

Expectations, inflation and financial markets: an exciting trinomial full of surprises

The importance of expectations in the formation of the prices of financial assets is beyond any doubt. It is also indisputable that investors' expectations are not rational and that human beings often make mistakes which affect the decision-making process, as we have seen in the article «From expectations formation to decision making» in this same Dossier. The intuition of the highly reputable-economist Keynes a century ago has been widely corroborated by the empirical evidence: «the markets can remain irrational for longer than you can remain solvent.» In this article, we will focus on studying the mistakes that are made when developing expectations about a variable that is key at the macro level, namely inflation, and their consequences for the financial markets.

However, before diving in, it is worth going over some of the anomalies that occur in the financial markets. In particular, here are three examples that have been the subject of much debate. Firstly, share prices in the US stock market tend to rise in January. Secondly, share prices tend to increase on Fridays but fall between the close of trading on Friday and the early hours of Monday trading. Thirdly, the yield of the Dow Jones Index is 23 times higher just before holidays than on a normal day. Clearly, there cannot be any satisfactory rational explanation for these anomalies. Nobel laureate Richard Thaler has argued that there are underlying psychological factors behind these anomalies, which are likely to be familiar to readers of our *Monthly Report* (if only vaguely): stock prices go up in January due to people's positive attitude and desire to turn over a new leaf in the new year; on Fridays or just before holidays, investors tend to buy assets due to the euphoria of knowing that rest days lie ahead, but on Mondays they are depressed at the thought of the beginning of a new work week.

In parallel, a plethora of studies attest to the existence of biases in the financial markets, such as overconfidence, following the strategies of the herd without considering whether or not they are logical (herding or aggregate behaviour) and short-sightedness. These biases are far from trivial: for example, Benartzi and Thaler¹ documented that if citizens focused on the longer term, they would invest almost all their savings in the stock market and practically nothing in bonds.

Having established the often irrational behaviour of the financial markets, we can now turn our attention to the focus of the article: inflation expectations. While this is a very important topic for understanding trends in the financial markets in general, it is even more so in the current macroeconomic context. This is because, given the mature cyclical phase in which the US economy currently finds itself, we would expect inflation expectations to incorporate a scenario with higher inflationary pressures, and yet this is far from the case. Expectations are not currently discounting particularly high inflation for the next few years and have remained unusually stable. If inflation expectations are underestimating the likelihood of higher inflation, the impact could be significant. For example, there could be a more abrupt than expected hike in interest rates, which would test the macrofinancial situation of the more fragile emerging countries.

To study how inflation expectations behave over the course of the economic cycle in detail, as a reference we use the forecasts which economists and investors produce on a quarterly basis for the Survey of Professional Forecasters of the Federal Reserve Bank of Philadelphia in the US. To begin with, we compare the median of the inflation expectations for one year ahead with the actual inflation. Using statistical techniques, we conclude that the expectations are not rational. In other words, we detect the presence of systematic forecasting errors. To the extent that forecast errors are systematic in nature, it seems that analysts' forecasts could be improved. This suggests that analysts do not use all the available information to produce their inflation forecasts, as they would do if they acted rationally.

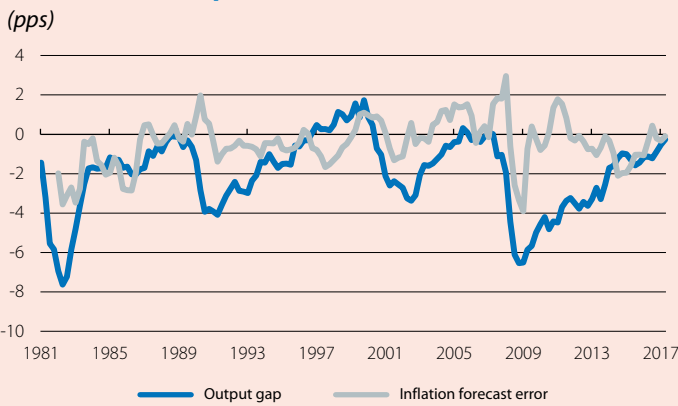
In light of this result, we wonder what factors influence the forecast errors that are made. To investigate this, we begin by examining what factors explain the variation in inflation expectations. The results are at least suggestive: 69% of the difference is explained by past inflation data, 29% by past prediction errors and only a meagre 2% by the cyclical position of the economy, measured with the output gap (actual GDP as a percentage of potential GDP). These results seem to indicate that experts pay too much attention to past inflation data, that they only learn from their past mistakes up to a certain point and that they do not pay much attention to the economy's current cyclical position.

On the basis of this preliminary evidence, we carry out a more rigorous econometric analysis, assessing how past inflation and the cyclical phase of the US economy have affected the forecast errors made in the past.² We find that there is a very close and statistically robust positive correlation between inflation forecast errors and the economy's situation in the cycle, as can be seen in the first chart. In particular, the more mature is the economy's cyclical position (i.e. the greater the output gap), the greater the downward error committed by specialists when predicting inflation (in other words, the more inflation surprises there are due to actual inflation being higher than expected). Therefore, during times of economic boom, we tend to forecast lower inflation rates

1. S. Benartzi and R. Thaler (1996), «Risk Aversion or Myopia: The Fallacy of Small Numbers and Its Implications for Retirement Savings», UCLA Working Paper.

2. We use inflation forecast error as the dependent variable. As regressors, we use inflation expectations for one year ahead, the output gap, and the current fluctuation in the price of crude oil as a control variable. We include a lag of these regressors and a polynomial function for the output gap to account for non-linear relationships.

Relationship between the point in the cycle and inflation surprises



Note: El output gap is expressed as the actual output as a percentage of the potential output. The inflation forecast error is calculated as the actual inflation less the forecast inflation for that period.
Source: CaixaBank Research, based on data from Bloomberg, FRED and DataStream.

but has virtually no impact on the 2-year rate. To rationalise this result, we break the interest rates down into the expectation of short-term rates, on the one hand, and the term premium on the other.³ This premium can be understood as the compensation or additional yield which is demanded by investors for investing over the long term rather than the short term (and reinvesting over the same period as the long-term bond). It turns out that the spike in 10-year rates is mainly explained by an increase in the term premium. The most plausible explanation for this is that, as we increase the time horizon, bigger inflation surprises occurring now generate greater uncertainty about future inflation expectations. This, in turn, increases the risk premium demanded by investors to compensate them for investing over 10 years instead of reinvesting from year to year.

But how big is this spike in 10-year rates? Assuming that the pattern observed historically holds in the current scenario, a surprise like the one we have estimated at the end of 2018 (of about 0.5 pps) would lead to an increase of 25 bps in the 10-year rate. For the reader to get an idea of the scale, 50% of the quarterly increments of the 10-year rate lie within a range of +/-30 bps. It should be noted, however, that although this is not a particularly high figure, it is a very conservative estimate, since the historical pattern is very much influenced by the low inflation levels and low interest rates of recent years. Therefore, as the US economy enters a more mature phase of the cycle, the inflation surprises can be expected to be more significant, hence the spikes in rates are likely to be much greater than 25 bps. This could put more stress on financial conditions than expected and, thus, reinforces the theory that high levels of uncertainty regarding inflation forecasts are pose substantial risks which can influence the monetary policy of the Fed.⁴

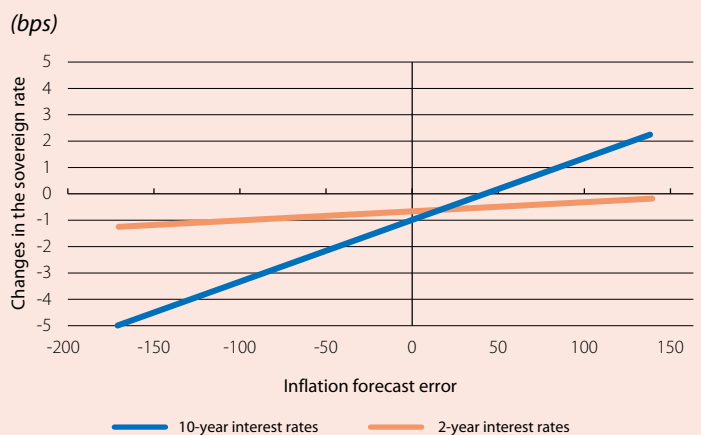
In summary, expectations have a significant impact on the future of the financial markets, hence economic science should take the study of expectations very seriously. In this article, we have focused on the macrofinancial impacts of the errors committed by analysts when producing their inflation forecasts, and we have seen that the impact can be considerable. Although Keynes' motto «it is better to be roughly right than precisely wrong» remains valid, our analysis appears to indicate that, while we are not «completely wrong», we cannot say that we are «approximately right» either, when it comes to developing inflation expectations.

than those we will actually have. The reason is perhaps that economists give too much weight to past inflation data (which were lower, since they related to a less mature point in the cycle), while on the other hand not assessing the cyclical phase of the economy with sufficient accuracy.

Having identified this situation, we might wonder how big of a mistake we make. Using the latest data, we estimate that the median forecast is usually between 4 and 5 decimal points below the actual inflation, which is a far from negligible difference.

Inflation expectations interest us, above all, because of the impact they can have on asset prices in the financial markets. To analyse this issue, we study the impact of deviations between the actual inflation observed in the US and the consensus of Bloomberg on 10 and 2-year interest rates of US sovereign debt. This exercise shows that an increase in upward inflation surprises causes a spike in the 10-year rate

Impact of inflation surprises on the sovereign interest rate in the US



Note: * The lines in the chart show the trend in the relationship between changes in the sovereign interest rate and inflation forecast error. The change in the sovereign interest rate is calculated as the difference between the closing rate on the day the inflation figure is published and that of the previous day.
Source: CaixaBank Research, based on data from Bloomberg.

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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 forecasts of interest rate» in MR10/2016.
 4. See O. Aspachs-Bracons (2018), «Retos a los que se enfrentan la Fed y el BCE», CaixaBank Research Working Paper.