

## FOCUS · On the likelihood of a recession in the US

April 2018 marked 106 months of expansion in the US economy, in what is the second longest growth phase in the last 170 years. What is more, it is only 14 months short of the all-time record held by the cycle of 1991-2001. Economic expansions do not die of old age and, as it happens, the economic data in recent quarters remains positive and indicates a good rate of growth. Nevertheless, there is one indicator in particular which has begun to arouse rumours about the possibility of the current expansionary phase coming to an end. It is the slope of the yield curve, an indicator which has correctly predicted every US recession of the past 50 years. Where does this predictive power come from? What is the current likelihood of recession according to this indicator? We analyse these issues below.

### An astonishing predictive history

The first chart shows the impressive predictive history of the slope of the yield curve since 1961. The blue line represents the spread between 10-year and 3-month sovereign interest rates, while the shaded bands indicate periods of recession. Clearly, each time the curve has been inverted (downward slope), the economy has entered into a recession after some 6 to 18 months (with one exception, at the end of 1966, when it only slowed down).

Economic theory has not yet developed a satisfactory causal explanation for this correlation, but there are two intuitive reasons behind the association between the two variables. Firstly, the tightening of monetary policy traditionally affects short-term interest rates more than long-term rates, which flattens the yield curve and, at the same time, slows down the economy over the medium term. Secondly, the slope of the yield curve contains information about expectations regarding future economic performance. Let's consider the following example, in which a saver has two options to lend money over a 10-year period: she can either (i) directly fix an interest rate over 10 years, or (ii) fix the interest rate over 1 year and renew it annually. Given that the saver compares the two alternatives, the 10-year interest rate reflects her expectation for the 1-year interest rate over the next 10 years (on balance, the saver is indifferent towards the two alternatives). Therefore, when the slope turns negative, it is a sign of the expectation that future interest rates will be lower than current rates. In other words, at some point, monetary policy is expected to

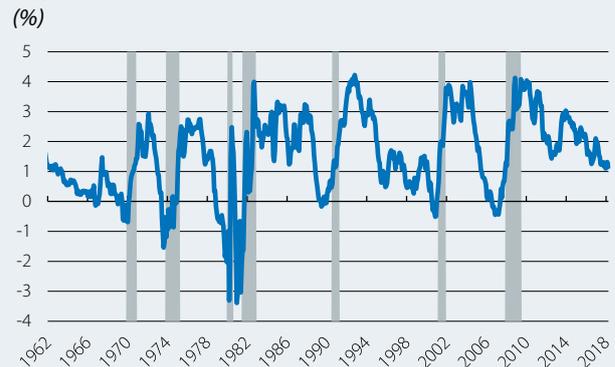
1. A probit model with data for the period between June 1961 and September 2016. The dependent variable indicates whether (or not) a recession occurs within 3 to 12 months, while the independent variable is the differential between 10-year and 3-month US sovereign interest rates.

become more expansionary because the economy will slow down and/or enter into a recession.

### The likelihood of recession in 2018

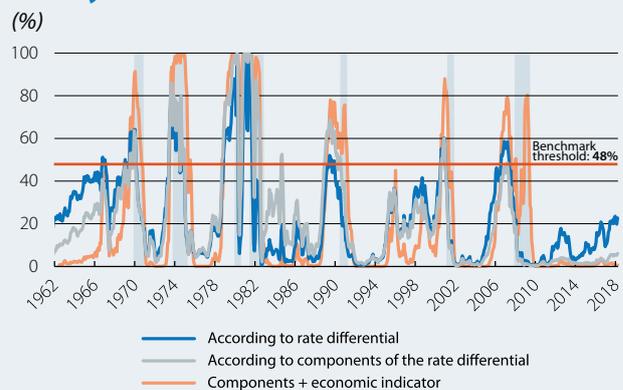
Given that this indicator has correctly anticipated the seven recessions that have occurred since 1961, the fact that the slope has steadily decreased from 300 bps in 2013 to the current 110 bps has fuelled the debate surrounding the possibility of a new recession. To quantify this possibility, in the second chart we present the probability of recession predicted by the slope of the yield curve, according to a statistical model.<sup>1</sup> As the blue line shows (we will discuss the grey and orange lines further below), the yield curve currently assigns a probability of 23% to the US going into recession sometime in the next 12 months. A useful benchmark for putting this figure into context is the probability of recession that the model

**US: recessions and the slope of the yield curve \***



**Note:** \* The shaded areas denote periods of recession. The slope of the yield curve is represented as the difference between 10-year and 3-month sovereign interest rates.  
**Source:** CaixaBank Research, based on data from Bloomberg and NBER.

**US: probability of recession according to the yield curve \***



**Note:** \* The shaded areas denote periods of recession.  
**Source:** CaixaBank Research, based on data from Bloomberg, the Federal Reserve Bank of New York and NBER.

indicates when the slope is perfectly flat: 48%.<sup>2</sup> Thus, although according to the yield curve the risk of recession is not negligible, it is still far from the levels that have historically provided a clear sign of a pending recession.

**Is this time different?**

One of the main criticisms of the use of the yield curve as a predictor of recessions is that economic and financial structures have evolved a great deal since the 1960s, so the past should not be extrapolated to predict how a radically different environment will evolve. One of the elements that change over time is the factors that determine the slope of the curve. Earlier, we discussed how long-term interest rates are a reflection of the expectations regarding the short-term interest rates that will prevail in the future. However, interest rates have another component: a term risk premium, which compensates savers for the additional risk of committing to a long-term investment.<sup>3</sup>

As can be seen in the third chart, the term premium is a significant component of interest rates and, moreover, it fluctuates over time. Furthermore, the levelling off of the yield curve in recent years is primarily due to how the term premium has changed (see the fourth chart). However, earlier we argued that the predictive power of the yield curve comes from the expectation component. Is it possible that the model will predict a lower probability of recession if we eliminate the term premium and use a more accurate measurement of expectations? The answer is yes. This is precisely what is happening in the grey line of the second chart, which corresponds to a model in which we break down the slope into the expectation component and the term premium component: the probability of recession is reduced to 6%. In the same spirit, the orange line shows that if we also add in information on indicators of economic activity, the probability of recession is reduced to 1%.

Although it is tempting to emphasise the mitigating effect of the term premium and the encouraging economic indicators, history recommends us to be cautious before declaring that «this time is different». For example, in an appearance at the Senate in 2007, when the sovereign curve was already inverted and indicated a 60% probability of recession, Ben Bernanke, the then chairman of the Fed, stated that «declines in the term premium (...) have led to a somewhat permanent flattening – or even inversion – of the yield curve, and that pattern does not necessarily predict

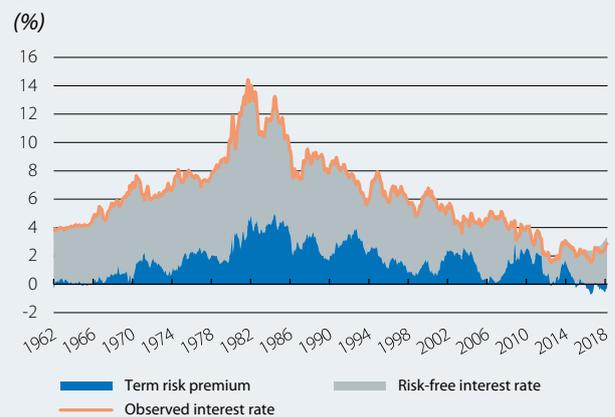
2. This is the benchmark because when the slope is inverted, the predictive history is virtually flawless.

3. For more information on the term premium, see the Focus «US Treasury term premia: not yet, but likely» in MR12/2014, and «The bias in market interest rate forecasts» in MR 10/2016.

slowing in the economy or a recession». However, we now know that, even on that occasion, the prediction of the yield curve was correct. In fact, the term premium is and has been a significant predictor of the likelihood of recession: each inversion of the yield curve has gone hand-in-hand with a compression of the differential of term premiums.

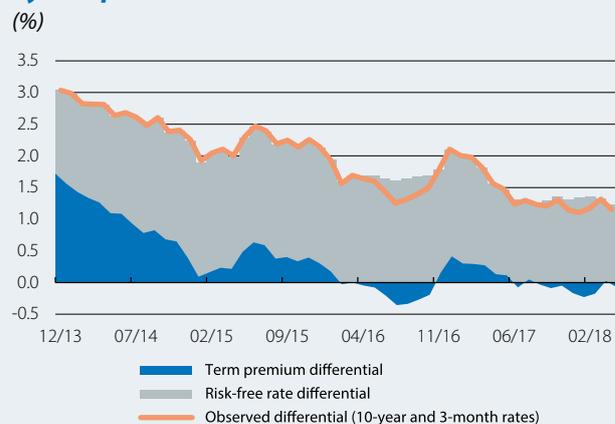
Finally, if we adjust the model to predict a less extreme scenario than recession, all of the specifications considered previously point towards an increase in the likelihood that growth will slow down in the coming quarters. This is a natural conclusion, since it is nothing more than a reflection of the fact that, besides the temporary boost provided by the fiscal stimulus of the Trump Administration, the US has been in the mature phase of the cycle for quite some months now, with a labour market showing high rates of employment and a level of real production which has already reached its potential.

**US: components of the 10-year sovereign interest rate**



*Note:* Breakdown according to T. Adrian, R. K. Crump, and E. Moench (2013), «Pricing the Term Structure with Linear Regressions», *Journal of Financial Economic*.  
*Source:* CaixaBank Research, based on data from the Federal Reserve Bank of New York.

**US: changes in the slope of the yield curve by component**



*Note:* Breakdown according to T. Adrian, R. K. Crump, and E. Moench (2013), «Pricing the Term Structure with Linear Regressions», *Journal of Financial Economics*.  
*Source:* CaixaBank Research, based on data from the Federal Reserve Bank of New York.