

Fixed Income

1906CFA一级押题

讲师：Vito Chen

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Fixed Income (1)

- A bond has a Macaulay duration of 7.414 with yield to maturity 5.6% and annual convexity of 65.180. If the bond's yield-to-maturity decreases by 25 basis points, the expected percentage price change is closest to:
 - A. 1.73%.
 - B. 1.76%.
 - C. 1.78%.

➤ **Solution: C.**

$$\begin{aligned} \text{Modified duration} &= \frac{\text{Macaulay duration}}{1 + r} = \frac{7.414}{1 + 5.6\%} = 7.02 \\ \% \Delta PV^{\text{full}} &\approx [-7.02 \times (-0.0025)] + [0.5 \times 65.180 \times (0.0025)^2] \\ &= 0.017754, \text{ or } 1.78\% \end{aligned}$$

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Fixed Income (2)

- A bond with exactly nine years remaining until maturity offers a 3% coupon rate with annual coupons. The bond, with a yield-to-maturity of 5%, is priced at 85.784357 per 100 of par value. The estimated price value of a basis point for the bond is closest to:
 - A. 0.0086.
 - B. 0.0648.
 - C. 0.1295.

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Fixed Income (2)

➤ **Solution: B.**

Lowering the yield-to-maturity by one basis point to 4.99% results in a bond price of 85.849134:

$$PV_- = \frac{3}{(1 + 0.0499)^1} + \dots + \frac{103}{(1 + 0.0499)^9} = 85.849134$$

Increasing the yield-to-maturity by one basis point to 5.01% results in a bond price of 85.719638:

$$PV_+ = \frac{3}{(1 + 0.0501)^1} + \dots + \frac{103}{(1 + 0.0501)^9} = 85.719638$$

$$PVBP = \frac{85.849134 - 85.719638}{2} = 0.06475$$

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Fixed Income (3)

- All rates are annual rates stated for a periodicity of one (effective annual rates).

Time period	Forward rate
0y1y	0.80%
1y1y	1.12%
2y1y	3.94%
3y1y	3.28%
4y1y	3.14%

The 3-year implied spot rate is closest to:

- A. 1.18%
B. 1.94%
C. 2.28%

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Fixed Income (3)

➤ **Solution: B.**

$$(1.0080 * 1.0112 * 1.0394) = (1 + Z_3)^3$$

$$Z_3 = 1.944\%$$

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Fixed Income (4)

- A Canadian pension fund manager seeks to measure the sensitivity of her pension liabilities to market interest rate changes. The manager determines the present value of the liabilities under three interest rate scenarios: a base rate of 7%, a 100 basis point increase in rates up to 8%, and a 100 basis point drop in rates down to 6%. The results of the manager's analysis are presented below:

Interest rate assumption	Present value of liabilities
6%	CAD 510.1 million
7%	CAD 455.4 million
8%	CAD 373.6 million

The effective duration of the pension fund's liabilities is closest to:

- A. 1.49.
B. 14.99.
C. 29.97.

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Fixed Income (4)

- **Solution: B.**

$$\text{effectiveduration} = \frac{510.1 - 373.6}{2 * 0.01 * 455.4} = 14.99$$

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Fixed Income (5)

- A bond is currently trading for 98.722 per 100 of par value. If the bond's yield-to-maturity(YTM) rises by 10 basis points, the bond's full price is expected to fall to 98.669. If the bond's YTM decreases by 10 basis points, the bond's full price is expected to increase to 98.782. The bond's approximate convexity is closest to:
- A. 0.0071
B. 70.906
C. 1144.628

- **Solution: B.**

$$\begin{aligned} \text{approximate convexity} = \\ [98.782 + 98.669 - (2 * 98.722)] / (0.001^2 * 98.722) = 70.906 \end{aligned}$$

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Fixed Income (6)

- An investor purchases a nine-year, 7% annual coupon payment bond at a price equal to par value. After the bond is purchased and before the first coupon is received, interest rates increase to 8%. The investor sells the bond after five years. Assume that interest rates remain unchanged at 8% over the five-year holding period. Assuming that all coupons are reinvested over the holding period, the investor's five-year horizon yield is closest to:
- A. 5.66%.
 - B. 6.62%
 - C. 7.12%

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Fixed Income (6)

- **Solution: B.**

$$PV = \frac{7}{1.08^1} + \frac{7}{(1.08)^2} + \frac{7}{(1.08)^3} + \frac{107}{(1.08)^4} = 96.69$$

$$7 * 1.08^4 + 7 * 1.08^3 + 7 * 1.08^2 + 7 * 1.08 + 7 = 41.0662$$

$$100 = \frac{96.69 + 41.0662}{(1+r)^5}, r = 0.0662$$

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Fixed Income (7)

- In a securitization, the seller of the pool of securitized assets is the:
- A. trustee.
 - B. special purpose entity.
 - C. depositor.

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Fixed Income (7)

➤ **Solution: C.**

The collateral in a securitization is the pool of securitized assets from which cash flows will be generated. The seller of the collateral is the depositor, also referred to as the originator.

A is incorrect because the trustee is typically a financial institution that safeguards the assets, hold funds for bondholders until they are paid, and provides periodic information to the bondholders.

B is incorrect because the special purpose vehicle (SPV) is the issuer in the securitization.

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Fixed Income (8)

- Which of the following bond will have the biggest price change if the interest rate increases or decreases by 100bps?

	Increases	Decreases
A.	Callable bond	Callable bond
B.	Pure bond	Pure bond
C.	Putable bond	Callable bond

➤ **Solution: B.**

Either callable bond or putable bond has a smaller duration compared to that of a pure bond, which indicates that the pure bond will have bigger interest sensitivity.

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Fixed Income (9)

- Which of the following bond is most likely beneficial to the bondholders in the respect of risk?
- A. Putable bond.
B. Callable bond.
C. None.

➤ **Solution: A.**

A put feature is beneficial to the bondholders. If interest rates rise, the bondholders can sell the bond back to the issuer and get cash.

The price of a putable bond will typically be higher than the price of an otherwise similar non-putable bond.

A callable bond is beneficial to the bond issuers. If interest rates fall, issuer can retire the bond paying high coupon rate, and replace it with lower coupon bonds.

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Fixed Income (10)

- Assume a \$1,000,000 par value, semiannual coupon U.S. Treasury note with two years to maturity and a coupon rate of 10 percent. Using the following Treasury spot rates and ignoring accrued interest and transactions costs, the arbitrage-free value of the Treasury note is closest to:

Maturity	Spot Rate (%)
Six months	6.00
Twelve months	7.50
Eighteen months	9.00
Twenty-four months	10.00

- A. \$846,210.
B. \$1,000,000.
C. \$1,002,647.

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Fixed Income (10)

- **Solution: C.**

Note that the four cash flows are, in percent of par terms, 5, 5, 5, and 105.

Adjust the spot rates for semiannual compounding. Solve $(5 / 1.03) + (5 / (1.0375)^2) + (5 / (1.045)^3) + (105 / (1.05)^4) = 100.2647$ percent of par. As par is \$1,000,000, the correct answer is \$1,002,647.

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Fixed Income (11)

- When the investor's investment horizon is larger than the Macaulay duration of the bond she owns
- A. The investor is hedged against interest rate risk.
B. Reinvestment risk dominates, and the investor is at risk of lower rates.
C. Market price risk dominates, and the investor is at risk of higher rates.

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Fixed Income (11)

➤ **Solution: B.**

The investor is hedged against interest rate risk if the duration gap is zero; that is, the investor's investment horizon is equal to the bond's Macaulay duration. The investor is at risk of lower rates only if the duration gap is negative; that is, the investor's investment horizon is greater than the bond's Macaulay duration. In this case, coupon reinvestment risk dominates market price risk.

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Fixed Income (12)

➤ Which of the following is internal enhancement?

- A. Corporate guarantees
- B. Letter of credit
- C. Excess servicing spread funds

➤ **Solution: C.**

Internal enhancement includes cash reserve funds (from issuance proceeds), excess servicing spread funds, over collateralization, a senior/ subordinated structure.

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Fixed Income (13)

➤ Which of the following type of bond issued by a company is closest to the rating of the company?

- A. senior unsecured debt
- B. junior unsecured debt
- C. subordinated debt

➤ **Solution: A.**

Issuer credit rating: address an obligor's overall creditworthiness – its ability and willingness to make timely payments of interest and principal on its debt. Issuer credit rating usually applies to its senior unsecured debt.

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Fixed Income (14)

- The bonds of Whakatane and Co. are priced for settlement on 15 July 2014 and have the following features.

Par value	\$100.00
Annual coupon rate	8%
Coupon payment frequency	Semiannual
Coupon payment dates	15 May and 15 November
Maturity date	15 November 2017
Day count convention	Actual/Actual
Annual yield to maturity	5.5%

On the basis of this information, the difference between the full and flat prices is closest to

- A. 0.917.
B. 2.667.
C. 1.326.

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Fixed Income (14)

- **Solution: C.**

The difference between the full and flat prices is the accrued interest, which is computed as follows. Based on the Actual/Actual day convention, the number of days between the coupon periods is 184 days. Also, using the Actual/Actual day count convention, the number of days between 15 May 2014 and 15 July 2014 is 16 days remaining in May + 30 days in June + 15 days in July = 61 days. Accrued interest (per \$100 par value) = $(61/184)(8.00/2) = 1.326$.

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Fixed Income (15)

- A 365-day year bank certificate of deposit has an initial principal amount of USD 96.5 million and a redemption amount due at maturity of USD 100million. The number of days between settlement and maturity is 350. The bond equivalent yield is closest to:
- A. 3.48%.
B. 3.65%.
C. 3.78%.

- **Solution: C.**

$$BEY = \frac{365}{350} * \frac{100-96.5}{96.5} = 3.78\%$$

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Fixed Income (16)

- Rollover risk is most likely related to:
 - A. Commercial paper
 - B. Bank debt
 - C. Corporate bond
- **Solution: A.**
Rollover risk is a risk that the issuer will be unable to issue new paper at maturity.

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Fixed Income (17)

- Which of the following ABS most likely have call protection?
 - A. Agency RMBS
 - B. Non-agency RMBS
 - C. CMBS
- **Solution: C.**
A critical investment feature that distinguishes CMBS from RMBS is the protection against early prepayments available to investors' known as a call protection. With CMBS, investors have considerable call protection.

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Fixed Income (18)

- Using the information below, which bond has the greatest money duration per 100 of par value assuming annual coupon payments and no accrued interest?

bond	Time-to-maturity	Price per 100 of par value	Coupon rate	Yield-to-maturity	Modified duration
A	6 years	85.00	2.00%	4.95%	5.42
B	10 years	80.00	2.40%	4.99%	8.44
C	9 years	85.78	3.00%	5.00%	7.54

- A. Bond A
- B. Bond B
- C. Bond C

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Fixed Income (18)

➤ **Solution: B.**

Money Duration of Bond A = $5.42 \times 85.00 = 460.70$

Money Duration of Bond B = $8.44 \times 80.00 = 675.20$

Money Duration of Bond C = $7.54 \times 85.78 = 646.78$

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Fixed Income (19)

- Consider the planned amortization class (PAC) tranches in a collateralized mortgage obligation (CMO) are provided protection against both extension and contraction risk. If the prepayment speed is slower than the lower collar on the PAC. Which of the following statements is most accurate? The:
- A. Average life of the PAC tranche will extend.
 - B. PAC tranche has no risk of prepayments.
 - C. Average life of the support tranche will contract.

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Fixed Income (19)

➤ **Solution: A.**

The lower and upper PSA prepayment assumptions are called the “initial PAC collar”. If the prepayment speed is slower than lower limit of initial collar, the support tranche receives a lower level of prepayments, even no cash flow received and the PAC tranche also receives a lower level of prepayments. The average life of the support tranche and the PAC tranche will extend (lengthen).

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Fixed Income (20)

- Which of the following debts would most likely have the highest repayment priority?
- Third lien debt
 - Senior unsecured debt
 - Subordinate debt

➤ **Solution: A.**

Secured debt is less risky than both unsecured debt and subordinate debt. And third lien has a secured interest in the pledged assets.

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Fixed Income (21)

- A bond portfolio consists of the following two fixed-rate bonds. Assume annual coupon payments and no accrued interest on the bonds. Prices are per 100 of par value.

Bond	Market value	Price	Coupon	Yield-to-maturity	Macaulay duration
A	170,000	85.0000	2.00%	4.95%	5.69
B	120,000	85.0000	2.4%	4.99%	8.86

The bond portfolio's modified duration is closest to:

- 6.67
- 7.62
- 8.13

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Fixed Income (21)

➤ **Solution: A.**

$$\text{modified duration} = \frac{\text{macaulay duration}}{(1 + YTM)}$$

$$\text{Mod. } D_A = \frac{5.69}{1 + 4.95\%} = 5.42$$

$$\text{Mod. } D_B = \frac{8.86}{1 + 4.99\%} = 8.44$$

$$\text{market value of the portfolio} = 170,000 + 120,000 = 290,000$$

$$\text{portfolio duration} = 5.42 \times \left(\frac{170,000}{290,000} \right) + 8.44 \times \left(\frac{120,000}{290,000} \right) = 6.67$$

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Fixed Income (22)

- Which of the following element of FRN will most likely change?
- Reference rate
 - Quoted margin
 - Principle

➤ **Solution: A.**

The coupon rate of a FRN includes two components: a reference rate plus a spread. The reference rate of FRN resets periodically. The spread, also called margin, is typically constant. And the principal of FRN will not change.

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Fixed Income (23)

- With the increase of repo term, the repo rate and repo margin on a repurchase agreement margin will most likely:

	Repo rate	Repo margin
A.	increase	increase
B.	increase	decrease
C.	decrease	decrease

➤ **Solution: A.**

The longer the term of the repurchase agreement, the higher repo rate and repo margin (haircut).

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Fixed Income (24)

- The Delfain Corporation reported a significant improvement in profitability that was followed by a material upgrade in its credit rating. The market responded by immediately requiring a 100 basis point narrower spread to Gilts on Delfain's 8-year bond. If the bond's modified duration is 6.0 and its convexity is 55.0, the return impact of this change is closest to:
- 6.28%.
 - 5.73%.
 - 7.10%.

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Fixed Income (24)

➤ Solution: A.

The return impact of a 60 bps fall in the bond's yield can be computed as:

$$\text{Return impact} \approx -(\text{MDu} \times \Delta\text{Spread}) + \frac{1}{2}\text{Cvx} \times (\Delta\text{Spread})^2$$

$$\text{Return impact} \approx -(6.0 \times -0.01) + \frac{1}{2}(55.0) \times (-0.01)^2 = 6.28\%$$

B is incorrect because the return impact is incorrectly computed as:

$$\text{Return impact} \approx -(6.0 \times 0.01) + \frac{1}{2}(55.0) \times (0.01)^2 = -5.73\%$$

C is incorrect because the return impact is incorrectly computed as:

$$\text{Return impact} \approx -(6.0 \times -0.01) + \frac{1}{2}(55.0) \times (-0.01)^2 = 7.10\%$$

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Fixed Income (25)

- Assume a bond with an 8% coupon rate, and paid annually and 4 years to maturity. When a discount rate of 6%, the value of the bond today is \$106.93. One day later, the discount rate increases to 10%. Assuming the discount rate remains at 10% over the remaining life of the bond, the price of the bond between today and maturity will:

- A. Increases then decreases
- B. Decreases then remains unchanged
- C. Decreases then increases

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Fixed Income (25)

➤ Solution: C.

If the discount rate increases to 10% from 6%, the price of a bond decreases. At a discount rate of 10%, the bond sells at a discount to face value. As a discount bond approaches maturity, it will increase in price over time until it reaches par at maturity.

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Fixed Income (26)

- Which of the following is an example of a domestic bond?
- A. A bond is issued by LG Group from South Korea, denominated in British pounds, and sold in the United Kingdom
 - B. A bond is issued by the U.K. Debt Management Office, denominated in British pounds, and sold in the United Kingdom
 - C. A bond is issued by Wal-Mart from the United States, denominated in U.S. dollars, and sold in various countries in North America, Europe, the Middle East, and Asia Pacific

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Fixed Income (26)

- **Solution: B.**
- A domestic bond is issued by a local issuer, denominated in local currency, and sold in the domestic market. Gilts are British pound—denominated bonds issued by the U.K. Debt Management Office in the United Kingdom. Thus, they are U.K. domestic bonds. A is incorrect because a bond issued by LG Group from South Korea, denominated in British pounds, and sold in the United Kingdom, is an example of a foreign bond (bulldog bond). C is incorrect because a bond issued by Wal-Mart from the United States, denominated in U.S. dollars, and sold in various countries in North America, Europe, the Middle East, and Asia Pacific is most likely an example of a global bond, particularly if it is also sold in the Eurobond market.

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Fixed Income (27)

- An analyst needs to assign a value to an illiquid four-year, 4.5% annual coupon payment corporate bond. The analyst identifies two corporate bonds that have similar credit quality: One is a three-year, 5.50% annual coupon payment bond priced at 107.500 per 100 of par value, and the other is a five-year, 4.50% annual coupon payment bond priced at 104.750 per 100 of par value. Using matrix pricing, the estimated price of the illiquid bond per 100 of par value is closest to:
- A. 103.895.
 - B. 104.991.
 - C. 106.125.

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Fixed Income (27)

➤ **Solution: B.**

The first step is to determine the yields-to-maturity on the observed bonds. The required yield on the three-year, 5.50% bond priced at 107.500 is 2.856%. The required yield on the five-year, 4.50% bond priced at 104.7500 is 3.449%.

Applying the method of linear interpolation, the YTM of a bond with four-year maturity and same credit ranking is $(2.856\% + 3.449\%) / 2 = 3.152\%$, then calculate the price, which is 104.991.

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Fixed Income (27)

Some fixed-rate bonds are not actively traded. Therefore, there is no market price available to calculate the rate of return required by investors. The same problem occurs for bonds that are not yet issued. In these situations, it is common to estimate the market discount rate and price based on the quoted or flat prices of more frequently traded comparable bonds. These comparable bonds have similar times-to-maturity, coupon rates, and credit quality. This estimation process is called matrix pricing.

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