

- a. What is its yield to maturity (YTM)?  
 b. Assume that the yield to maturity remains constant for the next 3 years. What will the price be 3 years from today?

**7-3 BOND VALUATION** Nungesser Corporation's outstanding bonds have a \$1,000 par value, a 9% semiannual coupon, 8 years to maturity, and an 8.5% YTM. What is the bond's price?

**7-4 YIELD TO MATURITY** A firm's bonds have a maturity of 10 years with a \$1,000 face value, have an 8% semiannual coupon, are callable in 5 years at \$1,050, and currently sell at a price of \$1,100. What are their nominal yield to maturity and their nominal yield to call? What return should investors expect to earn on these bonds?

Intermediate  
 Problems 5-14

**7-5 BOND VALUATION** An investor has two bonds in his portfolio that have a face value of \$1,000 and pay a 10% annual coupon. Bond L matures in 15 years, while Bond S matures in 1 year.

- a. What will the value of each bond be if the going interest rate is 5%, 8%, and 12%? Assume that only one more interest payment is to be made on Bond S at its maturity and that 15 more payments are to be made on Bond L.  
 b. Why does the longer-term bond's price vary more than the price of the shorter-term bond when interest rates change?

**7-6 BOND VALUATION** An investor has two bonds in her portfolio, Bond C and Bond Z. Each bond matures in 4 years, has a face value of \$1,000, and has a yield to maturity of 9.6%. Bond C pays a 10% annual coupon, while Bond Z is a zero coupon bond.

- a. Assuming that the yield to maturity of each bond remains at 9.6% over the next 4 years, calculate the price of the bonds at each of the following years to maturity:

Years to Maturity	Price of Bond C	Price of Bond Z
4	_____	_____
3	_____	_____
2	_____	_____
1	_____	_____
0	_____	_____

- b. Plot the time path of prices for each bond.

**7-7 INTEREST RATE SENSITIVITY** An investor purchased the following 5 bonds. Each bond had a par value of \$1,000 and an 8% yield to maturity on the purchase day. Immediately after the investor purchased them, interest rates fell and each then had a new YTM of 7%. What is the percentage change in price for each bond after the decline in interest rates? Fill in the following table:

	Price @ 8%	Price @ 7%	Percentage Change
10-year, 10% annual coupon	_____	_____	_____
10-year zero	_____	_____	_____
5-year zero	_____	_____	_____
30-year zero	_____	_____	_____
\$100 perpetuity	_____	_____	_____

**7-8 YIELD TO CALL** Six years ago the Singleton Company issued 20-year bonds with a 14% annual coupon rate at their \$1,000 par value. The bonds had a 9% call premium, with 5 years of call protection. Today Singleton called the bonds. Compute the realized rate of return for an investor who purchased the bonds when they were issued and held them until they were called. Explain why the investor should or should not be happy that Singleton called them.

**7-9 YIELD TO MATURITY** Heymann Company bonds have 4 years left to maturity. Interest is paid annually, and the bonds have a \$1,000 par value and a coupon rate of 9%.

- a. What is the yield to maturity at a current market price of (1) \$829 and (2) \$1,104?  
 b. Would you pay \$829 for each bond if you thought that a "fair" market interest rate for such bonds was 12%—that is, if  $r_d = 12\%$ ? Explain your answer.

the data in the table, would you have more confidence about earning your expected rate of return if you bought United Parcel Service or Telecom Italia Capital bonds? Explain.

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**YIELD TO MATURITY AND YIELD TO CALL** Kaufman Enterprises has bonds outstanding with a \$1,000 face value and 10 years left until maturity. They have an 11% annual coupon payment, and their current price is \$1,175. The bonds may be called in 5 years at 109% of face value (Call price = \$1,090).

- What is the yield to maturity?
- What is the yield to call if they are called in 5 years?
- Which yield might investors expect to earn on these bonds? Why?
- The bond's indenture indicates that the call provision gives the firm the right to call the bonds at the end of each year beginning in Year 5. In Year 5, the bonds may be called at 109% of face value; but in each of the next 4 years, the call percentage will decline by 1%. Thus, in Year 6, they may be called at 108% of face value; in Year 7, they may be called at 107% of face value; and so forth. If the yield curve is horizontal and interest rates remain at their current level, when is the latest that investors might expect the firm to call the bonds?

## COMPREHENSIVE/SPREADSHEET PROBLEM

7-20 **BOND VALUATION** Clifford Clark is a recent retiree who is interested in investing some of his savings in corporate bonds. His financial planner has suggested the following bonds:

- Bond A has a 7% annual coupon, matures in 12 years, and has a \$1,000 face value.
- Bond B has a 9% annual coupon, matures in 12 years, and has a \$1,000 face value.
- Bond C has an 11% annual coupon, matures in 12 years, and has a \$1,000 face value.

Each bond has a yield to maturity of 9%.

- Before calculating the prices of the bonds, indicate whether each bond is trading at a premium, at a discount, or at par.
- Calculate the price of each of the three bonds.
- Calculate the current yield for each of the three bonds. (Hint: Refer to Footnote 8 for the definition of the current yield and to Table 7-1.)
- If the yield to maturity for each bond remains at 9%, what will be the price of each bond 1 year from now? What is the expected capital gains yield for each bond? What is the expected total return for each bond?
- Mr. Clark is considering another bond, Bond D. It has an 8% semiannual coupon and a \$1,000 face value (i.e., it pays a \$40 coupon every 6 months). Bond D is scheduled to mature in 9 years and has a price of \$1,150. It is also callable in 5 years at a call price of \$1,040.
  - What is the bond's nominal yield to maturity?
  - What is the bond's nominal yield to call?
  - If Mr. Clark were to purchase this bond, would he be more likely to receive the yield to maturity or yield to call? Explain your answer.
- Explain briefly the difference between interest rate (or price) risk and reinvestment rate risk. Which of the following bonds has the most interest rate risk?
  - A 5-year bond with a 9% annual coupon
  - A 5-year bond with a zero coupon
  - A 10-year bond with a 9% annual coupon
  - A 10-year bond with a zero coupon
- Only do this part if you are using a spreadsheet. Calculate the price of each bond (A, B, and C) at the end of each year until maturity, assuming interest rates remain constant. Create a graph showing the time path of each bond's value similar to Figure 7-2.
  - What is the expected interest yield for each bond in each year?
  - What is the expected capital gains yield for each bond in each year?
  - What is the total return for each bond in each year?