NBA 5420 – Investments and Portfolio Management
Problem Set 6 – Fixed Income

1. A nine-year bond has a yield of 10% and a modified duration of 7.194 years. If the market yield rises by 50 basis points, what is the percentage change in the bond's price?

2. Find the modified duration of a 6% coupon bond making annual coupon payments if it has three years until maturity and has a yield to maturity of 6%.

3. The following questions are from past CFA examinations:

   a) A 6% coupon bond paying interest annually has a modified duration of 10 years, sells for $800, and is priced at a yield to maturity of 8%. If the YTM increases to 9%, the predicted change in price, using the duration concept, decreases by:

      i) $76.56
      ii) $75.92
      iii) $77.67
      iv) $80.00

   b) A 6% coupon bond with semiannual coupons has a convexity (in years) of 120, sells for 80% of par, and is priced at a yield to maturity of 8%. If the YTM increases to 9.5%, the predicted contribution to the percentage change in price, due to convexity, would be:

      i) 1.08%
      ii) 1.35%
      iii) 2.48%
      iv) 7.35%

   c) When interest rates decline, the duration of a 30-year bond selling at a premium:

      i) increases.
      ii) decreases.
      iii) remains the same.
      iv) increases at first, then declines.

d) Which bond has the longest duration?

i) 8-year maturity, 6% coupon.
ii) 8-year maturity, 11% coupon.
iii) 15-year maturity, 6% coupon.
iv) 15-year maturity, 11% coupon.

4. Assume the following actual and expected interest rates.

Actual Market Rates	Expected One-Year Rates
$r_{0,1} = 4\%$	
$r_{0,2} = 4½\%$	$Er_{1,2} = ?$
$r_{0,3} = ?$	$Er_{2,3} = 5\%$
$r_{0,4} = 5\%$	$Er_{3,4} = ?$

Assuming that all the simplifying assumptions of the expectations theory of the term structure hold, find the actual market three-year rate ($r_{0,3}$) and the expected one-year rate for next year ($Er_{1,2}$) and three years from now ($Er_{3,4}$).

5. According to the liquidity-preference theory, what can be said about the implied future (forward) one-year rate two years from today that can be calculated from the term structure?

a) It will be higher than the market-expected future one-year rate.
b) It will be lower than the market-expected future one-year rate
c) It will be the same as the market-expected future one-year rate.
d) The answer cannot be determined from the information given.

6. Descending yield curves are likely to be characteristic of periods when expectations are that future interest rates

a) will remain high.
b) will remain low.
c) will rise.
d) will fall.

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