levels similar to those observed at present. This suggests that other factors, such as declining inflation and exchange rate risk premia and lower fiscal deficits, have allowed euro area average real interest rates to come down substantially. This is a clear illustration of the benefits of the convergence process towards Monetary Union, indicating that progress towards low inflation, exchange rate stability and improved fiscal positions have together brought about lower real interest rates. Establishing a credible single monetary policy in this beneficial environment has fostered expectations of price stability, thereby lowering real interest rates and supporting economic growth.

Short-term and long-term real interest rates for the euro area

(percentages per annum)



Source: ECB aggregation of individual country data; monthly averages.

Note: Nominal interest rates minus annual changes in the CPI.

1) Euro area average of national three-month interbank rates until 29 December 1998; three-month EURIBOR from 30 December 1998 onwards.

2) Long-term government bond yields, 10-year bonds or the closest available bond maturity.