

Derivatives Lab

Session 6

September 25, 2012

1. Show how you can construct a portfolio which is equivalent to the issue of a zero coupon bond at period i with maturity j at today's implied forward rate $S(i, j)$. (Such a portfolio is called a *forward contract*.)
2. Show that, under continuous compounding, the implied forward rate equals

$$S(i, j) = \frac{j S(j) - i S(i)}{j - i},$$

so that the implied single-period forward rate reads

$$S(i, i + 1) = (i + 1) S(i + 1) - i S(i).$$

Hint: The discount factor over n periods is $\exp(-n S(n))$.

Extend your program from Session 5, Exercise 4 to also plot the implied one-period forward rate into the same coordinate system as computed by the above formula, and the “instantaneous forward rate” given in the ECB table. Comment on what you see.

3. Look up yield curve data for bonds of a European corporation of your choice. Extract the spot rates from the yield curve data.
4. For the spot rates of Question 3 and the ECB yield curve extracted earlier, compute and visualize the implied probability of corporate default as a function of time.