Homework 5, 4/25/2017, FRE-6971

Problem 1 (20 points)

Reading: Sato (Ch. 4 & 8), Bjork (Ch. 24 & 26)

1-Factor Vasicek Model:

$dr(t) = \{\mu - \kappa r(t)\}dt + \sigma \; dW(t)$

Derive SDE for the short rate, r(t), under the T-forward measure

Problem 2 (40 ponts):

Use results of DNS estimation you carried out in HW4:

- Reading: Diebold & Li paper on Dynamic Nelson-Siegel model (DNS)

- Dataset: CMT-all.xlxs, sample: 2007-on

- Estimated model: DNS (optimal λ+time series of $\beta_1(t), \beta_2(t), \beta_3(t)$)

  Perform the following analysis of results:

1. Step 1: Fit AR(1) to each of $\beta_1(t), \beta_2(t), \beta_3(t)$ time series and compute half-lives (HL).

2. Step 2: Compute RMSE for each day in the sample

3. Step 3. Pick 5 days with the largest RMSE.   Use the models fitted on these days to compute {t+1w}-forecast.   Do these forecasts perform better than those generated under a random walk assumption?