

ch09

Student: _____

1. In most countries FIs report their balance sheet using market value accounting.
True False
2. Marking -to-market accounting is a market value accounting method that reflects the purchase prices of assets and liabilities.
True False
3. The difference between the changes in the market value of the assets and market value of liabilities for a given change in interest rates is, by definition, the change in the FI's net worth.
True False
4. Duration measures the average life of a financial asset.
True False
5. The economic meaning of duration is the interest elasticity of a financial assets price.
True False
6. Duration considers the timing of all the cash flows of an asset by summing the product of the cash flows and the time of occurrence.
True False
7. A key assumption of Macaulay duration is that the yield curve is flat so that all cash flows are discounted at the same discount rate.
True False
8. Duration is the weighted-average present value of the cash flows using the timing of the cash flows as weights.
True False
9. In duration analysis, the times at which cash flows are received are weighted by the relative importance in present value terms of the cash flows arriving at each point in time.
True False
10. Duration normally is less than the maturity for a fixed coupon asset.
True False
11. Duration is equal to maturity when at least some of the cash flows are received upon maturity of the asset.
True False
12. Duration of a fixed-rate coupon bond will always be greater than one-half of the maturity.
True False
13. Duration is related to maturity in a linear manner through the interest rate of the asset.
True False
14. Duration is related to maturity in a nonlinear manner through the current yield to maturity of the asset.
True False
15. Duration of a zero coupon bond is equal to the bond's maturity.
True False

16. As interest rates rise, the duration of a consol bond decreases.
True False
17. Duration increases with the maturity of a fixed-income asset at a decreasing rate.
True False
18. For a given maturity fixed-income asset, duration decreases as the market yield increases.
True False
19. For a given maturity fixed-income asset, duration increases as the promised interest payment declines.
True False
20. Larger coupon payments on a fixed-income asset cause the present value weights of the cash flows to be lower in the duration calculation.
True False
21. The value for duration describes the percentage increase in the price of an asset for a given increase in the required yield or interest rate.
True False
22. For a given change in required yields, short-duration securities suffer a smaller capital loss or receive a smaller capital gain than do long-duration securities.
True False
23. Investing in a zero-coupon asset with a maturity equal to the desired investment horizon is one method of immunizing against changes in interest rates.
True False
24. Investing in a zero-coupon asset with a maturity equal to the desired investment horizon removes interest rate risk from the investment management process.
True False
25. Buying a fixed-rate asset whose duration is exactly equal to the desired investment horizon immunizes against interest rate risk.
True False
26. Deep discount bonds are semi-annual fixed-rate coupon bonds that sell at a market price that is less than par value.
True False
27. Using a fixed-rate bond to immunize a desired investment horizon means that the reinvested coupon payments are not affected by changes in market interest rates.
True False
28. An FI can immunize its portfolio by matching the maturity of its asset with its liabilities.
True False
29. The immunization of a portfolio against interest rate risk means that the portfolio will neither gain nor lose value when interest rates change.
True False
30. Perfect matching of the maturities of the assets and liabilities will always achieve perfect immunization for the equity holders of an FI against interest rate risk.
True False
31. Matching the maturities of assets and liabilities is not a perfect method of immunizing the balance sheet because the timing of the cash flows is likely to differ between the assets and liabilities.
True False

32. The duration of a portfolio of assets can be found by calculating the book value weighted average of the durations of the individual assets.
True False
33. For given changes in interest rates, the change in the market value of net worth of an FI is equal to the difference between the changes in the market value of the assets and market value of the liabilities.
True False
34. Immunizing the balance sheet of an FI against interest rate risk requires that the leverage adjusted duration gap (DA-kDL) should be set to zero.
True False
35. The smaller the leverage adjusted duration gap, the more exposed the FI is to interest rate shocks.
True False
36. The larger the interest rate shock, the smaller the interest rate risk exposure of an FI.
True False
37. Setting the duration of the assets higher than the duration of the liabilities will exactly immunize the net worth of an FI from interest rate shocks.
True False
38. Immunization of an FIs net worth requires the duration of the liabilities to be adjusted for the amount of leverage on the balance sheet.
True False
39. The leverage adjusted duration of a typical depository institution is positive.
True False
40. One method of changing the positive leverage adjusted duration gap for the purpose of immunizing the net worth of a typical depository institution is to increase the duration of the assets and to decrease the duration of the liabilities.
True False
41. Attempts to satisfy the objectives of shareholders and regulators requires the bank to use the same duration match in the protection of net worth from interest rate risk.
True False
42. Immunizing the net worth ratio requires that the duration of the assets be set equal to the duration of the liabilities.
True False
43. The cost in terms of both time and money to restructure the balance sheet of large and complex FIs has decreased over time.
True False
44. Immunizing net worth from interest rate risk using duration matching requires that the duration match must be realigned periodically as the maturity horizon approaches.
True False
45. The rate of change in duration values is less than the rate of change in maturity.
True False
46. As the investment horizon approaches, the duration of an unreballed portfolio that originally was immunized will be less than the time remaining to the investment horizon.
True False
47. The use of duration to predict changes in bond prices for given changes in interest rate changes will always underestimate the amount of the true price change.
True False

48. The fact that the capital gain effect for rate decreases is greater than the capital loss effect for rate increases is caused by convexity in the yield-price relationship.
True False
49. Convexity is a desirable effect to a portfolio manager because it is easy to measure and price.
True False
50. All fixed-income assets exhibit convexity in their price-yield relationships.
True False
51. The greater is convexity, the more insurance a portfolio manager has against interest rate increases and the greater potential gain from rate decreases.
True False
52. The error from using duration to estimate the new price of a fixed-income security will be less as the amount of convexity increases.
True False
53. Which of the following is indicated by high numerical value of the duration of an asset?
A. Low sensitivity of an asset price to interest rate shocks.
B. High interest inelasticity of a bond.
C. High sensitivity of an asset price to interest rate shocks.
D. Lack of sensitivity of an asset price to interest rate shocks.
E. Smaller capital loss for a given change in interest rates.
54. For small change in interest rates, market prices of bonds move in an inversely proportional manner according to the size of the
A. equity.
B. asset value.
C. liability value.
D. duration value.
E. Answers A and B only.
55. Which of the following statements about leverage adjusted duration gap is true?
A. It is equal to the duration of the assets minus the duration of the liabilities.
B. Larger the gap in absolute terms, the more exposed the FI is to interest rate shocks.
C. It reflects the degree of maturity mismatch in an FI's balance sheet.
D. It indicates the dollar size of the potential net worth.
E. Its value is equal to duration divided by $(1+R)$.
56. The larger the size of an FI, the larger the _____ from any given interest rate shock.
A. duration mismatch
B. immunization effect
C. net worth exposure
D. net interest income
E. risk of bankruptcy
57. The duration of all floating rate debt instruments is
A. equal to the time to maturity.
B. less than the time to repricing of the instrument.
C. time interval between the purchase of the security and its sale.
D. equal to time to repricing of the instrument.
E. infinity.

58. Managers can achieve the results of duration matching by using these to hedge interest rate risk.
- Rate sensitive assets.
 - Rate sensitive liabilities.
 - Coupon bonds.
 - Consol bonds.
 - Derivatives.
59. Immunizing the balance sheet to protect equity holders from the effects of interest rate risk occurs when
- the maturity gap is zero.
 - the repricing gap is zero.
 - the duration gap is zero.
 - the effect of a change in the level of interest rates on the value of the assets of the FI is exactly offset by the effect of the same change in interest rates on the liabilities of the FI.
 - after-the-fact analysis demonstrates that immunization coincidentally occurred.
60. The duration of a consol bond is
- less than its maturity.
 - infinity.
 - 30 years.
 - more than its maturity.
 - given by the formula $D=1/(1-R)$.
61. Immunization of a portfolio implies that changes in _____ will not affect the value of the portfolio.
- book value of assets
 - maturity
 - market prices
 - interest rates
 - duration
62. When does "duration" become a less accurate predictor of expected change in security prices?
- As interest rate shocks increase in size.
 - As interest rate shocks decrease in size.
 - When maturity distributions of an FI's assets and liabilities are considered.
 - As inflation decreases.
 - When the leverage adjustment is incorporated.
63. An FI has financial assets of \$800 and equity of \$50. If the duration of assets is 1.21 years and the duration of all liabilities is 0.25 years, what is the leverage-adjusted duration gap?
- 0.9000 years.
 - 0.9600 years.
 - 0.9756 years.
 - 0.8844 years.
 - Cannot be determined.
64. Calculate the duration of a two-year corporate bond paying 6 percent interest annually, selling at par. Principal of \$20,000,000 is due at the end of two years.
- 2 years.
 - 1.91 years.
 - 1.94 years.
 - 1.49 years.
 - 1.75 years.

65. Calculate the duration of a two-year corporate loan paying 6 percent interest annually, selling at par. The \$30,000,000 loan is 100 percent amortizing.
- A. 2 years.
 - B. 1.89 years.
 - C. 1.94 years.
 - D. 1.49 years.
 - E. 1.73 years.
66. Calculate the modified duration of a two-year corporate loan paying 6 percent interest annually. The \$40,000,000 loan is 100 percent amortizing, and the current yield is 9 percent annually.
- A. 2 years.
 - B. 1.91 years.
 - C. 1.94 years.
 - D. 1.49 years.
 - E. 1.36 years.
67. Which of the following statements is true?
- A. The optimal duration gap is zero.
 - B. Duration gap measures the impact of changes in interest rates on the market value of equity.
 - C. The shorter the maturity of the FI's securities, the greater the FI's interest rate risk exposure.
 - D. The duration of all floating rate debt instruments is equal to the time to maturity.
 - E. The duration of equity is equal to the duration of assets minus the duration of liabilities.
68. An FI purchases a \$9,982 million pool of commercial loans at par. The loans have an interest rate of 8 percent, a maturity of five years, and annual payments of principal and interest that will exactly amortize the loan at maturity. What is the duration of this asset?
- A. 4.12 years.
 - B. 3.07 years.
 - C. 2.50 years.
 - D. 2.85 years.
 - E. 5.00 years.
69. A \$1,000 six-year Eurobond has an 8 percent coupon, is selling at par, and contracts to make annual payments of interest. The duration of this bond is 4.99 years. What will be the new price using the duration model if interest rates increase to 8.5 percent?
- A. \$23.10.
 - B. \$976.90.
 - C. \$977.23.
 - D. \$1,023.10.
 - E. -\$23.10.
70. An FI purchases at par value a \$100,000 Treasury bond paying 10 percent interest with a 7.5 year duration. If interest rates rise by 4 percent, calculate the bond's new value. Recall that Treasury bonds pay interest semiannually. Use the duration valuation equation.
- A. \$28,571.43.
 - B. \$20,864.46.
 - C. \$15,000.00.
 - D. \$20,864.46.
 - E. \$71,428.57.
71. What is the duration of a two-year note selling at par and receiving 8 percent interest annually?
- A. 2 years.
 - B. 1.75 years.
 - C. 1.93 years.
 - D. 1.5 years.
 - E. 1.97 years.

72. What is the duration of a 5-year par value zero coupon bond yielding 10 percent annually?

- A. 0.50 years.
- B. 2.00 years.
- C. 4.40 years.
- D. 5.00 years.
- E. 4.05 years.

73. Calculating modified duration involves

- A. dividing the value of duration by the change in the market interest rate.
- B. dividing the value of duration by 1 plus the interest rate.
- C. dividing the value of duration by discounted change in interest rates.
- D. multiplying the value of duration by discounted change in interest rates.
- E. dividing the value of duration by the curvature effect.

An FI has a leverage-adjusted duration gap of 1.21 years, \$60 million in assets, 7 percent equity to assets ratio, and market rates are 8 percent.

74. What is the impact on the dealer's market value of equity per \$100 of assets if the relative change in all interest rates is an increase of 0.5 percent [i.e., $\Delta R/(1+R) = 0.5$ percent]

- A. +\$336,111.
- B. -\$0.605.
- C. -\$336,111.
- D. +\$0.605.
- E. -\$363,000.

75. What conclusions can you draw from the duration gap in your answer to the previous question?

- A. The market value of the dealer's equity decreases slightly if interest rates fall.
- B. The market value of the dealer's equity becomes negative if interest rates rise.
- C. The market value of the dealer's equity decreases slightly if interest rates rise.
- D. The market value of the dealer's equity becomes negative if interest rates fall.
- E. The dealer has no interest rate risk exposure.

Consider a one-year maturity, \$100,000 face value bond that pays a 6 percent fixed coupon annually.

76. What is the price of the bond if market interest rates are 7 percent?

- A. \$99,050.15.
- B. \$99,457.94.
- C. \$99,249.62.
- D. \$100,000.00.
- E. \$99,065.42.

77. What is the price of the bond if market interest rates are 5 percent?

- A. \$100,952.38.
- B. \$101,238.10.
- C. \$100,963.71.
- D. \$100,000.00.
- E. \$101,108.27.

78. What is the percentage price change for the bond if interest rates increase 50 basis points from the original 6 percent?

- A. -0.1033 percent.
- B. -0.4766 percent.
- C. -0.4695 percent.
- D. 0.0000 percent.
- E. -0.2907 percent.

Consider a six-year maturity, \$100,000 face value bond that pays a 5 percent fixed coupon annually.

79. What is the price of the bond if market interest rates are 4 percent?
- \$105,816.44.
 - \$105,287.67.
 - \$105,242.14.
 - \$100,000.00.
 - \$106,290.56.
80. What is the price of the bond if market interest rates are 6 percent?
- \$95,082.68.
 - \$95,769.55.
 - \$95,023.00.
 - \$100,000.00.
 - \$96,557.87.
81. What is the percentage price change for the bond if interest rates decline 50 basis points from the original 5 percent?
- 2.106 percent.
 - +2.579 percent.
 - +0.000 percent.
 - +3.739 percent.
 - +2.444 percent.

Assets	Par Amount	Rate	Liabilities	Par Amount	Rate
2-year commercial loans, annual fixed rate, at par	\$400 million	10 %	1-year CDs, annual fixed rate, at par	\$450 million	7 %
1-year Treasury bills	\$100 million		Net Worth	\$50 million	

82. What is the duration of the commercial loans?
- 1.00 years.
 - 2.00 years.
 - 1.73 years.
 - 1.91 years.
 - 1.50 years.
83. What is the FI's leverage-adjusted duration gap?
- 0.91 years.
 - 0.83 years.
 - 0.73 years.
 - 0.50 years.
 - 0 years.
84. What is the FI's interest rate risk exposure?
- Exposed to increasing rates.
 - Exposed to decreasing rates.
 - Perfectly balanced.
 - Exposed to long-term rate changes.
 - Insufficient information.

The following information is about current spot rates for an FI's assets (loans) and liabilities (CDs). All

Assets	Liabilities
1-year loan rate: 7.50 percent	1-year CD rate: 6.50 percent
2-year loan rate: 8.15 percent	2-year CD rate: 6.65 percent

interest rates are fixed and paid annually.

85. If rates do not change, the balance sheet position that maximizes the FI's returns is
 - A. a positive spread of 15 basis points by selling 1-year CDs to finance 2-year CDs.
 - B. a positive spread of 100 basis points by selling 1-year CDs to finance 1-year loans.
 - C. a positive spread of 85 basis points by financing the purchase of a 1-year loan with a 2-year CD.
 - D. a positive spread of 165 basis points by selling 1-year CDs to finance 2-year loans.
 - E. a positive spread of 150 basis points by selling 2-year CDs to finance 2-year loans.
86. What is the interest rate risk exposure of the optimal transaction in the previous question over the next 2 years?
 - A. The risk that interest rates will rise since the FI must purchase a 2-year CD in one year.
 - B. The risk that interest rates will rise since the FI must sell a 1-year CD in one year.
 - C. The risk that interest rates will fall since the FI must sell a 2-year loan in one year.
 - D. The risk that interest rates will fall since the FI must buy a 1-year loan in one year.
 - E. There is no interest rate risk exposure.
87. What is the duration of the two-year loan (per \$100 face value) if it is selling at par?
 - A. 2.00 years.
 - B. 1.92 years.
 - C. 1.96 years.
 - D. 1.00 year.
 - E. 0.91 years.
88. If the FI finances a \$500,000 2-year loan with a \$400,000 1-year CD and equity, what is the leveraged adjusted duration gap of this position? Use your answer to the previous question.
 - A. +1.25 years.
 - B. +1.12 years.
 - C. -1.12 years.
 - D. +0.92 years.
 - E. -1.25 years.
89. Use the duration model to approximate the change in the market value (per \$100 face value) of two-year loans if interest rates increase by 100 basis points.
 - A. -\$1.756.
 - B. -\$1.775.
 - C. +\$98.24.
 - D. -\$1.000.
 - E. +\$1.924.

Based on an 18-month, 8 percent (semiannual) coupon Treasury note selling at par.

90. What is the duration of this Treasury note?
 - A. 1.500 years.
 - B. 1.371 years.
 - C. 1.443 years.
 - D. 2.882 years.
 - E. 1.234 years.
91. If interest rates increase by 20 basis points (i.e., $\Delta R = 20$ basis points), use the duration approximation to determine the approximate price change.
 - A. \$0.000.
 - B. \$0.2775 per \$100 face value.
 - C. \$2.775 per \$100 face value.
 - D. \$0.2672 per \$100 face value.
 - E. \$2.672 per \$100 face value.

The two-year Treasury notes are zero coupon assets. Interest payments on all other assets and liabilities occur at maturity. Assume 360 days in a year.

Assets	Liabilities
\$ 300 million 30-day Treasury bills	\$ 1,150 million 14-day repos
\$ 550 million 90-day Treasury bills	\$ 560 million 1-year commercial paper
\$ 700 million 2-year Treasury notes	\$ 20 million equity
\$ 180 million 180-day municipal notes	

92. What is the duration of the assets?
 - A. 0.708 years.
 - B. 0.354 years.
 - C. 0.350 years.
 - D. 0.955 years.
 - E. 0.519 years.
93. What is the duration of the liabilities?
 - A. 0.708 years.
 - B. 0.354 years.
 - C. 0.350 years.
 - D. 0.955 years.
 - E. 0.519 years.
94. What is the leverage-adjusted duration gap?
 - A. 0.605 years.
 - B. 0.956 years.
 - C. 0.360 years.
 - D. 0.436 years.
 - E. 0.189 years.

Consider a five-year, 8 percent annual coupon bond selling at par of \$1,000.

95. What is the duration of this bond?
 - A. 5 years.
 - B. 4.31 years.
 - C. 3.96 years.
 - D. 5.07 years.
 - E. Not enough information to answer.
96. If interest rates increase by 20 basis points, what is the approximate change in the market price using the duration approximation?
 - A. -\$7.98.
 - B. -\$7.94.
 - C. -\$3.99.
 - D. +\$3.99.
 - E. +\$7.94.
97. Using present value bond valuation techniques, calculate the exact price of the bond after the interest rate increase of 20 basis points.
 - A. \$1,007.94.
 - B. \$992.02.
 - C. \$992.06.
 - D. \$996.01.
 - E. \$1003.99.

Treasury bill	\$ 90	Time deposits	\$1,100
Treasury notes	\$ 55	Fed funds sold	\$ 230
Treasury bonds	\$ 176	Demand deposits	\$2,500
Loans	\$4,679	Equity	\$1,170

The numbers provided are in thousands of dollars.

Notes: All Treasury bills have six months until maturity. One-year Treasury notes are priced at par and have a coupon of 7 percent paid semiannually. Treasury bonds have an average duration of 4.5 years and the loan portfolio has a duration of 7 years. Time deposits have a 1-year duration and the Fed funds duration is .003 years.

98. What is the duration of the bank's Treasury note portfolio?
- 1.07 years.
 - 1.00 year.
 - 0.98 years.
 - 0.92 years.
 - Insufficient information.
99. What is the bank's leverage adjusted duration gap?
- +6.73 years.
 - +0.29 years.
 - 6.44 years.
 - +6.51 years.
 - 0 years.
100. If all interest rates fall by 1 percent, calculate the impact on the bank's market value of equity using the duration approximation. (That is, $\Delta R/(1+R) = -1$ percent)
- The bank's market value of equity increases by \$325,450.
 - The bank's market value of equity decreases by \$325,450.
 - The bank's market value of equity increases by \$336,500.
 - The bank's market value of equity decreases by \$336,500.
 - There is no change in the bank's market value of equity.
- A bond is scheduled to mature in five years. Its coupon rate is 9 percent with interest paid annually. This \$1,000 par value bond carries a yield to maturity of 10 percent.
101. What is the bond's price?
- \$962.09.
 - \$961.39.
 - \$1,000.
 - \$1,038.90.
 - \$995.05.
102. What is the duration of the bond?
- 4.677 years.
 - 5.000 years.
 - 4.674 years.
 - 4.328 years.
 - 4.223 years.
103. Calculate the percentage change in this bond's price if interest rates on comparable risk securities decline to 7 percent. Use the duration valuation equation.
- +8.58 percent.
 - +12.76 percent.
 - 12.75 percent.
 - +11.80 percent.
 - +11.52 percent.

104. Calculate the percentage change in this bond's price if interest rates on comparable risk securities increase to 11 percent. Use the duration valuation equation.
- A. +4.25 percent.
 - B. -4.25 percent.
 - C. +8.58 percent.
 - D. -3.93 percent.
 - E. -3.84 percent.

Assets	Amount	Rate	Duration
Cash	\$75 million		
Loans	\$750 million	12 percent	1.75 years
Treasuries	\$175 million	9 percent	7.00 years
Liabilities and Equity			
Time Deposits	\$350 million	7 percent	1.75 years
CDs	\$575 million	8 percent	2.50 years
Equity	\$75 million		

105. Calculate the duration of the assets.

- A. 2.54 years.
- B. 4.375 years.
- C. 1.75 years.
- D. 3.08 years.
- E. 2.50 years.

106. Calculate the duration of the liabilities.

- A. 2.05 years.
- B. 1.75 years.
- C. 2.22 years.
- D. 2.125 years.
- E. 2.50 years.

107. Calculate the leverage-adjusted duration gap and state the FI's interest rate risk exposure.

- A. +1.03 years; exposed to interest rate increases.
- B. +0.32 years; exposed to interest rate increases.
- C. +0.86 years; exposed to interest rate increases.
- D. +0.49 years; exposed to interest rate increases.
- E. -1.32 years; exposed to interest rate decreases.

108. If all interest rates decline 90 basis points ($\Delta R/(1+R) = -90$ basis points), what is the change in the market value of equity?

- A. -\$4.430 million.
- B. +\$3.925 million.
- C. +\$4.378 million.
- D. +\$2.550 million.
- E. +\$0.022 million.

U.S. Treasury quotes from the WSJ on Oct. 15, 1993:

Rate	Maturity	Ask	Change	Ask yield
7.1250	Oct 15, 1995	102.08	-1	5.9156

109. What is the duration of the above Treasury note? Use the asked price to calculate the duration. Recall that Treasuries pay interest semiannually.

- A. 3.86 years.
- B. 1.70 years.
- C. 2.10 years.
- D. 1.90 years.
- E. 3.40 years.

- 110.If yields increase by 10 basis points, what is the approximate price change on the \$100,000 Treasury note? Use the duration approximation relationship.
- A. +\$188.69.
 - B. +\$16.05.
 - C. -\$1,605.05.
 - D. -\$16.05.
 - E. +\$160.51.

The numbers provided are in millions of dollars and reflect market values:

Cash		20	Deposits	historical avg. maturity = 4 years; historical average duration = 3.5 years	200
T-Bills	30 days (4.5 percent, par)	50	Certificates of Deposit	avg. maturity = 6 months; avg. duration = 6 months	150
T-Bills	91 days (5.0 percent, par)	60	Short-term Debt	avg. maturity = 4 years	150
Commercial Loans	avg. maturity = 9.0 years; avg. duration = 7.5 years	300	Long-term debt	avg. maturity = 15 years; average duration = 12 years	200
Consumer Loans	avg. maturity = 6.0 years; avg. duration = 4.0 years	200	Equity		130
Mortgage Loans – Fixed rate	avg. maturity = 30 years; avg. duration = 25 years	150			
Mortgage Loans - Adjustable	avg. maturity = 30 years; interest rate reset = 6 months	50			
Total Assets:		830	Total Liabilities & Equity:		830

- 111.The short-term debt consists of 4-year bonds paying an annual coupon of 4 percent and selling at par. What is the duration of the short-term debt?
- A. 3.28 years.
 - B. 3.53 years.
 - C. 3.78 years.
 - D. 4.03 years.
 - E. 4.28 years.
- 112.What is the weighted average duration of the assets of the FI?
- A. 7.25 years.
 - B. 7.75 years.
 - C. 8.25 years.
 - D. 8.75 years.
 - E. 9.25 years.
- 113.What is the weighted average duration of the liabilities of the FI?
- A. 5.00 years.
 - B. 5.35 years.
 - C. 5.70 years.
 - D. 6.05 years.
 - E. 6.40 years.

114. What is the leverage adjusted duration gap of the FI?
- 3.61 years.
 - 3.74 years.
 - 4.01 years.
 - 4.26 years.
 - 4.51 years.
115. A risk manager could restructure assets and liabilities to reduce interest rate exposure for this example by
- increasing the average duration of its assets to 9.56 years.
 - decreasing the average duration of its assets to 4.00 years.
 - increasing the average duration of its liabilities to 6.78 years.
 - increasing the average duration of its liabilities to 9.782 years.
 - increasing the leverage ratio, k , to 1.
116. The shortcomings of this strategy are the following except
- duration changes as the time to maturity changes, making it difficult to maintain a continuous hedge.
 - estimation of duration is difficult for some accounts such as demand deposits and passbook savings account.
 - it ignores convexity which can be distorting for large changes in interest rates.
 - it is difficult to compute market values for many assets and liabilities.
 - it does not assume a flat term structure, so its estimation is imprecise.
117. What is the effect of a 100 basis point increase in interest rates on the market value of equity of the FI? Use the duration approximation relationship. Assume $r = 4$ percent.
- 27.56 million.
 - 28.01 million.
 - 29.85 million.
 - 31.06 million.
 - 33.76 million.

The following is an FI's balance sheet (\$millions).

Assets	Amount	Duration	Liabilities	Amount	Duration
Cash	\$ 1	0 years	Dem. Deposits	\$100	0 years
FF&RP	20	0.01 years	FF&RP	50	0.01 years
Munis	50	x	CDs	90	1.0 years
Loans	200	y	Net Worth	31	

Notes to Balance Sheet:

Munis are 2-year 6 percent annual coupon municipal notes selling at par. Loans are floating rates, repriced quarterly. Spot discount yields for 91-day Treasury bills are 3.75 percent. CDs are 1-year pure discount certificates of deposit paying 4.75 percent.

118. What is the duration of the municipal notes (the value of x)?
- 1.94 years.
 - 2.00 years.
 - 1.00 years.
 - 1.81 years.
 - 0.97 years.
119. What is this bank's interest rate risk exposure, if any?
- The bank is exposed to decreasing interest rates because it has a negative duration gap of -0.21 years.
 - The bank is exposed to increasing interest rates because it has a negative duration gap of -0.21 years.
 - The bank is exposed to increasing interest rates because it has a positive duration gap of +0.21 years.
 - The bank is exposed to decreasing interest rates because it has a positive duration gap of +0.21 years.
 - The bank is not exposed to interest rate changes since it is running a matched book.

120. What will be the impact, if any, on the market value of the bank's equity if all interest rates increase by 75 basis points? (i.e., $\Delta R/(1+R) = 0.0075$)
- A. The market value of equity will decrease by \$15,750.
 - B. The market value of equity will increase by \$15,750.
 - C. The market value of equity will decrease by \$426,825.
 - D. The market value of equity will increase by \$426,825.
 - E. There will be no impact on the market value of equity.

The following questions are based on material in Appendix 9B.

121. Calculating modified duration involves dividing the value of duration by the change in the market interest rate.

True False

122. The degree of curvature in the price-yield relationship is reflected by the CX parameter which measures the degree to which the capital loss effect exceeds the capital gain effect.

True False

123. Convexity decreases as the maturity decreases.

True False

124. Given the same maturity, zero coupon bonds have more convexity than coupon bonds.

True False

125. Given the same duration, zero coupon bonds have more convexity than coupon bonds.

True False

126. A key assumption of the (Macaulay) duration model is that the term structure of interest rates must be upward sloping.

True False

127. In the purest sense, the appropriate duration measure of a bond should be found by discounting the cash flows of the bond by the discount rates on similar maturity zero coupon bonds.

True False

128. The purest duration measure, D^* , is robust in the sense that changes in the yield curve from which it was calculated will not change its value.

True False

129. The effect of rescheduling an interest payment on a defaulted bond will cause the measure of duration to increase.

True False

130. The duration value for floating-rate assets is calculated in the same manner as for fixed-rate assets.

True False

131. One method of calculating the duration of demand deposits is to consider duration to be the average turnover of the deposit accounts in days.

True False

132. Duration is difficult to calculate for mortgages and mortgage-backed securities because of prepayment risk.

True False

133. The convexity adjustment
- A. overestimates price decreases.
 - B. underestimates price increases.
 - C. approximates the curvature of the nonlinear price valuation function.
 - D. is less accurate for large interest rate changes because of its nonlinearity.
 - E. is more accurate for large interest rate changes because of its linearity.
134. All of the following statements are true for fixed-rate bonds EXCEPT
- A. given the market interest rate and coupon rates, convexity increases as maturity increases.
 - B. given the same maturity and market interest rate, convexity is lower for coupon bonds than for zero coupon bonds.
 - C. given the same duration and market interest rates, zero-coupon bonds are less convex than coupon bonds.
 - D. for incremental changes in the various properties of convexity, duration and convexity always change in the same direction.
 - E. given the same maturity and coupon rates, convexity changes with changes in the market interest rates.
- Consider a six-year, \$1,000 par value, zero-coupon bond yielding 8 percent.
135. What is the duration of this bond?
- A. 4 years.
 - B. 5 years.
 - C. 6 years.
 - D. 4.5 years.
 - E. 5.25 years.
136. If interest rates increase to 9 percent, what is the amount of error ($P_{\text{duration}} - P_{\text{market}}$) in the price estimate using the duration relationship versus the true bond price determined in the market?
- A. -\$1.11.
 - B. +\$2.47.
 - C. +\$1.16.
 - D. -\$2.47.
 - E. -\$1.16.
137. What is the convexity factor (CX) for this bond?
- A. 36.
 - B. 28.
 - C. 130.
 - D. 25.72.
 - E. 312.
138. What is the change in price caused by convexity in the duration-convexity model for an interest rate increase to 9 percent?
- A. \$0.882.
 - B. \$1.134.
 - C. \$4.096.
 - D. \$0.810.
 - E. \$9.831.

The following questions are based on material in Appendix 9B.

For the following four (4) questions, consider a 4-year, \$1,000 par value, 7 percent annual coupon bond that is trading to yield 7 percent.

139. What is the duration of this bond?
- A. 4.000 years.
 - B. 3.557 years.
 - C. 2.000 years.
 - D. 3.624 years.
 - E. 3.847 years.

140. If interest rates increase to 8 percent, what is the amount of error ($P_{\text{duration}} - P_{\text{market}}$) in the price estimate using the duration relationship versus the true bond price determined in the market?
- +\$0.12.
 - \$0.75.
 - \$4.26.
 - +\$0.75.
 - \$0.12.
141. What is the convexity factor (CX) for this bond?
- 36.
 - 28.
 - 130.
 - 15.30.
 - 312.
142. What is the change in price caused by convexity in the duration-convexity model for an interest rate increase to 8 percent?
- \$0.765.
 - \$15.60.
 - \$1.80.
 - \$1.40.
 - \$6.50.

Assume all interest is paid annually. All coupon instruments are priced at par.

Assets	Rate	Liabilities	Rate
1-year Treasury bill	4.75 %	1-year CD	4.80 %
2-year Treasury note	4.90 %	2-year CD	4.95 %
2-year AAA-corporate debt	5.00 %	Treasury note futures	4.90 %

143. If your bank wanted to maximize net interest income, what position would you put on?
- Earn a spread of 15 basis points by selling 1-year T-bills to invest in 2-year T- notes.
 - Earn a spread of 25 basis points by selling 1-year T-bills to invest in AAA-debt.
 - Earn a spread of 20 basis points by issuing 1-year CDs to invest in AAA-debt.
 - Earn a spread of 25 basis points by selling 2-year T-note to invest in 2-year CDs.
 - Earn a spread of 5 basis points by issuing 2-year CDs to invest in AAA-debt.
144. What would be the risk exposure of the position that maximizes net interest income?
- Credit risk only.
 - Interest rate risk only.
 - Currency risk only.
 - All of the above.
 - Answers A and B only.
145. If your bank puts on the position to maximize net interest income, what will be the impact on the bank's end of year 2 net interest income if all interest rates immediately (at $t=0$) increase 25 basis points?
- End of year 2 net interest income is -0.05 percent.
 - End of year 2 net interest income is +0.05 percent.
 - End of year 2 net interest income is +0.25 percent.
 - End of year 2 net interest income is +0.20 percent.
 - End of year 2 net interest income is -0.20 percent.
146. What is the duration of the Treasury note?
- 2.00 years.
 - 1.95 years.
 - 1.93 years.
 - 3.00 years.
 - 1.00 year.

147. What is the duration of the Treasury bill?
- A. 2.00 years.
 - B. 1.95 years.
 - C. 1.93 years.
 - D. 3.00 years.
 - E. 1.00 year.
148. What is the duration of the 2-year CD?
- A. 2.00 years.
 - B. 1.95 years.
 - C. 1.93 years.
 - D. 3.00 years.
 - E. 1.00 year.
149. What is the duration of the AAA-corporate debt?
- A. 2.00 years.
 - B. 1.95 years.
 - C. 1.93 years.
 - D. 3.00 years.
 - E. 1.00 year.
150. If AAA-corporate debt rates increase 10 basis points, use duration to calculate the approximate price change for a \$100,000 bond.
- A. -\$185.71.
 - B. +\$185.71.
 - C. -\$95.24.
 - D. +\$95.24.
 - E. -\$1,838.10.
151. Use convexity to find the approximate price change for the 2-year AAA-corporate debt if interest rates increase by 10 basis points.
- A. -\$185.71.
 - B. +\$184.41.
 - C. -\$94.94.
 - D. +\$94.94.
 - E. -\$1,837.80.
152. If the position that maximizes net interest income is fully financed using liabilities (i.e. there is no capital contribution), what is the position's duration gap?
- A. 0 years.
 - B. 1 year.
 - C. 0.95 years.
 - D. 1.93 years.
 - E. 0.05 years.
153. Using the position's duration gap, what is the impact on the bank's capital if all interest rates increase by a percentage rate of 10 basis points? (That is, $\Delta R / (1 + R) = 0.10$ percent)
- A. No impact.
 - B. A decline in the market value of capital of 0.095 percent.
 - C. An increase in the market value of capital of 0.095 percent.
 - D. A decline in the market value of capital of 0.50 percent.
 - E. An increase in the market value of capital of 0.50 percent.

ch09 Key

1. FALSE
2. FALSE
3. TRUE
4. TRUE
5. TRUE
6. FALSE
7. TRUE
8. FALSE
9. TRUE
10. TRUE
11. FALSE
12. FALSE
13. FALSE
14. TRUE
15. TRUE
16. TRUE
17. TRUE
18. TRUE
19. FALSE
20. FALSE
21. FALSE
22. TRUE
23. TRUE
24. TRUE
25. TRUE
26. FALSE
27. FALSE
28. FALSE
29. TRUE
30. FALSE
31. TRUE
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35. FALSE
36. FALSE

37. FALSE
38. TRUE
39. TRUE
40. FALSE
41. FALSE
42. TRUE
43. TRUE
44. TRUE
45. TRUE
46. FALSE
47. FALSE
48. TRUE
49. FALSE
50. TRUE
51. TRUE
52. FALSE
53. C
54. D
55. B
56. C
57. D
58. E
59. D
60. A
61. D
62. A
63. C
64. C
65. D
66. E
67. B
68. D
69. B
70. E
71. C
72. D
73. B
74. B

75. C
76. E
77. A
78. C
79. C
80. A
81. B
82. D
83. B
84. A
85. D
86. B
87. B
88. B
89. B
90. C
91. B
92. D
93. B
94. A
95. B
96. A
97. C
98. C
99. D
100. A
101. A
102. E
103. E
104. E
105. A
106. C
107. D
108. C
109. D
110. A
111. C
112. C

113. B
114. B
115. D
116. E
117. C
118. A
119. C
120. C
121. FALSE
122. FALSE
123. TRUE
124. TRUE
125. FALSE
126. FALSE
127. TRUE
128. FALSE
129. TRUE
130. FALSE
131. TRUE
132. TRUE
133. C
134. D
135. C
136. A
137. A
138. B
139. D
140. B
141. A
142. B
143. C
144. E
145. A
146. B
147. E
148. B
149. B
150. A

151. A

152. C

153. B

ch09 Summary

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