

FN 211

Quiz 4 – Bond Valuation

1.	C	6.	A
2.	C	7.	B
3.	A	8.	C
4.	C	9.	C
5.	A	10.	A

1. Which of the following bonds would be the most sensitive to changes in market interest rates?
- A. 4% coupon bond with a 2 year maturity
 - B. 8% coupon bond with a 10 year maturity
 - C. 4% coupon bond with a 10 year maturity

2. An analyst determines that a 5.50% coupon option-free bond, maturing in 7 years, would experience a 3% decrease in price if market interest rates rise by 50 basis points. If market interest rates instead fall by 50 basis points, the bond's price would increase by:

- A. Exactly 3%
- B. Less than 3%
- C. More than 3%

Option-free bond exhibits positive convexity.

3. An 8 year corporate bond pays has a 7% coupon rate and par of \$1,000. What should be the bond's price if the required return is 6% and the bond pays interest semiannually?
- A. \$1,062.81
 - B. \$1,053.45
 - C. \$1,049.49

$N = 16, I = 3, PMT = 35, FV = 1000$

4. All of the following are one of the relationships between yield changes and bond prices except
- A. Bond prices move inversely to bond yields.
 - B. Longer-maturity bonds experience larger price changes than shorter-maturity bonds.
 - C. Bond price movements resulting from equal absolute increases or decreases in yield are symmetrical.
5. An 8 year annual payment 7% coupon Treasury bond has a price of \$1,075 and par of \$1,000. The bond's YTM must be
- A. 5.80%
 - B. 7.00%
 - C. 1.69%

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$N=8, PV = -1075, PMT = 70, FV = 1000$

6. An annual payment bond with a \$1,000 par has a 5% quoted coupon rate, a 6% promised ytm and 6 years to maturity. What is the bond's Macaulay Duration?

- A. 5.31 years
- B. 4.76 years
- C. 4.16 years

Macaulay Duration: Annual-pay coupon

Period	Cash Flow	PV of CF	$t \times PV$
1	50.0	47.17	47.17
2	50.0	44.50	89.00
3	50.0	41.98	125.94
4	50.0	39.60	158.42
5	50.0	37.36	186.81
6	1,050.0	740.21	4,441.25
		950.83	5,048.60

Duration	5.3097	years
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7. A bond is selling for 982.0 Baht. It is estimated that the price will fall to 966.0 Baht if yields rise 30 bps and that the price will rise to 1,001.0 Baht if yields fall 30 bps. Based on these estimates, the Effective Duration of the bond is *closest to*:

- A. 1.78
- B. 5.94
- C. 11.88

$$\text{Effective Duration} = \frac{1001.0 - 966.0}{2(982)(0.003)}$$

$$= 5.94$$

8. The Modified Duration for a 10-year, 12% semi-annual pay coupon bond with a yield to maturity of 10 percent and a Macaulay duration of 7.2 years is *closest to*:

- A. 6.55 years
- B. 6.79 years
- C. 6.86 years

$$D_{\text{mod}} = 7.2 / (1 + 0.10/2) = 7.2 / 1.05 = 6.86 \text{ years}$$

9. A portfolio consists of 4 bonds with the following characteristics:

Bond	Market Value	Modified Duration
A	\$1.2 million	3.2
B	\$3.4 million	7.6
C	\$2.9 million	12.4
D	\$1.6 million	1.5

The duration of the portfolio is *closest to*:

- A. 5.40
- B. 6.18

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C. 7.48

$w_{\text{bond}} = \text{Value}_{\text{bond}} / \text{Value}_{\text{portfolio}}$ and $\text{Duration}_{\text{portfolio}} = \sum w_{\text{bond}} \times \text{duration}_{\text{bond}}$. In this case, value of the portfolio is $1.2 + 3.4 + 2.9 + 1.6 = 9.1$ million and the portfolio duration equals $(1.2/9.1 \times 3.2) + (3.4/9.1 \times 7.6) + (2.9/9.1 \times 12.4) + (1.6/9.1 \times 1.5) = 0.4220 + 2.8396 + 3.9516 + 0.2637 = 7.48$.

10. If a Treasury bond has a modified duration of 10.27 and a convexity of 71.51. 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. -11.718%

B. -13.956%

C. -9.325%

$$[-(10.27)(1.25\%)] + [(71.51)(0.0125)^2] = -12.8375 + 1.120\% = -11.7175\%.$$