**Seminar 4 Examples**

**Accrued interest**

1. A bond pays a semiannual coupon, and the last coupon was paid 61 days ago. If the annual coupon payment is $5, what is the accrued interest? (Assume 182 days in the 6-month period.)
2. A bond has a flat price of $985, and it pays an annual coupon. The last coupon payment was made 90 days ago. What is the invoice price if the annual coupon is $69?
3. A bond has a 5% coupon rate. The coupon is paid semiannually, and the last coupon was paid 35 days ago. If the bond has a par value of $1,000, what is the accrued interest?
4. The price on a Treasury bond is 104.3625, with a yield to maturity of 3.45%. The price on a comparable maturity corporate bond is 103.5, with a yield to maturity of 4.59%. What is the approximate percentage value of the credit risk of the corporate bond?
5. The price of a bond (with par value of $1,000) at the beginning of a period is $980 and at the end of the period is $95. What is the holding-period return if the annual coupon rate is 4.5%?
6. A coupon bond that pays interest annually has a par value of $1,000, matures in 5 years, and has a yield to maturity of 12%. If the coupon rate is 9%, the intrinsic value of the bond today will be \_\_\_\_\_\_\_\_\_.

**Duration**

1. **(354/1.)** Rank the following bonds in order of descending duration.

|  |  |  |  |
| --- | --- | --- | --- |
| **Bond** | **Coupon** | **Time to Maturity** | **Yield to Maturity** |
| **A** | **15%** | **20 years** | **10%** |
| **B** | **15%** | **15 years** | **10%** |
| **C** | **0** | **20 years** | **10%** |
| **D** | **8%** | **20 years** | **10%** |
| **E** | **15%** | **15 years** | **15%** |

1. **(352/8.)** Find the duration of a 6% coupon bond making annual coupon payments if it has three years until maturity and a yield to maturity is 6%? What is the duration if the yield to maturity is 10%?
2. **(333/11.1)** A bond with a maturity of 3 years has a coupon of 8 percent (paid annually) and a yield to maturity of 10 percent.
   1. Calculate its price.
   2. Calculate its duration.
3. A pension fund must pay out $1 million next year, $2 million the following year, and then $3 million the year after that. If the discount rate is 8%, what is the duration of this set of payments?
4. Compute the duration of an 8%, 5-year corporate bond with a par value of $1,000 and yield to maturity of 10%.
5. **(336/3)** A 9 percent coupon, 8-year maturity bond with annual payments, selling at a yield to maturity of 10%.
6. Calculate the duration of this bond.
7. What would its duration be if the bond paid its coupon semi-annually?
8. Why intuitively does duration fall?
9. **(335/2.)** The bond has a 3-year maturity, an 8 percent coupon, and sells at an initial yield to maturity of 9 percent.
   1. Calculate the price of the bond.
   2. Calculate the modified duration of the bond.
   3. Calculate the convexity of the bond.
   4. If the bond’s yield increases from 9% to 9.05%, what will be the bond price?
   5. Calculate the bond new price with the duration formula.
   6. Calculate the bond new price with the convexity formula.

**Immunization**

1. **(345/7)** How would an increase in trading costs affect the attractiveness of dedication versus immunization?
2. **(352/10.)** A pension plan is obligated to make disbursements of $1 million, $2 million, and $1 million at the end of each of the next three years, respectively. Find the duration of the plan’s obligations if the interest rate is 10% annually.