

1. **Valuing Bonds** What is the price of a 10-year, zero coupon bond paying \$1,000 at maturity if the YTM is:
1. 5 percent?
 2. 10 percent?
 3. 15 percent?

2. **Valuing Bonds** Microhard has issued a bond with the following characteristics:

Par: \$1,000

Time to maturity: 25 years

Coupon rate: 7 percent

Semiannual payments

Calculate the price of this bond if the YTM is:

1. 7 percent
2. 9 percent
3. 5 percent



3. **Bond Yields** Watters Umbrella Corp. issued 12-year bonds 2 years ago at a coupon rate of 7.8 percent. The bonds make semiannual payments. If these bonds currently sell for 105 percent of par value, what is the YTM?



4. **Coupon Rates** Rhiannon Corporation has bonds on the market with 13.5 years to maturity, a YTM of 7.6 percent, and a current price of \$1,175. The bonds make semiannual payments. What must the coupon rate be on these bonds?

5. **Valuing Bonds** Even though most corporate bonds in the United States make coupon payments semiannually, bonds issued elsewhere often have annual coupon payments. Suppose a German company issues a bond with a par value of €1,000, 15 years to maturity, and a coupon rate of 8.4 percent paid annually. If the yield to maturity is 7.6 percent, what is the current price of the bond?

6. **Bond Yields** A Japanese company has a bond outstanding that sells for 87 percent of its ¥100,000 par value. The bond has a coupon rate of 5.4 percent paid annually and matures in 21 years. What is the yield to maturity of this bond?

7. **Calculating Real Rates of Return** If Treasury bills are currently paying 5 percent and the inflation rate is 3.9 percent, what is the approximate real rate of interest? The exact real rate?

8. **Inflation and Nominal Returns** Suppose the real rate is 2.5 percent and the inflation rate is 4.7 percent. What rate would you expect to see on a Treasury bill?

9. **Nominal and Real Returns** An investment offers a 17 percent total return over the coming year. Alan Wingspan thinks the total real return on this investment will be only 11 percent. What does Alan believe the inflation rate will be over the next year?

10. **Nominal versus Real Returns** Say you own an asset that had a total return last year of 14.1 percent. If the inflation rate last year was 6.8 percent, what was your real return?
11. **Using Treasury Quotes** Locate the Treasury bond in [Figure 8.4](#) maturing in November 2027. What is its coupon rate? What is its bid price? What was the previous day's asked price?
12. **Using Treasury Quotes** Locate the Treasury bond in [Figure 8.4](#) maturing in November 2024. Is this a premium or a discount bond? What is its current yield? What is its yield to maturity? What is the bid-ask spread?

INTERMEDIATE (Questions 13–22)

13. **Bond Price Movements** Miller Corporation has a premium bond making semiannual payments. The bond pays a 9 percent coupon, has a YTM of 7 percent, and has 13 years to maturity. The Modigliani Company has a discount bond making semiannual payments. This bond pays a 7 percent coupon, has a YTM of 9 percent, and also has 13 years to maturity. If interest rates remain unchanged, what do you expect the price of these bonds to be 1 year from now? In 3 years? In 8 years? In 12 years? In 13 years? What's going on here? Illustrate your answers by graphing bond prices versus time to maturity.
14. **Interest Rate Risk** Laurel, Inc., and Hardy Corp. both have 8 percent coupon bonds outstanding, with semiannual interest payments, and both are priced at par value. The Laurel, Inc., bond has 2 years to maturity, whereas the Hardy Corp. bond has 15 years to maturity. If interest rates suddenly rise by 2 percent, what is the percentage change in the price of these bonds? If interest rates were to suddenly fall by 2 percent instead, what would the percentage change in the price of these bonds be then? Illustrate your answers by graphing bond prices versus YTM. What does this problem tell you about the interest rate risk of longer-term bonds?



15. **Interest Rate Risk** The Faulk Corp. has a 6 percent coupon bond outstanding. The Gonas Company has a 14 percent bond outstanding. Both bonds have 8 years to maturity, make semiannual payments, and have a YTM of 10 percent. If interest rates suddenly rise by 2 percent, what is the percentage change in the price of these bonds? What if interest rates suddenly fall by 2 percent instead? What does this problem tell you about the interest rate risk of lower coupon bonds?
16. **Bond Yields** Hacker Software has 7.4 percent coupon bonds on the market with 9 years to maturity. The bonds make semiannual payments and currently sell for 96 percent of par. What is the current yield on the bonds? The YTM? The effective annual yield?
17. **Bond Yields** Pembroke Co. wants to issue new 20-year bonds for some much-needed expansion projects. The company currently has 10 percent coupon bonds on the market that sell for \$1,063, make semiannual payments, and mature in 20 years. What coupon rate should the company set on its new bonds if it wants them to sell at par?
18. **Accrued Interest** You purchase a bond with an invoice price of \$1,090. The bond has a coupon rate of 8.4 percent, and there are 2 months to the next semiannual coupon date. What is the clean price of the bond?



19. **Accrued Interest** You purchase a bond with a coupon rate of 7.2 percent and a clean price of \$904. If the next semiannual coupon payment is due in four months, what is the invoice price?
20. **Finding the Bond Maturity** Argos Corp. has 9 percent coupon bonds making annual payments with a YTM of 7.81 percent. The current yield on these bonds is 8.42 percent. How many years do these bonds have left until they mature?

21. **Using Bond Quotes** Suppose the following bond quote for IOU Corporation appears in the financial page of today's newspaper. Assume the bond has a face value of \$1,000 and the current date is April 15, 2010. What is the yield to maturity of the bond? What is the current yield?

Company (Ticker)	Coupon	Maturity	Last Price	Last Yield	EST Vol (000s)
IOU (IOU)	8.250	Apr 15, 2020	87.155	??	1,827

22. **Finding the Maturity** You've just found a 10 percent coupon bond on the market that sells for par value. What is the maturity on this bond?

CHALLENGE (Questions 23–30)

23. **Components of Bond Returns** Bond P is a premium bond with a 9 percent coupon. Bond D is a 5 percent coupon bond currently selling at a discount. Both bonds make annual payments, have a YTM of 7 percent, and have five years to maturity. What is the current yield for Bond P? For Bond D? If interest rates remain unchanged, what is the expected capital gains yield over the next year for Bond P? For Bond D? Explain your answers and the interrelationship among the various types of yields.
24. **Holding Period Yield** The YTM on a bond is the interest rate you earn on your investment if interest rates don't change. If you actually sell the bond before it matures, your realized return is known as the holding period yield (HPY).
- Suppose that today you buy a 9 percent annual coupon bond for \$1,140. The bond has 10 years to maturity. What rate of return do you expect to earn on your investment?
 - Two years from now, the YTM on your bond has declined by 1 percent, and you decide to sell. What price will your bond sell for? What is the HPY on your investment? Compare this yield to the YTM when you first bought the bond. Why are they different?
25. **Valuing Bonds** The Morgan Corporation has two different bonds currently outstanding. Bond M has a face value of \$20,000 and matures in 20 years. The bond makes no payments for the first six years, then pays \$800 every six months over the subsequent eight years, and finally pays \$1,000 every six months over the last six years. Bond N also has a face value of \$20,000 and a maturity of 20 years; it makes no coupon payments over the life of the bond. If the required return on both these bonds is 8 percent compounded semiannually, what is the current price of Bond M? Of Bond N?
26. **Real Cash Flows** When Marilyn Monroe died, ex-husband Joe DiMaggio vowed to place fresh flowers on her grave every Sunday as long as he lived. The week after she died in 1962, a bunch of fresh flowers that the former baseball player thought appropriate for the star cost about \$8. Based on actuarial tables, "Joltin' Joe" could expect to live for 30 years after the actress died. Assume that the EAR is 10.7 percent. Also, assume that the price of the flowers will increase at 3.5 percent per year, when expressed as an EAR. Assuming that each year has exactly 52 weeks, what is the present value of this commitment? Joe began purchasing flowers the week after Marilyn died.
27. **Real Cash Flows** You are planning to save for retirement over the next 30 years. To save for retirement, you will invest \$800 a month in a stock account in real dollars and \$400 a month in a bond account in real dollars. The effective annual return of the stock account is expected to be 12 percent, and the bond account will earn 7 percent. When you retire, you will combine your money into an account with an 8 percent effective return. The inflation rate over this period is expected to be 4 percent. How much can you withdraw each month from your account in real terms assuming a 25-year withdrawal period? What is the nominal dollar amount of your last withdrawal?
28. **Real Cash Flows** Paul Adams owns a health club in downtown Los Angeles. He charges his customers an annual fee of \$500 and has an existing customer base of 500. Paul plans to raise the annual fee by 6 percent every year and expects the club membership to grow at a constant rate of 3 percent for the next five years. The overall expenses of running the health club are \$75,000 a year and are expected to grow at the inflation rate of 2 percent annually. After five years, Paul

plans to buy a luxury boat for \$500,000, close the health club, and travel the world in his boat for the rest of his life. What is the annual amount that Paul can spend while on his world tour if he will have no money left in the bank when he dies? Assume Paul has a remaining life of 25 years and earns 9 percent on his savings.

S&P Problem



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1. **Bond Ratings** Look up Coca-Cola (KO), American Express (AXP), AT&T (T), and Altria (MO). For each company, follow the "Financial Highlights" link and find the bond rating. Which companies have an investment grade rating? Which companies are rated below investment grade? Are any unrated? When you find the credit rating for one of the companies, click on the "S&P Issuer Credit Rating" link. What are the three considerations listed that Standard & Poor's uses to issue a credit rating?

Mini Case: FINANCING EAST COAST YACHTS'S EXPANSION PLANS WITH A BOND ISSUE

After Dan's EFN analysis for East Coast Yachts (see the Mini Case in [Chapter 3](#)), Larissa has decided to expand the company's operations. She has asked Dan to enlist an underwriter to help sell \$40 million in new 20-year bonds to finance new construction. Dan has entered into discussions with Kim McKenzie, an underwriter from the firm of Crowe & Mallard, about which bond features East Coast Yachts should consider and also what coupon rate the issue will likely have. Although Dan is aware of bond features, he is uncertain as to the costs and benefits of some of them, so he isn't clear on how each feature would affect the coupon rate of the bond issue.

1. You are Kim's assistant, and she has asked you to prepare a memo to Dan describing the effect of each of the following bond features on the coupon rate of the bond. She would also like you to list any advantages or disadvantages of each feature.
 1. The security of the bond, that is, whether or not the bond has collateral.
 2. The seniority of the bond.
 3. The presence of a sinking fund.
 4. A call provision with specified call dates and call prices.
 5. A deferred call accompanying the above call provision.
 6. A make-whole call provision.
 7. Any positive covenants. Also, discuss several possible positive covenants East Coast Yachts might consider.
 8. Any negative covenants. Also, discuss several possible negative covenants East Coast Yachts might consider.
 9. A conversion feature (note that East Coast Yachts is not a publicly traded company).
 10. A floating rate coupon.

Dan is also considering whether to issue coupon bearing bonds or zero coupon bonds. The YTM on either bond issue will be 7.5 percent. The coupon bond would have a 7.5 percent coupon rate. The company's tax rate is 35 percent.

2. How many of the coupon bonds must East Coast Yachts issue to raise the \$40 million? How many of the zeroes must it issue?
3. In 20 years, what will be the principal repayment due if East Coast Yachts issues the coupon bonds? What if it issues the zeroes?
4. What are the company's considerations in issuing a coupon bond compared to a zero coupon bond?
5. Suppose East Coast Yachts issues the coupon bonds with a make-whole call provision. The make-whole call rate is the Treasury rate plus .40 percent. If East Coast calls the bonds in 7 years when the Treasury rate is 5.6 percent, what is the call price of the bond? What if it is 9.1 percent?
6. Are investors really made whole with a make-whole call provision?
7. After considering all the relevant factors, would you recommend a zero coupon issue or a regular coupon issue? Why? Would you recommend an ordinary call feature or a make-whole call feature? Why?