Homework #2, Due October 28 (in class)

1. Type in "fred net interest margin" into Google. The first hit will bring you to the Federal Reserve Bank of St. Louis economic data center (FRED). From this site do the following:

   (a) Find ROA of banks under $300 million in assets and banks over $15 billion over the last 10 years. Print the graphs.
   (b) Repeat the above for ROE.
   (c) Repeat the above for NIM.

   What differences do you see in these time series?

2. Given two bonds with duration of 7.3 and 2.2 years, you are asked to split investment funds between them so that the resulting portfolio will have a duration of five years. Assume that you have $1,000,000 to invest. How much would you commit to each bond?

3. Describe (with explanation) the position one would take in the financial futures market in order to hedge interest rate risk implied by the following:

   (a) A bank has a negative duration GAP.
   (b) A S&L has a positive funding GAP.
   (c) A mortgage firm plans to lend $3 million in 3 months.

4. Suppose the current spot price of wheat is $10/bushel while the futures price for wheat with delivery date of 1 year from now is $15/bushel. If there are no storage costs and the current one-year interest rate is 5%, construct an arbitrage that would generate profits.

5. Suppose the current 1 year T-Bill rate is 4% while the 6 month T-bill rate is 3%. If the current futures price of a 6-month T-bill with delivery 6 months from now is $98.53 (per $100 of contract), demonstrate that this can not be an equilibrium (i.e. one can construct an arbitrage with positive returns).

6. Describe the strengths and weaknesses of funding GAP and duration GAP analyses.

7. In general, what are the advantages of a futures contract over a forward contract?

8. Suppose Corp. A can borrow long term at a fixed rate of 9% or at a floating rate of 60 bp over LIBOR. Corp B can borrow long term at a fixed rate of 11% and a floating rate of 75bp over LIBOR. If Corp. A desires a floating rate and Corp. B wants a fixed rate, design an interest rate swap that reduces the borrowing costs of both firms.

9. Suppose that you are offered a 12% fixed rate payment over the next 15 years. The duration of the swap is -6.4. You are managing a firm with $3.7 million of assets and a duration gap of 1.7 years. How much notional principal would you want the swap to have in order to insulate net worth from interest rate movements.
10. Your portfolio consists of three assets that have stochastic returns. It is assumed that the returns for each asset is distributed normally with a mean of $\mu$ and a standard deviation of $\sigma$. The returns are assumed to be uncorrelated. If you have invested equally in the three assets, calculate the expected value (i.e. mean) and standard deviation of the return on your portfolio. What is the implication for the expected value and standard deviation of the returns on your portfolio if you invest in $N$ of these assets and $N$ becomes very large?

The following questions are from the end of Chapter 25 in your text:

Do Questions 14, 19, 20, 30.