Reply to Referee

Dear Referee,

We would like to thank you for your comments, which helped us to improve our paper in various respects. Below we provide a description of how we dealt with your remarks, which we also reproduced in italics for your convenience.

Comment 1

Firstly, I think it could be made more clear and explicit what the contribution of this piece of research is, i.e., what is the gap in the existing literature and how this paper tries to address it. From the title, it is apparent that the novelty here is to incorporate macro variables and allow them to interact with latent factors, but the contribution does not seem to be stated very explicitly in the paper.

I have re-drafted the third paragraph of the article so now it is clearly stated that the contribution of the article to the literature is threefold.

Comment 2

Section 3.1, I would suggest this is explained in more detail or a reference to a derivation of (4) is provided. For instance, as it reads to me, the first bond under 2. Exists between time 0 and h, and then we shift to a bond living between h+1 and m. So the total holding period is m, whereas the bond under 1. lives for m+h years, but these two maturities should be equal. SO there is something I do not understand there[...]

I have added a reference to Rubaszek (2012, p. 180), where a reader can find a detailed derivation.

Comment 3

I do not think it is explained that by latent factors the authors mean the C, L and S parameters.

No it is clearly indicated at the end of section 2 that C, L and S are referred to as latent factors.

Comment 4

Section 3.3., last para, I think it would be helpful to expand to include more explanations.

I have slightly adjusted the text so that it was clear that the mean refers to the parameters of the BVAR and that the hyperparameters are the same as proposed by Robertson and Tallman (1999)

Comment 5

IĄam not sure how the estimation of those latent factors is done at a time. If this is just cross-sectional across all maturities at time t, this gives only very few observations to estimate these factors. Or is it done differently. Maybe by recursive estimation, where data on yields at different maturities are pooled at any point in time, so that we have more and more observations as the sample size increases. It would be good to have a more detailed explanation for how these factors are estimated.

It is done exactly as in Diebold-Li (2006) original paper. For each t we estimate the cross-section regression to get the estimates of S_t, C_t and L_t. Even though the regressions are estimated merely on the basis of 9 observations, the fit is based on points that are evenly distributed on the yield curve, which is the main requirement that the parameters are well describing the shape of the yield curve.

Comment 6

Page 6: values for slopes are mostly negative here, but the yield curves are usually positively sloped. Could the authors please add an explanation of this fact?

The definition of the slope is that it is the difference between the ST and LT rates, so if LT yields are higher than ST yields then the value of S_t is negative.

Comment 7

Section 4.2, estimation are done using moving windows. An alternative would be to do recursive estimations but I would not insist on that, I guess any approach has got its pros and cons.

Recursive and rolling forecasting schemes have their cons and pros. A nice description is provided in Chapter 3 of Hnadbook of Economic Forecasting by Kenneth D. West. In our case there are twofold advantages of the rolling scheme. First, this kind of forecasting scheme allows for the use of asymptotic DM test statistic. Second, given the secular declining trend in the level of interest rates the bias of forecasts, which is already visible in our study, would be strengthened additionally by using a longer sample span in the recursive setup.

Comment 8

Sections 4.3 and 4.4: there are other measures of how good the forecasts are which are reported in the literature, e.g. looking at absolute rather than squared values of errors,not to mention some looking at gains to utility for an invest using one rather than another forecasting model. But maybe including more measures would be beyond the scope of this paper.

I do agree, but at this stage I would stick to the two most commonly used statistics.

Comment 9

Section 5, IĄam not sure it is entirely clear how these macro variables are used to forecast future yields. Is it because they help to (potentially better) forecast the latent factors, which in turn are used to construct the future expected yield curve? In any case, it would be helpful to have a more explicit statement explaining how the macro variables are utilised exactly.

Thank you for this comment. Macrovariables are used to forecast latent factors, which are subsequently used to forecast yields. I have adjusted the text in Sections 5.1 and 5.2 to make it clear.

Comment 10

Section 6. Based on the empirical results, I think the conclusions and the abstract might be too strong, i.e., the superiority of more complex models in forecasting is not as clear as some statements suggest. I do not think this is a bad thing, i.e., one would expect more sophisticated models to work better but if they don't then they don't, we do not have to try to dress up the results. Rather, a discussion on why they are not clearly superior (e.g. adding estimation uncertainty while adding more variables into the forecasting model) could be extended. As the authors notice, these results might also be sample-sensitive and these models might work better on different samples.

I do not agree that there are strong statements that are not supported by the results. We point only to what has been found, namely:

- dynamic affine models tend are more accurate than the arbitrage-free model
- models allowing for endogenous interactions between factors and macroeconomic variables produce forecasts of worse quality
- yields forecasts conditional on the realization of macroeconomic variables are significantly more accurate than unconditional forecast

Minor issues

Corrected, but the first point (it is function not functions)