HOMEWORK 8

This problem set uses the string market model from the previous homework.

1. Solve for the values of 2, 3, 4, 5, 7, and 10 year caps. Set the strike rates equal to the CMS rates from the corresponding maturities. For simplicity, assume that caplets are semiannual rather than quarterly. Recall that the first caplet is omitted because of the setting in advance feature.

2. Price at-the-money-forward European receivers swaptions (strike equals the forward swap rate for the underlying swap) for the following structures: 1 into 1, 1 into 2, 1 into 3, 1 into 4, 2 into 1, 2 into 2, 2 into 3, 5 into 1, 5 into 2, 5 into 5.

3. Calculate the sensitivity of the swaptions in the last question to each spot rate (DVO1 bucketing).

4. Value a five-year resettable cap with a strike of .07 and semiannual caplets. The cash flows from each caplet are $.5\max(0, L_{.5} - L_0)$, $.5\max(0, L_1 - L_{.5})$, etc.

5. Value a five-year CMS5 cap with a strike of .06 (semiannual caplets for simplicity). Cash flows are $.5\max(0, CMS5 - .05)$ for each six month date (except the first). CMS is set in advance.