Question #1 of 23

Question ID: 1574348

Negative convexity is *most likely* to be observed in:

A) callable bonds.

B) government bonds.

C) zero coupon bonds.

Explanation

All noncallable bonds exhibit the trait of being positively convex. Callable bonds have negative convexity because once the yield falls below a certain point prices will rise at a decreasing rate, thus giving the price-yield relationship a negative convex shape.

(Module 60.1, LOS 60.a)

Question #2 of 23

Question ID: 1574357

Donald McKay, CFA, is analyzing a client's fixed income portfolio. As of the end of the last quarter, the portfolio had a market value of $7,545,000 and a portfolio duration of 6.24. McKay is predicting that the yield for all of the securities in the portfolio will decline by 25 basis points next quarter. If McKay's prediction is accurate, the market value of the portfolio:

A) at the end of the next quarter will be approximately $7,427,300.

B) will increase by approximately $117,700.

C) will increase by approximately 6.24%.

Explanation

A portfolio's duration can be used to estimate the approximate change in value for a given change in yield. A critical assumption is that the yield for all bonds in the portfolio change by the same amount, known as a parallel shift. For this portfolio the expected change in value can be calculated as: $7,545,000 × 6.24 × 0.0025 = $117,702. The decrease in yields will cause an increase in the value of the portfolio, not a decrease.

(Module 60.1, LOS 60.c)

Question #3 of 23

Question ID: 1574354

If interest rates decrease by 50 basis points, a 10-year, 6% coupon, option-free bond will increase in price by $36. If instead interest rates increase by 50 basis points, this bond's price will decrease by:

A) $36.

B) less than $36.

C) more than $36.

Explanation

The bond described will have positive convexity. Because of convexity, the bond's price will decrease less as a result of a given increase in interest rates than it will increase as a result of an equivalent decrease in interest rates.

(Module 60.1, LOS 60.a)

Question #4 of 23

Question ID: 1574359

Which of the following is *least likely* an advantage of estimating the duration of a bond portfolio as a weighted average of the durations of the bonds in the portfolio?

A) It is easier to calculate than the alternative.

B) It is theoretically more sound than the alternative.

C) It can be used when the portfolio contains bonds with embedded options.

Explanation

Compared to portfolio duration based on the cash flow yield of the portfolio, portfolio duration calculated as a weighted average of the durations of the individual bonds in the portfolio is easier to calculate and can be used for bonds with embedded options. Portfolio duration calculated using the cash flow yield for the entire portfolio is theoretically more correct.

(Module 60.1, LOS 60.c)

Question #5 of 23

Question ID: 1576059

Price change estimates based on duration alone are improved by positive convexity adjustments for:

A) yield decreases, and negative convexity adjustments for yield increases.

B) yield increases, and negative convexity adjustments for yield decreases.

C) both increases and decreases in yield.

Explanation

An estimate of the change in bond prices due to changes in yield will be either too low (from yield decreases) or too high (from yield increases). Both estimates are improved by making positive adjustments for convexity.

(Module 60.1, LOS 60.b)

Question #6 of 23

Question ID: 1574345

An annual-pay bond is priced at 101.50. If its yield to maturity decreases 100 basis points, its price will increase to 105.90. If its yield to maturity increases 100 basis points, its price will decrease to 97.30. The bond's approximate modified convexity is *closest to*:

A) 0.2.

B) 19.7.

C) 4.2.

Explanation

Approximate modified convexity is calculated as [$V_{-} + V_{+} - 2V_0$] / [$(V_0)(\text{change in YTM})^2$]. [$105.90 + 97.30 - 2(101.50)$] / [$101.50(0.01)^2$] = 19.70.

(Module 60.1, LOS 60.a)

Question #7 of 23

Question ID: 1576063

Rather than using the annual modified duration and convexity numbers, a financial analyst plans to use money duration and money convexity to estimate the new price of a bond after a change in yield. Relative to the estimated price using the annual numbers, the "money" duration and convexity will produce an estimated bond price that is:

A) higher.

B) lower.

C) equivalent.

Explanation

Although the calculation incorporates different components, the estimated price change and new bond price will be equivalent under the approach that uses annual duration and convexity versus the approach that uses money duration and convexity. Any differences would be due to rounding.

(Module 60.1, LOS 60.b)

Question #8 of 23

Question ID: 1574353

Negative effective convexity will *most likely* be exhibited by a:

A) callable bond at high yields.

B) callable bond at low yields.

C) putable bond at high yields.

Explanation

A callable bond trading at a low yield will most likely exhibit negative effective convexity.

(Module 60.1, LOS 60.a)

Question #9 of 23

Question ID: 1574344

A bond is priced at 95.80. Using a pricing model, an analyst estimates that a 25 bp parallel upward shift in the yield curve would decrease the bond's price to 94.75, while a 25 bp parallel downward shift in the yield curve would increase its price to 96.75. The bond's effective convexity is *closest to*:

A) 3,340.

B) 4.

C) –167.

Explanation

Approximate effective convexity is calculated as [V_- + V_+ – $2V_0$] / [(V_0)(change in curve)^2].

[96.75 + 94.75 – 2(95.80)] / [(95.80)(0.0025)^2] = –167.01.

(Module 60.1, LOS 60.a)

Question #10 of 23

Question ID: 1576062

The annual convexity of a bond is calculated as 12.35. If the full price of the bond position is $1.5 million and the bond matures in three years, the money convexity is *closest* to:

A) $55,575,000.

B) $6,175,000.

C) $18,525,000.

Explanation

The money convexity of a bond is equal to its annual convexity times the full price of the bond position. With an annual convexity of 12.35 and the full price of the bond position of $1,500,000, the money convexity is equal to 12.35 × $1,500,000 = $18,525,000. The maturity of the bond does not impact the calculation.

(Module 60.1, LOS 60.b)

Question #11 of 23

Question ID: 1577973

A bond currently trading at 102.5 percent of par value has an approximate modified duration of 6.5 and an approximate convexity of 28.0. If the bond's yield increases by 200 basis points, its estimated price will be *closest* to:

A) 89.75.

B) 89.18.

C) 90.32.

Explanation

The estimated percent change in the bond's price is –6.5(0.02) + (1/2)(28.0)(0.02)2 = –0.1244. The estimated price is 102.5(1 – 0.1244) = 89.75.

(Module 60.1, LOS 60.b)

Question #12 of 23

Question ID: 1574349

Adjusting for convexity improves an estimated price change for a bond compared to using duration alone because:

A) it measures the volatility of non-callable bonds.

B) the slope of the callable bond price/yield curve is backward bending at high interest rates.

C) the slope of the price/yield curve is not constant.

Explanation

Modified duration is a good approximation of price changes for an option-free bond only for relatively small changes in interest rates. *As rate changes grow larger, the curvature of the bond price/yield relationship becomes more prevalent, meaning that a linear estimate of price changes will contain errors.* The modified duration estimate is a linear estimate, as it assumes that the change is the same for each basis point change in required yield. *The error in the estimate is due to the curvature of the actual price path. This is the degree of convexity.* If we can generate a measure of this convexity, we can use this to improve our estimate of bond price changes.

(Module 60.1, LOS 60.a)

Question #13 of 23

Question ID: 1574350

Which of the following is *most* accurate about a bond with positive convexity?

A) Positive changes in yield lead to positive changes in price.

B) Price increases and decreases at a faster rate than the change in yield.

C) Price increases when yields drop are greater than price decreases when yields rise by the same amount.

Explanation

A convex price/yield graph has a larger increase in price as yield decreases than the decrease in price when yields increase.

(Module 60.1, LOS 60.a)

Question #14 of 23

Question ID: 1574346

A $1,000 face, 10-year, 8.00% semi-annual coupon, option-free bond is issued at par (market rates are thus 8.00%). Given that the bond price decreased 10.03% when market rates increased 150 basis points (bp),if market yields decrease by 150 bp, the bond's price will:

A) decrease by more than 10.03%. ✗

B) increase by more than 10.03%. ✓

C) increase by 10.03%. ✗

Explanation

Because of positive convexity, (bond prices rise faster than they fall) for any given absolute change in yield, the increase in price will be more than the decrease in price for a fixed-coupon, noncallable bond. As yields increase, bond prices fall, and the price curve gets flatter, and changes in yield have a smaller effect on bond prices. As yields decrease, bond prices rise, and the price curve gets steeper, and changes in yield have a larger effect on bond prices. Here, for an absolute 150bp change, the price increase would be more than the price decrease.

(Module 60.1, LOS 60.a)

Question #15 of 23

Question ID: 1576060

A bond is currently priced at 92.35. If the calculated modified duration is 3.27 and the convexity is 15.74, the expected price change due to a 25 basis point decrease in yields is *closest* to:

A) 0.8126%. ✗

B) 0.8028%. ✗

C) 0.8224%. ✓

Explanation

The change in bond price can be calculated using the following formula:

> price change = –annual modified duration (Δ YTM) + ½ annual convexity (Δ YTM) squared

For a 25 basis point decrease in yields, the calculation is equal to (–3.27 × –0.0025) + (0.5 × 15.74 × -0.0025^2) = .008224, or 0.8224%.

(Module 60.1, LOS 60.b)

Question #16 of 23

Question ID: 1576061

A bond is currently priced at 92.35. If the calculated modified duration is 3.27 and the convexity is 15.74, the expected new price of the bond due to a 50 basis point increase in yields is *closest* to:

A) 91.591.

B) 90.859.

C) 93.878.

Explanation

The change in bond price can be calculated using the following formula:

price change = –annual modified duration (Δ YTM) + ½ annual convexity (Δ YTM) squared

For a 50 basis point increase in yields, the calculation is equal to (–3.27 × 0.005) + (0.5 × 15.74 × 0.005^2) = –1.615%. The expected new price will, therefore, be equal to 92.35 × (1 – 0.01615, or .98385) = 90.859.

(Module 60.1, LOS 60.b)

Question #17 of 23

Question ID: 1574360

A fixed-income portfolio manager is estimating portfolio duration based on the weighted average of the durations of each bond in the portfolio. The manager should calculate duration using:

A) equal-sized increases and decreases in a benchmark bond's yield.

B) parallel shifts of the benchmark yield curve.

C) equal-sized increases and decreases in the portfolio's cash flow yield.

Explanation

Portfolio duration as a weighted average of the individual bonds' durations is calculated assuming parallel shifts in the yield curve. Cash flow yield is used to calculate duration based on the weighted average time until a bond portfolio's cash flows are scheduled to be received.

(Module 60.1, LOS 60.c)

Question #18 of 23

Question ID: 1574356

Which of the following is a limitation of the portfolio duration measure? Portfolio duration only considers:

A) a linear approximation of the actual price-yield function for the portfolio.

B) a nonparallel shift in the yield curve.

C) the market values of the bonds.

Explanation

Duration is a linear approximation of a nonlinear function. The use of market values has no direct effect on the inherent limitation of the portfolio duration measure. Duration assumes a parallel shift in the yield curve, and this is an additional limitation.

(Module 60.1, LOS 60.c)

Question #19 of 23

Question ID: 1574347

Which of the following statements *best* describes the concept of negative convexity in bond prices? As interest rates:

A) fall, the bond's price increases at a decreasing rate.

B) fall, the bond's price increases at an increasing rate.

C) rise, the bond's price decreases at a decreasing rate.

Explanation

Negative convexity occurs with bonds that have prepayment/call features. As interest rates fall, the borrower/issuer is more likely to repay/call the bond, which causes the bond's price to approach a maximum. As such, the bond's price increases at a decreasing rate as interest rates decrease.

(Module 60.1, LOS 60.a)

Question #20 of 23

Question ID: 1574351

How does the price-yield relationship for a callable bond compare to the same relationship for an option-free bond? The price-yield relationship is *best* described as exhibiting:

A) negative convexity at low yields for the callable bond and positive convexity for the option-free bond.

B) negative convexity for the callable bond and positive convexity for an option-free bond.

C) the same convexity for both bond types.

Explanation

Since the issuer of a callable bond has an incentive to call the bond when interest rates are very low in order to get cheaper financing, this puts an upper limit on the bond price for low interest rates and thus introduces negative convexity between yields and prices.

(Module 60.1, LOS 60.a)

Question #21 of 23

Question ID: 1574352

For a given change in yields, the difference between the actual change in a bond's price and that predicted using duration alone will be greater for:

A) a bond with greater convexity.

B) a bond with less convexity.

C) a short-term bond.

Explanation

Duration is a linear measure of the relationship between a bond's price and yield. The true relationship is not linear as measured by the convexity. When convexity is higher, duration will be less accurate in predicting a bond's price for a given change in interest rates. Short-term bonds generally have low convexity.

(Module 60.1, LOS 60.a)

Question #22 of 23

Question ID: 1574358

The price value of a basis point (PVBP) for a bond is most accurately described as:

A) an estimate of the curvature of the price-yield relationship for a small change in yield.

B) the change in the price of the bond when its yield changes by 0.01%.

C) the product of a bond's value and its duration.

Explanation

PVBP represents the change in the price of the bond when its yield changes by one basis point, or 0.01%. PVBP = duration × 0.0001 × bond value. This calculation ignores convexity because for a small change in yield, the curvature of the price-yield relationship typically has no material effect on the PVBP.

(Module 60.1, LOS 60.c)

Question #23 of 23

Question ID: 1574355

A bond portfolio consists of a AAA bond, a AA bond, and an A bond. The prices of the bonds are $1,050, $1,000, and $950 respectively. The durations are 8, 6, and 4 respectively. What is the duration of the portfolio?

A) 6.00.

B) 6.07.

C) 6.67.

Explanation

The duration of a bond portfolio is the weighted average of the durations of the bonds in the portfolio. The weights are the value of each bond divided by the value of the portfolio:

> portfolio duration = 8 × (1050 / 3000) + 6 × (1000 / 3000) + 4 × (950 / 3000) = 2.8 + 2 + 1.27 = 6.07.

(Module 60.1, LOS 60.c)