Question #1 of 32

Question ID: 1574343

Given the three bonds listed here, which bond has the *most* interest rate risk?

A) 24-year maturity, 5.0% coupon.

B) 8-year maturity, 12.0% coupon.

C) 8-year maturity, 5.5% coupon.

Explanation

Interest rate risk (or price volatility) increases at longer maturities and with lower coupons.

(Module 59.1, LOS 59.b)

Question #2 of 32

Question ID: 1574336

Which of the following bonds is *most likely* to exhibit the greatest volatility due to interest rate changes? A bond with a:

A) high coupon and a long maturity.

B) low coupon and a long maturity.

C) low coupon and a short maturity.

Explanation

Other things equal, a bond with a low coupon and long maturity will have the greatest price volatility.

(Module 59.1, LOS 59.b)

Question #3 of 32

Question ID: 1574322

Which of the following is *most likely* to be the money duration of newly issued 360-day eurocommercial paper?

A) 360 days.

B) 4.3%.

C) €25 million.

Explanation

Money duration is expressed in currency units.

(Module 59.1, LOS 59.a)

Question #4 of 32

Question ID: 1574324

The price value of a basis point (PVBP) for a 18 year, 8% annual pay bond with a par value of $1,000 and yield of 9% is *closest* to:

A) $0.44.

B) $0.80.

C) $0.82.

Explanation

PVBP = initial price – price if yield changed by 1 bps.

Initial price:	Price with change:
FV = 1000	FV = 1000
PMT = 80	PMT = 80
N = 18	N = 18
I/Y = 9%	I/Y = 9.01
CPT PV = 912.44375	CPT PV = 911.6271

PVBP = 912.44375 – 911.6271 = 0.82

(Module 59.1, LOS 59.a)

Question #5 of 32

Question ID: 1574329

Which of the following five year bonds has the *highest* interest rate sensitivity?

A) Floating rate bond.

B) Zero-coupon bond. ✓

C) Option-free 5% coupon bond. ✗

Explanation

The Macaulay duration of a zero-coupon bond is equal to its time to maturity. Its price is greatly affected by changes in interest rates because its only cash-flow is at maturity and is discounted from the time at maturity until the present.

(Module 59.1, LOS 59.b)

Question #6 of 32

Question ID: 1574337

When interest rates increase, the modified duration of a 30-year bond selling at a discount:

A) decreases. ✓

B) does not change. ✗

C) increases. ✗

Explanation

The higher the yield on a bond the lower the price volatility (duration) will be. When interest rates increase the price of the bond will decrease and the yield will increase because the current yield = (annual cash coupon payment) / (bond price). As the bond price decreases the yield increases and the price volatility (duration) will decrease.

(Module 59.1, LOS 59.b)

Question #7 of 32

Question ID: 1576493

A 30-year semi-annual coupon bond issued today with market rates at 6.75% pays a 6.75% coupon. If the market yield declines by 30 basis points, the price increases to $1,039.59. If the market yield rises by 30 basis points, the price decreases to $962.77. The bond's approximate modified duration is *closest* to:

A) 1.3%. ✗

B) 12.8%. ✓

C) 3.9%. ✗

Explanation

Approximate modified duration =

(price if yield down − price if yield up) / (2 × initial price × yield change expressed as a decimal).

Here, the initial price is par, or $1,000 because we are told the bond was issued today at par. So, the calculation is: (1039.59 − 962.77) / (2 × 1000 × 0.003) = 76.82 / 6.00 = **12.80**.

(Module 59.1, LOS 59.a)

Question #8 of 32

Question ID: 1576496

For large changes in yield, which of the following statements about using duration to estimate price changes is *most accurate*? Duration alone:

A) overestimates the increase in price for decreases in yield. ✗

B) overestimates the increase in price for increases in yield. ✗

C) underestimates the increase in price for decreases in yield. ✓

Explanation

For large changes in yield, duration underestimates the increase in price when yield decreases and overestimates the decrease in price when yield increases. This is because duration is a linear estimate that does not account for the convexity (curvature) in the price/yield relationship.

(Module 59.1, LOS 59.a)

Question #9 of 32

Question ID: 1574334

Holding other factors constant, the interest rate risk of a coupon bond is higher when the bond's:

A) coupon rate is higher. ✗

B) current yield is higher. ✗

C) yield to maturity is lower. ✓

Explanation

In this case the only determinant that will cause higher interest rate risk is having a low yield to maturity. A higher coupon rate and a higher current yield will result in lower interest rate risk.

(Module 59.1, LOS 59.b)

Question #10 of 32

Question ID: 1574327

Martina Whittaker runs a fixed-income portfolio that contains a $12 million full price position in the corporate bonds of Dewey Treadmills. Whittaker is concerned that interest rates are likely to rise and has calculated an annual modified duration of 8.0 for the Dewey bonds. The money duration of the position in Dewey bonds is *closest* to:

A) $9.6 million. ✗

B) $48.0 million. ✗

C) $96.0 million. ✓

Explanation

Money duration = annual modified duration × portfolio value = 8 × $12 million = $96,000,000.

(Module 59.1, LOS 59.a)

Question #11 of 32

Question ID: 1574341

All other things being equal, which of the following bonds has the greatest duration?

A) 5-year, 8% coupon bond. ✗

B) 15-year, 8% coupon bond. ✓

C) 15-year, 12% coupon bond. ✗

Explanation

If bonds are identical except for maturity and coupon, the one with the longest maturity and lowest coupon will have the greatest duration. The later the cash flows are received, the greater the duration.

(Module 59.1, LOS 59.b)

Question #12 of 32

Question ID: 1574330

Which of the following bonds has the *highest* interest rate sensitivity? A:

A) five year, 5% coupon bond callable in one year. ✗

B) ten year, option-free 4% coupon bond. ✓

C) ten year, option-free 6% coupon bond. ✗

Explanation

If two bonds are identical in all respects except their term to maturity, the longer term bond will be more sensitive to changes in interest rates. All else the same, if a bond has a lower coupon rate when compared with another, it will have greater interest rate risk. Therefore, for the option-free bonds, the 10 year 4% coupon is the longest term and has the lowest coupon rate. The call feature does not make a bond more sensitive to changes in interest rates, because it places a ceiling on the maximum price investors will be willing to pay. If interest rates decrease enough the bonds will be called.

(Module 59.1, LOS 59.b)

Question #13 of 32

Question ID: 1576497

Consider a 25-year, $1,000 par semiannual-pay bond with a 7.5% coupon and a 9.25% YTM. Based on a yield change of 50 basis points, the approximate modified duration of the bond is *closest to*:

A) 10.03. ✓

B) 12.50. ✗

C) 8.73. ✗

Explanation

Calculate the new bond prices at the 50 basis point change in rates both up or down and then plug into the approximate modified duration equation:

Current price: N = 50; FV = 1,000; PMT = (0.075/2) × 1,000 = 37.50; I/Y = 4.625; CPT → PV = $830.54.

+50 basis pts: N = 50; FV = 1,000; PMT = (0.075/2)1,000 = 37.50; I/Y = 4.875; CPT → PV = $790.59.

–50 basis pts: N = 50; FV = 1,000; PMT = (0.075/2)1,000 = 37.50; I/Y = 4.375; CPT → PV = $873.93.

Approximate modified duration = (873.93 – 790.59) / (2 × 830.54 × 0.005) = 10.03.

(Module 59.1, LOS 59.a)

Question #14 of 32

Question ID: 1576495

A non-callable bond with 10 years remaining maturity has an annual coupon of 5.5% and a $1,000 par value. The yield to maturity on the bond is 4.7%. Which of the following is *closest* to the estimated price change of the bond using duration if rates rise by 75 basis points?

A) -$5.68.

B) -$47.34.

C) -$61.10.

Explanation

First, compute the current price of the bond as: FV = 1,000; PMT = 55; N = 10; I/Y = 4.7; CPT → PV = –1,062.68. Then compute the price of the bond if rates rise by 75 basis points to 5.45% as: FV = 1,000; PMT = 55; N = 10; I/Y = 5.45; CPT → PV = –1,003.78. Then compute the price of the bond if rates fall by 75 basis points to 3.95% as: FV = 1,000; PMT = 55; N = 10; I/Y = 3.95; CPT → PV = –1,126.03.

The formula for approximate modified duration is: $(V_- – V_+) / (2V_0\Delta y)$. Therefore, modified duration is: ($1,126.03 – $1,003.78) / (2 × $1,062.68 × 0.0075) = 7.67.

The formula for the percentage price change is then: –(duration)(ΔYTM). Therefore, the estimated *percentage price change* using duration is: –(7.67)(0.75%) = –5.75%. The estimated *price change* is then: (–0.0575)($1,062.68) = –$61.10

(Module 59.1, LOS 59.a)

Question #15 of 32

Question ID: 1574323

The price value of a basis point (PVBP) for a 7-year, 10% semiannual pay bond with a par value of $1,000 and yield of 6% is *closest* to:

A) $0.28.

B) $0.64.

C) $0.92.

Explanation

PVBP = initial price – price if yield changed by 1 bps.

Initial price:	Price with change:
FV = 1000	FV = 1000
PMT = 50	PMT = 50
N = 14	N = 14
I/Y = 3%	I/Y = 3.005
CPT PV = 1225.92	CPT PV = 1225.28

PVBP = 1,225.92 – 1,225.28 = 0.64

(Module 59.1, LOS 59.a)

Question #16 of 32

Question ID: 1574339

An analyst has stated that, holding all else constant, an increase in the maturity of a coupon bond will typically increase its interest rate risk, and that a decrease in the coupon rate of a coupon bond will typically decrease its interest rate risk. The analyst is correct with respect to:

A) neither of these effects.

B) only one of these effects.

C) both of these effects.

Explanation

The analyst is incorrect with respect to coupon rate. As the coupon rate decreases, the interest rate risk of a bond increases. Lower coupons cause greater relative weight to be placed on the principal repayment. Because this cash flow occurs farther out in time, its present value is much more sensitive to changes in interest rates. As the coupon rate goes to zero (i.e., a zero-coupon bond), all of the bond's return relies on the return of principal which as stated before is highly sensitive to interest rate changes.

The analyst is correct with respect to maturity. As the maturity of a bond increases, an investor must wait longer for the eventual repayment of the bond principal. As the length of time until principal payment increases, the probability that interest rates will change increases. If interest rates increase, the present value of the final payment (which is the largest cash flow of the bond) decreases. At longer maturities, the present value decreases by greater amounts. Thus, interest rate risk typically increases as the maturity of the bond increases. (The exception is for long-term discount bonds, which may exhibit a range of long maturities over which an increase in maturity decreases interest rate risk.)

(Module 59.1, LOS 59.b)

Question #17 of 32

Question ID: 1574326

The current price of a $1,000 par value, 6-year, 4.2% semiannual coupon bond is $958.97.

The bond's price value of a basis point is *closest* to:

A) $4.20. ✗

B) $5.01. ✗

C) $0.50. ✓

Explanation

First we compute the yield to maturity of the bond. PV = –$958.97, FV = $1,000, PMT = $21, N = 12, CPT I/Y = 2.5%, multiply by 2 since it is a semiannual bond to get an annualized yield to maturity of 5.0%. Now compute the price of the bond at using yield one basis point higher, or 5.01%. FV = $1,000, PMT = 21, N = 12, I/Y = (5.01 / 2 =) 2.505, CPT PV = –$958.47. The price changes from $958.97 to $958.47, or $0.50.

(Module 59.1, LOS 59.a)

Question #18 of 32

Question ID: 1577196

The approximate modified duration of an option-free 20-year 7% annual-pay par bond based on a 25 basis point change in yield is *closest* to:

A) 5.3. ✗

B) 10.6. ✓

C) 13.7.

Explanation

If the yield on the bond were 7.25%, the price would be 97.402 and would be 102.701 if the yield were 6.75%. The approximate modified duration for this bond based on a 25 basis point change in yield is calculated as:

$$\frac{102.701-97.402}{2(100)(0.0025)} = 10.5976$$

(Module 59.1, LOS 59.a)

Question #19 of 32

Question ID: 1576491

Assume that the current price of an annual-pay bond is 102.50 per 100 of face value. If its YTM increases by 0.5% the value of the bond decreases to 100 and if its YTM decreases by 0.5% the price of the bond increases to 105.5. What is the approximate modified duration of the bond?

A) 5.37.

B) 5.48.

C) 5.50.

Explanation

Approximate modified duration is computed as follows:

$$\text{Duration} = \frac{105.50-100}{2\times102.50\times0.005} = 5.37$$

(Module 59.1, LOS 59.a)

Question #20 of 32

Question ID: 1576492

An investor finds that for a 1% increase in yield to maturity, a bond's price will decrease by 4.21% compared to a 4.45% increase in value for a 1% decline in YTM. If the bond is currently trading at par value, the bond's approximate modified duration is *closest* to:

A) 43.30.

B) 4.33.

C) 8.66.

Explanation

Modified duration is a measure of a bond's sensitivity to changes in interest rates.

Approximate modified duration = $(V_- - V_+) / [2V_0$(change in required yield)] where:

V_- = estimated price if yield decreases by a given amount

V_+ = estimated price if yield increases by a given amount

V_0 = initial observed bond price

Thus, duration = (104.45 – 95.79)/(2 × 100 × 0.01) = 4.33. Remember that the change in interest rates must be in decimal form.

(Module 59.1, LOS 59.a)

Question #21 of 32

Question ID: 1574325

A $100,000 par value bond has a full price of $99,300, a Macaulay duration of 6.5, and an annual modified duration of 6.1. The bond's money duration per $100 par value is *closest to*:

A) $606.

B) $645.

C) $6.06.

Explanation

Money duration per $100 par value = annual modified duration × full price per $100 par value = 6.1 × $99.30 = $605.73

(Module 59.1, LOS 59.a)

Question #22 of 32

Question ID: 1574338

What happens to bond durations when coupon rates increase and maturities increase?

	As coupon rates increase, duration:	As maturities increase, duration:
A)	decreases	decreases

B) decreases	increases	✓
C) increases	increases	✗

Explanation

As coupon rates increase the duration on the bond will decrease because investors are receiving more cash flow sooner. As maturity increases, duration will increase because the payments are spread out over a longer period of time.

(Module 59.1, LOS 59.b)

Question #23 of 32

Question ID: 1574340

All else equal, which of the following is *least likely* to increase the interest rate risk of a bond?

A) A longer maturity. ✗

B) Inclusion of a call feature. ✓

C) A decrease in the YTM. ✗

Explanation

Inclusion of a call feature will decrease the duration of a fixed income security. The other choices increase duration.

(Module 59.1, LOS 59.b)

Question #24 of 32

Question ID: 1574335

In comparing the price volatility of putable bonds to that of option-free bonds, a putable bond will have:

A) less price volatility at higher yields. ✓

B) less price volatility at low yields. ✗

C) more price volatility at higher yields. ✗

Explanation

The only true statement is that putable bonds will have less price volatility at higher yields. At higher yields the put becomes more valuable and reduces the decline in price of the putable bond relative to the option-free bond. On the other hand, when yields are low, the put option has little or no value and the putable bond will behave much like an option-free bond. Therefore at low yields a putable bond will not have more price volatility nor will it have less price volatility than a similar option-free bond.

(Module 59.1, LOS 59.b)

Question #25 of 32

Question ID: 1574342

On Monday, the yield curve is upward sloping with yields of 3%, 4%, and 5.5% on 1-year, 5-year, and 10-year government bonds, respectively. The following day, the yield curve experiences an upward parallel shift equal to 50 basis points. Other things equal, which of the following noncallable 6% coupon bonds is likely to experience the smallest percent change in price as a result of the yield curve shift?

A) Zero coupon government bond maturing in five years. ✗

B) Par value government bond maturing in five years. ✓

C) Par value government bond maturing in ten years. ✗

Explanation

The bond with the least percentage price change will be the bond with the lowest interest rate risk. Higher coupons or shorter maturities decrease interest rate risk. The coupon paying bond with only five years to maturity will have the lowest interest rate risk.

(Module 59.1, LOS 59.b)

Question #26 of 32

Question ID: 1574331

Which of the following statements about an embedded call feature in a bond is *least* accurate? The call feature:

A) reduces the bond's capital appreciation potential. ✗

B) increases the bond's duration, increasing price risk. ✓

C) exposes investors to additional reinvestment rate risk. ✗

Explanation

A call provision *decreases* the bond's duration because a call provision introduces prepayment risk that should be factored in the calculation.

For the investor, one of the most significant risks of callable (or prepayable) bonds is that they can be called/retired prematurely. Because bonds are nearly always called for prepayment after interest rates have decreased significantly, the investor will find it nearly impossible to find comparable investment vehicles. Thus, investors have to replace their high-yielding bonds with much lower-yielding issues. From the bondholder's perspective, a called bond means not only a disruption in cash flow but also a sharply reduced rate of return.

Generally speaking, the following conditions apply to callable bonds:

- *The cash flows associated with callable bonds become unpredictable,* since the life of the bond could be much shorter than its term to maturity, due to the call provision.
- The bondholder is exposed to the risk of investing the proceeds of the bond at lower interest rates after the bond is called. This is known as *reinvestment risk*.
- *The potential for price appreciation is reduced,* because the possibility of a call limits or caps the price of the bond near the call price if interest rates fall.

(Module 59.1, LOS 59.b)

Question #27 of 32

Question ID: 1574333

Suppose the term structure of interest rates makes an instantaneous parallel upward shift of 100 basis points. Which of the following securities experiences the largest change in value? A five-year:

A) coupon bond with a coupon rate of 5%.

B) floating rate bond.

C) zero-coupon bond.

Explanation

The duration of a zero-coupon bond is equal to its time to maturity since the only cash flows made is the principal payment at maturity of the bond. Therefore, it has the highest interest rate sensitivity among the four securities.

A floating rate bond is incorrect because the duration, which is the interest rate sensitivity, is equal to the time until the next coupon is paid. So this bond has a very low interest rate sensitivity.

A coupon bond with a coupon rate of 5% is incorrect because the duration of a coupon paying bond is lower than a zero-coupon bond since cash flows are made before maturity of the bond. Therefore, its interest rate sensitivity is lower.

(Module 59.1, LOS 59.b)

Question #28 of 32

Question ID: 1577195

Compared to a bond's Macaulay duration, its modified duration:

A) is lower. ✓

B) is higher. ✗

C) may be lower or higher. ✗

Explanation

Modified duration = Macaulay duration / (1 + YTM). Modified duration is lower than Macaulay duration unless YTM equals zero.

(Module 59.1, LOS 59.a)

Question #29 of 32

Question ID: 1574332

Which of the following bonds has the shortest duration? A bond with a:

A) 20-year maturity, 6% coupon rate. ✗

B) 10-year maturity, 10% coupon rate. ✓

C) 10-year maturity, 6% coupon rate. ✗

Explanation

All else constant, a bond with a longer maturity will be more sensitive to changes in interest rates. All else constant, a bond with a lower coupon will have greater interest rate risk.

(Module 59.1, LOS 59.b)

Question #30 of 32

Question ID: 1576494

A bond with a yield to maturity of 8.0% is priced at 96.00. If its yield increases to 8.3% its price will decrease to 94.06. If its yield decreases to 7.7% its price will increase to 98.47. The modified duration of the bond is *closest to*:

A) 4.34. ✗

B) 7.66. ✓

C) 2.75.

Explanation

The change in the yield is 30 basis points.

Approximate modified duration = (98.47 − 94.06) / (2 × 96.00 × 0.003) = 7.6563.

(Module 59.1, LOS 59.a)

Question #31 of 32

Question ID: 1577197

An option-free 5-year 6% annual-pay bond is selling $979.22 per $1,000 of par value and has a Macaulay duration of 4.4587. The bond's modified duration is *closest* to:

A) 4.187.

B) 4.206.

C) 4.246.

Explanation

The YTM on the bond is 6.5%. N=5, PV = −979.22, PMT = 60, FV=1,000, CPT I/Y = 6.5%

Modified duration = Macaulay duration / (1 + YTM) = 4.4587 / 1.065 = 4.187.

(Module 59.1, LOS 59.a)

Question #32 of 32

Question ID: 1574328

Which of the following statements concerning the price volatility of bonds is *most* accurate?

A) As the yield on callable bonds approaches the coupon rate, the bond's price will approach a "floor" value.

B) Bonds with longer maturities have lower interest rate risk.

C) Bonds with higher coupons have lower interest rate risk.

Explanation

Other things equal, bonds with higher coupons have lower interest rate risk. Note that the other statements are false. Bonds with longer maturities have *higher* interest rate risk. Callable bonds have a ceiling value as yields decline.

(Module 59.1, LOS 59.b)