

## **Learning Module 13: Curve Based and Empirical Fixed Income Risk Measures**

Q.82 The current price of a bond is \$100.

- When the YTM increases by 1%, the price of the bond goes down to \$98.5.
- When the YTM decreases by 1%, the price of the bond reaches \$103.

The effective duration of this bond is *closest to*:

- A. 0.045 years.
- B. 2.25 years.
- C. 4.5 years.

The correct answer is **B**.

$$D_{\text{Effective}} = \frac{(P_- - P_+)}{2 \times P_0 \times \Delta y}$$
$$D_{\text{Effective}} = \frac{(\$103 - \$98.5)}{(2 \times \$100 \times 0.01)} = 2.25$$

***CFA Level I, Fixed Income, Learning Module 13: Curve-Based and Empirical Fixed-Income Risk Measures. LOS 13a: Explain why effective duration and effective convexity are the most appropriate measures of interest rate risk for bonds with embedded options.***

---

Q.84 The effective duration of a bond refers to:

- A. The sensitivity of the bond's price to a change in a benchmark yield curve.
- B. The percentage duration change for a bond given a change in its yield-to-maturity.
- C. The percentage duration percentage change for a bond given a change in its price.

The correct answer is **A**.

The effective duration of a bond is the sensitivity of the bond's price to a change in a benchmark yield curve.

$$D_{\text{Eff}} = \frac{(P_- - P_+)}{(2 \times P_0 \times \Delta y)}$$

**CFA Level I, Fixed Income, Learning Module 13: Curve-Based and Empirical Fixed-Income Risk Measures. LOS 13a: Explain why effective duration and effective convexity are the most appropriate measures of interest rate risk for bonds with embedded options.**

---

Q.86 A bond selling for par currently has a 9% yield. If the bond price increases to USD 101 when yields fall 10 basis points and the price falls to USD 98 when yields rise by 10 basis points, then what is this bond's effective duration?

- A. 3 years.
- B. 15 years.
- C. 30 years.

The correct answer is **B**.

$$\begin{aligned} D_{\text{Eff}} &= \frac{(P_- - P_+)}{(2 \times \Delta \text{Curve} \times PV_0)} \\ &= \frac{(101 - 98)}{(2 \times 0.001 \times 100)} = 15 \text{ years} \end{aligned}$$

**CFA Level I, Fixed Income, Learning Module 13: Curve-Based and Empirical Fixed-Income Risk Measures. LOS 13a: Explain why effective duration and effective convexity are the most appropriate measures of interest rate risk for bonds with embedded options.**

---

Q.3891 The interest rate risk of a fixed-rate bond with an embedded call option is *most likely* measured by?

- A. Key rate duration.
- B. Modified duration.
- C. Effective duration.

The correct answer is C.

Effective duration is a measure of the interest rate risk of a fixed rate bond with an embedded call option.

**A is incorrect.** The key rate duration is a method of measuring the interest rate sensitivities of a fixed-income instrument or portfolio to shifts in key points along the yield curve.

**B is incorrect.** The modified duration is a measure of the percentage price change of a bond given a change in its yield-to-maturity.

**CFA Level I, Fixed Income, Learning Module 13: Curve-Based and Empirical Fixed-Income Risk Measures. LOS 13a: Explain why effective duration and effective convexity are the most appropriate measures of interest rate risk for bonds with embedded options.**

---