

Finance 462
Problem Set #5

Assume that forward rates can be described by a binomial structure:

$$i_0 = 6\%$$

$$\Pr(i_{t+1} = (1.2)i_t) = .5$$

$$\Pr\left(i_{t+1} = \frac{i_t}{1.2}\right) = .5$$

- 1) Calculate the possible paths for the forward interest rate. Calculate the implied yield curve.
- 2) Suppose you have a 3 year Treasury with \$2,000 face value and a 5% coupon paid annually. Using the yield curve calculated in (1) compute the price of this bond.
- 3) Calculate the modified duration for this bond assuming a yield to maturity of 6%. Calculate the effective duration for this bond.
- 4) Some corporate bonds are “callable”. That is, the corporation retains the right to recall the bond (i.e. pay off the loan) early if it’s advantageous to do so. Consider the following bond: A three year corporate bond with a \$2,000 face value and a 5% annual coupon rate. However, if the interest rate drops below 5% (strictly below), the corporation will refinance. In this case, the face value is paid off and the bond is retired.
 - a) Calculate the price of this bond using the interest rate structure described above.
 - b) Calculate this bond’s modified duration at a YTM of 6%. Calculate the bond’s effective duration using the interest rate structure given above.