Reading 55

YIELD & YIELD SPREAD MEASURES FOR FIXED-RATE BONDS

1. (B) YTC, since YTC is less than YTM.

Explanation

The bond is trading at a premium, and if the bond is called at par that premium would be amortized over a shorter period, resulting in a lower return. The lower return is the more conservative number, so the YTC should be used. You could use your financial calculator to solve for YTC assuming 10 semiannual coupon payments of $35 (FV = 1,000; PMT = 35; PV = –1,065; N = 10; solve for i = 2.75; × 2 to get annual YTC = 5.5%). Calculation of YTM would use the same inputs except N = 20, to get YTM = 6.12%

(Module 55.1, LOS 55.a)

2. (A) +210 basis points.

Explanation

Because a conversion option is favorable for the bondholder, the convertible bonds should trade at a lower spread than otherwise identical non-convertible bonds.

(Module 55.1, LOS 55.b)

3. (B) 7.4%.

Explanation

We are given N, FV, and PMT, but to calculate the yield to maturity I/Y we also need the bond's current price (PV). We can use the given current yield to determine the price:

Because current yield = annual interest / price, we can state:

Price = annual interest / current yield

= $60 /0.07%

= $857.143

Therefore: N = 20; FV = 1,000; PMT = 60; PV = –857.143;

CPT → I/Y = 7.3896%

(Module 55.1, LOS 55.a)

4. (A) 8.0%.

Explanation

Input into your calculator:

N = 5; FV = 1,100; PMT = 100; PV = -1,150; CPT → I/Y = 7.95%.

(Module 55.1, LOS 55.a)

5. (B) The stated annual interest rate is used to find the effective annual rate.

Explanation

The effective annual rate, not the stated rate, adjusts for the frequency of compounding. The nominal, stated, and stated annual rates are all the same thing.

(Module 55.1, LOS 55.a)

6. (A) 12%.

Explanation

The YTM can be calculated using money values or percent-of par values.

Using percent of par:

N = 5; FV = 100; PMT = 10; PV = –92.8; CPT I/Y = 11.9972.

Using money values:

N = 5; FV = 1,000; PMT = 100; PV = –928; CPT I/Y = 11.9972.

(Module 55.1, LOS 55.a)

7. (C) 7.82%.

Explanation

N = 6; PMT = 50; FV = 1,030; PV = –1,081.11; CPT → I = 3.91054

3.91054 × 2 = 7.82

(Module 55.1, LOS 55.a)

8. (A) 10.65%.

Explanation

FV = 1,000; N = 4; PMT = 100; I = 12; CPT → PV = 939.25.

Current yield = coupon / current price

100 / 939.25 × 100 = 10.65

(Module 55.1, LOS 55.a)

9. (A) a periodic interest rate of 0.667%.

Explanation

Periodic rate = 8.0 / 12 = 0.667. Stated rate is 8.0% and effective rate is 8.30%.

(Module 55.1, LOS 55.a)

10. (B) flat.

Explanation

G-spreads and I-spreads are only correct when the spot yield curve is flat (yields are about the same across maturities).

(Module 55.1, LOS 55.b)

11. (C) yield to maturity greater than 8.0%.

Explanation

A bond trading at a discount will have a YTM greater than its coupon. The current yield is 8 / 97.55 = 8.2%. True yield is adjusted for payments delayed by weekends and holidays and is equal to or slightly less than the yield on a street convention basis.

(Module 55.1, LOS 55.a)

12. (A) 8.93% 11.02%

Explanation

To calculate the CY and YTC, we first need to calculate the present value of the bond: FV = 1,000; N = 5 × 2 = 10; PMT = (1000 × 0.0875) / 2 = 43.75; I/Y = (9.25 / 2) = 4.625; CPT → PV = -980.34 (negative sign because we entered the FV and payment as positive numbers). Then, CY = (Face value × Coupon) / PV of bond = (1,000 × 0.0875) / 980.34 = **8.93%.**

And the YTC calculation is: FV = 1,025 (price at first call); N = (2 × 2) = 4; PMT = 43.75 (same as above); PV = –980.34 (negative sign because we entered the FV and payment as positive numbers); CPT → I/Y = 5.5117 (semi-annual rate, need to multiply by 2) = **11.02%.**

(Module 55.1, LOS 55.a)

13. (A) 7.80% 15.82%

Explanation

To calculate the CY and YTC, we first need to calculate the present value of the bond: FV = **1,000**, N = 14 = 7 × 2, PMT **= 35** = (1000 × 0.07)/2, I/Y = **4.5** (9 / 2), Compute PV = -897.77 (negative sign because we entered the FV and payment as positive numbers).Then, CY = (Face value × Coupon) / PV of bond = (1,000 × 0.07) / 897.77 = **7.80%.**And finally, YTC calculation: FV = **1,060** (price at first call), N = **4** (2 × 2), PMT = **35** (same as above), PV = -897.77 (negative sign because we entered the FV and payment as positive numbers), Compute I/Y = 7.91 (semi-annual rate, need to multiply by 2) = **15.82%.**

(Module 55.1, LOS 55.a)

14. (C) 13.8%.

Explanation

FV = 1,000, PMT = 100, N = 10, PV = -800; Compute I/Y = 13.8

(Module 55.1, LOS 55.a)

15. (A) EAR increases.

Explanation

The EAR increases with the frequency of compounding.

(Module 55.1, LOS 55.a)

16. (B) 14.97%.

Explanation

PMT = 110, N = 3, FV = 1,100, PV = 975

Compute I = 14.97

(Module 55.1, LOS 55.a)

17. (C) 19.25%.

Explanation

Because this investment is compounded quarterly, we need to divide the APR by four compounding periods: 18 / 4 = 4.5%. EAR = $(1.045)^4 - 1 = 0.1925$, or 19.25%.

(Module 55.1, LOS 55.a)

18. (A) 8%.

Explanation

N = 20, PMT = 90, PV = -1,098.96, FV = 1,000, CPT I/Y

(Module 55.1, LOS 55.a)

19. (B) lower.

Explanation

The option-adjusted yield is the yield a bond with an embedded option would have if it were option-free. For a callable bond, the option-adjusted yield is lower than the YTM. This is because the call option may be exercised by the issuer, rather than the bondholder. Bond investors require a higher yield to invest in a callable bond than they would require on an otherwise identical option-free bond.

(Module 55.1, LOS 55.b)

20. (C) 5.68%.

Explanation

The annual-pay yield is computed as follows:

Annual-pay yield = $[(1 + 0.056 / 2)^2 - 1 = 5.68\%$

(Module 55.1, LOS 55.a)

21. (C) swap rates.

Explanation

Spreads relative to swap rates are referred to as Interpolated or I-spreads.

(Module 55.1, LOS 55.b)

22. (C) 0.9% 0.6%

Explanation

9.4 – 8.5 = 0.9

9.9 – 9.3 = 0.6

(Module 55.1, LOS 55.b)

23. (A) yield to maturity.

Explanation

Yield to maturity is the discount rate used to discount each of a bond's cash flows when calculating the bond's price. Current yield is a bond's annual coupon payment divided by its price. Simple yield is a bond's annual coupon payment plus amortization of a discount or minus amortization of a premium.

(Module 55.1, LOS 55.a)

24. (C) 4.556%.

Explanation

N = 10 × 2 = 20; PV = –111.5; PMT = 6 / 2 = 3; FV = 100.

Compute I/Y = 2.2777 (semiannual) × 2 = 4.5554%.

(Module 55.1, LOS 55.a)

25. (B) 5.26%.

Explanation

First, find the annual yield to maturity of the bond as: FV = $1,000; PMT = $65; N = 10; PV = –1,089.25; CPT → I/Y = 5.33%. Then, find the semiannual-bond basis yield as: $2 \times [(1 + 0.0533)^{0.5} – 1] = 0.0526$ = 5.26%.

(Module 55.1, LOS 55.a)

26. (C) 4.59%.

Explanation

$(1 + 0.045 / 12)^{12} – 1 = 1.0459 – 1 = 0.0459$.

(Module 55.1, LOS 55.a)

27. (B) Adjust the corporate bond yield to actual months and years.

Explanation

Corporate bond yields are typically based on a 30/360 day count. When calculating spreads, corporate yields are often restated to the actual/actual basis typically used to state government bond yields.

(Module 55.1, LOS 55.a)

28. (B) 9.1% higher

Explanation

Current yield = annual coupon payment/price of the bond

CY = 100/1,100 = 0.0909

The current yield will be between the coupon rate and the yield to maturity. The bond is selling at a premium, so the YTM must be less than the coupon rate, and therefore the current yield is greater than the YTM.

The YTM is calculated as: FV = 1,000; PV = -1,100; N = 40; PMT = 50; CPT → I = 4.46 × 2 = 8.92

(Module 55.1, LOS 55.a)

29. (C) 9.2%.

Explanation

If the stated rate is 9% then the effective six month (period) rate is 9% / 2 = 4.5% The effective annual rate is, therefore, (1 + period rate) # Periods in a year $_{-1}$ EAR = $(1 + 4.5\%)^2 - 1 = 9.2\%$

(Module 55.1, LOS 55.a)

30. (C) 5.37%.

Explanation

The current yield is computed as follows:

Current yield = 5% x 100 / $93.19 = 5.37%

(Module 55.1, LOS 55.a)

31. (B) 8.24%.

Explanation

$(1 + \text{periodic rate})^m - 1 = (1.02)^4 - 1 = 8.24\%$.

(Module 55.1, LOS 55.a)

32. (C) 7.02%.

Explanation

N = 6; PV = -1,100.00; PMT = 80; FV = 1,080; Compute I/Y = 7.02%.

(Module 55.1, LOS 55.a)

33. (B) 14.74%.

Explanation

(0.14)(1,000) = $140 coupon

140/950 × 100 = 14.74

(Module 55.1, LOS 55.a)

34. (B) 4.72%.

Explanation

To compute yield to first call, enter: FV = $1,075; N = 2 × 2 = 4; PMT = $66.25; PV = –1,229.50, CPT → I/Y = 2.36%, annualized as (2.36) (2) = 4.72%.

(Module 55.1, LOS 55.a)

35. (C) 8.9%.

Explanation

First determine the price paid for the bond:>

N = 5 × 2 = 10; I/Y = 8.20 / 2 = 4.10; PMT = 7.95 / 2 = 3.975; FV = 100;

CPT PV = –98.99

Then use this value and the call price and date to determine the yield to call:

N = 3 × 2 = 6; PMT = 7.95 / 2 = 3.975; PV = –98.99; FV = 102;

CPT I/Y = 4.4686 × 2 =8.937%

(Module 55.1, LOS 55.a)

36. (A) the bond has a zero-volatility spread greater than 75 basis points.

Explanation

For a bond with an embedded call option, the OAS is less than its zero-volatility spread by the option cost. Therefore, the zero-volatility spread is greater than the OAS for callable bonds. If the embedded call option has any value to the issuer, a callable bond with an OAS of 75 basis points will have a Z-spread that is greater than 75 basis points. Because the OAS represents the bond's spread to the spot yield curve excluding the effect of the embedded option, it does not include any compensation for the volatility risk related to the option. The implied cost of an embedded option is the difference between the bond's zero-volatility spread (not the nominal spread) and its OAS.

(Module 55.1, LOS 55.b)

37. (C) the option cost is 75 basis points.

Explanation

The option cost is the difference between the zero volatility spread and the OAS, or 150 − 75 = 75 bp. With a flat yield curve, the G-spread and zero volatility spread will be the same.

(Module 55.1, LOS 55.b)

38. (C) 11.62%.

Explanation

N = 40 (2 × 20 years); PMT = 50 (0.10 × 1,000) / 2; PV = -875; FV = 1,000; CPT → I/Y = 5.811 × 2 (for annual rate) = 11.62%.

(Module 55.1, LOS 55.a)

39. (B) 7.65%.

Explanation

The current yield is computed as: (Annual Cash Coupon Payment) / (Current Bond Price). The annual coupon is: ($1,000)(0.0775) = $77.50. The current yield is then: ($77.50) / ($1,012.45) = 0.0765 = 7.65%.

(Module 55.1, LOS 55.a)

40. (A) Bond Y will have a higher zero-volatility spread than Bond X.

Explanation

Bond Y will have the higher Z-spread due to the call option embedded in the bond. This option benefits the issuer, and investors will demand a higher yield to compensate for this feature. The option-adjusted spread removes the value of the option from the spread calculation, and would always be less than the Z-spread for a callable bond. Since Bond X is noncallable, the Z-spread and the OAS will be the same.

(Module 55.1, LOS 55.b)

41. (B) 9.3%.

Explanation

Quarterly rate = 0.09 / 4 = 0.0225.

Effective annual rate = $(1 + 0.0225)^4 - 1$ = 0.09308, or 9.308%.

(Module 55.1, LOS 55.a)

42. (A) lowest of all possible yields to call.

Explanation

Yield to worst involves the calculation of yield to call for every possible call date, and determining which of these results in the lowest expected return.

(Module 55.1, LOS 55.a)

43. (B) 12.1%.

Explanation

YTC: N = 10; PV = –895; PMT = 80 / 2 = 40; FV = 1080; CPT → I/Y = 6.035 × 2 = 12.07%.

(Module 55.1, LOS 55.a)

44. (A) 10.34%.

Explanation

N = 28; PMT = 120; PV = –1,150; FV = 1,000; CPT I/Y = 10.3432.

(Module 55.1, LOS 55.a)

45. (B) 6.11%.

Explanation

N = 40; PV = –300; FV = 1,000; CPT → I = 3.055 × 2 = 6.11.

(Module 55.1, LOS 55.a)

46. (A) 12.55%.

Explanation

If the stated rate is 12%, then the effective quarterly (period) rate is 12% / 4 = 3% The effective annual rate is, therefore, (1 + period rate) # periods in a year – 1 EAR = $[1 + (0.12 / 4)]^4 - 1 = 12.55\%$

(Module 55.1, LOS 55.a)

47. (B) 10.95%.

Explanation

PMT = 60; N = 10; FV = 1,120; PV = –1,110; CPT → I = 5.47546 (5.47546) (2) = 10.95

(Module 55.1, LOS 55.a)

48. (A) is added to each spot rate on the government yield curve that will cause the present value of the bond's cash flows to equal its market price.

Explanation

The zero-volatility spread (Z-spread) is the interest rate that is added to each zero-coupon bond spot rate that will cause the present value of the risky bond's cash flows to equal its market value. The nominal spread is the spread that is added to the YTM of a similar maturity government bond that will then equal the YTM of the risky bond. The zero volatility spread (Z-spread) is the spread that results when the cost of the call option in percent is added to the option adjusted spread.

(Module 55.1, LOS 55.b)

49. (B) 11.52%.

Explanation

To find the YTM, enter PV = –$1,022.50; PMT = $60; N = 14; FV = $1,000; CPT → I/Y = 5.76%. Now multiply by 2 for the semiannual coupon payments: (5.76) (2) = 11.52%.

(Module 55.1, LOS 55.a)

50. (A) 10.05%.

Explanation

N = 8; PMT = 120; PV = -1,150; FV = 1,100; CPT I/Y = 10.0554.

(Module 55.1, LOS 55.a)

51. (A) is less than the zero-volatility spread.

Explanation

For a callable bond, the OAS is less than the zero-volatility spread because of the extra yield required to compensate the bondholder for the call option.

(Module 55.1, LOS 55.b)

52. (B) 10%.

Explanation

N = 40; PMT = 45; PV = -914.20; FV = 1,000; CPT → I/Y = 5%
YTM = 5% × 2 = 10%

(Module 55.1, LOS 55.a)

53. (B) greater than its current yield.

Explanation

The bond's YTM is:
N = 15; PMT = 100; PV = –951; FV = 1,000; CPT I/Y = 10.67%
Current Yield = annual coupon payment / bond price
CY = 100 / $951 = 0.1051 or 10.51%

(Module 55.1, LOS 55.a)

54. (A) 6.87.

Explanation

n = 4(2) = 8; PMT = 80/2 = 40; PV = -1,100; FV = 1,080
Compute YTC = 3.435(2) = 6.87%

(Module 55.1, LOS 55.a)

55. (A) 10.93%.

Explanation

N = 40, PMT = 50, PV = -925, FV = 1,000, CPT I/Y = 5.4653 × 2 = 10.9305.

(Module 55.1, LOS 55.a)

56. (A) 10.6%.

Explanation

N = 10; PMT = 100; PV = –1,000; FV = 1,100; CPT → I = 10.6.

(Module 55.1, LOS 55.a)