

- (5-3) The rate of return on a bond held to its maturity date is called the bond's yield to maturity. If interest rates in the economy rise after a bond has been issued, what will happen to the bond's price and to its YTM? Does the length of time to maturity affect the extent to which a given change in interest rates will affect the bond's price? Why or why not?
- (5-4) If you buy a *callable* bond and interest rates decline, will the value of your bond rise by as much as it would have risen if the bond had not been callable? Explain.
- (5-5) A sinking fund can be set up in one of two ways. Discuss the advantages and disadvantages of each procedure from the viewpoint of both the firm and its bondholders.

SELF-TEST PROBLEM

Solution Appears in Appendix A

(ST-1)
Bond Valuation

The Pennington Corporation issued a new series of bonds on January 1, 1990. The bonds were sold at par (\$1,000), had a 12% coupon, and matured in 30 years on December 31, 2019. Coupon payments are made semiannually (on June 30 and December 31).

- What was the YTM on the date the bonds were issued?
- What was the price of the bonds on January 1, 1995 (5 years later), assuming that interest rates had fallen to 10%?
- Find the current yield, capital gains yield, and total yield on January 1, 1995, given the price as determined in part b.
- On July 1, 2013 (6.5 years before maturity), Pennington's bonds sold for \$916.42. What are the YTM, the current yield, and the capital gains yield for that date?
- Now assume that you plan to purchase an outstanding Pennington bond on March 1, 2013, when the going rate of interest given its risk is 15.5%. How large a check must you write to complete the transaction? (*Hint: Don't forget the accrued interest.*)

PROBLEMS

Answers Appear in Appendix B

Easy Problems 1-6

(5-1)
Bond Valuation with
Annual Payments

Jackson Corporation's bonds have 12 years remaining to maturity. Interest is paid annually, the bonds have a \$1,000 par value, and the coupon interest rate is 8%. The bonds have a yield to maturity of 9%. What is the current market price of these bonds?

(5-2)
Yield to Maturity for
Annual Payments

Wilson Wonders's bonds have 12 years remaining to maturity. Interest is paid annually, the bonds have a \$1,000 par value, and the coupon interest rate is 10%. The bonds sell at a price of \$850. What is their yield to maturity?

(5-3)
Current Yield for
Annual Payments

Heath Foods's bonds have 7 years remaining to maturity. The bonds have a face value of \$1,000 and a yield to maturity of 8%. They pay interest annually and have a 9% coupon rate. What is their current yield?

(5-4)
Determinant of
Interest Rates

The real risk-free rate of interest is 4%. Inflation is expected to be 2% this year and 4% during the next 2 years. Assume that the maturity risk premium is zero. What is the yield on 2-year Treasury securities? What is the yield on 3-year Treasury securities?

(5-5)
Default Risk
Premium

A Treasury bond that matures in 10 years has a yield of 6%. A 10-year corporate bond has a yield of 9%. Assume that the liquidity premium on the corporate bond is 0.5%. What is the default risk premium on the corporate bond?

(5-6)
Maturity Risk
Premium

The real risk-free rate is 3%, and inflation is expected to be 3% for the next 2 years. A 2-year Treasury security yields 6.3%. What is the maturity risk premium for the 2-year security?

Intermediate
Problems 7-20

- (5-7) Renfro Rentals has issued bonds that have a 10% coupon rate, payable semiannually. The bonds mature in 8 years, have a face value of \$1,000, and a yield to maturity of 8.5%. What is the price of the bonds?
- Bond Valuation with Semiannual Payments
- (5-8) Thatcher Corporation's bonds will mature in 10 years. The bonds have a face value of \$1,000 and an 8% coupon rate, paid semiannually. The price of the bonds is \$1,100. The bonds are callable in 5 years at a call price of \$1,050. What is their yield to maturity? What is their yield to call?
- Yield to Maturity and Call with Semiannual Payments
- (5-9) The Garraty Company has two bond issues outstanding. Both bonds pay \$100 annual interest plus \$1,000 at maturity. Bond L has a maturity of 15 years, and Bond S has a maturity of 1 year.
- Bond Valuation and Interest Rate Risk
- a. What will be the value of each of these bonds when the going rate of interest is (1) 5%, (2) 8%, and (3) 12%? Assume that there is only one more interest payment to be made on Bond S.
- b. Why does the longer-term (15-year) bond fluctuate more when interest rates change than does the shorter-term bond (1 year)?
- (5-10) The Brownstone Corporation's bonds have 5 years remaining to maturity. Interest is paid annually, the bonds have a \$1,000 par value, and the coupon interest rate is 9%.
- Yield to Maturity and Required Returns
- a. What is the yield to maturity at a current market price of (1) \$829 or (2) \$1,104?
- b. Would you pay \$829 for one of these bonds if you thought that the appropriate rate of interest was 12%—that is, if $r_d = 12\%$? Explain your answer.
- (5-11) Seven years ago, Goodwynn & Wolf Incorporated sold a 20-year bond issue with a 14% annual coupon rate and a 9% call premium. Today, G&W called the bonds. The bonds originally were sold at their face value of \$1,000. Compute the realized rate of return for investors who purchased the bonds when they were issued and who surrender them today in exchange for the call price.
- Yield to Call and Realized Rates of Return
- (5-12) A 10-year, 12% semiannual coupon bond with a par value of \$1,000 may be called in 4 years at a call price of \$1,060. The bond sells for \$1,100. (Assume that the bond has just been issued.)
- Bond Yields and Rates of Return
- a. What is the bond's yield to maturity?
- b. What is the bond's current yield?
- c. What is the bond's capital gain or loss yield?
- d. What is the bond's yield to call?
- (5-13) You just purchased a bond that matures in 5 years. The bond has a face value of \$1,000 and has an 8% annual coupon. The bond has a current yield of 8.21%. What is the bond's yield to maturity?
- Yield to Maturity and Current Yield
- (5-14) A bond that matures in 7 years sells for \$1,020. The bond has a face value of \$1,000 and a yield to maturity of 10.5883%. The bond pays coupons semiannually. What is the bond's current yield?
- Current Yield with Semiannual Payments

(5-15)
Yield to Call, Yield to
Maturity, and Market
Rates

Absalom Motors's 14% coupon rate, semiannual payment, \$1,000 par value bonds that mature in 30 years are callable 5 years from now at a price of \$1,050. The bonds sell at a price of \$1,353.54, and the yield curve is flat. Assuming that interest rates in the economy are expected to remain at their current level, what is the best estimate of the nominal interest rate on new bonds?

(5-16)
Interest Rate
Sensitivity

A bond trader purchased each of the following bonds at a yield to maturity of 8%. Immediately after she purchased the bonds, interest rates fell to 7%. What is the percentage change in the price of 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	_____	_____	_____

(5-17)
Bond Value as
Maturity Approaches

An investor has two bonds in his portfolio. Each bond matures in 4 years, has a face value of \$1,000, and has a yield to maturity equal to 9.6%. One bond, Bond C, pays an annual coupon of 10%; the other bond, Bond Z, is a zero coupon bond. Assuming that the yield to maturity of each bond remains at 9.6% over the next 4 years, what will be the price of each of the bonds at the following time periods? Fill in the following table:

t	Price of Bond C	Price of Bond Z
0	_____	_____
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____

(5-18)
Determinants of
Interest Rates

The real risk-free rate is 2%. Inflation is expected to be 3% this year, 4% next year, and then 3.5% thereafter. The maturity risk premium is estimated to be $0.0005 \times (t - 1)$, where t = number of years to maturity. What is the nominal interest rate on a 7-year Treasury security?

(5-19)
Maturity Risk
Premiums

Assume that the real risk-free rate, r^* , is 3% and that inflation is expected to be 8% in Year 1, 5% in Year 2, and 4% thereafter. Assume also that all Treasury securities are highly liquid and free of default risk. If 2-year and 5-year Treasury notes both yield 10%, what is the difference in the maturity risk premiums (MRPs) on the two notes; that is, what is MRP_5 minus MRP_2 ?

(5-20)
Inflation Risk
Premiums

Because of a recession, the inflation rate expected for the coming year is only 3%. However, the inflation rate in Year 2 and thereafter is expected to be constant at some level above 3%. Assume that the real risk-free rate is $r^* = 2\%$ for all maturities and that there are no maturity premiums. If 3-year Treasury notes yield 2 percentage points more than 1-year notes, what inflation rate is expected after Year 1?