MF 803 HW 5
Sketch of Solutions

November 3, 2018

Claim: in the solutions I won't give you detailed answers for all the questions. Instead, I'm trying to provide intuitions or algorithms for the most crucial and confusing parts.

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(a)(b)(c)(e) You should use the formulas on notes 7b:

$$C = \frac{\sum \delta_{t_i} L_{t_i} D(0, t_i)}{\sum \delta_{t_i} D(0, t_i)}$$

where $D(0,t) = exp(-\int_0^t f(s)ds)$ so $L_{t_i} = [1/D(t_{i-1}, t_i) - 1]/\delta_{t_i}$. You start from the 1Y swap rate and then iteratively solve the forward rates using the forward rate of the last periods. Notice that this is what bootstrapping means in fitting a yield curve.

Notice that this formula tells us both legs dicount at a same frequency. However many of you discount the floating leg annually, not semi-annually as the fixed leg does. Be careful next time.

The forward rate cuve here is above the swap rate curve, this is because the market is worried about the risk of rising rate in the future so it requires a higher compensation from bearing this risk.

The spot rate curve is also slightly above the swap rate curve because spot rate can be considered as some kinds of weighted average of forward rates.

(d) The assumption in this assignment is that the forward rates are constant between the benchmark points, which means that the forward rate between 10Y and 15Y is the same as the forward rate between 10Y and 30Y. You can use the rate that they obtain in your bootstrapping procedure then.

(f) The difference, if any, should be small.

(g,h) The new forward rate curve agrees the old curve at the begining and diverges as term becomes longer. It also becomes steeper.

(i,j) The new forward rate curve diverges at the begining and get close to the old one as term becomes longer. It doesn't obviously become steeper.