## Chapter 4 Questions

1. Explain why you would be more or less willing to buy a share of Polaroid stock in the following situations:
	1. Your wealth falls.
	2. You expect it to appreciate in value.
	3. The bond market becomes more liquid.
	4. Prices in the bond market become more volatile.
2. Explain why you would be more or less willing to buy a house under the following circumstances:
	1. You just inherited $100,000.
	2. Real estate commissions fall from 6% of the sales price to 4% of the sales price.
	3. You expect Polaroid stock to double in value next year.
	4. You expect housing prices to fall.
3. “The more risk-averse people are, the more likely they are to diversify.” Is this statement true, false or uncertain? Explain your answer.
4. I own a professional football team, and I plan to diversify in either a company that owns a professional basketball team or a pharmaceutical company. Which of these two investments is more likely to reduce the overall risk I face? Why?
5. “No one who is risk-averse will ever buy a security that has a lower expected return, more risk and less liquidity than another security.” Is this statement true, false or uncertain? Explain your answer.

For questions 6-13, answer each question by drawing the appropriate supply and demand diagrams.

1. An important way in which the Federal Reserve decreases the money supply is by selling bonds to the public. Using a supply-and-demand analysis for bonds, show what effect this action has on interest rates.
2. Using the supply-and-demand for bonds framework show why interest rates are pro-cyclical (rising when the economy is expanding and falling during recessions).
3. Find the “Credit Markets” column in the Wall Street Journal. Underline the statements in the column that explain bond price movements, and draw the appropriate supply-and-demand diagrams that support these statements.
4. What effect will a sudden increase in the volatility of gold prices have on interest rates?
5. How might a sudden increase in people’s expectations of future real estate prices affect interest rates?
6. Explain what effect a large federal deficit might have on interest rates.
7. Using a supply and demand analysis for bonds, show what the effect is on interest rates when the riskiness of bonds rises.
8. Will there be an effect on interest rates if brokerage commissions on stocks fall? Explain your answer.

## Explaining the Future

1. The president of the United States announces in a press conference that he will fight the higher inflation rate with a new anti-inflation program. Predict what will happen to interest rates if the public believes him.
2. The chairman of the Fed announces that interest rates will rise sharply next year, and the market believes him. What will happen to today’s interest rate on AT&T bonds, such as the 8 1/8s of 2022?
3. Predict what will happen to interest rates if the public suddenly expects a large increase in stock prices?
4. Predict what will happen to interest rates if prices in the bond market become more volatile.

## Chapter 4 Quantitative Problems

1. You own a $1,000-par zero-coupon bond that has 5 years of remaining maturity. You plan on selling the bond in one year, and believe that the yield to maturity next year will have the following probability distribution

|  |  |
| --- | --- |
| Probability  | Yield % |
| 0.1 | 6.60% |
| 0.2 | 6.75% |
| 0.4 | 7.00% |
| 0.2 | 7.20% |
| 0.1 | 7.45% |

* 1. What is your expected price when you sell the bond?
	2. What is the standard deviation of the bond price?
1. Consider a $1,000-par junk bond paying a 12% annual coupon with 2 years to maturity. The issuing company has a 20% chance of defaulting this year in which case the bond would not pay anything. If the company survives the first year, paying the annual coupon payment then it has a 25% chance of defaulting in the second year. If the company defaults in the second year then neither the final coupon payment nor the par value of the bond will be paid
	1. What price must investors pay for this bond to expect a 10% yield to maturity?
	2. At that price what is the expected holding period return and standard deviation of returns? Assume that periodic cash flows are reinvested at 10%
2. Last month, corporations supplied $250 billion in 1 year discount bonds to investors at an average market rate of 11.8%. This month, an additional $25bn in one-year discount bonds became available, and market rates increased to 12.2%. Assuming that the demand curve remained constant, derive a linear equation for the demand for bonds, using prices instead of interest rates.
3. An economist has concluded that, near the point of equilibrium, the demand curve and supply curve for 1-year discount bonds can be estimated using the following equations

$$B^{d}:Price= \frac{-2}{5}Quantity+940$$

$$B^{s}:Price= Quantity+500$$

* 1. What is the expected equilibrium price and quantity of bonds in this market?
	2. Given your answer to part (a), what is the expected interest rate in this market?
1. Use the same supply and demand curves in question 4. Following a dramatic increase in the value of the stock market, many retirees starting moving money out of the stock market and into bonds. This results in a parallel shift in the demand for bonds, such that the price of bonds at all quantities increased $50. Assuming no change in the supply equation for bonds, what is the new equilibrium price and quantity? What is the new market interest rate?
2. The demand curve and supply curve for 1-year discount bonds were estimated using the following equations:

$$B^{d}:Price= \frac{-2}{5}Quantity+990$$

$$B^{s}:Price= Quantity+500$$

As the stock market continued to rise, the Federal Reserve felt the need to increase the interest rates. As a result the new market interest rate increased to 19.65%, but the equilibrium quantity remained unchanged. What are the new demand and supply equations. Assume parallel shifts in the equations.

## Chapter 5 Questions

1. Which should have the higher risk premium on its interest rates, a corporate bond with a Moody’s Baa rating or a corporate bond with a C rating? Why?
2. Why do U.S. Treasury Bills have lower interest rates than large-denomination negotiable bank CDs?
3. Risk premiums on corporate bonds are usually anti-cyclical; that is they decrease during business cycle expansions and increase during recessions? Why?
4. “If bonds of different maturities are close substitutes, their interest rates are more likely to move together.” Is this statement true, false or uncertain? Explain your answer.
5. If yield curves, on average, were flat, what would this say about the liquidity premiums in the term structure? Would you be more or less willing to accept the pure expectations theory?
6. If a yield curve looks like the one shown here, what is the market predicting about future short-term interest rates? What might the yield curve indicate about the inflation rate in the future?



1. If the yield curve looks like the one below, what is the market predicting about the movement of future short-term interest rates? What might the yield curve indicate about the inflation rate in the future?
2. What effect would reducing income tax rates have on the interest rates of municipal bonds? Would interest rates of Treasury securities be affected, and, if so, how?
3. Predict what will happen to interest rates on a corporation’s bonds if the federal government guarantees today that it will pay creditors if the corporation goes bankrupt in the future? What will happen to the interest rates on Treasury securities?
4. Predict what would happen to the risk premium on corporate bonds if brokerage commissions were lowered in the corporate bond market.
5. If the income tax exemption on municipal bonds were abolished, what would happen to the interest rate on these bonds? What effect would it have on the rates of US treasury securities?

## Chapter 5 Quantitative Problems

1. Assuming that the expectations theory is the correct theory of the term structure, calculate the interest rates in the term structure for maturities of 1 to 5 years and plot the resulting yield curves for the following series of 1-year interest rates over the next 5 years:
	1. 5%, 7%, 7%, 7%, 7%
	2. 5%, 4%, 4%, 4%, 4%

How would your yield curves change if people preferred shorter-term bonds over longer-term bonds?

1. Government economists have forecasted one-year T-bill rates for the following 5 years:

|  |  |
| --- | --- |
| Year | 1-year rate % |
| 1 | 4.25 |
| 2 | 5.15 |
| 3 | 5.50 |
| 4 | 6.25 |
| 5 | 7.10 |

You have a liquidity premium of 0.25% for the next two years and 0.50% thereafter. Would you be willing to purchase a 4-year T-Bond at a 5.75% interest rate?

1. How does the after-tax yield on a $1,000,000 municipal bond with a coupon rate of 8% paying interest annually, compare with that of a $1,000,000 corporate bond with a coupon rate of 10% paying interest annually? Assume you are in the 25% tax bracket.
2. Consider the decision to purchase either a 5-year corporate bond or a 5-year municipal bond. The corporate bond is a 12% annual coupon bond with a par value of $1,000. It is currently yielding 11.5%. The municipal bond has an 8.5% annual coupon and a par value of $1,000. It is currently yielding 7%. Which of the two bonds would be more beneficial to you? Assume that your marginal tax rate is 35%.
3. Debt is issued by Southeastern Corporation currently yields 12%. A municipal bond of equal risk currently yields 8%. At what marginal tax rate would an investor be indifferent between these two bonds?
4. One year T-bill rates are expected to steadily increase by 150 basis points per year over the next six years. Determine the required interest rate on a three-year T-bond and a six-year T-bond if the current 1-year interest rate is 7.5%. Assume that the expectations hypothesis for interest rates holds.
5. The one year interest rate over the next 10 years will be 3%, 4.5%, 6%, 7.5%, 9%, 10.5%, 13%, 14.5%, 16% and 17.5%. Using the expectations theory, what will be the interest rates on a 3-year, 6-year and 9-year bond?
6. Using the information from the previous question, now assume that investors prefer holding short-term bonds. A liquidity premium of 10 basis points is required for each year of a bond’s maturity. What will be the interest rate on a 3-year, 6-year and 9-year bond?
7. Which bond will produce a greater return if the expectations theory were to hold true, a two-year bond with an interest rate of 15% or two 1-year bonds with sequential interest payments of 13% and 17%?
8. Little Monsters Inc., borrowed $1,000,000 for two years from NorthernBank Inc., at an 11.5% interest rate. The current risk-free rate is 2%, and Little Monsters’ financial conditions warrants a default risk premium of 3% and a liquidity risk premium of 2%. The maturity risk premium for a two-year loan is 1%, and inflation is expected to be 3% next year. What does this information imply about the rate of inflation in the second year?
9. One year T-bill rates are 2% currently. If interest rates are expected to go up after three years by 2% every year, what should be the required interest rate on a 10-year bond issued today? Assume that the expectations theory holds.
10. One year T-bill rates over the next four years are expected to be 3%, 4%, 5% and 5.5%. If four-year T-Bonds are yielding 4.5%, what is the liquidity premium on this bond?
11. At your favorite bond store, Bonds-R-Us, you see the following prices
	1. 1 year $100 zero selling for $90.19
	2. Three-year 10% coupon $1,000 par bond selling for $1,000
	3. Two-year 10% coupon $1,000 par bond selling for $1,000

Assume that the expectations theory for the term structure of interest rates holds, no liquidity premium exists, and the bonds are equally risky. What is the implied one-year rate two years from now?

1. You observe the following market interest rates for both borrowing and lending:
	1. One year rate = 5%
	2. Two year rate = 6%
	3. One year rate one year from now = 7.25%

How can you take advantage of these rates to earn a riskless profit? Assume that the expectations theory of interest rates holds.

1. If the interest rates on 1 to 5 year bonds are currently 4%, 5%, 6%, 7% and 8%, and the term premiums for 1 to 5 year bonds are 0%, 0.25%, 0.35%, 0.4% and 0.5%, predict what the one-year interest rate will be two years from now.

## Additional Questions

1. Current yields on 1 year T-bills are 25bps. The current yield to maturity on 10 year T-bonds is 2%. Assume both instruments are trading at par today. If we buy the T-Bond and expect to hold it for 1 year. If the return on the bond over the holding period is the same as the T-Bill rate at what price will one sell the bond? What is the 1-year forward yield to maturity on the T-Bond? Assume semi-annual coupons on the T-Bond where each coupon pays half the T-Bond rate.
2. Assume the expectations theory of interest rates. The current yield to maturity on 5 year T-Bonds is 1.25%. Assume that we buy the T-Bond at par today and hold it for 1 year. In one years time we sell the T-Bond at 99.17. What is the 1-year T-Bill rate today? What is the 1-year forward 4-year T-Bond rate?
3. You own a $100-par 5% annual coupon bond that has 10 years of remaining maturity. Today’s yield to maturity on this bond is 7%. You plan on selling the bond in one year, and believe that the yield to maturity next year will have the following probability distribution

|  |  |
| --- | --- |
| Probability  | Yield % |
| 0.1 | 6.60% |
| 0.2 | 6.75% |
| 0.4 | 7.00% |
| 0.2 | 7.20% |
| 0.1 | 7.45% |

* 1. What is your expected price when you sell the bond?
	2. What is the standard deviation of the bond price?
	3. What is the probability of losing money on my bond investment?
	4. What is your expected return when you sell the bond?
	5. What is the standard deviation of return?
1. If the 26W T-Bill rate is 3% and the 52W T-Bill rate is 2.75% then what is the expected 26W T-Bill rate in 26W time. Use the market expectations theory.
2. If the 26W T-Bill rate is 4% and the expected 26W T-Bill rate in 26W time is 4.25%, what is the 52W T-Bill rate? Use the market expectations theory.
3. If the 26W T-Bill rate is 3%, the 52W T-Bill rate is 3.25% and expected 26W T-Bill rate in 26W time is 2.75% what is the liquidity premium for the 52W T-Bill? Use the Liquidity Premium Theory of Term Structure.
4. If the 26W T-Bill rate is 2%, the 52W T-Bill rate is 2.25% and the liquidity premium for the 52W T-Bill is 0.25%, what is the expected 26W T-Bill rate in 26W time? Use the Liquidity Premium Theory of Term Structure.