

# Problem Set 6

## Foundations of Financial Markets

**Due date: 7<sup>th</sup> November 2007 in class**

1. Calculate the values of the following two bonds. Assume that coupon interest payments are made semi-annually and that par value is \$1,000 for both bonds.

	Bond A	Bond B
Coupon Rate (semi-annual)	5%	5%
Time to Maturity	5 years	25 years
Yield to maturity (semi-annual)	7.2%	7.2%

Recalculate the bonds' values if the yield to maturity changes to 9.4%. Which bond is more sensitive to changes in the discount rate? Will this always be the case?

2. A bond with a coupon rate of 4.70% (*annualized*) is priced with a 6.30% (*annualized*) yield to maturity. Coupon interest is paid semiannually. The par value is \$1,000. The bond has 5 years remaining until maturity. Assuming that market rates stay the same over the next 5 years, calculate the value of the bond at the beginning of each year and the amount of change in the bond's value from year to year. Describe the behavior of the bond's value over time.
3. Suppose that you just purchased a 20-year bond that pays an annual coupon of \$40 and is selling at par (par=\$1,000). Calculate the one year holding period return for each of these three cases:
- The yield to maturity is 5.5% one year from now
  - The yield to maturity is the same one year from now as it is today
  - The yield to maturity is 2.5% one year from now.

4. Plot the yield curve implied by the data in the following table.

Time to Maturity	Yield to Maturity
3 months	2.40%
6 months	2.60%
1 year	3.00%
2 years	4.30%
5 years	4.80%
10 years	5.70%
15 years	6.40%
20 years	5.20%

Based on the Expectations Hypothesis, what does the yield curve tell us about short term interest rates 5 years from now? What does it tell us about short term rates 15 years from now and 20 years from now?

5. (*A little more challenging*) The current yield curve for default free zero coupon bonds is as follows:

Maturity (years)	Yield to Maturity
1	10%
2	11%
3	12%

- What are the implied one year forward rates?
- Assume that the expectations hypothesis of the term structure is correct. If market expectations are accurate, what will the yield curve (i.e. the yields to maturity on one and two year zero coupon bonds) be next year?
- If you purchase a two year zero coupon bond now, what is the expected total rate of return over the next year? What if you purchase a three year zero coupon bond? You can assume that the par value is \$100.