

Hand-in Assignment 1

Quantitative Methods in Fixed Income, Michel vd Wel, Erasmus U. Rotterdam

IMPORTANT INFORMATION

Below is the first hand-in assignment. It is in the form of a case and requires you to provide a brief three-slide (plus title slide) five-minute video presentation of your findings. At most 10 points can be earned. You will receive a grade on a scale of 1-10 (0 if you hand in nothing or in case of plagiarism), and your grade equals the amount of points earned with this assignment. Hand in your video latest Friday December 1 at 23:59 (one minute before midnight) through Canvas. Make the assignment in your group listed on Canvas (and do not collaborate/collude with other groups!). You can start working on the assignment far before the deadline, as after lecture 2 you have enough information to make Parts I and II; Part III can be made after lecture 3.

CASE

Problem Description A certain investment company is interested in obtaining good-quality interest-rate forecasts. The company is curious how the Nelson-Siegel method performs relative to the random walk and at least one other benchmark.

Part I: Data [2 points] You are free to choose your own data set and the country for which you to study the yield curve, as long as it is not the U.S.¹ On your first slide (after the title slide), provide an insightful figure of the data and clearly state the source of the data you've used. Describe key features of the data.

Part II: Stylized Facts [3 points] Before going into the forecasting analysis, check whether or not the stylized facts hold for your data set on your second slide. As there are six stylized facts and space on a slide is limited, make good choices on what you discuss and whether your slide needs one or more supporting tables and/or figures. (For example, if some stylized facts are easily met, you can go over them and state this, and show one interesting table/figure that makes this point. Or, in another example, if none of the stylized facts hold, it is good to state this and show a table/figure that has the most salient finding regarding the stylized facts.)

Part III: Forecasting [3 points] In the final slide, show the results regarding the forecasting exercise. Compare forecasts obtained from the Nelson-Siegel model to at least two benchmarks, of which one is the random walk. You are free to choose the estimation method for the DNS model that you'd like to use from any of the methods mentioned in class (2-step and state space for DNS). For the split of data into in-sample and out-of-sample, use (roughly) 60% of the data for in-sample and the remainder for out-of-sample.² Forecast 1, 3, 6 and 12 months ahead using expanding windows.³ If you need to make other choices in your analysis, state clearly which choices you've made. On slide three, show the key output from the forecasting analysis. This can obviously be in the form of a table with RMSFEs, but nicer is to use graphical depiction of the results (e.g., with histograms,

¹A list of data sources that there is access to at the Erasmus University Rotterdam is available at the website of the Erasmus Data Service Centre (EDSC; see <https://www.eur.nl/en/library/erasmus-data-service-centre>). An additional useful source is the website of a country's central bank. If you are unclear whether your data source is appropriate for use in the assignment, post a message about it on the discussion forum and I'll provide my insights.

²Round down to the nearest number of years. If you have 12 years of monthly data, 60% would be 86.4 months or 7.2 years, so you would use 7 years of data in-sample and the remainder for out-of-sample analysis.

³In case you use weekly data, use 4, 12, 26 and 52 weeks. For daily data, use 20, 60, 125 and 250 days.

plots of forecasting ability over time, etc). Make sure you provide a clear recommendation for the investment company on whether or not they should invest in incorporating the Nelson-Siegel method in their interest-rate forecasting analysis.

VIDEO PRESENTATION

Your solutions for this assignment should be provided in the form of a recorded video presentation. To support your presentation, you should use the above three-slide presentation (with one additional slide for the titlepage). This is a strict maximum and thus forces you to think carefully what to present or not. The video presentation has a strict time length limit of five minutes. Speak audibly and try to make your presentation engaging (reading from a piece of paper isn't engaging!). It is ok if one team-member presents on behalf of the team, but naturally the presentation is a team effort so you are jointly responsible for the quality of the presentation! Make sure you have a titlepage with the names of the students in your group, your group number, and a title of your presentation. Technical information with suggestions on how to record the video is available via Canvas. The video should be uploaded via the Canvas assignment **"Hand-in Assignment 1 - Video"**.

Of the 10 points, eight points come from the content-wise answering of the three parts. Grading of these eight points includes whether the tables/figures are clear and are introduced well to the audience, whether you made logical choices in what to present, and of course whether the approach is correct. Two points are for the form of your presentation. Grading elements here include whether the slides have a good and logical general lay-out and if the presentation is engaging and clear.

Copy-paste your code into a document that you save as PDF and upload this PDF as well for the assignment. In this manner a plagiarism scan can be run on the code. For this assignment you are free to choose the programming language that you use, but notify me in advance (through a message on the discussion forum) if you use any other program than Matlab/Octave, R and Python (these are the only languages allowed for the second hand-in assignment). This PDF should also contain the names of the students in your group and your group number, and should be uploaded via a separate Canvas Assignment (named **"Hand-in Assignment 1 - Code"**)