Discussion

of

"Reaction of Swiss Term Premia to Monetary Policy Surprises" by Paul Söderlind

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This is a very interesting paper on the influence of monetary policy surprises on the longer end of the Swiss yield curve. In particular, it relates the communication of monetary policy decisions by the Swiss National Bank (SNB) to the dynamics of the term structure. Paul Söderlind has succeeded in adding a substantial contribution to the literature on affine yield curves. Besides that, he connects this literature to the research which uses high frequency data from the futures market to assess the impact of monetary policy actions on bond yields.

Using a DAI and SINGLETON (2000)-type affine model of the yield curve, Söderlind incorporates information from interest rate options to construct two observable factors which have an effect on the market price of risk. His approach involves estimating the risk neutral distribution of future interest rates and relating this distribution to the observable risk factors. These two factors, together with two unobservable factors representing level and slope, form an autoregressive model which determines the dynamics of the yield curve Applying this structure to daily data allows to calculate the innovations to the 3-month rate. A comparison of these innovations with movements of the futures written on the 3-month Libor after the communication of policy decisions by the SNB indicates that the yield curve model is able to capture monetary policy surprises. In an event study using daily data and focussing on dates with a monetary policy decision, Söderlind demonstrates that the term premium for longer maturities typically shifts in the opposite direction from the interest rate move performed by the SNB. He interprets this result as showing that hikes of the policy rate demonstrate the SNB's commitment to price stability which in turn dampens the increase of long term interest rates.

From a technical viewpoint the main contribution of Söderlind's paper is the incorporation of observable risk factors based on interest rate options into an

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affine yield curve model. The interest rate options allow to calculate a forward looking measure of volatility on a daily basis which provides a robust measure of risk. Given the prices of interest caps, Söderlind calculates the width of the 80% confidence band of the riskneutral distribution of future interest 1- and 5-year interest rates. He uses this volatility measures to construct a factor representing "1-year bond market risk" (based on the confidence band for the 1-year rates) and a second factor labelled "term spread of bond market risk" (based on the difference of the confidence bands for the 5- and the 1-year rates).

This type of observable risk factors is extremely useful as they can be calculated on a daily basis because they do not rely on macroeconomic variables. Most other approaches incorporating observable risk factors into affine yield curve models (see Chib and Ergashev (2009) for an overview) use a different approach. They rely on the fact that in asset-pricing models, the main driver of time-variation in the price of risk is the business cycle. Because they incorporate macroeconomic variables, the corresponding models can at most be estimated at the monthly frequency which makes them not amenable to an event analysis.

The principal economic contribution of this paper is a careful event analysis of the effect of monetary policy on the term premium at different maturities. To this end, an economic meaningful way of defining monetary policy surprises as innovations to the 3 month rate using the yield curve model is applied. These innovations are then compared to monetary policy surprises calculated from interest rate futures on days where the SNB takes monetary policy decisions. The comparison shows that both approaches yield similar surprises for the decision days. Relying on this and some other robustness checks, Söderlind then goes on to relate the innovations in the 3-month rate to the four factors of his model. As the factors are uncorrelated over the entire sample by assumption, their relative contribution to the innovation in the 3-month rate is not identified. This just means, that each of the factors is in principle equally likely to create a surprise in the 3-month rate. However, on decision days this is not the case, the estimated covariance matrix of factor innovations for this subsample non-diagonal. This fact can be exploited to calculate the typical factor innovations on decision days and to study the corresponding dynamic responses of the factors and the 3-month rate.

Söderlind's main result is a decomposition of the reaction of the yield curve to a monetary policy surprise into a part driven by the expected future short rate and the term premium. For Switzerland he shows that a surprising rate hike which, through the expectations hypothesis, leads to an upward shift of the entire yield curve has also a negative effect on the term premium at longer maturities. Overall

this results in a tilting of the yield curve and in a negative response of the long end to a hike of the policy rate.

At first sight, this seems to provide an explanation for something which the former chairman of the Fed, Alan Greenspan, labelled a *conundrum* in 2005: "In this environment, long-term interest rates have trended lower in recent months even as the Federal Reserve has raised the level of the target federal funds rate by 150 basis points."[1] A possible solution to the conundrum in the light of Söderlind's results would be that the increase of the short rate signals a reduction in risk which is strong enough to actually lower the long rate. Whether this solution works could be checked through an application of Söderlind's method to U.S. data.

For the Swiss case the situation is somewhat different as it is not quite clear whether rate hikes actually reduce the term premium for longer maturities. The event study does not give a conclusive answer to this question for the following reason: The four major policy surprises (defined as those being larger than 12.5 basis points in absolute value) were cuts of the 3-month Libor by at least 50 basis points at unscheduled meetings.[2] Overall, there were more than twice as much rate cuts than rate hikes in the sample and the average absolute size of rate cuts was about four times as large as that of rate hikes. This suggests that the interpretation of the event study results should be focused on rate cuts rather than on rate hikes.

Figure 1 shows that the four big monetary policy surprises (indicated by vertical lines) were followed by a substantial and sharp increase of the term spread indicating an increase of the term premium after a rate cut. The event study is strongly driven by negative surprises and therefore calls for an interpretation in terms of increased uncertainty after a rate cut. This in turn increases the term premium at longer maturities and leads to an upward tilt of the yield curve. However, the fact that cuts of the 3-month Libor decided upon at *unscheduled* meetings appear to have the strongest effects, suggests a possible endogeneity problem: In contrast to the quarterly scheduled meetings, the unscheduled meetings are usually prompted by major economic or financial shocks which themselves increase uncertainty. It could therefore be the case that the rate cuts are driven by higher uncertainty rather than the other way round.

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1   Federal Reserve Board's semiannual Monetary Policy Report to the Congress, February 16, 2005

2   Thanks to Angelo Ranaldo for providing the extended sample of the monetary surprise data in Ranaldo and Rossi (2010).

Figure 1: Term Spread (10y–3m) and Big Surprises
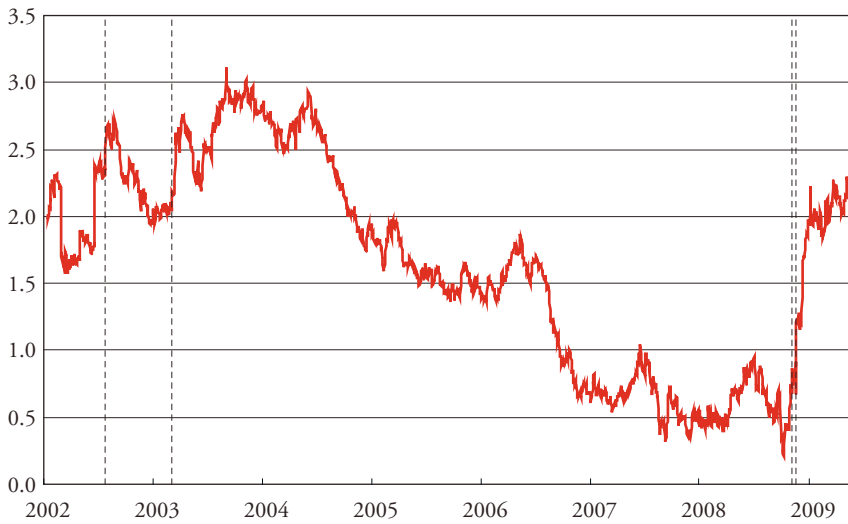
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