Question #1 of 29

Question ID: 1574367

A callable bond trading at $1,000 has an effective duration of 5 and modified duration of 6. If the market yield increases by 1% the bond's price will decrease by approximately:

A) $60.

B) $50.

C) $55.

Explanation

Effective duration should be used for callable bonds as it takes into account the impact the embedded option has on the bond's cash flows.

Approximate percentage price change of a bond = (–)(effective duration)(ΔYTM)

(–5)(1%) = –5%

The change in price is therefore $1,000 × –5% = –$50

(Module 61.1, LOS 61.b)

Question #2 of 29

Question ID: 1574385

Key rate duration is *best* described as a measure of price sensitivity to a:

A) change in a bond’s cash flows.

B) change in yield at a single maturity.

C) parallel shift in the benchmark yield curve.

Explanation

Key rate duration is the price sensitivity of a bond or portfolio to a change in the interest rate at one specific maturity on the yield curve.

(Module 61.1, LOS 61.c)

Question #3 of 29

Question ID: 1574376

A bond has a convexity of 51.44. What is the approximate percentage price change of the bond due to convexity if rates rise by 150 basis points?

A) 0.26%.

B) 0.58%.

C) 0.71%.

Explanation

The convexity effect, or the percentage price change due to convexity, formula is: (½)convexity × $(\Delta YTM)^2$. The percentage price change due to convexity is then: (½)(51.44)$(0.015)^2$ = 0.0058.

(Module 61.1, LOS 61.b)

Question #4 of 29

Question ID: 1574374

Assume that a straight bond has a duration of 1.89 and a convexity of 32. If interest rates decline by 1% what is the total estimated percentage price change of the bond?

A) 1.56%.

B) 1.89%.

C) 2.05%.

Explanation

The total percentage price change estimate is computed as follows:

> Total estimated price change = -1.89 × (-0.01) × 100 + (½)(32) × $(-0.01)^2$ × 100 = 2.05%

(Module 61.1, LOS 61.b)

Question #5 of 29

Question ID: 1574380

An analyst gathered the following information about a 15-year bond:

- 10% semiannual coupon.
- Modified duration of 7.6 years.

If the market yield rises 75 basis points, the bond's approximate price change is a:

A) 5.4% decrease.

B) 5.4% increase.

C) 5.7% decrease.

Explanation

$\Delta P/P = -D\Delta i$

$\Delta P/P = -7.6(+0.0075) = -0.057$, or -5.7%.

(Module 61.1, LOS 61.b)

Question #6 of 29

Question ID: 1574382

A UK 12-year corporate bond with a 4.25% coupon is priced at £107.30. This bond's duration and convexity are 9.5 and 107.2. If the bond's yield decreases by 125 basis points, the estimated price of the bond is *closest to*:

A) £121.84.

B) £112.72.

C) £120.95.

Explanation

$$
\begin{aligned}
\text{Return impact} &\approx -(\text{Duration} \times \Delta\text{Yield}) + (1/2) \times (\text{Convexity} \times (\Delta\text{Yield}))^2 \\
&\approx -(9.5 \times -0.0125) + (1/2) \times (107.2) \times (-0.0125)^2 \\
&\approx 0.1188 + 0.0084 \\
&\approx 0.1272 \text{ or } 12.72\%
\end{aligned}
$$

$$
\begin{aligned}
\text{Estimated price of bond} &= (1 + 0.1272) \times 107.30 \\
&= 120.95
\end{aligned}
$$

(Module 61.1, LOS 61.b)

Question #7 of 29

Question ID: 1574368

A bond has the following characteristics:

- Maturity of 30 years
- Modified duration of 16.9 years
- Yield to maturity of 6.5%

If the yield to maturity *decreases* by 0.75%, what will be the percentage change in the bond's price?

A) +12.675%.

B) 0.750%.

C) -12.675%.

Explanation

Approximate percentage price change of a bond = (-)(modified duration)(ΔYTM)

= (-16.9)(-0.75%) = +12.675%

(Module 61.1, LOS 61.b)

Question #8 of 29

Question ID: 1574373

An investor gathered the following information about an option-free U.S. corporate bond:

- Par Value of $10 million
- Convexity of 90
- Duration of 7

If interest rates increase 2% (200 basis points), the bond's percentage price change is *closest* to:

A) -12.2%.

B) -14.0%.

C) -15.8%.

Explanation

Recall that the percentage change in prices = Duration effect + Convexity effect = [-duration × (change in yields)] + [(½)convexity × (change in yields)^2] = [(-7)(0.02) + (½)(90)(0.02)^2] = -0.12 = -12.2%. Remember that you must use the decimal representation of the change in interest rates when computing the duration and convexity adjustments.

(Module 61.1, LOS 61.b)

Question #9 of 29

Question ID: 1574372

If a Treasury bond has an annual modified duration of 10.27 and an annual convexity of 143, which of the following is *closest* to the estimated percentage price change in the bond for a 125 basis point increase in interest rates?

A) -11.72%. ✓

B) -13.96%. ✗

C) -9.33%. ✗

Explanation

The estimated percentage price change = the duration effect plus the convexity effect. The formula is: [–duration × (ΔYTM)] + ½[convexity × (ΔYTM)^2]. Therefore, the estimated percentage price change is: [–(10.27)(0.0125)] + [(½)(143)(0.0125)^2] = –0.128375 + 0.011172 = –0.117203 = –11.72%.

(Module 61.1, LOS 61.b)

Question #10 of 29

Question ID: 1574379

Vantana Inc. has a bond outstanding with a modified duration of 5.3 and approximate convexity of 110. If yields increase by 1%, the bond price will:

A) decrease by less than 5.3%. ✓

B) decrease by more than 5.3%. ✗

C) increase by more than 5.3%. ✗

Explanation

The positive convexity effect will mean yields will drop by less than 5.3% (the effect of duration alone).

$$\text{Price change} = (-5.3 \times 0.01) + (0.5 \times 110 \times 0.01^2) = -0.0475 = -4.75\%.$$

(Module 61.1, LOS 61.b)

Question #11 of 29

Question ID: 1574378

A bond's duration is 4.5 and its convexity is 87.2. If interest rates rise 100 basis points, the bond's percentage price change is *closest* to:

A) -4.06%. ✓

B) -4.50%. ✗

C) -4.94%. ✗

Explanation

Recall that the percentage change in prices = Duration effect + Convexity effect = [-duration × (change in yields)] + [(½)convexity × (change in yields)^2] = (-4.5)(0.01) + (½)(87.2)(0.01)^2 = -4.06%. Remember that you must use the decimal representation of the change in interest rates when computing the duration and convexity adjustments.

(Module 61.1, LOS 61.b)

Question #12 of 29

Question ID: 1574384

Wendy Jones, CFA, is reviewing a current bond holding. The bond's duration is 10 and its convexity is 200. Jones believes that interest rates will decrease by 100 basis points. If Jones's forecast is accurate, the bond's price will change by approximately:

A) +8.0%. ✗

B) +11.0%. ✓

C) –8.0%. ✗

Explanation

You can answer this question without calculations. A decrease in interest rates must cause the price to increase. Because duration alone will underestimate a price increase, the price must increase by more than 10%.

$$\text{percentage change in price}$$
$$= [-\text{duration} \times \Delta\text{YTM}] + \frac{1}{2}\left[\text{convexity} \times (\Delta\text{YTM})^2\right] \times 100$$
$$= [(-10)(-0.01)] + \frac{1}{2}\left[(200)(-0.01)^2\right] = 0.11 = 11\%$$

(Module 61.1, LOS 61.b)

Question #13 of 29

Question ID: 1574387

Sensitivity of a bond's price to a change in yield at a specific maturity is *least appropriately* estimated by using:

A) effective duration. ✓

B) key rate duration. ✗

C) partial duration. ✗

Explanation

Effective duration is used to measure the sensitivity of a bond price to a parallel shift in the yield curve. Key rate duration, also known as partial duration, is used to measure the sensitivity of a bond price to a change in yield at a specific maturity.

(Module 61.1, LOS 61.c)

Question #14 of 29

Question ID: 1574370

For a given bond, the duration is 8 and the convexity is 100. For a 60 basis point decrease in yield, what is the approximate percentage price change of the bond?

A) 2.52%. ✗

B) 4.62%. ✗

C) 4.98%. ✓

Explanation

The estimated price change is -(duration)(ΔYTM) + (½)(convexity) × (ΔYTM)^2 = -8 × (-0.006) + (½)(100) × (-0.006^2) = +0.0498 or 4.98%.

(Module 61.1, LOS 61.b)

Question #15 of 29

Question ID: 1574381

A 9-year corporate bond with a 3.25% coupon is priced at 103.96. This bond's duration and convexity are 7.8 and 69.8. If the bond's yield increases by 100 basis points, the impact on the bondholder's return is *closest to*:

A) +8.15%.

B) –7.45%.

C) –7.80%.

Explanation

Return impact $\approx -(\text{Duration} \times \Delta\text{Yield}) + (1/2) \times (\text{Convexity} \times (\Delta\text{Yield})^2)$

$$\approx -(7.8 \times 0.0100) + (1/2) \times (69.8) \times (0.0100)^2$$

$$\approx -0.0780 + 0.0035$$

$$\approx -0.0745 \text{ or } -7.45\%$$

(Module 61.1, LOS 61.b)

Question #16 of 29

Question ID: 1574388

The approach to estimating duration that relies on using historical relationships between benchmark yield changes and bond price changes is:

A) empirical duration.

B) analytical duration.

C) modified duration.

Explanation

Empirical duration is estimated by using historical data between benchmark yield changes and bond price changes. Analytical duration approaches based on mathematical analysis include Macaulay, modified, and effective durations.

(Module 61.1, LOS 61.d)

Question #17 of 29

Question ID: 1574369

The price of a bond is equal to $101.76 if the term structure of interest rates is flat at 5%. The following bond prices are given for up and down shifts of the term structure of interest rates. Using the following information what is the approximate percentage price change of the bond using effective duration and assuming interest rates decrease by 0.5%?

Bond price: $98.46 if term structure of interest rates is flat at 6%

Bond price: $105.56 if term structure of interest rates is flat at 4%

A) 0.0087%.

B) 1.74%.

C) 0.174%.

Explanation

The effective duration is computed as follows:

$$\text{Effective duration} = \frac{105.56 \text{ - } 98.46}{2 \times 101.76 \times 0.01} = 3.49$$

Using the effective duration, the approximate percentage price change of the bond is computed as follows:

Percent price change = -3.49 × (-0.005) × 100 = 1.74%

(Module 61.1, LOS 61.b)

Question #18 of 29

Question ID: 1574364

Jayce Arnold, a CFA candidate, considers a $1,000 face value, option-free bond issued at par. Which of the following statements about the bond's dollar price behavior is *most likely* accurate when yields rise and fall by 200 basis points, respectively? Price will:

A) decrease by $124, price will increase by $149.

B) decrease by $149, price will increase by $124.

C) increase by $149, price will decrease by $124.

Explanation

As yields increase, bond prices fall, the price curve gets flatter, and changes in yield have a smaller effect on bond prices. As yields decrease, bond prices rise, the price curve gets steeper, and changes in yield have a larger effect on bond prices. Thus, the price increase when interest rates decline must be greater than the price decrease when interest rates rise (for the same basis point change). Remember that this applies to percentage changes as well.

(Module 61.1, LOS 61.b)

Question #19 of 29

Question ID: 1574365

A non-callable bond has a modified duration of 7.26. Which of the following is the *closest* to the approximate price change of the bond with a 25 basis point increase in rates?

A) -0.018%.

B) -1.820%.

C) 1.820%.

Explanation

The formula for the percentage price change is: –(duration)(ΔYTM). Therefore, the estimated percentage price change using duration is: –(7.26)(0.25%) = –1.82%.

(Module 61.1, LOS 61.b)

Question #20 of 29

Question ID: 1574362

Effective duration is more appropriate than modified duration as a measure of a bond's price sensitivity to yield changes when:

A) the bond contains embedded options.

B) the bond has a low coupon rate and a long maturity.

C) yield curve changes are not parallel.

Explanation

Effective duration takes into consideration embedded options in the bond. Modified duration does not consider the effect of embedded options. For option-free bonds, modified duration will be similar to effective duration. Both duration measures are based on the value impact of a parallel shift in a flat yield curve.

(Module 61.1, LOS 61.a)

Question #21 of 29

Question ID: 1574386

Which of the following duration measures is *most appropriate* if an analyst expects a non-parallel shift in the yield curve?

A) Effective duration.

B) Key rate duration.

C) Modified duration.

Explanation

Price sensitivity to a non-parallel shift in the yield curve can be estimated using key rate durations. Modified duration and effective duration measure price sensitivity to a parallel shift in the yield curve.

(Module 61.1, LOS 61.c)

Question #22 of 29

Question ID: 1574377

A bond has a modified duration of 7 and convexity of 100. If interest rates decrease by 1%, the price of the bond will *most likely:*

A) decrease by 7.5%.

B) increase by 6.5%.

C) increase by 7.5%.

Explanation

Percentage Price Change = –(duration) (ΔYTM) + (½)convexity $(\Delta YTM)^2$

therefore

Percentage Price Change = –(7) (–0.01) + (½)(100) $(-0.01)^2$=7.5%.

(Module 61.1, LOS 61.b)

Question #23 of 29

Question ID: 1574383

A bond priced at par ($1,000) has a modified duration of 8 and a convexity of 100. If interest rates fall 50 basis points, the new price will be *closest* to:

A) $958.75.

B) $1,041.25.

C) $875.00.

Explanation

$$\frac{\Delta \mathrm{P}}{\mathrm{P}} = -\mathrm{Duration}(\Delta \mathrm{YTM}) + \frac{1}{2}\mathrm{Convexity}(\Delta \mathrm{YTM})^2$$

$$\begin{aligned}\frac{\Delta \mathrm{P}}{\mathrm{P}} &= (-)(8)(-0.005) + \frac{1}{2}(100)(-0.005)^2 \\ &= +0.0400 + 0.00125 \\ &= +0.04125, \text{ or up } 4.125\%\end{aligned}$$

The price would thus be $1,000 × 1.04125 = $1,041.25.

(Module 61.1, LOS 61.b)

Question #24 of 29

Question ID: 1574375

Consider a bond with modified duration of 5.61 and convexity of 43.84. Which of the following is *closest* to the estimated percentage price change in the bond for a 75 basis point decrease in interest rates?

A) 4.12%.

B) 4.21%.

C) 4.33%.

Explanation

The estimated percentage price change is equal to the duration effect plus the convexity effect. The formula is: [–duration × (ΔYTM)] + ½[convexity × (ΔYTM)^2]. Therefore, the estimated percentage price change is: [–(5.61)(–0.0075)] + [(½)(43.84)(-0.0075)^2] = 0.042075 + 0.001233 = 0.043308 = 4.33%.

(Module 61.1, LOS 61.b)

Question #25 of 29

Question ID: 1574366

Given a bond with a modified duration of 1.93, if required yields increase by 50 basis points, the price would be expected to decrease by:

A) 0.965%. ✓

B) 1.930%. ✗

C) 0.009%. ✗

Explanation

Modified duration indicates the expected percent change in a bond's price given a 1% (100 bp) change in yield to maturity. For a 50 bp (0.5%) increase in YTM, the price of a bond with modified duration of 1.93 should decrease by approximately 0.5(1.93%) = 0.965%.

(Module 61.1, LOS 61.b)

Question #26 of 29

Question ID: 1574371

A bond has a duration of 10.62 and a convexity of 182.92. For a 200 basis point increase in yield, what is the approximate percentage price change of the bond?

A) -1.62%. ✗

B) -17.58%. ✓

C) -24.90%. ✗

Explanation

The estimated price change is:

$$-(\text{duration})(\Delta YTM) + ½(\text{convexity}) \times (\Delta YTM)^2 = -10.62 \times 0.02 + (½)(182.92)(0.02^2) = -0.2124 + 0.0366 = -0.1758 \text{ or } –17.58\%.$$

(Module 61.1, LOS 61.b)

Question #27 of 29

Question ID: 1574363

The appropriate measure of interest rate sensitivity for bonds with an embedded option is:

A) effective duration. ✓

B) Macaulay duration. ✗

C) modified duration. ✗

Explanation

Effective duration is appropriate for bonds with embedded options because their future cash flows are affected by the level and path of interest rates.

(Module 61.1, LOS 61.a)

Question #28 of 29

Question ID: 1574361

An investor gathered the following information on two U.S. corporate bonds:

- Bond J is callable with maturity of 5 years
- Bond J has a par value of $10,000
- Bond M is option-free with a maturity of 5 years
- Bond M has a par value of $1,000

For each bond, which duration calculation should be applied?

	Bond J	Bond M	
A)	Effective Duration	Effective Duration only	✗
B)	Effective Duration	Modified Duration or Effective Duration	✓

C) Modified Duration Effective Duration only

Explanation

Effective duration is that effective duration is used for bonds with embedded options. Modified duration assumes that all the cash flows on the bond will not change, while effective duration considers expected cash flow changes that may occur with embedded options.

(Module 61.1, LOS 61.a)

Question #29 of 29

Question ID: 1574389

For a portfolio consisting solely of short-term U.S. government bonds:

A) estimates of empirical and analytical durations should be similar.

B) empirical duration will be significantly lower than analytical duration.

C) analytical duration would be the preferable risk measure.

Explanation

A portfolio consisting solely of short-term U.S. government bonds should closely resemble the performance of its government benchmark yield. As a result, estimates of empirical duration should be similar to the portfolio's analytical durations.

(Module 61.1, LOS 61.d)