Chapter 5 History of Interest Rates and Risk Premiums

Multiple Choice Questions

1. Over the past year you earned a nominal rate of interest of 10 percent on your money. The inflation rate was 5 percent over the same period. The exact actual growth rate of your purchasing power was
   A) 15.5%.
   B) 10.0%.
   C) 5.0%.
   D) 4.8%.
   E) 15.0%

   Answer: D Difficulty: Moderate

   Rationale: r = (1+R) / (1+I) - 1 ; 1.10% / 1.5% - 1 = 4.8%.

2. A year ago, you invested $1,000 in a savings account that pays an annual interest rate of 7%. What is your approximate annual real rate of return if the rate of inflation was 3% over the year?
   A) 4%.
   B) 10%.
   C) 7%.
   D) 3%.
   E) none of the above.

   Answer: A Difficulty: Easy

   Rationale: 7% - 3% = 4%.

3. If the annual real rate of interest is 5% and the expected inflation rate is 4%, the nominal rate of interest would be approximately
   A) 1%.
   B) 9%.
   C) 20%.
   D) 15%.
   E) none of the above.

   Answer: B Difficulty: Easy

   Rationale: 5% + 4% = 9%.

4. You purchased a share of stock for $20. One year later you received $1 as dividend and sold the share for $29. What was your holding period return?
   A) 45%
   B) 50%
   C) 5%
   D) 40%
   E) none of the above

   Answer: B Difficulty: Moderate

   Rationale: ($1 + $29 - $20)/$20 = 0.5000, or 50%.

5. Which of the following determine(s) the level of real interest rates?

   I) the supply of savings by households and business firms
   II) the demand for investment funds
   III) the government's net supply and/or demand for funds

   A) I only
   B) II only
   C) I and II only
   D) I, II, and III (all of the above)
   E) none of the above

   Answer: D Difficulty: Moderate

   Rationale: The value of savings by households is the major supply of funds; the demand for investment funds is a portion of the total demand for funds; the government's position can be one of either net supplier, or net demander of funds. The above factors constitute the total supply and demand for funds, which determine real interest rates.

6. Which of the following statement(s) is (are) **true**?

   I) The real rate of interest is determined by the supply and demand for funds.
   II) The real rate of interest is determined by the expected rate of inflation.
   III) The real rate of interest can be affected by actions of the Fed.
   IV) The real rate of interest is equal to the nominal interest rate plus the expected rate of inflation.

   A) I and II only.
   B) I and III only.
   C) III and IV only.
   D) II and III only.
   E) I, II, III, and IV only

   Answer: B Difficulty: Moderate

   Rationale: The expected rate of inflation is a determinant of nominal, not real, interest rates. Real rates are determined by the supply and demand for funds, which can be affected by the Fed.

7. Which of the following statements is **true**?
   A) Inflation has no effect on the nominal rate of interest.
   B) The realized nominal rate of interest is always positive.
   C) The realized nominal rate of interest is always greater than the real rate of interest.
   D) Certificates of deposit offer a guaranteed real rate of interest.
   E) None of the above is true.

   Answer: E Difficulty: Moderate

   Rationale: Expected inflation rates are a determinant of nominal interest rates. The realized nominal rate of interest would be negative if the difference between actual and anticipated inflation rates exceeded the real rate. The realized nominal rate of interest would be less than the real rate if the unexpected inflation were greater than the real rate of interest. Certificates of deposit contain a real rate based on an estimate of inflation that is not guaranteed.

8. Other things equal, an increase in the government budget deficit
   A) drives the interest rate down.
   B) drives the interest rate up.
   C) might not have any effect on interest rates.
   D) increases business prospects.
   E) none of the above.

   Answer: B Difficulty: Moderate

   Rationale: An increase in the government budget deficit, other things equal, causes the government to increase its borrowing, which increases the demand for funds and drives interest rates up.

9. Ceteris paribus, a decrease in the demand for loanable funds
   A) drives the interest rate down.
   B) drives the interest rate up.
   C) might not have any effect on interest rate.
   D) results from an increase in business prospects and a decrease in the level of savings.
   E) none of the above.

   Answer: A Difficulty: Moderate

   Rationale: A decrease in demand, ceteris paribus, always drives interest rates down. An increase in business prospects would increase the demand for funds. The savings level affects the supply of, not the demand for, funds.

10. The holding period return (HPR) on a share of stock is equal to
    A) the capital gain yield over the period, plus the inflation rate.
    B) the capital gain yield over the period, plus the dividend yield.
    C) the current yield, plus the dividend yield.
    D) the dividend yield, plus the risk premium.
    E) the change in stock price.

    Answer: B Difficulty: Moderate

    Rationale: The HPR of any investment is the sum of the capital gain and the cash flow over the period, which for common stock is B.

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11. Historical records regarding return on stocks, Treasury bonds, and Treasury bills between 1926 and 2002 show that
    A) stocks offered investors greater rates of return than bonds and bills.
    B) stock returns were less volatile than those of bonds and bills.
    C) bonds offered investors greater rates of return than stocks and bills.
    D) bills outperformed stocks and bonds.
    E) treasury bills always offered a rate of return greater than inflation.

    Answer: A Difficulty: Moderate

    Rationale: The historical data show that, as expected, stocks offer a greater return and greater volatility than the other investment alternatives. Inflation sometimes exceeded the T-bill return. See Table 5-2, page 146.

12. If both the interest rate paid by borrowers and the interest rate received by savers accurately reflect the realized rate of inflation:
    A) borrowers gain and savers lose.
    B) savers gain and borrowers lose.
    C) both borrowers and savers lose.
    D) neither borrowers nor savers gain or lose.
    E) both borrowers and savers gain.

    Answer: D Difficulty: Moderate

    Rationale: If the described interest rate accurately reflects the rate of inflation, both borrowers and lenders are paying and receiving, respectively, the real rate of interest; thus, neither group gains.

Use the following to answer questions 13-15:

You have been given this probability distribution for the holding period return for XYZ stock:

State of the Economy	Probability	HPR
Boom	.30	18%
Normal growth	.50	12%
Recession	.20	- 5%

13. What is the expected holding period return for XYZ stock?
    A) 11.67%
    B) 8.33%
    C) 10.4%
    D) 12.4%
    E) 7.88%

    Answer: C Difficulty: Moderate

    Rationale: HPR = .30 (18%) + .50 (12%) + .20 (-5%) = 10.4%

14. What is the expected standard deviation for XYZ stock?
    A) 2.07%
    B) 9.96%
    C) 7.04%
    D) 1.44%
    E) 8.13%

    Answer: E Difficulty: Difficult

    Rationale: $s = [.30 (18 - 10.4)^2 + .50 (12 - 10.4)^2 + .20 (-5 - 10.4)^2]^{1/2} = 8.13\%$

15. What is the expected variance for XYZ stock?
    A) 72.07%
    B) 69.96%
    C) 77.04%
    D) 66.04%
    E) 68.13%

    Answer: D Difficulty: Difficult

    Rationale: $s = [.30 (18 - 10.4)^2 + .50 (12 - 10.4)^2 + .20 (-5 - 10.4)^2] = 66.04\%$

16. If the nominal return is constant, the after-tax real rate of return
    A) declines as the inflation rate increases.
    B) increases as the inflation rate increases.
    C) declines as the inflation rate declines.
    D) increases as the inflation rate decreases.
    E) A and D.

    Answer: E Difficulty: Moderate

    Rationale: Inflation rates have an inverse effect on after-tax real rates of return.

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17. The risk premium for common stocks
    A) cannot be zero, for investors would be unwilling to invest in common stocks.
    B) must always be positive, in theory.
    C) is negative, as common stocks are risky.
    D) A and B.
    E) A and C.

    Answer: D Difficulty: Moderate

    Rationale: If the risk premium for common stocks were zero or negative, investors would be unwilling to accept the lower returns for the increased risk.

18. A risk-free intermediate or long-term investment
    A) is free of all types of risk.
    B) does not guarantee the future purchasing power of its cash flows.
    C) does guarantee the future purchasing power of its cash flows as it is insured by the U. S. Treasury.
    D) A and B.
    E) B and C.

    Answer: B Difficulty: Moderate

    Rationale: A risk-free U. S. Treasury bond is a fixed income instrument, and thus does not guarantee the future purchasing power of its cash flows. As a result, purchasing power risk is present.

19. You purchase a share of Yestel stock for $90. One year later, after receiving a dividend of $3, you sell the stock for $92. What was your holding period return?
    A) 5.56%
    B) 2.22%
    C) 3.33%
    D) 1.11%
    E) 40%

    Answer: A Difficulty: Moderate

    Rationale: HPR = (92 - 90 + 3) / 90 = 5.56%

20. Toyco stock has the following probability distribution of expected prices one year from now:

State	Probability	Price
1	25%	$50
2	40%	$60
3	35%	$70

If you buy Toyco today for $55 and it will pay a dividend during the year of $4 per share, what is your expected holding period return on Toyco?
A) 7.27%
B) 18.18%
C) 10.91%
D) 16.36%
E) 9.09%

Answer: B Difficulty: Difficult

Rationale: E(P1) = .25 (54/55 - 1) + .40 (64/55 - 1) + .35 (74/55 - 1) = 18.18%.

21. Which of the following factors would **not** be expected to affect the nominal interest rate?
A) the supply of loanable funds
B) the demand for loanable funds
C) the coupon rate on previously issued government bonds
D) the expected rate of inflation
E) government spending and borrowing

Answer: C Difficulty: Easy

Rationale: The nominal interest rate is affected by supply, demand, government actions and inflation. Coupon rates on previously issued government bonds reflect historical interest rates but should not affect the current level of interest rates.

22. Your Certificate of Deposit will mature in one week and you are considering how to invest the proceeds. If you invest in a 30-day CD the bank will pay you 4%. If you invest in a 2-year CD the bank will pay you 6% interest. Which option would you choose?
    A) the 30-day CD, no matter what you expect interest rates to do in the future
    B) the 2-year CD, no matter what you expect interest rates to do in the future
    C) the 30-day CD if you expect that interest rates will fall in the future
    D) the 2-year CD if you expect that interest rates will fall in the future
    E) You would be indifferent between the 30-day and the 2-year CDs.

    Answer: D Difficulty: Moderate

    Rationale: You would prefer to lock in the higher rate on the 2-year CD rather than subject yourself to reinvestment rate risk. If you expected interest rates to rise in the future the opposite choice would be better.

23. In words, the real rate of interest is approximately equal to
    A) the nominal rate minus the inflation rate.
    B) the inflation rate minus the nominal rate.
    C) the nominal rate times the inflation rate.
    D) the inflation rate divided by the nominal rate.
    E) the nominal rate plus the inflation rate.

    Answer: A Difficulty: Easy

    Rationale: The actual relationship is (1 + real rate) = (1 + nominal rate) / (1 + inflation rate). This can be approximated by the equation: real rate = nominal rate - inflation rate.

24. If the Federal Reserve lowers the discount rate, ceteris paribus, the equilibrium levels of funds lent will _____ and the equilibrium level of real interest rates will _____
    A) increase; increase
    B) increase; decrease
    C) decrease; increase
    D) decrease; decrease
    E) reverse direction from their previous trends

    Answer: B Difficulty: Moderate

    Rationale: A lower discount rate would encourage banks to make more loans, which would increase the money supply. The supply curve would shift to the right and the equilibrium level of funds would increase while the equilibrium interest rate would fall.

25. What has been the relationship between T-Bill rates and inflation rates since the 1980s?
    A) The T-Bill rate was sometimes higher than and sometimes lower than the inflation rate.
    B) The T-Bill rate has equaled the inflation rate plus a constant percentage.
    C) The inflation rate has equaled the T-Bill rate plus a constant percentage.
    D) The T-Bill rate has been higher than the inflation rate almost the entire period.
    E) The T-Bill rate has been lower than the inflation rate almost the entire period.

    Answer: D Difficulty: Moderate

    Rationale: The T-Bill rate was higher than the inflation rate for over two decades. See Figure 5.5, page 149.

26. "Bracket Creep" happens when
    A) tax liabilities are based on real income and there is a negative inflation rate.
    B) tax liabilities are based on real income and there is a positive inflation rate.
    C) tax liabilities are based on nominal income and there is a negative inflation rate.
    D) tax liabilities are based on nominal income and there is a positive inflation rate.
    E) too many peculiar people make their way into the highest tax bracket.

    Answer: D Difficulty: Moderate

    Rationale: A positive inflation rate typically leads to higher nominal income. Higher nominal income means people will have higher tax liabilities and in some cases will put them in higher tax brackets. This can happen even when real income has declined.

27. The holding-period return (HPR) for a stock is equal to
    A) the real yield minus the inflation rate.
    B) the nominal yield minus the real yield.
    C) the capital gains yield minus the tax rate.
    D) the capital gains yield minus the dividend yield.
    E) the dividend yield plus the capital gains yield.

    Answer: E Difficulty: Easy

    Rationale: HPR consists of an income component and a price change component. The income component on a stock is the dividend yield. The price change component is the capital gains yield.

28. The historical rate of return on small stocks over the 1926-2002 period has been _____. The standard deviation of small stocks' returns has been _____ than the standard deviation of large stocks' returns.
A) 12.43%, lower
B) 13.11%, lower
C) 16.24%, higher
D) 17.74%, higher
E) 21.53%, higher

Answer: D Difficulty: Moderate

Rationale: See Table 5-2, page 146-147.

29. Wine Cellars, Inc. has the following probability distribution of holding period returns on its stock.

State of Economy	Probability	HPR
Boom	.20	24%
Normal Growth	.45	15%
Recession	.35	8%

Assuming that the expected return on Wine Cellar's stock is 14.35%, what is the standard deviation of these returns?
A) 4.27%
B) 5.74%
C) 12.83%
D) 20.42%
E) 32.93%

Answer: B Difficulty: Moderate

Rationale: Variance = $.20*(24-14.35)^2 + .45*(15-14.35)^2 + .35*(8-14.35)^2 = 32.9275$. Standard deviation = $32.9275^{1/2} = 5.74$.

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30. An investor purchased a bond 45 days ago for $985. He received $15 in interest and sold the bond for $980. What is the holding period return on his investment?
    A) 1.52%
    B) 0.50%
    C) 1.02%
    D) 0.01%
    E) 0.01%

    Answer: C Difficulty: Easy

    Rationale: HPR = ($15+980-985)/$985 = .010152284 = approximately 1.02%.

31. Over the past year you earned a nominal rate of interest of 8 percent on your money. The inflation rate was 3.5 percent over the same period. The exact actual growth rate of your purchasing power was
    A) 15.55%.
    B) 4.35%.
    C) 5.02%.
    D) 4.81%.
    E) 15.04%

    Answer: B Difficulty: Moderate

    Rationale: r = (1+R) / (1+I) - 1 ; 1.08 / 1.035 - 1 = 4.35%.

32. Over the past year you earned a nominal rate of interest of 14 percent on your money. The inflation rate was 2 percent over the same period. The exact actual growth rate of your purchasing power was
    A) 12.00%.
    B) 16.00%.
    C) 15.02%.
    D) 14.32%.
    E) 11.76%

    Answer: E Difficulty: Moderate

    Rationale: r = (1+R) / (1+I) - 1; 1.14 / 1.02 - 1 = 11.76%.

33. Over the past year you earned a nominal rate of interest of 12.5 percent on your money. The inflation rate was 2.6 percent over the same period. The exact actual growth rate of your purchasing power was
    A) 9.65%.
    B) 9.90%.
    C) 15.10%.
    D) 10.52%.
    E) 8.67%.

    Answer: A Difficulty: Moderate

    Rationale: r = (1+R) / (1+I) - 1; 1.125 / 1.026 - 1 = 9.65%.

34. A year ago, you invested $1,000 in a savings account that pays an annual interest rate of 4%. What is your approximate annual real rate of return if the rate of inflation was 2% over the year?
    A) 4%.
    B) 2%.
    C) 6%.
    D) 3%.
    E) none of the above.

    Answer: B Difficulty: Easy

    Rationale: 4% - 2% = 2%.

35. A year ago, you invested $2,500 in a savings account that pays an annual interest rate of 2.5%. What is your approximate annual real rate of return if the rate of inflation was 1.6% over the year?
    A) 4.1%.
    B) 2.5%.
    C) 0.9%.
    D) 1.6%.
    E) none of the above.

    Answer: C Difficulty: Easy

    Rationale: 2.5% - 1.6% = 0.9%.

36. A year ago, you invested $12,000 in an investment that produced a return of 16%. What is your approximate annual real rate of return if the rate of inflation was 2% over the year?
    A) 18%.
    B) 2%.
    C) 16%.
    D) 14%.
    E) none of the above.

    Answer: D Difficulty: Easy

    Rationale: 16% - 2% = 14%.

37. If the annual real rate of interest is 3.5% and the expected inflation rate is 2.5%, the nominal rate of interest would be approximately
    A) 3.5%.
    B) 2.5%.
    C) 1%.
    D) 6%.
    E) none of the above.

    Answer: D Difficulty: Easy

    Rationale: 3.5% + 2.5% = 6%.

38. If the annual real rate of interest is 2.5% and the expected inflation rate is 3.4%, the nominal rate of interest would be approximately
    A) 5.9%.
    B) 0.9%.
    C) -0.9%.
    D) 7%.
    E) none of the above.

    Answer: A Difficulty: Easy

    Rationale: 2.5% + 3.4% = 5.9%.

39. If the annual real rate of interest is 4% and the expected inflation rate is 3%, the nominal rate of interest would be approximately
    A) 4%.
    B) 3%.
    C) 1%.
    D) 7%.
    E) none of the above.

    Answer: B Difficulty: Easy

    Rationale: 4% + 3% = 7%.

40. You purchased a share of stock for $12. One year later you received $0.25 as dividend and sold the share for $12.92. What was your holding period return?
    A) 11%
    B) 8.65%
    C) 9.75%
    D) 11.25%
    E) none of the above

    Answer: C Difficulty: Moderate

    Rationale: ($0.25 + $12.92 - $12)/$12 = 0.975, or 9.75%.

41. You purchased a share of stock for $120. One year later you received $1.82 as dividend and sold the share for $136. What was your holding period return?
    A) 14.85%
    B) 22.12%
    C) 15.67%
    D) 13.24%
    E) none of the above

    Answer: A Difficulty: Moderate

    Rationale: ($1.82 + $136 - $120)/$120 = 0.1485, or 14.85%.

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42. You purchased a share of stock for $65. One year later you received $2.37 as dividend and sold the share for $63. What was your holding period return?
    A) -4.5%
    B) -0.2550%
    C) 0.89%
    D) 0.57%
    E) none of the above

    Answer: D Difficulty: Moderate

    Rationale: ($2.37 + $63 - $65)/$65 = 0.0056, or 0.57%.

Use the following to answer questions 43-44:

You have been given this probability distribution for the holding period return for a stock:

State of the Economy	Probability	HPR
Boom	.40	22%
Normal growth	.35	11%
Recession	.25	-9%

43. What is the expected holding period return for the stock?
    A) 11.67%
    B) 8.33%
    C) 10.4%
    D) 12.4%
    E) 7.88%

    Answer: C Difficulty: Moderate

    Rationale: HPR = .40 (22%) + .35 (11%) + .25 (-9%) = 10.4%

44. What is the expected standard deviation for the stock?
    A) 2.07%
    B) 9.96%
    C) 7.04%
    D) 1.44%
    E) 12.17%

    Answer: E Difficulty: Difficult

    Rationale: $s = [.40 (22 - 10.4)^2 + .35 (11 - 10.4)^2 + .25 (-9 - 10.4)^2]^{1/2} = 12.167\%$

45. What is the expected variance for the stock?
    A) 142.07%
    B) 189.96%
    C) 177.04%
    D) 148.04%
    E) 128.17%

    Answer: D Difficulty: Moderate

    Rationale: $s = [.40 (22 - 10.4)^2 + .35 (11 - 10.4)^2 + .25 (-9 - 10.4)^2] = 148.04\%$

46. Which of the following measures of risk best highlights the potential loss from extreme negative returns?
    A) Standard deviation
    B) Variance
    C) Upper partial standard deviation
    D) Value at Risk (VaR)
    E) None of the above

    Answer: D Difficulty: Moderate

Short Answer Questions

47. Discuss the relationships between interest rates (both real and nominal), expected inflation rates, and tax rates on investment returns.

    Answer: The nominal interest rate is the quoted interest rate; however this rate is approximately equal to the real rate of interest plus the expected rate of inflation. Thus, an investor is expecting to earn the real rate in terms of the increased purchasing power resulting from the investment. In addition, the investor should consider the after-tax returns on the investment. The higher the inflation rate, the lower the real after-tax rate of return. Investors suffer an inflation penalty equal to the tax rate times the inflation rate.

    The rationale for this question is to ascertain that the student understands the relationships among these basic determinants of the after-tax real rate of return.

    Difficulty: Moderate

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48. Discuss why common stocks must earn a risk premium.

    Answer: Most investors are risk averse; that is, in order to accept the risk involved in investing in common stocks, the investors expect a return from the stocks over and above the return the investors could earn from a risk-free investment, such as U. S. Treasury issues. This excess return (the return in excess of the risk-free rate) is the risk premium required by the investors to invest in common stocks.

    The purpose of this question is to ascertain that the students understanding the basic risk-return relationship, as the relationship applies to investing in common stocks vs. a risk-free asset (i.e., why would investors be willing to assume the risk of common stock as investment vehicles)?

    Difficulty: Easy

49. Discuss the law of one price and how this concept relates to the possibility of earning arbitrage profits?

    Answer: The law of one price states that equivalent securities are equally (or almost equally) priced when sold on different markets. As a result, risk-free arbitrage profits should not be possible.

    The purpose of this question to introduce the student to arbitrage profits and market efficiency.

    Difficulty: Moderate

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50. Discuss the historical distributions of each of the following in terms of their average return and the dispersion of their returns: small company stocks, large company stocks, long-term government bonds, and U.S. T-bills. Would any of these investments cause a loss in purchasing power during a 1926-2002 holding period?

    Answer: The data given in Figure 5.5, page 149 are

Return Measure	Small Companies	Large Companies	Long-term Government Bonds	T-bills	Inflation
Geometric Average	11.64%	10.01%	5.38%	3.78%	3.05%
Arithmetic Average	17.74%	12.04%	5.68%	3.82%	3.14%
Standard Deviation	39.30%	20.55%	8.24%	3.18%	4.37%

    Whether the averages are measured on a geometric basis or an arithmetic basis, the ranking is always the same, with small company average>large company average>government bond average>T-bill average. With regard to risk, the relationships among the standard deviations are small company>large company>government bonds>T-bills. These ranks indicate that the ex-post data confirm what would be expected - higher returns are earned to compensate for the increased risk. None of these investments would have caused a loss in purchasing power during the 1926-2002 period, because all had average returns higher than the average inflation rate.

    The goal of this question is to see if students have a general idea of the historical relationships among the returns and risk levels of various categories of investments relative to each other and to the level of inflation.

    Difficulty: Difficult

51. Discuss some reasons why an investor with a long time horizon might choose to invest in common stocks, even though they have historically been riskier than government bonds or T-bills.

    Answer: Common stocks can be expected to provide for the best growth in purchasing power based on historical data. An investor with a long time horizon can tolerate fluctuations in stock returns because of the long-term upward trend in stock returns. How much common stock an investor is willing to hold and what types of stocks he chooses for his portfolio will depend on his level of risk aversion.

    Difficulty: Easy