Quantitative Finance: 22:839:611

Sections: 30 and 31

Analysis of Fixed Income

Fall 2022

Instructor: Priyank Gandhi

Extra Credit Assignment

(Submit 1 printed copy, per individual. This is not a group assignment. To be handed in during final exam)

The goal of this assignment is to replicate the Black-Derman-Toy example presented in class. The data for volatility of r is in the file voldat.xlsx. Replicating the tree to get the exact values I have is not required. Each software has its own particular quirks, and it is impossible to get two numerical programs to give exactly the same results. Try your best. If you do it right, you will be close to my numbers. If you do it wrong, you will be way off and most likely you will have an interest rate tree that explodes (i.e., has very large values for rates).

The best approach is to program to solve at each date for the correct r^* that matches the discount bond price as discussed in class. The tree can be built in Excel using solver bit this will be tedious as you will have to manually use solver several times. It is up to you on how you want to proceed.

Once the tree is built, compute the expected value (as of time 0) of the value of r in 0.5, 1.0, 1.5….out to the last date on the tree. Graph the expected value of r against the horizon. Contrast

this with the forward rate for the same horizon computed using the data for the initial term structure data (provided to you in the term_structure.xlsx file).

Best of luck!!!