HOMEWORK 3

1. Use the zero-coupon curve you created in Homework 2 to compute the par rates for semiannual pay bonds with maturities ranging from 1 year to 25 years.

2. For each of these bonds, compute their DV01.

3. Compute the Macauley and modified durations for the 1, 2, 3, 4, and 5 year bonds in question 1 above.

4. You have a $5,000,000 liability due in 3 years. How much do you need to invest in a 3 year zero-coupon bond to defease the liability? Use the same zero-coupon curve as in 1.

5. Using the data in question 1, compute the convexities of the 1, 2, 3, 4, and 5 year bonds.

6. Use the computed dollar durations and convexities for the 1, 2, 3, 4, and 5 year bonds, compute the price change of a 100 basis point upward and downward parallel shift in the zero-curve. Compare the price changes with the actual price change obtained by recomputing the price of the bond from the shifted spot curve.

Yahoo Junk Bond Case

Current Date: June 30, 2015

On June 30, 2010, Yahoo.com issued a high yield ("junk") bond. The bond has an 11 percent annual coupon (paid semiannually) and a maturity date of June 30, 2022. It was a private placement and the bond is non-callable. The entire issue was purchased by a major life insurance company, which intends to hold the bond for at least one more year. After that time, the life insurance company would be willing to consider an advanced refunding at a negotiated premium.

In the meantime, Yahoo.com has been unexpectedly profitable and has generated a large pool of cash. Most of the principal stockholders do not want an extra dividend nor a share repurchase because of tax consequences. Thus, management is faced with investing the cash at least until the life insurance comnpany becomes willing to accept a bond refunding. This investment should be accomplished so that the net interest rate sensitivity of Yahoo.com common stock is minimized.

Assume that Yahoo.com can purchase a bond portfolio consisting of some amounts of ten-year Treasury notes (5 percent annual coupon, currently priced at par), and one-year Treasury bills (currently yielding 0.75 percent).

Assuming that the outstanding high yield bond is riskless from Yahoo.com's perspective (because it is a corporate liability), and that its effective yield based on that assumption should be 8 percent if it were selling in the market, find the amounts that Yahoo.com should invest in the ten-year note and in the one-year T-bill as a percentange of the current market value of the Yahoo.com bond, in order to immunize the common stock against interest rate shifts of equal amount everywhere along the yield curve.

If the position above were invested in the bill and the note in order to neutralize the interest rate risk, and if yields immediately fell by 50 basis points all along the term structure, what would be the capital gain or loss to Yahoo.com's shareholders

as a percentage of the intitial market value of their high yield debt? What would be the capital gain or loss if yields immediately rose by 50 basis points? For either circumstance, an immediate decrease or increase in yields by 50 basis points, what sales or purchases of the bill and note, if any, would be required to re-establish an immunized position?