Name: _____

Problem set 1
266: Fi. Markets and Institutions
Spring 2011
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Directions. You are to do this problem set alone. If you would benefit from conferring on how to do the part that is in Excel, this is ok, but complete the work yourself.

Due Date/time. Your work is due by the beginning of class (12:00 PM) March 10. You can hand the work in to me at the beginning of class. If you put the work under my office door or in my mailbox, it must be in before I leave for lecture at about 11:55pm. Only hardcopy submissions allowed.

Questions. If you have questions, email me or the TAs or raise them in class, or come to office hours.

Grading. All parts have equal value.

1 Basics

1.1 I own a stock for 5 months. I bought for $30.23 and sold for $37.52. What is my annualized rate of capital gain in percent?

1.2 The interest rate on a risk free zero coupon bond with maturity 3 years is 2.21 percent. The interest rate on a risk free zero coupon bond with maturity 7 years is 2.63 percent. What is the implied forward rate for a 4-year bond 3 years from today?

1.3 Today's one-year interest rate is 1.03 percent and the 5-year rate is 2.28 percent. According to the expectations theory of the term structure, short-term interest rates are expected to fall, rise, or stay the same?

1.4 A 10-year bond pays a coupon rate of 3 percent and pays annual coupon payments. Its yield to maturity is 5 percent. Is the bond selling below par or above par?

2 Use a spreadsheet program or financial calculator to do the following.

2.1 I just signed a 30-year, fixed-rate mortgage (360 equal monthly payments). My monthly mortgage payment is $1,650. My mortgage interest rate is 4.56 percent. How much did I borrow?

Hint: What we want here is the present value of the payments when discounted at the mortgage interest rate. Assume that the first payment comes 1-month after signing.

2.2 Just after signing the mortgage, interest rates fall to 4.30 percent. Now what is the present value of what I owe?

2.3 What is the duration of a 30-year coupon bond (annual coupons), paying a coupon rate of 6 percent, and selling at par?

3 Stocks and bonds. Use a spreadsheet ps12011data.xls you can download in conjunction with the problem set for this problem. The spreadsheet has some inflation, interest rate, and stock returun data for 1962 to 2010.

Note: The nominal stock portfolio data are from Ken French's website. This is a fabulous source of portfolio data for study.
url: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Inflation is for the CPI from the St. Louis Fed Fred database. The 1-year Treasury rate is the 1-year constant maturity rate also from Fred. This is not strictly a zero coupon rate, but we will treat it as if it were.
Fred url: http://research.stlouisfed.org/fred2/

The spreadsheet has two pages; One page is for nominal returns and one for real returs. See the tabs labelled 'nom' and 'real' at the bottom.

The nominal return page is complete and can be used as a model for finishing the real return page.

Both pages have columns for 17 sector-based portfolios of stocks and also have the rate on a 1-year U.S. Treasury security.

A 'Market' portfolio return is computed based on a simple average of the returns in the 17 sectors. This is the approximate return you would get if you held a portfolio equal-weighted in the 17 sectors.

For more detail on the data, go to the websites listed above.

Note: All of the following concern the real returns

3.1 Using the 'nom' sheet as a guide, complete the 'real' sheet. That is: Add the market return data and then below the time series data for the returns, fill in the rows for the mean, standard deviation, and for the 17 portfolios, the correlation with the market portfolio.

3.2 How much higher was the mean return on the market portfolio than the mean return on the 1-year Treasury over this sample?

3.3 How much higher was the standard deviation of the return on the market portfolio than the standard deviation of the return on the 1-year Treasury over this sample?

3.4 What is the range of correlation of the returns between the individual portfolios and the market portfolio.

3.5 Plot the return on the finance sector portfolio (finan), the market portfolio, and the 1 year treasury. Attach a hardcopy of the figure to your answers.

3.6 In the worst year in the sample, what share of your value would you have lost if you were invested in the financial sector? And what share could you have gained at best in the finnace sector?