FIN2010 Problem Set 4

1. You have been asked to analyze the capital structure of Stevenson Steel. The company has supplied you with the following information:
   - There are 100 million shares outstanding, trading at $ 10 a share.
   - The firm has bond outstanding of $500 million (in market value) in total. Each bond has a coupon rate of 6% with semiannual payment and 10 year maturity. Current price of each bond is quoted at 96.7.
   - The beta for the firm currently is 1.02, the risk free rate is 5% and the market risk premium is 5.5%.
   - The expected dividend payment for the next year is $0.5/share, and it is expected to grow at 4.9% every year.
   - The tax rate is 30%.

   (1) Estimate the current equity cost of capital for Stevens Steel. Please use all the possible methods and then take the average as your final estimate.
   (2) Estimate the current debt cost of capital for Stevens Steel.
   (3) What is the firm's pretax WACC and after-tax WACC?
   (4) Now assume that you have computed the optimal debt-to-equity ratio to be 75%. If it moves to the optimal debt level, estimate the new after-tax cost of capital according to MM theory.

2. An oil company is drilling a series of new wells on the perimeter of a producing oil field. About 30% of the new wells will be dry holes (i.e. the production will be 0 barrels per day). Even if a new well strikes oil, there is still uncertainty about the amount of oil produced. Of the new wells that strike oil, 40% produce only 1,000 barrels a day (low yield) and 60% produce 5,000 barrels per day (high yield).

   (1) Suppose the oil price is $50 per barrel. What is the expected value and standard deviation of the annual revenue of an oil well (assume the well produces oil on 365 days per year)?
   (2) If the company plans to dig 3 wells, and the outcome of the 3 wells are independent of each other (i.e. the ρ between every two wells is 0), what is the expected value and standard deviation of the average annual revenue from the 3 wells?
   (3) Suppose the incremental cash flows of digging and operating a well under the three possible scenarios are as follows. Using a 10% annual discount rate, what is the expected value of the NPV of one well?

Year	Dry	Low Yield	High Yield
0	-150M	-150M	-150M
1	0	-13M	-10M
2-19	0	5M	80M
20	0	5M	5M

3. You are considering buying a ￥9 million apartment so that your child can go to an elite public school. You can take a 30-year mortgage to finance 70% of the price with an interest rate of 5.2% (APR). You also have the option to report a fake transaction price of ￥11 million to the bank and finance 70% of the ￥11 million (and you still only pay ￥9 million to the seller).

(1) What are your monthly payments for the two cases (borrow 70% of 9 and 11 million)?
(2) Other than the down payment, now you need to pay a total ￥0.7 million now for all the fees associated with the transaction (taxes, commission, etc.) if you borrow 70% of ￥9 million. You need to pay ￥1 million fees now if you want to borrow 70% of ￥11 million. Suppose your opportunity cost of capital is 7.2% (that is, you can invest your cash elsewhere and make 7.2% per year in term of APR, monthly compounding), which choice should you take? Hint: calculate the PV of the costs of these two purchasing method.
(3) You plan to sell the apartment after 3 years. In the meantime, you do not plan to live in this apartment, and you can rent it out for ￥8000 per month. After 3 years, you expect to sell the apartment for ￥11.5 million, and pre-pay the outstanding balance of your mortgage. What is the NPV of this investment, assuming you borrow 70% of 11 million? Remember you need to pay ￥1 million fees right now. Use the discount rate of 7.2% (APR, monthly compounding) as in part (2).

4. KD Industries is expected to generate free cash flow of $200 million next year. Since next year, the free cash flow is expected to grow at a stable rate of 6% for the first 10 years and then grow 3.5% forever. It has $0 million cash in the bank now. The firm currently uses 100% equity, and its cost of equity is 12%. It pays a 30% corporate tax rate.
   1) What is the firm value now?
   2) The firm's management plans to borrow $200 million on a permanent basis through a leveraged recapitalization in which they would use the borrowed funds to repurchase outstanding shares. The cost of debt will be 5%. After the recapitalization, what should be the firm value?
   3) Assume that the firm's management is also considering another recapitalization plan. The firm plans to borrow money to maintain a constant debt to equity ratio of 0.75. What is the firm after-tax WACC after the recapitalization? The cost of debt will be 5%.