



Subject: Fixed Income Products

Chapter: Unit 3

Category: Practice question

1. An investor purchases a 20-year bond with a 5% semiannual coupon and a yield to maturity of 6%. Five years later the investor sells the bond for a price of 91.40. Determine whether the investor realizes a capital gain or loss, and calculate its amount.
2. Choose the correct alternative:
 - 1) An investor buys a 10-year bond with a 6.5% annual coupon and a YTM of 6%. Before the first coupon payment is made, the YTM for the bond decreases to 5.5%. Assuming coupon payments are reinvested at the YTM, the investor's return when the bond is held to maturity is:
 - A. less than 6.0%
 - B. equal to 6.0%
 - C. greater than 6.0%
 - 2) Assuming coupon interest is reinvested at a bond's YTM, what is the interest portion of an 18year, \$1,000 par, 5% annual coupon bond's return if it is purchased at par and held to maturity?
 - A. \$576.95
 - B. \$1,406.62
 - C. \$1,476.95
 - 3) An investor buys a 15-year, £800,000, zero-coupon bond with an annual YTM of 7.3%. If she sells the bond after three years for £346,333 she will have:
 - A. a capital gain
 - B. a capital loss
 - C. neither a capital gain nor a capital loss
 - 4) A bond portfolio manager who wants to estimate the sensitivity of the portfolio's value to changes in the 5-year spot rate should use:
 - A. a key rate duration
 - B. a Macaulay duration
 - C. an effective duration
 - 5) Which of the following three bonds (similar except for yield and maturity) has the least Macaulay duration? A bond with:
 - A. 5% yield and 10-year maturity
 - B. 5% yield and 20-year maturity
 - C. 6% yield and 10-year maturity

3. A newly issued, 20-year, 6% annual-pay straight bond is priced at 101.39. Calculate the price value of a basis point for this bond assuming it has a par value of \$1 million.

4. Consider an 8% bond with a full price of \$908 and a YTM of 9%. Estimate the percentage change in the full price of the bond for a 30 basis point increase in YTM assuming the bond's duration is 9.42 and its convexity is 68.33.

5. A hedge fund specializes in investments in emerging market sovereign debt. The fund manager believes that the implied default probabilities are too high, which means that the bonds are viewed as "cheap" and the credit spreads are too high. The hedge fund invests in the following bond where time to maturity = 10 years, coupon rate = 10%, Price = 58.075279 and yield to maturity = 20%. The coupon payments are annual. The yields-to-maturity are effective annual rates. The prices are per 100 of par value.

Compute the approximate modified duration of each of the bond using a 1 bp change in the yield-to-maturity and keeping precision to six decimals (because approximate duration statistics are very sensitive to rounding).

6. A life insurance company holds a USD10 million (par value) position in a 4.50% ArcelorMittal bond that matures on 25 February 2017. The bond is priced (flat) at 98.125 per 100 of par value to yield 5.2617% on a street-convention semiannual bond basis for settlement on 27 June 2014. The total market value of the position, including accrued interest, is USD9,965,000, or 99.650 per 100 of par value. The bond's (annual) Macaulay duration is 2.4988.

1. Calculate the money duration per 100 in par value for the ArcelorMittal bond.

2. Using the money duration, estimate the loss on the position for each 1 bp increase in the yield-to-maturity for that settlement date.

7. The investment manager for a UK defined-benefit pension scheme is considering two bonds about to be issued by a large life insurance company. The first is a 30-year, 4% semiannual coupon payment bond. The second is a 100-year, 4% semiannual coupon payment "century" bond. Both bonds are expected to trade at par value at issuance.

Calculate the approximate modified duration and approximate convexity for each bond using a 5 bp increase and decrease in the annual yield-to-maturity. Retain accuracy to six decimals per 100 of par value.