***Financial Markets and Institutions, 7e* (Saunders)**

**Chapter 3 Interest Rates and Security Valuation**

1) If interest rates increase, the value of a fixed income contract decreases and vice versa.

Answer: TRUE

Difficulty: 1 Easy

Topic: Impact of Interest Rate Changes on Security Values

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-04 Appreciate how security prices are affected by interest rate changes.

Accessibility: Keyboard Navigation

2) At equilibrium a security's required rate of return will be less than its expected rate of return.

Answer: FALSE

Difficulty: 1 Easy

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

3) If a security's realized return is negative, it must have been true that the expected return was greater than the required return.

Answer: FALSE

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

4) Suppose two bonds of equivalent risk and maturity have different prices such that one is a premium bond and one is a discount bond. The premium bond must have a greater expected return than the discount bond.

Answer: FALSE

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

5) A bond with an 11 percent coupon and a 9 percent required return will sell at a premium to par.

Answer: TRUE

Difficulty: 1 Easy

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

6) A fairly priced bond with a coupon less than the expected return must sell at a discount from par.

Answer: TRUE

Difficulty: 1 Easy

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

7) All else equal, the holder of a fairly priced premium bond must expect a capital loss over the holding period.

Answer: TRUE

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

8) The duration of a four-year maturity 10 percent coupon bond is less than four years.

Answer: TRUE

Difficulty: 1 Easy

Topic: Duration

Bloom's: Remember

AACSB: Reflective Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

9) The longer the time to maturity, the lower the security's price sensitivity to an interest rate change, *ceteris paribus*.

Answer: FALSE

Difficulty: 1 Easy

Topic: Impact of Maturity on Security Values

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-05 Understand how the maturity and coupon rate on a security affect its price sensitivity to interest rate changes.

Accessibility: Keyboard Navigation

10) The greater a security's coupon, the lower the security's price sensitivity to an interest rate change, *ceteris paribus*.

Answer: TRUE

Difficulty: 1 Easy

Topic: Impact of Coupon Rates on Security Values

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-05 Understand how the maturity and coupon rate on a security affect its price sensitivity to interest rate changes.

Accessibility: Keyboard Navigation

11) For a given interest rate change, a 20-year bond's price change will be twice that of a 10-year bond's price change.

Answer: FALSE

Difficulty: 2 Medium

Topic: Impact of Maturity on Security Values

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-05 Understand how the maturity and coupon rate on a security affect its price sensitivity to interest rate changes.

Accessibility: Keyboard Navigation

12) Any security that returns a greater percentage of the price sooner is less price-volatile.

Answer: TRUE

Difficulty: 1 Easy

Topic: Impact of Coupon Rates on Security Values

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-05 Understand how the maturity and coupon rate on a security affect its price sensitivity to interest rate changes.

Accessibility: Keyboard Navigation

13) A zero coupon bond has a duration equal to its maturity and a convexity equal to zero.

Answer: TRUE

Difficulty: 2 Medium

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

14) The lower the level of interest rates, the greater a bond's price sensitivity to interest rate changes.

Answer: TRUE

Difficulty: 2 Medium

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

15) The higher a bond's coupon, the lower the bond's price volatility.

Answer: TRUE

Difficulty: 1 Easy

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

16) Higher interest rates lead to lower bond convexity, *ceteris paribus*.

Answer: TRUE

Difficulty: 2 Medium

Topic: Appendix 3B: More on Convexity

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

17) A 10-year maturity zero coupon bond will have lower price volatility than a 10-year bond with a 10 percent coupon.

Answer: FALSE

Difficulty: 1 Easy

Topic: Impact of Coupon Rates on Security Values

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-05 Understand how the maturity and coupon rate on a security affect its price sensitivity to interest rate changes.

Accessibility: Keyboard Navigation

18) Ignoring default risk, if a bond's expected return is greater than its required return, then the bond's market price must be greater than the present value of the bond's cash flows.

Answer: FALSE

Difficulty: 1 Easy

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

19) The coupon rate represents the most accurate measure of the bondholder's required return.

Answer: FALSE

Difficulty: 3 Hard

Topic: Various Interest Rate Measures

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

20) The higher the interest rate is the higher the duration, all else being equal.

Answer: FALSE

Difficulty: 1 Easy

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

21) The required rate of return on a bond is

A) the interest rate that equates the current market price of the bond with the present value of all future cash flows received.

B) equivalent to the current yield for nonpar bonds.

C) less than the E(r) for discount bonds and greater than the E(r) for premium bonds.

D) inversely related to a bond's risk and coupon.

E) None of these choices are correct.

Answer: E

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

22) Duration is

A) the elasticity of a security's value to small coupon changes.

B) the weighted average time to maturity of the bond's cash flows.

C) the time until the investor recovers the price of the bond in today's dollars.

D) greater than maturity for deep discount bonds and less than maturity for premium bonds.

E) the second derivative of the bond price formula with respect to the YTM.

Answer: B

Difficulty: 2 Medium

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

23) Which of the following bond terms are generally positively related to bond price volatility?

I. Coupon rate

II. Maturity

III. YTM

IV.  Payment frequency

A) II and IV only

B) I and III only

C) II and III only

D) II only

E) II, III, and IV only

Answer: D

Difficulty: 3 Hard

Topic: Impact of Maturity on Security Values; Impact of Coupon Rates on Security Values; Impact of Interest Rate Changes on Security Values

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-05 Understand how the maturity and coupon rate on a security affect its price sensitivity to interest rate changes.

Accessibility: Keyboard Navigation

24) The interest rate used to find the present value of a financial security is the

A) expected rate of return.

B) required rate of return.

C) realized rate of return.

D) realized yield to maturity.

E) current yield.

Answer: B

Difficulty: 1 Easy

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

25) A security has an expected return less than its required return. This security is

A) selling at a premium to par.

B) selling at a discount to par.

C) selling for more than its PV.

D) selling for less than its PV.

E) a zero coupon bond.

Answer: C

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

26) A bond that you held to maturity had a realized return of 8 percent, but when you bought it, it had an expected return of 6 percent. If no default occurred, which one of the following must be true?

A) The bond was purchased at a premium to par.

B) The coupon rate was 8 percent.

C) The required return was greater than 6 percent.

D) The coupons were reinvested at a higher rate than expected.

E) The bond must have been a zero coupon bond.

Answer: D

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

27) You would want to purchase a security if P \_\_\_\_\_\_\_\_ PV or E(r) \_\_\_\_\_\_\_\_ r.

A) ≥; ≤

B) ≥; ≥

C) ≤; ≥

D) ≤; ≤

Answer: C

Difficulty: 3 Hard

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

28) A 10-year annual payment corporate bond has a market price of $1,050. It pays annual interest of $100 and its required rate of return is 9 percent. By how much is the bond mispriced?

A) $0.00

B) Overpriced by $14.18

C) Underpriced by $14.18

D) Overpriced by $9.32

E) Underpriced by $9.32

Answer: C

Explanation: PV = 100 × PVIFA [9%, 10 yrs.] + 1,000 × PVIF (9%, 10 yrs.) = $1,064.18

Calculator Method:

N = 10

PMT = 100

I/Y = 9

FV = 1,000

Solve for PV which is $1064.18; Market value is underpriced by $14.18.

Difficulty: 2 Medium

Topic: Various Interest Rate Measures; Bond Valuation

Bloom's: Analyze; Apply; Evaluate

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.; 03-02 Calculate bond values.

Accessibility: Keyboard Navigation

29) A 12-year annual payment corporate bond has a market price of $925. It pays annual interest of $60 and its required rate of return is 7 percent. By how much is the bond mispriced?

A) $0.00

B) Overpriced by $7.29

C) Underpriced by $7.29

D) Overpriced by $4.43

E) Underpriced by $4.43

Answer: D

Explanation: FPV = 60 × PVIFA [7%, 12 yrs.] + 1,000 × PVIF (7%, 12 yrs.) = $920.57

Calculator Method:

N = 12

PMT = 60

I/Y = 7

FV = 1,000

Solve for PV which is $920.57; Market value is overpriced by $4.43.

Difficulty: 2 Medium

Topic: Various Interest Rate Measures; Bond Valuation

Bloom's: Analyze; Apply; Evaluate

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.; 03-02 Calculate bond values.

Accessibility: Keyboard Navigation

30) An eight-year corporate bond has a 7 percent coupon rate. What should be the bond's price if the required return is 6 percent and the bond pays interest semiannually?

A) $1,062.81

B) $1,062.10

C) $1,053.45

D) $1,052.99

E) $1,049.49

Answer: A

Explanation: Price = 35.00 × PVIFA (3%, 16) + 1,000 × PVIF (3%, 16)

Calculator Method:

N = 16

PMT = 35

I/Y = 3

FV = 1,000

Solve for PV which is $1062.81.

Difficulty: 2 Medium

Topic: Bond Valuation

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-02 Calculate bond values.

Accessibility: Keyboard Navigation

31) A 15-year corporate bond pays $40 interest every six months. What is the bond's price if the bond's promised YTM is 5.5 percent?

A) $1,261.32

B) $1,253.12

C) $1,250.94

D) $1,263.45

E) $1,264.79

Answer: B

Explanation: Using P/Y2 for semiannual; FV $1,000; PMT $40; N 15 years; and I/Y 5.5 percent. Solve bond price (PV) = $1,253.12.

Calculator Method:

N = 30

PMT = 40

I/Y = 2.75

FV = 1,000

Solve for PV which is $1,253.12.

Difficulty: 2 Medium

Topic: Bond Valuation

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-02 Calculate bond values.

Accessibility: Keyboard Navigation

32) A corporate bond has a coupon rate of 10 percent and a required return of 10 percent. This bond's price is

A) $924.18.

B) $1,000.00.

C) $879.68.

D) $1,124.83.

E) not possible to determine from the information given.

Answer: B

Explanation: When coupon rate = required return; price = par

Difficulty: 1 Easy

Topic: Bond Valuation

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-02 Calculate bond values.

Accessibility: Keyboard Navigation

33) A 10-year annual payment corporate coupon bond has an expected return of 11 percent and a required return of 10 percent. The bond's market price is

A) greater than its PV.

B) less than par.

C) less than its E(r).

D) less than its PV.

E) $1,000.00.

Answer: D

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

34) An eight-year annual payment 7 percent coupon Treasury bond has a price of $1,075. The bond's annual E(r) must be

A) 13.49 percent.

B) 5.80 percent.

C) 7.00 percent.

D) 1.69 percent.

E) 4.25 percent.

Answer: B

Explanation: $1,075 = 70 × PVIFA (E(r)%, 8) + 1,000 × PVIF (E(r)%, 8), trial and error or calculator

Calculator Method:

N = 8

PMT = 70

PV = −1,075

FV = 1,000

Solve for I/Y which is 5.80%.

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

35) A six-year annual payment corporate bond has a required return of 9.5 percent and an 8 percent coupon. Its market value is $20 over its PV. What is the bond's E(r)?

A) 8.00 percent

B) 10.21 percent

C) 9.98 percent

D) 9.03 percent

E) 3.53 percent

Answer: D

Explanation: PV = 933.70 = 80 × PVIFA (9.5%, 6 yrs.) + 1,000 × PVIF (9.5%, 6 yrs.); (933.70 + 20) = 80 × PVIFA (E(r), 6 yrs.) + 1,000 × PVIF (E(r), 6 yrs.), trial and error or calculator

Calculator Method:

First find the Present Value of this bond.

N = 6

PMT = 80

I/Y = 9.5

FV = 1,000

Solve for PV which is 933.70.

The market value is 953.70, using this value solve for I/Y to find E(r).

PV = −953.70

PMT = 80

N = 6

FV = 1,000

Solve for I/Y to get 9.03%.

Difficulty: 3 Hard

Topic: Various Interest Rate Measures

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

36) Corporate Bond A returns 5 percent of its cost in PV terms in each of the first five years and 75 percent of its value in the sixth year. Corporate Bond B returns 8 percent of its cost in PV terms in each of the first five years and 60 percent of its cost in the sixth year. If A and B have the same required return, which of the following is/are true?

I. Bond A has a bigger coupon than Bond B.

II. Bond A has a longer duration than Bond B.

III. Bond A is less price-volatile than Bond B.

IV.  Bond B has a higher PV than Bond A.

A) III only

B) I, III, and IV only

C) I, II, and IV only

D) II and IV only

E) I, II, III, and IV

Answer: D

Difficulty: 3 Hard

Topic: Various Interest Rate Measures; Duration; Impact of Coupon Rates on Security Values

Bloom's: Analyze; Evaluate

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-05 Understand how the maturity and coupon rate on a security affect its price sensitivity to interest rate changes.; 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.; 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

37) A corporate bond returns 12 percent of its cost (in PV terms) in the first year, 11 percent in the second year, 10 percent in the third year and the remainder in the fourth year. What is the bond's duration in years?

A) 3.68 years

B) 2.50 years

C) 4.00 years

D) 3.75 years

E) 3.32 years

Answer: E

Explanation: 3.32 = (12% × 1) + (11% × 2) + (10% × 3) + (67% × 4)

Difficulty: 2 Medium

Topic: Duration

Bloom's: Analyze; Apply; Evaluate

AACSB: Analytical Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

38) A semiannual payment bond with a $1,000 par has a 7 percent quoted coupon rate, a 7 percent promised YTM, and 10 years to maturity. What is the bond's duration?

A) 10.00 years

B) 8.39 years

C) 6.45 years

D) 5.20 years

E) 7.35 years

Answer: E

Explanation: Σ[(t × CFt/(1.035)t)]/($1,000)

Difficulty: 3 Hard

Topic: Duration

Bloom's: Analyze; Apply; Evaluate

AACSB: Analytical Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

39) An annual payment bond with a $1,000 par has a 5 percent quoted coupon rate, a 6 percent promised YTM, and six years to maturity. What is the bond's duration?

A) 5.31 years

B) 5.25 years

C) 4.76 years

D) 4.16 years

E) 3.19 years

Answer: A

Explanation: Σ[(t × CFt/(1.06)t)]/$950.83

Difficulty: 3 Hard

Topic: Duration

Bloom's: Analyze; Apply; Evaluate

AACSB: Analytical Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

40) If an N year security recovered the same percentage of its cost in PV terms each year, the duration would be

A) N.

B) 0.

C) sum of the years/N.

D) N!/N2.

E) None of these choices are correct.

Answer: C

Difficulty: 3 Hard

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

41) The \_\_\_\_\_\_\_\_ the coupon and the \_\_\_\_\_\_\_\_ the maturity; the \_\_\_\_\_\_\_\_ the duration of a bond, *ceteris paribus*.

A) larger; longer; longer

B) larger; longer; shorter

C) smaller; shorter; longer

D) smaller; shorter; shorter

E) None of these choices are correct.

Answer: E

Difficulty: 3 Hard

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

42) A four-year maturity 0 percent coupon corporate bond with a required rate of return of 12 percent has an annual duration of \_\_\_\_\_\_\_\_ years.

A) 3.05

B) 2.97

C) 3.22

D) 3.71

E) 4.00

Answer: E

Explanation: Duration of zero coupon bond definition.

Difficulty: 1 Easy

Topic: Duration

Bloom's: Analyze; Apply; Evaluate

AACSB: Analytical Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

43) A decrease in interest rates will

A) decrease the bond's PV.

B) increase the bond's duration.

C) lower the bond's coupon rate.

D) change the bond's payment frequency.

E) not affect the bond's duration.

Answer: B

Difficulty: 2 Medium

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

44) A 10-year maturity coupon bond has a six-year duration. An equivalent 20-year bond with the same coupon has a duration

A) equal to 12 years.

B) less than six years.

C) less than 12 years.

D) equal to six years.

E) greater than 20 years.

Answer: C

Difficulty: 1 Easy

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

45) A six-year maturity bond has a five-year duration. Over the next year maturity will decline by one year and duration will decline by

A) less than one year.

B) more than one year.

C) one year.

D) N years.

E) N/(N − 1) years.

Answer: A

Difficulty: 2 Medium

Topic: Duration

Bloom's: Analyze

AACSB: Analytical Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

46) An annual payment bond has a 9 percent required return. Interest rates are projected to fall 25 basis points. The bond's duration is 12 years. What is the predicted price change?

A) −2.75 percent

B) 33.33 percent

C) 1.95 percent

D) −1.95 percent

E) 2.75 percent

Answer: E

Explanation: −12 × (−0.0025/1.09) = 0.0275

Difficulty: 2 Medium

Topic: Duration

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

47) A bond that pays interest annually has a 6 percent promised yield and a price of $1,025. Annual interest rates are now projected to fall 50 basis points. The bond's duration is six years. What is the predicted new bond price after the interest rate change? (Watch your rounding.)

A) $1,042.33

B) $995.99

C) $1,054.01

D) $987.44

E) None of these choices are correct.

Answer: C

Explanation: 1,025 + [−6 × (−0.0050/1.06) × $1,025] = 1,054

Difficulty: 2 Medium

Topic: Duration

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

48) A bond that pays interest semiannually has a 6 percent promised yield and a price of $1,045. Annual interest rates are now projected to increase 50 basis points. The bond's duration is five years. What is the predicted new bond price after the interest rate change? (Watch your rounding.)

A) $1,020.35

B) $1,069.65

C) $1,070.36

D) $1,019.64

E) None of these choices are correct.

Answer: D

Explanation: ((−5/1.03) × 0.0050 × $1,045) + $1,045 = 1,019.635

Difficulty: 2 Medium

Topic: Duration

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

49) Convexity arises because

A) bonds pay interest semiannually.

B) coupon changes are the opposite sign of interest rate changes.

C) duration is an increasing function of maturity.

D) present values are a nonlinear function of interest rates.

E) duration increases at higher interest rates.

Answer: D

Difficulty: 2 Medium

Topic: Appendix 3B: More on Convexity

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

50) The duration of a 180-day T-Bill is (in years)

A) 0.493.

B) 0.246.

C) 1.

D) 0.

E) indeterminate.

Answer: A

Explanation: 180/365 = 0.493

Difficulty: 1 Easy

Topic: Duration

Bloom's: Analyze; Apply

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

51) The duration of a 91-day T-Bill is (in years).

A) 0.325

B) 0.249

C) 0.715

D) 0

E) Indeterminate

Answer: B

Explanation: 91/365 = 0.249

Difficulty: 1 Easy

Topic: Duration

Bloom's: Analyze; Apply

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-06 Know what duration is.

Accessibility: Keyboard Navigation

52) For large interest rate increases, duration \_\_\_\_\_\_\_\_ the fall in security prices, and for large interest rate decreases, duration \_\_\_\_\_\_\_\_ the rise in security prices.

A) overpredicts; overpredicts

B) overpredicts; underpredicts

C) underpredicts; overpredicts

D) underpredicts; underpredicts

E) None of these choices are correct.

Answer: B

Difficulty: 2 Medium

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

53) Suppose you owned stock in a company for the last three years. You originally bought the stock three years ago for $30 and just sold it for $56. The stock paid an annual dividend of $1.35 on the last day of each of the past three years. What is your realized return on this investment?

A) 15.36 percent

B) 36.14 percent

C) 26.85 percent

D) 37.58 percent

E) None of these choices are correct.

Answer: C

Explanation: Use a financial calculator to solve for IRR as follows:

CF0 = −$30, CF1 = $1.35, CF2 = $1.35, CF3 = $57.35

Compute IRR = 26.85%.

Difficulty: 2 Medium

Topic: Equity Valuation

Bloom's: Analyze; Apply

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-03 Calculate equity values.

Accessibility: Keyboard Navigation

54) You are considering the purchase of a certain stock. You expect to own the stock for the next four years. The current market price of the stock is $24.50 and you expect to sell it for $55 in four years. You also expect the stock to pay an annual dividend of $1.25 at the end of year 1, $1.35 at the end of year 2, $1.45 at the end of year 3 and $1.55 at the end of year 4. What is your expected return from this investment?

A) 21.78 percent

B) 18.36 percent

C) 26.68 percent

D) 32.85 percent

E) None of these choices are correct.

Answer: C

Explanation: Use a financial calculator to solve for IRR as follows:

CF0 = −$24.50, CF1 = $1.25, CF2 = $1.35, CF3 = $1.45, CF4 = $56.55

Compute IRR = 26.68%.

Difficulty: 2 Medium

Topic: Equity Valuation

Bloom's: Analyze; Apply

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-03 Calculate equity values.

Accessibility: Keyboard Navigation

55) A preferred stock is expected to pay a constant quarterly dividend of $1.25 per quarter into the future. The required rate of return, *Rs*, on the preferred stock is 13.5 percent. What is the fair value (or price) of this stock?

A) $37.04

B) $24.36

C) $52.36

D) $18.65

E) None of these choices are correct.

Answer: A

Explanation: *Rs* = (4 × 1.25) / 0.135 = 37.04

Difficulty: 2 Medium

Topic: Equity Valuation

Bloom's: Analyze; Apply

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-03 Calculate equity values.

Accessibility: Keyboard Navigation

56) You are evaluating a company's stock. The stock just paid a dividend of $1.75. Dividends are expected to grow at a constant rate of 5 for long time into the future. The required rate of return (*Rs*) on the stock is 12 percent. What is the fair present value?

A) $26.25

B) $22.50

C) $35.26

D) $50.25

E) None of these choices are correct.

Answer: A

Explanation: P0 = (1.75 × 1.05)/(0.12 − 0.05) = 26.25

Difficulty: 2 Medium

Topic: Equity Valuation

Bloom's: Analyze; Apply

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-03 Calculate equity values.

Accessibility: Keyboard Navigation

57) A common stock paid a dividend at the end of last year of $3.50. Dividends have grown at a constant rate of 6 percent per year over the last 20 years, and this constant growth rate is expected to continue into the future. The stock is currently selling at a price of $35 per share. What is the expected rate of return on this stock?

A) 18.7 percent

B) 22.5 percent

C) 16.6 percent

D) 8.4 percent

E) None of these choices are correct.

Answer: C

Explanation: E(*Rs*) = (3.5 × 1.06/35) + 0.06 = 0.166

Difficulty: 2 Medium

Topic: Equity Valuation

Bloom's: Analyze; Apply

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-03 Calculate equity values.

Accessibility: Keyboard Navigation

58) A stock you are evaluating is expected to experience supernormal growth in dividends of 12 percent over the next three years. Following this period, dividends are expected to grow at a constant rate of 4 percent. The stock paid a dividend of $1.50 last year and the required rate of return on the stock is 11 percent. Calculate the stock's fair present value.

A) $16.24

B) $21.56

C) $24.25

D) $27.46

E) None of these choices are correct.

Answer: D

Explanation: D1 = 1.5 × 1.12 = 1.68

D2 = 1.68 × 1.12 = 1.88

D3 = 1.88 × 1.12 = 2.11

D4 = 2.11 × 1.04 = 2.19

P3 = 2.19/(0.11 - 0.04) = 31.29

Use the Calculator to solve for the NPV:

CF0 = 0, CF1 = $1.68, CF2 = $1.88, CF3 = $33.40, I/Y = 11 to get NPV = 27.46

Difficulty: 3 Hard

Topic: Equity Valuation

Bloom's: Analyze; Apply

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-03 Calculate equity values.

Accessibility: Keyboard Navigation

59) The basic principle of valuation states that the value of any asset is

A) the present value of all future cash flows generated by the asset.

B) the sum of all future cash flows generated by the asset.

C) the present value of next year's cash flow only.

D) the degree of cash flow riskiness is not a relevant factor in valuation.

E) None of these choices are correct.

Answer: A

Difficulty: 1 Easy

Topic: Bond Valuation; Equity Valuation

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-02 Calculate bond values.; 03-03 Calculate equity values.

Accessibility: Keyboard Navigation

60) Is the realized rate of return related to the expected return? the required return? Explain.

Answer: Yes and no. The required return determines the initial size of the coupon and the offer price and, as the *r* changes, forces the market price to change. As the buy and sell prices and reinvestment rates on coupons change, the realized return will be affected. However, the required return is an ex-ante rate designed to compensate investors for risk. The realized return may be less than or more than the expected or the required. That is the nature of risk. If you repeated the same investment with the same terms over and over, you should, on average, earn a realized return equal to the required return.

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Understand; Analyze

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

61) You bought a stock three years ago and paid $45 per share. You collected a $2 dividend per share each year you held the stock and then you sold the stock for $47 per share. What was your annual compound rate of return?

A) 8.89 percent

B) 8.51 percent

C) 5.84 percent

D) 4.44 percent

E) 2.96 percent

Answer: C

Explanation: Use a financial calculator to solve for IRR as follows:

CF0 = −$45, CF1 = $2, CF2 = $2, CF3 = $49,

Compute for IRR = 5.84%.

Difficulty: 3 Hard

Topic: Equity Valuation

Bloom's: Analyze; Apply; Evaluate

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-03 Calculate equity values.

Accessibility: Keyboard Navigation

62) Conceptually, why does a bond's price fall when required returns rise on an existing fixed income security?

Answer: Since the cash flows are set by contract, the only way a new investor can expect to earn the new higher required return is to pay less for the bond, so the price has to fall. Traders sell the existing bond in favor of newer, higher rate bonds, dropping the price and raising the expected return.

Difficulty: 1 Easy

Topic: Impact of Interest Rate Changes on Security Valuation

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-04 Appreciate how security prices are affected by interest rate changes.

Accessibility: Keyboard Navigation

63) A 15-year, 7 percent coupon annual payment corporate bond has a PV of $1,055.62. However, you pay $1,024.32 for the bond. By how many basis points is your E(*r*) different from your *r*?

Answer: *r* = 6.41%

1,055.62 = 70 × [PVIFA15 yr, *r*] + 1,000 × [PVIFA15yr, *r*]

E(*r*) = 6.74%

1,024.32 = 70 × [PVIFA15 yr, E(*r*)] + 1,000 × [PVIFA15yr, E(*r*)]

E(*r*) is 33 basis points more than your *r*. Calculator Solution:

First solve for the required return:

PV = −1,055.62

FV = 1,000

PMT = 70

N = 15

Solve for I/Y = 6.41%.

Now solve for the E(*r*):

PV = −1,024.32

FV = 1,000

PMT = 70

N = 15

Solve for I/Y = 6.74%.

The difference between expected return and required return is 0.33% or 33 basis points.

Difficulty: 2 Medium

Topic: Various Interest Rate Measures

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-01 Understand the differences in the required rate of return, the expected rate of return, and the realized rate of return.

Accessibility: Keyboard Navigation

64) What is convexity? How does convexity affect duration-based predicted price changes for interest rates changes?

Answer: Convexity is a measure of the nonlinearity (curvature) of a change in a bond's price caused by a change in interest rates. The level of convexity increases for greater interest rate changes. Duration is a linear estimate of a bond's price change as the interest rate changes from its current level. Due to convexity, the greater the interest rate change, the greater the error in using duration to estimate the bond's price change. For a multimillion-dollar bond portfolio, the dollar errors can be quite significant. In abnormal markets, bond investors may face more or less risk than the bond's duration would imply.

Calculus

Answer: Duration is the first derivative of the bond price formula with respect to a change in interest rates. As such, it is accurate only for extremely small changes in interest rates. Duration gives only an approximation of the actual value change for interest rate movements that are normally observed in the market.

Difficulty: 3 Hard

Topic: Appendix 3B: More on Convexity

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

65) An investor owned a 9 percent annual payment coupon bond for six years that was originally purchased at a 9 percent required return. She did not reinvest any coupons (she kept the money under her mattress). She redeemed the bond at par. What was her annual realized rate of return? What if she did reinvest the coupons but only earned 5 percent on each coupon? Why are your answers not equal to 9 percent?

Answer: You can't use the bond price formula in this case because of the lack of reinvestment.

First alternative: Do not reinvest the coupons at all.

PV = $1,000 purchase price (coupon = YTM when purchased)

FV = $90 × 6 = $540 + $1,000 par = $1,540

With a financial calculator, input: PV = −1,000, FV = 1,540, N = 6, PMT = 0 and solve for I to get 7.46%.

Second alternative: reinvest coupons at 5%

PV = $1,000 purchase price (coupon = YTM when purchased)

The future value will be $1,000 plus the sum of the future values of each of the $90 reinvested at 5%. With a financial calculator, first find the sum of the future values of each of the $90. PMT = 90, I = 5, N = 6, PV = 0, and solve for FV1 to get 612.17 and then add $1,000 to this amount to get the FV = 612.17 + 1,000 = $1,612.17. Finally to solve for r, using the financial calculator, input FV = 1,612.17, PV = 1,000, N = 6, PMT = 0, and solve for I to get 8.29%.

The realized returns are less than 9 percent because the investor did not reinvest the coupons at the required rate of return. In order to earn a compound rate of return equal to the promised yield, an investor must reinvest the coupons and earn the promised yield for the remaining time to maturity.

Difficulty: 2 Medium

Topic: Bond Valuation

Bloom's: Analyze; Apply; Evaluate; Create

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-02 Calculate bond values.

Accessibility: Keyboard Navigation

66) Explain the effects of coupon and maturity on volatility.

Answer: The longer the maturity, the greater the price sensitivity of an asset with respect to interest rate changes. The larger the coupon payments, or any interim cash flows, the lower the price sensitivity of an asset with respect to asset changes. In general, any security that returns a greater proportion of an investment more quickly will be less price-volatile because this allows the investor to respond to the interest rate change, minimizing the opportunity cost.

Difficulty: 1 Easy

Topic: Impact of Interest Rate Changes on Security Valuation

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-05 Understand how the maturity and coupon rate on a security affect its price sensitivity to interest rate changes.

Accessibility: Keyboard Navigation

67) Which would have a longer duration: (a) a five-year fully amortized installment loan with semiannual payments or (b) a five-year semiannual payment bond, *ceteris paribus*. Why?

Answer: The bond will have a longer duration because you receive interest payments only until maturity, whereas the amortizing loan pays principal and interest throughout the life of the loan. Hence, the loan pays more (%) money back sooner. That makes the loan less volatile than the bond.

Difficulty: 1 Easy

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

68) How does an increase in interest rates affect a security's duration?

Answer: At higher interest rates the PV of more distant cash flows is reduced by a greater amount than near-term cash flows due to compounding. For example, the PV of the 10th cash flow falls more than the PV of the first cash flow if rates rise. This shifts a greater portion of the PV weights to the near-term cash flows, which, in turn, results in a shorter duration. The converse is true for falling interest rates.

Difficulty: 2 Medium

Topic: Duration

Bloom's: Analyze

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-07 Understand how maturity, yield to maturity, and coupon rate affect the duration of a security.

Accessibility: Keyboard Navigation

69) An investor is considering purchasing a Treasury bond with a 16-year maturity, a 6 percent coupon and a 7 percent required rate of return. The bond pays interest semiannually.

a. What is the bond's modified duration?

b. If annual promised yields decrease 30 basis points immediately after the purchase, what is the predicted price change in dollars based on the bond's duration?

Answer:

a. The bond's price is $908.04 and the bond's modified duration is found as

Σ[(t × CFt/(1.035))t]/($904.66 × 2) = 10.19 years duration;

Modified duration = 10.19/1.035 = 9.85 years

b. With a decrease of 30 basis points in annual promised yields:

Predicted Δ Bond Price = −9.85 × −.0030 = 2.95% or a $ price change of 0.0295 × $904.66 = $26.72

Difficulty: 3 Hard

Topic: Duration

Bloom's: Analyze; Apply

AACSB: Analytical Thinking

Learning Goal: 03-06 Know what duration is.; 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

70) You have five years until you need to take your money out of your investments to make a planned expenditure. Right now bonds are promising an 8 percent return. You buy a five-year duration bond. After you buy the bond, interest rates fall to 6 percent and stay there for the full five years. You reinvest the coupons and earn 6 percent. Will your realized return be more or less than the originally promised 8 percent? Explain.

Answer: You will earn the promised 8 percent return. Because you chose a bond with a duration equal to the five-year time period, the loss in reinvestment income from reinvesting the coupons at 6 percent instead of 8 percent will just be offset by having a higher-than-expected sale price of the bond in five years.

Difficulty: 3 Hard

Topic: Duration

Bloom's: Understand

AACSB: Reflective Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

71) A nine-year maturity AAA-rated corporate bond has a 6 percent coupon rate. The bond's promised yield is currently 5.75 percent and the bond sells for its FPV. The bond pays interest semiannually and has an annual duration of 7.1023 years.

a. What is the bond's convexity?

b. If promised yields decrease to 5.45 percent, what is the bond's predicted new price, including convexity?

c. Based on your result in b, would you prefer to have a bond with more or less convexity? Explain.

Answer:

a. Bond's convexity:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | | | | | | | | | | | | |
|  | |  | |  | | rate change | |  | | 0.00005 | |  |  |  | |  | |  | |  | | |
| CX = 108 × [(ΔP−/P) + (ΔP+/P)] | | | |  | | New r | |  | | 2.8800 | | % |  |  | | 2.8700 | | % | |  | | |
| P(Old) = | $ | | 1,017.37 | |  | |  | |  | | P− |  |  | |  | | P+ | |  | |  | |
| 108 = |  | | 100,000,000 | |  | |  | | $ | | 1,016.67 |  |  | | $ | | 1,018.08 | |  | |  | |
| ΔP−/P | ( | | 0.000690093 | | ) | | ΔP | | ($ | | 0.70208 | ) |  | | $ | | 0.70268 | |  | |  | |
| ΔP+/P |  | | 0.000690678 | |  | |  | |  | |  |  |  | |  | |  | |  | |  | |
| [(ΔP−/P) + (ΔP+/P)] |  | | 5.84901E−07 | | | |  | |  | |  |  |  | |  | |  | |  | |  | |
| CX = |  | | 58.49006 | |  | | = Convexity | |  | |  |  |  | |  | |  | |  | |  | |

b. With a new promised YTM = 5.45 percent, the YTM change is 30 basis points and the bond's new predicted price is found as

ΔP/P = -DurMod × ΔYTM + 1/2 × CX × ΔYTM2 = (−6.90385 × −0.0030) + (½ × 58.49006 × 0.0032) = 2.09748%.

The bond's new price should be $1,017.37 + (2.09748% × $1,017.37) = $1,038.714.

c. An investor would prefer more convexity, with greater convexity or curvature; as yields drop, the bond's price will increase more.

Difficulty: 3 Hard

Topic: Appendix 3B: More on Convexity

Bloom's: Analyze; Apply; Evaluate

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-08 Understand the economic meaning of duration.

Accessibility: Keyboard Navigation

72) The preferred stock of ACE pays a constant $1.00 per share dividend. The common stock of ACME just paid a $1.00 dividend per share, but its dividend is expected to grow at 4 percent per year forever. ABLE common stock also just paid a dividend of $1.00 per share, but its dividend is expected to grow at 10 percent per year for five years and then grow at 4 percent per year forever. All three stocks have a 12 percent required return. How much should you be willing to pay for a share of each stock? Which stock will give you the best return? Explain.

Answer:

ACE: P = 1/0.12 = $8.33

ACME: P = 1(1.04)/(0.12 − 0.04) = $13.00

ABLE: D0 = $1; D1 through D5 grow at 10% per year, D6 = D5 × (1 + g2); P5 = D6/(r − g2); g2 = 4%

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | g1 | D1 | D2 | D3 | D4 | D5 | D6 | g2 | r |
| ABLE | 10% | 1.1 | 1.21 | 1.331 | 1.4641 | 1.61051 | 1.6749304 | 4.00% | 12% |
| D0 |  |  |  |  | P5 = | 20.93663 |  |  |  |
| 1 |  | 1.1 | 1.21 | 1.331 | 1.4641 | 22.54714 |  |  |  |
|  |  | P0 = | $16.62 |  |  |  |  |  |  |



If the stocks are priced at their fair values as calculated above, all three will give the investor the same pretax rate of return of 12 percent. A good stock buy is one where the price is less than the present value of the expected future cash flows, regardless of the expected growth rate in the cash flows.

Difficulty: 3 Hard

Topic: Equity Valuation

Bloom's: Analyze; Apply; Evaluate

AACSB: Reflective Thinking; Analytical Thinking

Learning Goal: 03-03 Calculate equity values.

Accessibility: Keyboard Navigation