Chapter 10
Bond Prices and Yields

1.

a. Effective annual rate on three-month T-bill: 10.00%

b. Effective annual interest rate on coupon bond paying 5% semiannually:
10.25%

Therefore, the coupon bond has the higher effective annual interest rate.

3. The bond callable at 105 should sell at a lower price because the call provision is more valuable to the firm. Therefore, its yield to maturity should be higher.

4. The bond price will be lower. As time passes, the bond price, which is now above par value, will approach par.

5. True. Under the expectations hypothesis, there are no risk premia built into bond prices. The only reason for long-term yields to exceed short-term yields is an expectation of higher short-term rates in the future.

6. c A "fallen angel" is a bond that has fallen from investment grade to junk bond status.

7. Uncertain. Lower inflation usually leads to lower nominal interest rates. Nevertheless, if the liquidity premium is sufficiently great, long-term yields can exceed short-term yields despite expectations of falling short rates.

8. If the yield curve is upward sloping, you cannot conclude that investors expect short-term interest rates to rise because the rising slope could be due to either expectations of future increases in rates or the demand of investors for a risk premium on long-term bonds. In fact the yield curve can be upward sloping even in the absence of expectations of future increases in rates.

9.

a. The bond pays $50 every six months.

Current price:

[$50 × Annuity factor(4%, 6)] + [$1000 × PV factor(4%, 6)] =

$1,052.42

Assuming the market interest rate remains 4% per half year, price six months from now:

[$50 × Annuity factor(4%, 5)] + [$1000 × PV factor(4%, 5)] =

$1,044.52

b. Rate of return = 4.00% per six months

10.

a. Use the following inputs: n = 40, FV = 1000, PV = –950, PMT = 40. You will find that the yield to maturity on a semi-annual basis is 4.26%. This implies a bond equivalent yield to maturity of: 4.26% × 2 = 8.52%

Effective annual yield to maturity = 8.70%

b. Since the bond is selling at par, the yield to maturity on a semi-annual basis is the same as the semi-annual coupon, 4%. The bond equivalent yield to maturity is 8%.

Effective annual yield to maturity = 8.16%

c. Keeping other inputs unchanged but setting PV = –1050, we find a bond equivalent yield to maturity of 7.52%, or 3.76% on a semi-annual basis.

Effective annual yield to maturity = 0.0766 = 7.66%

11. Since the bond payments are now made annually instead of semi-annually, the bond equivalent yield to maturity is the same as the effective annual yield to maturity. The inputs are: n = 20, FV = 1000, PV = –price, PMT = 80. The resulting yields for the three bonds are:

Bond Price	Bond equivalent yield = Effective annual yield
$950	8.53%
$1,000	8.00%
$1,050	7.51%

The yields computed in this case are lower than the yields calculated with semi-annual coupon payments. All else equal, bonds with annual payments are less attractive to investors because more time elapses before payments are received. If the bond price is the same with annual payments, then the bond's yield to maturity is lower.

13. Remember that the convention is to use semi-annual periods:

Price	Maturity (years)	Maturity (half-years)	Semi-annual YTM	Bond equivalent YTM
$400.00	20	40	2.32%	4.63%
$500.00	20	40	1.75%	3.50%
$500.00	10	20	3.53%	7.05%
$376.89	10	20	5.00%	10.00%
$456.39	10	20	4.00%	8.00%
$400.00	11.68	23.36	4.00%	8.00%

16. If the yield to maturity is greater than current yield, then the bond offers the prospect of price appreciation as it approaches its maturity date. Therefore, the bond is selling below par value.

17. The coupon rate is below 9%. If coupon divided by price equals 9%, and price is less than par, then coupon divided by par is less than 9%.

24.

   a. The bond sells for $1,124.72 based on the 3.5% yield to *maturity*:

      Therefore, yield to *call* is 3.368% semiannually, 6.736% annually:

   b. If the call price were $1050, we would set FV = 1050 and redo part (a) to find that yield to call is 2.976% semi-annually, 5.952% annually. With a lower call price, the yield to call is lower.

   c. Yield to call is 3.031% semiannually, 6.062% annually:

27. Zero coupon bonds provide no coupons to be reinvested. Therefore, the final value of the investor's proceeds from the bond is independent of the rate at which coupons could be reinvested (if they were paid). There is no reinvestment rate uncertainty with zeros.

28. April 15 is midway through the semi-annual coupon period. Therefore, the invoice price will be higher than the stated ask price by an amount equal to one-half of the semiannual coupon. The ask price is 101.125 percent of par, so the invoice price is:

   $1,036.25

33. Market conversion value = value if converted into stock = $583.24

   Conversion premium = Bond value – market conversion value

   = $191.76