Problem Set #13   Solutions

1. All other things equal (YTM = 10%), which of the following has the longest duration?

    A. A 30-year bond with a 10% coupon

    B. A 20-year bond with a 9% coupon

    C. A 20-year bond with a 7% coupon

    D. A 10-year zero-coupon bond

2. Compute the duration of an 8%, 5-year corporate bond with a par value of $1,000 and yield to maturity of 10%.

    A. 3.92

    B. 4.28

    C. 4.55

    D. 5

Time	CF	PV(CF) @ 10%	w_t	$t \times w_t$
1	$80	$72.73	0.0786935	0.078693477
2	$80	$66.12	0.0715395	0.143079048
3	$80	$60.11	0.0650359	0.195107793
4	$80	$54.64	0.0591236	0.236494295
5	$1,080	$670.60	0.7256075	3.628037474
		$924.18	1.00	4.28

3. You find a 5-year AA Xerox bond priced to yield 6%. You find a similar-risk 5-year Canon bond priced to yield 6.5%. If you expect interest rates to rise, which of the following should you do?

    A. Short the Canon bond, and buy the Xerox bond.

    B. Buy the Canon bond, and short the Xerox bond.

    C. Short both the Canon bond and the Xerox bond.

    D. Buy both the Canon bond and the Xerox bond.

4. You own a bond that has a duration of 6 years. Interest rates are currently 7%, but you believe the Fed is about to increase interest rates by 25 basis points. Your predicted price change on this bond is _____.

  A. +1.4%

  B. -1.4%

  C. -2.51%

  D. +2.51%

$$D^* = 6/1.07 = 5.61$$
$$\Delta P/P = -D^*(\Delta y) = -5.61(.25\%) = -1.4\%$$

5. A bond currently has a price of $1,050. The yield on the bond is 6%. If the yield increases 25 basis points, the price of the bond will go down to $1,030. The duration of this bond is _____ years.

  A. 7.46

  B. 8.08

  C. 9.02

  D. 10.11

$$\Delta P/P = -D^*(\Delta y)$$
$$-20/1,050 = -D^*(.25\%)$$
$$-1.9\% = -D^*(.25\%)$$
$$D^* = 7.6$$
$$D = D^*(1 + y)$$
$$D = 7.6(1.0625) = 8.075$$

6. All other things equal, which of the following has the longest duration?

  A. A 21-year bond with a 10% coupon yielding 10%

  B. A 20-year bond with a 10% coupon yielding 11%

  C. A 21-year zero-coupon bond yielding 10%

  D. A 20-year zero-coupon bond yielding 11%

7. A bond has a current price of $1,030. The yield on the bond is 8%. If the yield changes from 8% to 8.1%, the price of the bond will go down to $1,025.88. The modified duration of this bond is _____.

   A. 4.32

   B. 4

   C. 3.25

   D. 3.75

$$\Delta P/P = -D^*(\Delta y)$$
$$-.40\% = -D^*(.10\%)$$
$$D^* = .40\%/.10\% = 4$$

8. A bond has a maturity of 12 years and a duration of 9.5 years at a promised yield rate of 8%. What is the bond's modified duration?

   A. 12 years

   B. 11.1 years

   C. 9.5 years

   D. 8.8 years

$$D^* = 9.5/1.08 = 8.8 \text{ years}$$

9. A bond with a 9-year duration is worth $1,080, and its yield to maturity is 8%. If the yield to maturity falls to 7.84%, you would predict that the new value of the bond will be approximately _____.

   A. $1,035

   B. $1,036

   C. $1,094

   D. $1,124

$$\Delta P/P = -D^*(\Delta y)$$
$$D^* = D/(1 + y) = 9/1.08 = 8.33$$
$$\Delta P/P = -D^*(\Delta y) = -8.33(-.16\%) = 1.33\%$$
New price = $1,080(1.01333) = $1,094.40