

## Box 2

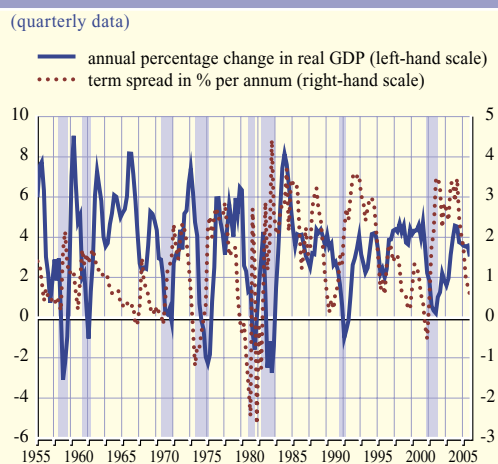
**DOES THE FLATTENING OF THE US YIELD CURVE SIGNAL LOWER GROWTH AHEAD?**

Since the start of the latest US monetary policy tightening cycle in June 2004, the Federal Reserve has thus far gradually raised its federal funds target rate by 350 basis points, the most recent rise having taken place at the end of January. In contrast to what happened in previous tightening cycles, long-term interest rates declined slightly over the same period, which has led to a flat yield curve. In December 2005, the average value of the differential between the yield on US ten-year constant-maturity government bonds and the three-month Treasury bill rate (hereinafter referred to as the “term spread”) reached 50 basis points, a huge drop from the 350 basis points it had stood at in June 2004. The ten-year government bond yield has even been below the three-month money market interest rate since the end of 2005. Such a development in the term spread has typically been a forerunner of a slowdown in the United States.<sup>1</sup>

Chart A plots quarterly data for the term spread, together with the annual growth rate of real GDP, with the shaded areas indicating recessionary phases as defined by the National Bureau of Economic Research (NBER). The chart illustrates that a sizeable drop in the steepness of the yield curve, making it become flat or even inverted, has been followed – after periods of between two and four quarters – by a recession. The only clear case of a false signal is in 1967, a year in which the United States experienced a marked slowdown in economic growth that was, however, not classified as a recession by the NBER. Hence, a flat and, in particular, an inverted US yield curve has in the past always indicated a future slowdown in economic growth, in most cases setting the stage for a recession.

<sup>1</sup> For empirical evidence, see, among others, A. Estrella, “The yield curve as a leading indicator: frequently asked questions”, [www.newyorkfed.org](http://www.newyorkfed.org), 2005, and A. Estrella, A. P. Rodrigues and S. Schich, “How stable is the predictive power of the yield curve? Evidence from Germany and the United States”, *Review of Economics and Statistics* 85(3), 2003, pp. 629-644.

**Chart A Term spread, real GDP growth and recessions in the United States**



Sources: Federal Reserve Economic Data (FRED) and NBER.  
 Notes: Shaded areas refer to NBER-defined recessions. Annual percentage change in real GDP is calculated over the corresponding quarter of the previous year.

**Chart B Probability of a US recession according to the term spread**



Sources: Federal Reserve Economic Data (FRED), NBER and ECB calculations.  
 Notes: Shaded areas refer to NBER-defined recessions. The probabilities are based on probit regression outcomes which are explained in footnote 2.

Applying a probit regression analysis on quarterly data, whereby the likelihood that the current quarter will belong to a recessionary phase is explained by the preceding four values of the term spread, it is found that, at present, the probability of an imminent US recession is not negligible. According to Chart B, which plots the estimated probabilities of a US recession according to the term spread, the likelihood of a recession in the United States in 2006 is about one-fourth.<sup>2</sup> The results reported by Estrella (see Footnote 1), based on monthly data, indicate that, when the term spread is nil, there is a one-third probability of experiencing a recession after 12 months.

The evidence reported above is cause for wondering whether history will again repeat itself or whether things will evolve differently this time.

The first reason why things could differ from the past is that this time the nearly inverted US yield curve seems to reflect particularly low long-term interest rates. The current historically low level of long-term interest rate in the United States may reflect exceptionally low risk premia that are driven by an unusually high demand for long-term bonds rather than by fundamental macroeconomic factors.<sup>3</sup> In particular, the United States has witnessed a surge in foreign investment in US government bonds since the last recession in 2001.

Second, looking at survey evidence, the recently perceived likelihood of a US recession over the next four quarters is significantly lower than that derived from the aforementioned probit

2 These probabilities are probit regression outcomes with an NBER-defined recession dummy as a dependent variable and four-quarter lagged term spreads as independent variables. They refer to in-sample one-step-ahead probabilities between the first quarter of 1955 and the fourth quarter of 2005 and to out-of-sample probabilities between the first and fourth quarters of 2006, with it being assumed that the term spread throughout 2006 is the same as the level recorded in December 2005.

3 For example, see the Box entitled "Recent developments in long-term real interest rates" in the April 2005 issue of the Monthly Bulletin.

model with the term spread as the single explanatory variable. For example, according to the so-called “anxious index” published in the Federal Reserve Bank of Philadelphia’s Survey of Professional Forecasters in December 2005, 14% of all the panellists covered foresaw negative quarter-on-quarter real GDP growth at the end of 2006. According to the January 2006 Merrill Lynch Global Fund Manager Survey, 9% of the global fund managers responding shared the view that the US economy would be fairly or very likely to experience a recession over the next 12 months.

All in all, it is important to bear in mind that, at the current juncture, the US term spread could be distorted by a strong demand for long-term government bonds, the precise impact of which is rather difficult to quantify. More than just usual caution therefore seems warranted when interpreting recent developments in the US yield curve as an indicator of lower economic growth.