Group Assignment # 2

Why this assignment?

Please complete the following set of numerical problems. To reflect the way in which most companies conduct business, students shall form groups to handle this assignment. Each group is to return its written answers **and** the supporting Excel spreadsheets by e-mail before Monday, March 22, at noon. **Assignments that are late will not be graded.**

In order to approximate business practice, where an individual's performance evaluation reflects not only the opinion of supervisors but also that of peers, group members shall evaluate one another. Each group member's grade will thus reflect overall group performance and other members' opinions. Evaluation sheets are provided on the web site.

Question 1.

The following set of prices were culled from actual trades of Treasury strips (a.k.a. zero-coupon T-bonds) on January 30, 2010. **To answer Questions 1 and 2, assume you are on 1-3010.**

maturity (years)	bond price	
	bid	ask
overnight	999.93	999.99
0.25	996.04	996.10
0.5	992.41	992.47
0.75	988.18	988.24
1	983.67	983.73
1.25	978.87	978.93
1.5	973.78	973.84
1.75	968.43	968.49
2	962.80	962.86
2.25	956.90	956.96
2.5	950.76	950.82
2.75	944.34	944.41
3	937.68	937.74
3.25	930.77	930.83
3.5	923.65	923.72
3.75	916.28	916.34
4	908.68	908.74
4.25	900.90	900.97
4.5	892.88	892.94
4.75	884.69	884.76
5	876.27	876.34
5.25	867.71	867.77
5.5	859.01	859.07
5.75	850.19	850.26
6	841.22	841.28
6.25	832.15	832.21
6.5	822.93	822.99
6.75	813.69	813.75
7	804.38	804.45

a. If the *expectations theory* is correct, what term structure of interest rates is the market expecting to observe two years from now (1-30-2012)? Explain and show your work.

b. If you believe the *liquidity preference* theory and think that the 3-month liquidity premium is a constant 0.125% (annualized), can you tell at what price a 4-year 4% coupon bond should sell two years from today? Assume coupons are paid semi-annually. Explain and show your work.

c. Suppose that an investment bank offers you a contract to lock in a 1-year deposit interest rate of 3% between 1-30-2012 and 1-30-2013. If the *expectations theory* is correct and you have $1,000 to invest for 3 years, should you buy a 3-year strip, or buy instead a 2-year strip and lock in the 3%? Why?

Question 2.

The following set of prices was built from trades involving AAA-rated 4%-coupon corporate bonds of various maturities on January 30, 2010. Interest payments are semi-annual.

maturity (years)	bond price	
	bid	ask
0.5	1011.26	1011.32
1	1021.02	1021.08
1.5	1029.83	1029.89
2	1037.14	1037.20
2.5	1043.17	1043.23
3	1047.90	1047.96
3.5	1051.43	1051.49
4	1053.72	1053.78
4.5	1054.89	1054.95
5	1054.93	1054.99

a. Extract, from the coupon bond prices above, the implied pure yield curve, i.e., the TSOIR for zero coupon bonds.

b. Given the zero-coupon bond prices in Q1, does the 4% coupon bond maturing in January 2012 seem mispriced? If so, can you build an arbitrage strategy? How much money could you make per bond you buy or sell? Show your work.

Question 3.

The following table gives the price of bonds

Bond Principal	Time to Maturity (years)	Annual Coupon ($)	Bond Price ($)
100	0.5	0.0	98
100	1.0	0.0	95
100	1.5	6.2	101
100	2.0	8.0	104

a) Calculate the zero rates for maturities 0.5, 1.0, 1.5 and 2.0 years. Comment on your results.

b) What are the forwards rates for the periods: 6 months to 12 months, 12 months to 18 months, 18 months to 24 months? Comment on your results.

c) Estimate the price and yield of a 2-years bond providing a semiannual coupon of 7% per annum.

Question 4.

Consider a bond with the following characteristics: Maturity 5 years, 5% semiannual coupon-paying period. Yield 5 % per year.

a) What does duration mean? Please compute Macaulay duration, Modified duration, and Dollar duration of this bond.

b) What does convexity mean? Please compute convexity and Dollar convexity of this bond.

c) Using the Taylor expansion, compute the new bond price if the yield moves from 6% to 8%.