BBVA Research

Mexico

Economic Watch

June 7, 2010

Monetary policy expectations in the financial markets

Estimate of implicit monetary policy in the IRS curve

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- **The risk premium existing between TIIE 28 and the expected policy rate in the IRS market needs to be subtracted in order to derive the market's implicit forecast for the monetary rate.**
- **It is currently estimated that the risk premium stands at between 33 and 45 bp over one year.**
- **The market is debating between an extended pause for the rest of the year and a 25 bp rise at the end of 2010. The expectations of rate rises discounted by the market have been delayed and held back considerably over the last few months.**
- **However, the monetary policy expectations obtained in the IRS market are not statistically reliable for periods over three months.**

Estimation of the intertemporal risk premium in the short-end of the IRS curve

The intertemporal structure of the yield curve, usually called the yield slope, is a result of combining both structural and temporary economic and financial factors. Among the former, and once the effects of the long-term economic outlook on growth and inflation have been taken into account, our estimates suggest an equilibrium premium by period between M10 and Cetes28 days of between 50 and 100 bp[1]. This implies that a slope outside this range would reflect other non-structural factors, such as growth and inflation –and therefore monetary policy– expectations and/or liquidity levels or financial risks such as uncertainty about the public sector resorting to the market –fiscal uncertainty– or risk appetite.

The slope in the shortest part of the curve (period from one day to one year) is, to a greater extent, due to expectation factors, especially regarding monetary policy. Thus, the short-term premium is hard to derive, and is normally assumed to be zero. However, for a one-year period, and even more so when the policy interest rate is far from its neutral level, this premium could play a more relevant role in the intertemporal structure of the short part of the curve.

As a result of these considerations, there is a major difference with the interpretation usually given to the market's expectations in relation to monetary policy. Regularly, it is assumed to be equal to TIIE 28 as the implicit derivation of monetary policy expectations, regardless of the period. However, this does not consider the required extraction of an intertemporal risk premium, equally justified as that of the long part of the curve, especially when analyzing periods over 6 months.

[1] See box "Short- and Long-Term Risk Premium: a first approach" in the Mexico Watch issue for the first quarter of 2008, available on the BBVA Research website. The equilibrium risk premium is not constant, and for this reason the results derived in this document have varied over the last two years in line with the changes in the economic variables.
[2] IRS instruments are used to hedge against the uncertainty surrounding future performance of interest rates and unify the various preferences or expectations of investors: those who want to pay a fixed rate instead of a variable one and those who seek to pay a variable rate instead of a fixed one.
[3] The OTC swap market is a liquid market which uses the TIIE 28 interest rate as a benchmark to facilitate the deduction on the monetary policy rate.
4 Different procedures and methodologies have been used in economic literature to extract the monetary policy expectations and estimate risk premiums. Our strategy is a mere approach to the subject. See Ang and Piazzesi (2003), Hordahl and Tristani (2007), and Taylor (2001).

Thus, when it is said, for example, that the market, according to the information on the IRS curve, discounts[2] a monetary policy rate of 5.0%, what it could actually be discounting is a 4.6% rate, which considers the extraction of an intertemporal risk premium, a premium that grows over time and can be estimated as detailed below.

To extract a measurement of the implicit expectation of monetary policy in Mexican debt markets we have used a strategy structured into three stages: 1) calculation of the equilibrium spread between TIIE 28 and the fondeo bancario; 2) estimate of the premium by period of the swap curve over TIIE 28 (IRS TIIE)[3]; 3) and finally, the spread derived between TIIE and fondeo, as well as the estimated premium between TIIE and the term swap, are discounted from the IRS curve[4].

To calculate the equilibrium spread between TIIE and the bank lending rate, we have estimated this spread based on its own lags and an inflation surprise index (or inflation expectations). A variable term has also been included which is estimated with the space-state methodology.

$$Spread_{t(TIIE\,28-\,fondeo)} = \hat{a} + \sum_{i=0}^{3} Spread_{t-i(TIIE\,28-\,fondeo)} + \sum_{i=0}^{3} \delta_i \pi_{t-j} + e_t$$

$$\hat{a}_t = \rho_j \sum_{j=1}^{n} \hat{a}_{t-j} + u_t$$

The estimated level is associated with the unobserved component $\hat{a}$ and represents the equilibrium spread, adjusted in terms of inflation expectations, which is the main determining factor in such short periods. As shown in chart 1, this equilibrium varies over time, but is relatively stable, averaging 8 bp (a less robust specification suggests an equilibrium of 15-20 bp).

In the derivation of the premium by period between TIIE and the one-year swap, we have used the unobserved factors methodology. To do so, we have estimated the swap curve based on the bank lending rate, inflation, economic growth and two unobserved components (associated with the level and slope of the swap curve). We thus obtain the series which cannot be explained by any of the economic variables from the slope factor, and this estimated residual is associated with the risk premium by period between the one-year swap and TIIE 28.

$$Swap = \hat{c} + \alpha_g \sum_{1}^{2} \hat{Y}_{t-g} + \delta\, fondeo_{t-1} + \rho_j \sum_{1}^{2} \pi_{t-j} + \mu_1 \lambda_{1,t-1} + \mu_2 \lambda_{2,t-1} + \upsilon_t$$

$$\lambda_{1,t} = \hat{a} + \alpha_i \sum_{1}^{3} \hat{Y}_{t-i} + \beta_1\, fondeo_{t-1} + \partial_j \sum_{1}^{2} \pi_{t-j} + \phi \lambda_{1,t-1} + \varepsilon_t + \upsilon_t$$

$$\lambda_{2,t} = \hat{b} + c_i \sum_{1}^{3} \hat{Y}_{t-i} + \beta_2\, fondeo_{t-1} + \theta_j \sum_{1}^{2} \pi_{t-j} + \Psi \lambda_{2,t-1} + u_t$$

Where λs represent non-observable factors, $\hat{Y}$ the monthly growth of the economy, and π the annual inflation. The one-year premium in the IRS curve $\hat{b}$ barely varies over time and averages around 25 bp (see chart 2). In other words, the premium that the market implicitly charges for insuring TIIE 28 during one year against the current level is 25 bp (other specifications suggest 30-35 bp).

We finally discount both these 25 bp of risk premium from the one-year swap curve and the 8 bp equilibrium spread between TIIE and the bank lending rate:

1-year swap – 25 bp – 8 bp = Implicit monetary policy expectation

Currently, the implicit monetary policy expectation in the IRS swap market only discounts a rise in the bank lending rate towards the end of this year. However, the expectations have been adjusted downwards since the beginning of 2010, as in January the market discounted a monetary adjustment of nearly 75 bp for December this year, and rises in this quarter had been forecast.

In January 2010, based on the IRS curve, the market assumed that the monetary restriction cycle would begin between February and March this year, and that the monetary policy rate would end at around 5.53% in 2010. In fact, once we adjust in terms of the estimated risk premiums, what the market was actually discounting was the beginning of monetary cycle between May and June, and expected a rate of between 5.0% and 5.2% for December this year.

How well does the interest rate market anticipate Banxico's decisions?

The interest rate swap market reflects a standard quotation according to the number of interest rate reviews every 28 days. A fixed interest rate payment is swapped for another variable one based on TIIE 28 every 28 days. Between one month and one year, this market reflects, among other factors, short-term interest rate expectations, which are determined mainly by the implementation of monetary policy. In other words, swapping the fixed interest rate for a variable one as determined by the market incorporates the bank lending rate expectation for a given period.

In this section we analyze the implicit monetary policy expectations and their relationship with the implementation of monetary policy; in other words, the effectiveness of this market for anticipating changes to the bank lending rate.

Charts 5 and 6 show the implicit monetary policy expectations in the swap market that were expected 3, 6, 9 and 12 months ago, together with the observed bank lending rate. This expectation already discounts the risk premiums estimated in the previous section. As can be seen, shorter-term expectations (3 and 6 months) maintain a dynamism more in line with the recorded fondeo rate, but the margin of error is not lower, especially for the 6-month term. The average error for these terms is 50 bp and 80 bp, respectively, while for the 9-month term it is 120 bp and for 1-year 180 bp.

We should point out that when the bank lending rate was not yet used as an explicit monetary policy instrument, expectation volatility, and therefore the margin of error, were considerably higher. However, the difference continues to be relevant from 2005-2006, especially for terms over 3 months. Only during the period between April 2006 and April 2007, which was an extended cycle of monetary pause, did monetary expectations match the observed monetary policy rate.

In order to determine statistically the degree of efficiency of monetary policy expectations for anticipating changes to the bank lending rate, linear regressions adjusted by HAC Newest-Wes were carried out to correct for the effects of overlapping observations and autocorrelation. As in the efficiency tests for the expectations theory of interest rates and the interest rate parity theory, the following function is estimated:

$$IRS_t(1xN)_{N=3,6,9,y12meses} = c + \beta_i\, fondeo_{t+i(i=3,6,9,12meses)} + \varepsilon_t$$

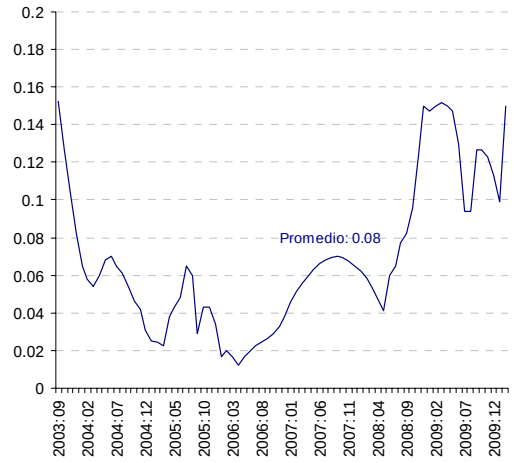
Chart 7 shows the calculation errors for the 3- and 12-month terms. In both cases, the errors show strong persistence, although the size of the 1-year expectation error is clearly larger. Chart 1 shows the parameter, as well as its statistical significance, for the implicit bank lending expectation variable. Only in the case of the 3-month expectation is the estimator significant. However, in none of the cases is the parameter's value near one, the value we would expect to obtain if the monetary expectation were accurate and efficient.

Table 1 shows the development of the estimate adjustment measured by R2. The adjustment is only greater than 40% for 3-month expectations; for all other terms, the regression adjustment is very low.

In short, the results suggest that only in the case of the 3-month implicit monetary policy expectation derived in the IRS curve does the latter anticipate with a significant relative degree of efficiency the changes to the bank lending rate. For terms over 3 months, market volatility or noise prevents the use of implicit monetary policy expectations as a significant statistical benchmark. In other words, the probability of the market rightly anticipating the monetary cycle is low.

Chart 1

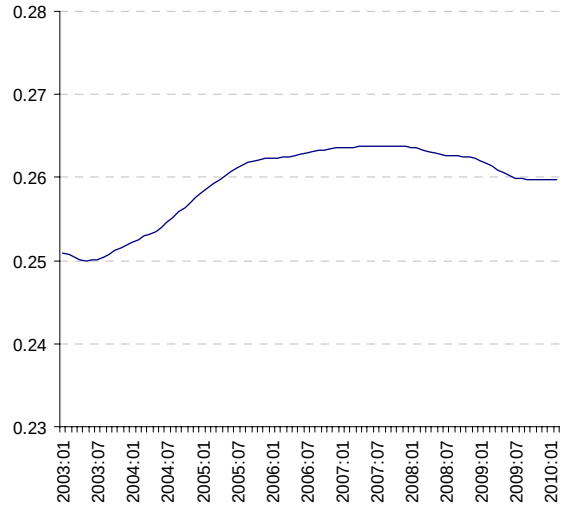
Estimated spread between TIIE 28 and monetary policy (%)



Source: BBVA Research

Chart 2

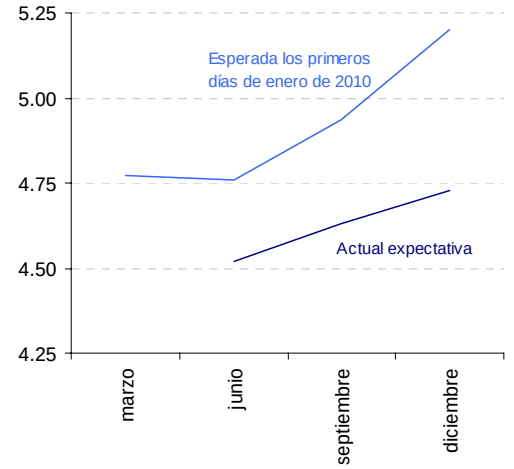
Premium by period in the IRS market (1 year, %)



Source: BBVA Research

Chart 3

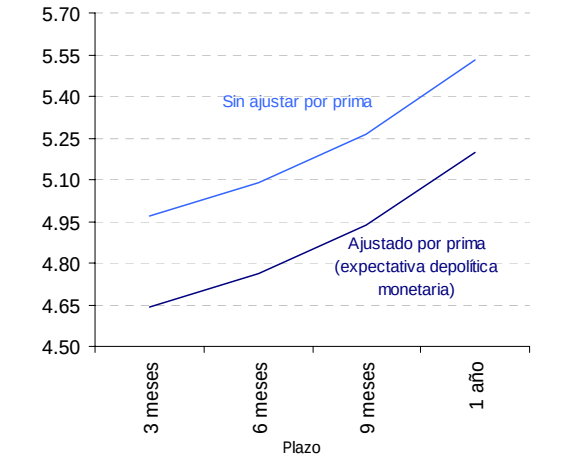
Implicit monetary policy expectation



Source: BBVA Research

Chart 4

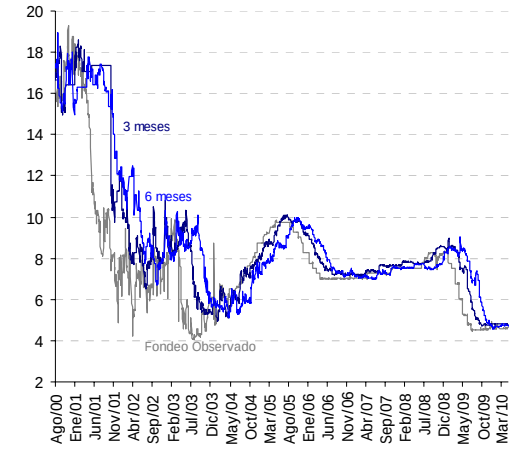
IRS rate and implicit monetary policy expectation in early 2010



Source: BBVA Research

Chart 5

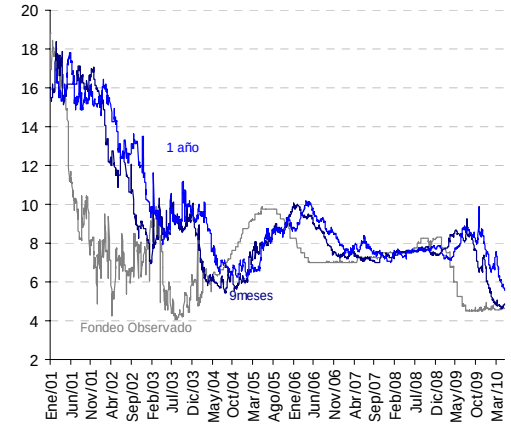
Monetary policy rate expected 3 and 6 months ago vs. observed rate (%)



Source: BBVA Research

Chart 6

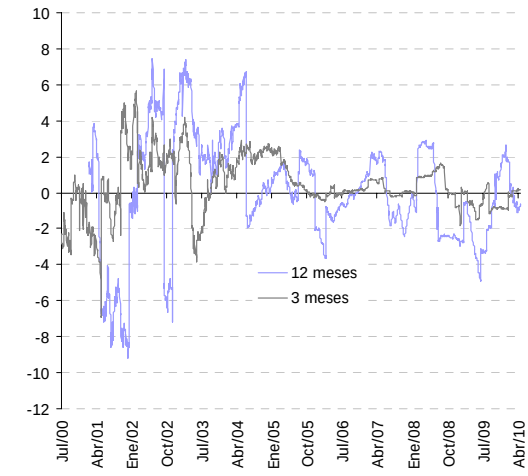
Monetary policy rate expected 9 and 12 months ago vs. observed rate (%)



Source: BBVA Research

Chart 7

Error forecasting of the implicit monetary policy expectation in IRS curve



Source: BBVA Research

Table 1

Statistical estimate summary

	B	*t-estadístico*	*R2*
3 meses	0.63	2.16	0.47
6 meses	0.42	1.37	0.39
9 meses	0.27	1.16	0.25
12 meses	0.083	0.74	0.11

Source: BBVA Research