

# Report on Rigorosis Thesis

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<b>Title of the thesis:</b>	Alternative Yield Curve Modelling Approach

## **OVERALL ASSESSMENT** (provided in English, Czech, or Slovak):

The thesis presents technically demanding work on yield curve modeling. Methodology used is consistent with state of the art in this field. Author performs independent scientific piece of work while estimating the proposed models on the real-world data.

Author pays lot of attention to estimation, but methodology and model description is not so clear and straightforward from the text. There are also several issues resulting from quite unorganized text. Thus author should address these issues:

- How would the results change if other than MATLAB `fminsearch` function would be used, choice of starting values is also crucial, how does the author know that algorithm converge to optimal solution? Statistical testing is needed for this. As the problem is quite complex and author claims to optimize under 31 variables, I wonder why author does not pay more attention to optimization technique? The results will be very sensible to optimization, thus a note should be added.
- Author is surprised to see only diagonal elements significant (estimation results (5.1)), but is not estimation procedure constrained only on diagonal T (in estimation procedure), thus others should really be indistinguishable from zero? Or is this different T (I did not find it in text)?
- Author claims that non-stationary process is not problem for the model (p.39). How does author prove this claim? This needs to be clarified.
- Explain the intuition of AR(1) versus Random Walk driving the factors. Why parameter equaling to 1 implies Random Walk which implies predictable dynamics (p.45)? Should not Random Walk imply unpredictable dynamics? In fact author need to test for random walk to carry on such conclusions.
- What is the interpretation of latent factors?
- What is the interpretation of principal component analysis? I miss comments on the factors chosen by the PCA. Finally, which factors where used for PCA? More attention should be paid to this discussion as it is crucial for the results.
- Overall, logics of the text lacks proper interpretation and motivation. Mainly economic Motivation is a must for this kind of research.

Overall, the presented thesis is computationally and technically demanding exercise which has been performed with high precision. On the other hand, proper motivation for the results and methods used is missing (see my comments above).

This Rigorosis thesis is identical to Master theses defended at IES few weeks ago. I believe that this should be the case only if both consultant and oponent has no concerns to defended Master thesis. Otherwise, comments of the referees should be addressed carefully. In this case, I raised some concerns to the Master thesis defence as oponent and I believe these should be addressed in the rigorosis thesis as it is next level academic degree.

Nevertheless, the thesis is very interesting thus I would like to encourage the author to address my comments from the Master thesis defence, which would help to improve the work. For the successful defence, I would like to see the revised version of this thesis.

**NAME OF THE REFEREE:** Jozef Barunik

**DATE OF EVALUATION:** 20.2.2010

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**Referee Signature**