

# ch13

Student: \_\_\_\_\_

1. The expected return/beta relationship is used \_\_\_\_\_.
  - A. by regulatory commissions in determining the costs of capital for regulated firms
  - B. in court rulings to determine discount rates to evaluate claims of lost future incomes
  - C. to advise clients as to the composition of their portfolios
  - D. all of the above
  - E. none of the above
2. The expected return/beta relationship is not used \_\_\_\_\_.
  - A. by regulatory commissions in determining the costs of capital for regulated firms
  - B. in court rulings to determine discount rates to evaluate claims of lost future incomes
  - C. to advise clients as to the composition of their portfolios
  - D. A and C
  - E. none of the above
3. \_\_\_\_\_ argued in his famous critique that tests of the expected return/beta relationship are invalid and that it is doubtful that the CAPM can ever be tested.
  - A. Kim
  - B. Markowitz
  - C. Modigliani
  - D. Roll
  - E. none of the above
4. Fama and MacBeth (1973) found that the relationship between average excess returns and betas was \_\_\_\_\_.
  - A. linear
  - B. nonexistent
  - C. as expected, based on earlier studies
  - D. Fama and MacBeth did not examine the relationship between excess returns and beta
  - E. A and C
5. In the empirical study of a multi-factor model by Chen, Roll, and Ross, a factor that appeared to have significant explanatory power in explaining security returns was \_\_\_\_\_.
  - A. the change in the expected rate of inflation
  - B. the risk premium on bonds
  - C. the unexpected change in the rate of inflation
  - D. industrial production
  - E. B, C and D

6. In the results of the earliest estimations of the security market line by Lintner (1965) and by Miller and Scholes (1972), it was found that the average difference between a stock's return and the risk-free rate was \_\_\_\_\_ to its nonsystematic risk.
- A. positively related
  - B. negatively related
  - C. unrelated
  - D. related in a nonlinear fashion
  - E. none of the above
7. In the results of the earliest estimations of the security market line by Lintner (1965) and Scholes (1972), it was found that the average difference between a stock's return and the risk-free rate was \_\_\_\_\_ to its beta.
- A. positively related
  - B. negatively related
  - C. unrelated
  - D. inversely related
  - E. not proportional
8. In the results of the earliest estimations of the security market line by Lintner (1965) and Scholes (1972), it was found that the average difference between a stock's return and the risk-free rate was \_\_\_\_\_ to its nonsystematic risk and \_\_\_\_\_ to its beta.
- A. positively related; negatively related
  - B. negatively related; positively related
  - C. positively related; positively related
  - D. negatively related; negatively related
  - E. not related; not related
9. In the 1972 empirical study by Black, Jensen, and Scholes, they found that the estimated slope of the security market line was \_\_\_\_\_ what the CAPM would predict.
- A. higher than
  - B. equal to
  - C. less than
  - D. twice as much as
  - E. more information is required to answer this question
10. In the 1972 empirical study by Black, Jensen, and Scholes, they found that the estimated slope of the security market line was \_\_\_\_\_ what the CAPM would predict.
- A. flatter than
  - B. equal to
  - C. steeper than
  - D. one-half as much as
  - E. none of the above

11. If a professionally managed portfolio consistently outperforms the market proxy on a risk-adjusted basis and the market is efficient, it should be concluded that \_\_\_\_\_.
- A. the CAPM is invalid
  - B. the proxy is inadequate
  - C. either the CAPM is invalid or the proxy is inadequate
  - D. the CAPM is valid and the proxy is adequate
  - E. none of the above
12. Given the results of the early studies by Lintner (1965) and Miller and Scholes (1972), one would conclude that
- A. high beta stocks tend to outperform the predictions of the CAPM.
  - B. low beta stocks tend to outperform the predictions of the CAPM.
  - C. there is no relationship between beta and the predictions of the CAPM.
  - D. A and B.
  - E. none of the above.
13. If a market proxy portfolio consistently beats all professionally managed portfolios on a risk-adjusted basis, it may be concluded that
- A. the CAPM is valid.
  - B. the market proxy is mean/variance efficient.
  - C. the CAPM is invalid.
  - D. A and B.
  - E. B and C.
14. In developing their test of a multifactor model, Chen, Roll, and Ross hypothesized that \_\_\_\_\_ for systematic factors.
- A. the monthly growth rate in industrial production might be a proxy
  - B. unexpected inflation might be a proxy
  - C. expected inflation might be a proxy
  - D. A and B
  - E. A, B, and C
15. Black, Jensen, and Scholes examined the validity of the simple version of the CAPM and the zero beta version of the CAPM. Their empirical results were
- A. fully consistent with the simple version of the CAPM.
  - B. fully consistent with the zero beta version of the CAPM.
  - C. not fully consistent with either the simple version of the CAPM or the zero beta version of the CAPM, but were more consistent with the simple version of the CAPM.
  - D. not fully consistent with either the simple version of the CAPM or the zero beta version of the CAPM, but were more consistent with the zero beta version of the CAPM.
  - E. none of the above.

16. Kandel and Stambaugh (1995) expanded Roll's critique of the CAPM by arguing that tests rejecting a positive relationship between average return and beta are demonstrating
- the inefficiency of the market proxy used in the tests.
  - that the relationship between average return and beta is not linear.
  - that the relationship between average return and beta is negative.
  - the need for a better way of explaining security returns.
  - none of the above
17. In the 1972 empirical study by Black, Jensen, and Scholes, they found that the risk-adjusted returns of high beta portfolios were \_\_\_\_\_ the risk-adjusted returns of low beta portfolios.
- greater than
  - equal to
  - less than
  - unrelated to
  - more information is necessary to answer this question
18. The research by Fama and French suggesting that CAPM is invalid has generated which of the following responses?
- Better econometrics should be used in the test procedure.
  - Estimates of asset betas need to be improved.
  - Theoretical sources and implications of research that contradicts CAPM needs to be reconsidered.
  - The single-index model needs to account for non-traded assets and the cyclical behavior of asset betas.
  - All of the above
19. Consider the regression equation:
- $$r_{it} - r_{ft} = a_i + b_i(r_{mt} - r_{ft}) + e_{it}$$
- where:
- $r_{it}$  = return on stock **i** in month **t**
- $r_{ft}$  = the monthly risk-free rate of return in month **t**
- $r_{mt}$  = the return on the market portfolio proxy in month **t**
- This regression equation is used to estimate
- the security characteristic line.
  - the security market line.
  - the capital market line.
  - all of the above.
  - none of the above.

20. Consider the regression equation:

$$r_i - r_f = g_0 + g_1 b_i + g_2 s^2(e_i) + e_{it}$$

where:

$r_i - r_f$  = the average difference between the monthly return on stock **i** and the monthly risk-free rate

$b_i$  = the beta of stock **i**

$s^2(e_i)$  = a measure of the nonsystematic variance of the stock **i**

If you estimated this regression equation and the CAPM was valid, you would expect the estimated coefficient  $g_0$  to be

A. 0.

B. 1.

C. equal to the risk-free rate of return.

D. equal to the average difference between the monthly return on the market portfolio and the monthly risk-free rate.

E. none of the above.

21. Consider the regression equation:

$$r_i - r_f = g_0 + g_1 b_i + g_2 s^2(e_i) + e_{it}$$

where:

$r_i - r_f$  = the average difference between the monthly return on stock **i** and the monthly risk-free rate

$b_i$  = the beta of stock **i**

$s^2(e_i)$  = a measure of the nonsystematic variance of the stock **i**

If you estimated this regression equation and the CAPM was valid, you would expect the estimated coefficient,  $g_1$  to be

A. 0

B. 1

C. equal to the risk-free rate of return.

D. equal to the average difference between the monthly return on the market portfolio and the monthly risk-free rate.

E. equal to the average monthly return on the market portfolio.

22. Consider the regression equation:

$$r_i - r_f = g_0 + g_1 b_i + g_2 s^2(e_i) + e_{it}$$

where:

$r_i - r_f$  = the average difference between the monthly return on stock **i** and the monthly risk-free rate

$b_i$  = the beta of stock **i**

$s^2(e_i)$  = a measure of the nonsystematic variance of the stock **i**

If you estimated this regression equation and the CAPM was valid, you would expect the estimated coefficient,  $g_2$  to be

A. 0

B. 1

C. equal to the risk-free rate of return

D. equal to the average difference between the monthly return on the market portfolio and the monthly risk-free rate

E. none of the above

23. Consider the regression equation:

$$r_i - r_f = g_0 + g_1 b_i + e_{it}$$

where:

$r_i - r_f$  = the average difference between the monthly return on stock **i** and the monthly risk-free rate

$b_i$  = the beta of stock **i**

This regression equation is used to estimate \_\_\_\_\_.

- A. the security characteristic line
- B. the security market line
- C. the capital market line
- D. A and B
- E. A, B, and C

24. Benchmark error

- A. refers to the use of an incorrect market proxy in tests of the CAPM.
- B. can result in inconclusive tests of the CAPM.
- C. can result in incorrect evaluation measures for portfolio managers.
- D. A and B.
- E. A, B, and C.

25. The CAPM is not testable unless

- A. the exact composition of the true market portfolio is known and used in the tests.
- B. all individual assets are included in the market proxy.
- C. the market proxy and the true market portfolio are highly negatively correlated.
- D. A and B.
- E. B and C.

26. In their multifactor model, Chen, Roll, and Ross found

- A. that two market indexes, the equally weighted NYSE and the value weighted NYSE, were not significant predictors of security returns.
- B. that the value weighted NYSE index had the incorrect sign, implying a negative market risk premium.
- C. expected changes in inflation predicted security returns.
- D. A and B.
- E. A, B, and C.

27. GARCH models use \_\_\_\_\_ as the information set used to form estimates of variance.

- A. forecasts of market volatility
- B. rate of return history
- C. estimated future returns
- D. beta coefficients
- E. none of the above

28. Early tests of the CAPM involved
- A. establishing sample data.
  - B. estimating the security characteristic line.
  - C. estimating the security market line.
  - D. all of the above.
  - E. none of the above.
29. According to Roll, the only testable hypothesis associated with the CAPM is
- A. the number of ex post mean-variance efficient portfolios.
  - B. The exact composition of the market portfolio.
  - C. whether the market portfolio is mean-variance efficient.
  - D. the SML relationship.
  - E. none of the above.
30. One way that Black, Jensen and Scholes overcame the problem of measurement error was to:
- A. group securities into portfolios.
  - B. use a two-stage regression methodology.
  - C. reduce the precision of beta estimates.
  - D. Set alpha equal to one.
  - E. None of the above.
31. Strongest evidence in support of the CAPM has come from demonstrating that
- A. the market beta is equal to 1.0.
  - B. non-systematic risk has significant explanatory power in estimating security returns.
  - C. The average return-beta relationship is highly significant.
  - D. The intercept in tests of the excess returns-beta relationship is exactly zero.
  - E. professional investors do not generally out-perform market indexes, demonstrating that the market is efficient.
32. Which of the following would be required for tests of the multifactor CAPM and APT?
- A. Specification of risk factors.
  - B. Identification of portfolios that hedge these fundamental risk factors.
  - C. Tests of the explanatory power and risk premiums of the hedge portfolios.
  - D. All of the above are true.
  - E. None of the above is true.
33. Tests of multifactor models indicate
- A. the single-factor model has better explanatory power in estimating security returns.
  - B. macroeconomic variables have no explanatory power in estimating security returns.
  - C. it may be possible to hedge some economic factors that affect future consumption risk with appropriate portfolios.
  - D. multifactor models do not work.
  - E. none of the above is true.

34. Fama and French, in their 1992 study, found that
- A. firm size had better explanatory power than beta in describing portfolio returns.
  - B. beta had better explanatory power than firm size in describing portfolio returns.
  - C. beta had better explanatory power than book-to-market ratios in describing portfolio returns.
  - D. macroeconomic factors had better explanatory power than beta in describing portfolio returns.
  - E. none of the above is true.
35. Which of the following statements is **true** about models that attempt to measure the empirical performance of the CAPM?
- A. The conventional CAPM works better than the conditional CAPM with human capital.
  - B. The conventional CAPM works about the same as the conditional CAPM with human capital.
  - C. The conditional CAPM with human capital yields a better fit for empirical returns than the conventional CAPM.
  - D. Adding firm size to the model specification dramatically improves the fit.
  - E. Adding firm size to the model specification worsens the fit.
36. Which of the following statements is **false** about models that attempt to measure the empirical performance of the CAPM?
- A. The conventional CAPM works better than the conditional CAPM with human capital.
  - B. The conventional CAPM works about the same as the conditional CAPM with human capital.
  - C. The conditional CAPM with human capital yields a better fit for empirical returns than the conventional CAPM.
  - D. A and B
  - E. B and C.
37. A study by Mehra and Prescott (1985) covered a period of \_\_\_\_\_ years and found that historical average excess returns \_\_\_\_\_.
- A. 25, have been too small to be consistent with rational security pricing.
  - B. 25, have been too large to be consistent with rational security pricing.
  - C. 90, have been too small to be consistent with rational security pricing.
  - D. 90, have been too large to be consistent with rational security pricing.
  - E. 25, are consistent with rational security pricing.
38. Fama and French (2002) studied the equity premium puzzle by breaking their sample into subperiods and found that
- A. the equity premium was largest throughout the entire 1872-1999 period.
  - B. the equity premium was largest during the 1872-1949 subperiod.
  - C. the equity premium was largest during the 1950-1999 subperiod.
  - D. the differences in equity premiums for the three time periods were statistically insignificant.
  - E. the constant-growth dividend-discount model never works.

39. Which of the following is (are) a result(s) of the Fama and French (2002) study of the equity premium puzzle?
- I) Average realized returns during 1950-1999 exceeded the internal rate of return (IRR) for corporate investments.
  - II) The statistical precision of average historical returns is far higher than the precision of estimates from the dividend-discount model (DDM).
  - III) The reward-to-variability ratio (Sharpe) ratio derived from the DDM is far more stable than that derived from realized returns.
  - IV) There is no difference between DDM estimates and actual returns with regard to IRR, statistical precision, or the Sharpe measure.
- A. I, II, and III
  - B. I and III
  - C. I and II
  - D. II and III
  - E. IV
40. Equity premium puzzle studies may be subject to survivorship bias because
- A. the time period covered was not long enough.
  - B. an inappropriate index was used.
  - C. the indexes used did not exist for the whole period of the study.
  - D. both U.S. and foreign data were used.
  - E. only U.S. data were used.
41. Tests of the CAPM that use regression techniques are subject to inaccuracies because
- A. the statistical results used are almost always incorrect.
  - B. the slope coefficient of the regression equation is biased downward.
  - C. the slope coefficient of the regression equation is biased upward.
  - D. the intercept of the regression equation is biased downward.
  - E. the intercept of the regression equation is equal to the risk-free rate.
42. Which of the following must be done to test the multifactor CAPM or the APT?
- I) specify the risk factors
  - II) identify portfolios that hedge the risk factors
  - III) test the explanatory power of hedge portfolios
  - IV) test the risk premiums of hedge portfolios
- A. I and II
  - B. II, and IV
  - C. II, and III
  - D. I, II, and IV
  - E. I, II, III, and IV
43. The Fama and French three factor model uses \_\_\_\_, \_\_\_\_, and \_\_\_\_ as factors.
- A. industrial production, term spread, default spread
  - B. industrial production, inflation, default spread
  - C. firm size, book-to-market ratio, market index
  - D. firm size, book-to-market ratio, default spread
  - E. none of the above

44. The Fama and French three factor model does **not** use \_\_\_\_ as one of the explanatory factors.
- A. industrial production
  - B. inflation
  - C. firm size
  - D. book-to-market ratio
  - E. both A and B
45. Davis, Fama, and French (2000) created three B/M ratio groups. The firms with a high B/M ratio are often called
- A. value firms.
  - B. growth firms.
  - C. midcap firms.
  - D. blend firms.
  - E. none of the above.
46. Jagannathan and Wang (2006) find that the CCAPM explains returns \_\_\_\_\_ the Fama-French 3-factor model and that the the Fama-French 3-factor model explains returns \_\_\_\_\_ than the traditional CAPM.
- A. worse than; worse than
  - B. worse than; better than
  - C. better than; better than
  - D. better than; worse than
  - E. equally as well as; equally as well as
47. A major finding by Heaton and Lucas (2000) is that:
- A. the market rate of return does not help explain the rate of return of individual securities and CAPM must be rejected.
  - B. the market rate of return does explain the rate of return of individual securities.
  - C. the change in proprietary wealth helps explain the rate of return of individual securities.
  - D. A and C.
  - E. none of the above
48. Liew and Vassalou (2000) show that returns on style portfolios (SMB and HML)
- A. seem like statistical flukes.
  - B. seem to predict GDP growth.
  - C. may be proxies for business cycle risk.
  - D. B and C.
  - E. none of the above
49. Petkova and Zhang (2005) examine the relationship between beta and the market risk premium and find
- A. a countercyclical beta.
  - B. the beta of the HML portfolio is negative in good economies and positive in bad economies.
  - C. a cyclical beta.
  - D. the beta of the HML portfolio is positive in good economies and negatives in bad economies.
  - E. A and B.

50. Studies by Chan, Karceski, and Lakonishok (2003) and La Porta, Lakonishok, Shleifer, and Vishny (1997) report that
- A. the value premium is a manifestation of market irrationality.
  - B. the value premium is a rational risk premia.
  - C. the value premium is a statistical artifact found only in the U.S.
  - D. all of the above
  - E. none of the above
51. The Fama-French model
- I) is a useful tool for benchmarking performance against a well-defined set of factors.
  - II) premia are determined by market irrationality.
  - III) premia are determined by rational risk factors.
  - IV) the reason for the premia is unsettled.
  - V) is not a useful tool for benchmarking performance against a well-defined set of factors.
- A. I only.
  - B. V only
  - C. I and II
  - D. I and IV
  - E. II and V
52. Acharya and Pedersen (2005) examine the effects of liquidity and find that
- A. liquidity risk helps explain size effects in assets returns but not book to market effects.
  - B. liquidity risk helps explain size and book to market effects in assets returns.
  - C. liquidity risk helps explain book to market effects in assets returns but not size effects.
  - D. liquidity risk does not help explain size or book to market effects in assets returns.
  - E. none of the above.
53. GARCH models are used to estimate
- A. conditional average returns of stocks, indices, or portfolios.
  - B. unconditional average returns of stocks, indices, or portfolios.
  - C. conditional variance of stocks, indices, or portfolios.
  - D. unconditional variance of stocks, indices, or portfolios.
  - E. none of the above
54. GARCH models were pioneered by
- A. Robert Engle
  - B. Bodie, Kane, and Marcus
  - C. William Sharpe
  - D. Michael Jensen
  - E. Fama and French

55. Discuss the results of the studies of **John Lintner (1965)** and **Merton Miller and Myron Scholes (1972)** in terms of the **validity of the capital asset pricing model (CAPM)**.
  
56. Discuss the **Black Jensen Scholes (BJS)** study of the **zero-beta version of the CAPM**.
  
57. Discuss Roll's **critique of the CAPM**.
  
58. Describe some of the ways the CAPM is applied in practice.
  
59. When portfolio performance is measured, what type of benchmark may be used? Explain what Roll meant by benchmark error.



## ch13 Key

1. The expected return/beta relationship is used \_\_\_\_\_.
- A. by regulatory commissions in determining the costs of capital for regulated firms
  - B. in court rulings to determine discount rates to evaluate claims of lost future incomes
  - C. to advise clients as to the composition of their portfolios
  - D.** all of the above
  - E. none of the above

The risk/return relationship is appropriate for all of the uses cited above.

*Bodie - Chapter 13 #1  
Difficulty: Easy*

2. The expected return/beta relationship is not used \_\_\_\_\_.
- A. by regulatory commissions in determining the costs of capital for regulated firms
  - B. in court rulings to determine discount rates to evaluate claims of lost future incomes
  - C. to advise clients as to the composition of their portfolios
  - D. A and C
  - E.** none of the above

The risk/return relationship is appropriate for all of the uses cited above.

*Bodie - Chapter 13 #2  
Difficulty: Easy*

3. \_\_\_\_\_ argued in his famous critique that tests of the expected return/beta relationship are invalid and that it is doubtful that the CAPM can ever be tested.
- A. Kim
  - B. Markowitz
  - C. Modigliani
  - D.** Roll
  - E. none of the above

These arguments were made by Richard Roll in his famous critique of the CAPM, resulting the Institutional Investor article, "Is Beta Dead?"

*Bodie - Chapter 13 #3  
Difficulty: Easy*

4. Fama and MacBeth (1973) found that the relationship between average excess returns and betas was \_\_\_\_\_.
- A. linear
  - B. nonexistent
  - C. as expected, based on earlier studies
  - D. Fama and MacBeth did not examine the relationship between excess returns and beta
  - E.** A and C

The Fama and MacBeth study validated earlier studies of the excess returns/beta relationship.

*Bodie - Chapter 13 #4  
Difficulty: Moderate*

5. In the empirical study of a multi-factor model by Chen, Roll, and Ross, a factor that appeared to have significant explanatory power in explaining security returns was \_\_\_\_\_.
- A. the change in the expected rate of inflation
  - B. the risk premium on bonds
  - C. the unexpected change in the rate of inflation
  - D. industrial production
  - E.** B, C and D

Of the variables tested, Chen, Roll, and Ross found that B, C, and D were significant predictors of security returns.

*Bodie - Chapter 13 #5  
Difficulty: Difficult*

6. In the results of the earliest estimations of the security market line by Lintner (1965) and by Miller and Scholes (1972), it was found that the average difference between a stock's return and the risk-free rate was \_\_\_\_\_ to its nonsystematic risk.
- A.** positively related
  - B. negatively related
  - C. unrelated
  - D. related in a nonlinear fashion
  - E. none of the above

These results were surprising, as it was expected that systematic, not nonsystematic, risk would be positively related to stock returns.

*Bodie - Chapter 13 #6  
Difficulty: Moderate*

7. In the results of the earliest estimations of the security market line by Lintner (1965) and Scholes (1972), it was found that the average difference between a stock's return and the risk-free rate was \_\_\_\_\_ to its beta.
- A. positively related
  - B. negatively related
  - C. unrelated
  - D. inversely related
  - E. not proportional

These results are consistent with the CAPM.

*Bodie - Chapter 13 #7  
Difficulty: Moderate*

8. In the results of the earliest estimations of the security market line by Lintner (1965) and Scholes (1972), it was found that the average difference between a stock's return and the risk-free rate was \_\_\_\_\_ to its nonsystematic risk and \_\_\_\_\_ to its beta.
- A. positively related; negatively related
  - B. negatively related; positively related
  - C. positively related; positively related
  - D. negatively related; negatively related
  - E. not related; not related

The risk premium was positively related to both factors.

*Bodie - Chapter 13 #8  
Difficulty: Moderate*

9. In the 1972 empirical study by Black, Jensen, and Scholes, they found that the estimated slope of the security market line was \_\_\_\_\_ what the CAPM would predict.
- A. higher than
  - B. equal to
  - C. less than
  - D. twice as much as
  - E. more information is required to answer this question

These studies found that the SML was "too flat", compared to CAPM predictions by a statistically significant margin.

*Bodie - Chapter 13 #9  
Difficulty: Moderate*

10. In the 1972 empirical study by Black, Jensen, and Scholes, they found that the estimated slope of the security market line was \_\_\_\_\_ what the CAPM would predict.
- A.** flatter than
  - B. equal to
  - C. steeper than
  - D. one-half as much as
  - E. none of the above

These studies found that the SML was "too flat", compared to CAPM predictions by a statistically significant margin.

*Bodie - Chapter 13 #10  
Difficulty: Moderate*

11. If a professionally managed portfolio consistently outperforms the market proxy on a risk-adjusted basis and the market is efficient, it should be concluded that \_\_\_\_\_.
- A. the CAPM is invalid
  - B. the proxy is inadequate
  - C.** either the CAPM is invalid or the proxy is inadequate
  - D. the CAPM is valid and the proxy is adequate
  - E. none of the above

C is true; however, unfortunately, one cannot conclude which one (or both) is the problem.

*Bodie - Chapter 13 #11  
Difficulty: Moderate*

12. Given the results of the early studies by Lintner (1965) and Miller and Scholes (1972), one would conclude that
- A. high beta stocks tend to outperform the predictions of the CAPM.
  - B.** low beta stocks tend to outperform the predictions of the CAPM.
  - C. there is no relationship between beta and the predictions of the CAPM.
  - D. A and B.
  - E. none of the above.

The results of these studies are exactly the opposite of what one would expect.

*Bodie - Chapter 13 #12  
Difficulty: Moderate*

13. If a market proxy portfolio consistently beats all professionally managed portfolios on a risk-adjusted basis, it may be concluded that
- A. the CAPM is valid.
  - B. the market proxy is mean/variance efficient.
  - C. the CAPM is invalid.
  - D.** A and B.
  - E. B and C.

If such results were obtained consistently, one could be assured that the model is valid and that the market proxy is mean/variance efficient.

*Bodie - Chapter 13 #13  
Difficulty: Moderate*

14. In developing their test of a multifactor model, Chen, Roll, and Ross hypothesized that \_\_\_\_\_ for systematic factors.
- A. the monthly growth rate in industrial production might be a proxy
  - B. unexpected inflation might be a proxy
  - C. expected inflation might be a proxy
  - D. A and B
  - E.** A, B, and C

In their model, Chen, Roll, and Ross hypothesized that A, B, and C might be proxies for systematic risk. However, of the above factors, only A and B appeared to have significant explanatory power.

*Bodie - Chapter 13 #14  
Difficulty: Moderate*

15. Black, Jensen, and Scholes examined the validity of the simple version of the CAPM and the zero beta version of the CAPM. Their empirical results were
- A. fully consistent with the simple version of the CAPM.
  - B. fully consistent with the zero beta version of the CAPM.
  - C. not fully consistent with either the simple version of the CAPM or the zero beta version of the CAPM, but were more consistent with the simple version of the CAPM.
  - D.** not fully consistent with either the simple version of the CAPM or the zero beta version of the CAPM, but were more consistent with the zero beta version of the CAPM.
  - E. none of the above.

D is the most accurate statement regarding these findings.

*Bodie - Chapter 13 #15  
Difficulty: Moderate*

16. Kandel and Stambaugh (1995) expanded Roll's critique of the CAPM by arguing that tests rejecting a positive relationship between average return and beta are demonstrating
- A. the inefficiency of the market proxy used in the tests.
  - B. that the relationship between average return and beta is not linear.
  - C. that the relationship between average return and beta is negative.
  - D. the need for a better way of explaining security returns.
  - E. none of the above

These results are typical of the results of similar studies.

*Bodie - Chapter 13 #16  
Difficulty: Moderate*

17. In the 1972 empirical study by Black, Jensen, and Scholes, they found that the risk-adjusted returns of high beta portfolios were \_\_\_\_\_ the risk-adjusted returns of low beta portfolios.
- A. greater than
  - B. equal to
  - C. less than
  - D. unrelated to
  - E. more information is necessary to answer this question

These results are inconsistent with what would be predicted with the CAPM.

*Bodie - Chapter 13 #17  
Difficulty: Moderate*

18. The research by Fama and French suggesting that CAPM is invalid has generated which of the following responses?
- A. Better econometrics should be used in the test procedure.
  - B. Estimates of asset betas need to be improved.
  - C. Theoretical sources and implications of research that contradicts CAPM needs to be reconsidered.
  - D. The single-index model needs to account for non-traded assets and the cyclical behavior of asset betas.
  - E. All of the above

All four responses have been given in the literature responding to the Fama-French critique.

*Bodie - Chapter 13 #18  
Difficulty: Moderate*

19. Consider the regression equation:

$$r_{it} - r_{ft} = a_i + b_i(r_{mt} - r_{ft}) + e_{it}$$

where:

$r_{it}$  = return on stock **i** in month **t**

$r_{ft}$  = the monthly risk-free rate of return in month **t**

$r_{mt}$  = the return on the market portfolio proxy in month **t**

This regression equation is used to estimate

- A. the security characteristic line.
- B. the security market line.
- C. the capital market line.
- D. all of the above.
- E. none of the above.

The security characteristic line is a graphical depiction of the excess returns on the security as a function of the excess returns on the market.

*Bodie - Chapter 13 #19  
Difficulty: Moderate*

20. Consider the regression equation:

$$r_i - r_f = g_0 + g_1 b_i + g_2 s^2(e_i) + e_{it}$$

where:

$r_i - r_f$  = the average difference between the monthly return on stock **i** and the monthly risk-free rate

$b_i$  = the beta of stock **i**

$s^2(e_i)$  = a measure of the nonsystematic variance of the stock **i**

If you estimated this regression equation and the CAPM was valid, you would expect the estimated coefficient  $g_0$  to be

- A. 0.
- B. 1.
- C. equal to the risk-free rate of return.
- D. equal to the average difference between the monthly return on the market portfolio and the monthly risk-free rate.
- E. none of the above.

In this model, the coefficient,  $g_0$  represents the excess return of the security, which would be zero if the CAPM held.

*Bodie - Chapter 13 #20  
Difficulty: Moderate*

21. Consider the regression equation:

$$r_i - r_f = g_0 + g_1 b_i + g_2 s^2(e_i) + e_{it}$$

where:

$r_i - r_f$  = the average difference between the monthly return on stock **i** and the monthly risk-free rate

$b_i$  = the beta of stock **i**

$s^2(e_i)$  = a measure of the nonsystematic variance of the stock **i**

If you estimated this regression equation and the CAPM was valid, you would expect the estimated coefficient,  $g_1$  to be

A. 0

B. 1

C. equal to the risk-free rate of return.

**D.** equal to the average difference between the monthly return on the market portfolio and the monthly risk-free rate.

E. equal to the average monthly return on the market portfolio.

The variable measured by the coefficient  $g_1$  in this model is the market risk premium.

*Bodie - Chapter 13 #21  
Difficulty: Moderate*

22. Consider the regression equation:

$$r_i - r_f = g_0 + g_1 b_i + g_2 s^2(e_i) + e_{it}$$

where:

$r_i - r_f$  = the average difference between the monthly return on stock **i** and the monthly risk-free rate

$b_i$  = the beta of stock **i**

$s^2(e_i)$  = a measure of the nonsystematic variance of the stock **i**

If you estimated this regression equation and the CAPM was valid, you would expect the estimated coefficient,  $g_2$  to be

**A.** 0

B. 1

C. equal to the risk-free rate of return

D. equal to the average difference between the monthly return on the market portfolio and the monthly risk-free rate

E. none of the above

If the CAPM is valid, the excess return on the stock is predicted by the systematic risk of the stock and the excess return on the market, not by the nonsystematic risk of the stock.

*Bodie - Chapter 13 #22  
Difficulty: Moderate*

23. Consider the regression equation:

$$r_i - r_f = g_0 + g_1 b_i + e_{it}$$

where:

$r_i - r_f$  = the average difference between the monthly return on stock **i** and the monthly risk-free rate

$b_i$  = the beta of stock **i**

This regression equation is used to estimate \_\_\_\_\_.

- A. the security characteristic line
- B.** the security market line
- C. the capital market line
- D. A and B
- E. A, B, and C

The security market line is a graphical depiction of the excess returns on the security and a function of the beta of the security.

*Bodie - Chapter 13 #23  
Difficulty: Moderate*

24. Benchmark error

- A. refers to the use of an incorrect market proxy in tests of the CAPM.
- B. can result in inconclusive tests of the CAPM.
- C. can result in incorrect evaluation measures for portfolio managers.
- D. A and B.
- E.** A, B, and C.

If an incorrect market proxy is used, A, B, and C can result.

*Bodie - Chapter 13 #24  
Difficulty: Easy*

25. The CAPM is not testable unless

- A. the exact composition of the true market portfolio is known and used in the tests.
- B. all individual assets are included in the market proxy.
- C. the market proxy and the true market portfolio are highly negatively correlated.
- D.** A and B.
- E. B and C.

A and B must be true for the CAPM to be tested; however, the exact composition of the true market portfolio cannot be known, thus the CAPM probably can never be tested.

*Bodie - Chapter 13 #25  
Difficulty: Easy*

26. In their multifactor model, Chen, Roll, and Ross found

- A. that two market indexes, the equally weighted NYSE and the value weighted NYSE, were not significant predictors of security returns.
- B. that the value weighted NYSE index had the incorrect sign, implying a negative market risk premium.
- C. expected changes in inflation predicted security returns.
- D.** A and B.
- E. A, B, and C.

A, B, and unexpected changes in inflation were significant predictors of security returns.

*Bodie - Chapter 13 #26  
Difficulty: Moderate*

27. GARCH models use \_\_\_\_\_ as the information set used to form estimates of variance.

- A. forecasts of market volatility
- B.** rate of return history
- C. estimated future returns
- D. beta coefficients
- E. none of the above

In a GARCH model, rate of return history is used to update estimates of market variance.

*Bodie - Chapter 13 #27  
Difficulty: Moderate*

28. Early tests of the CAPM involved

- A. establishing sample data.
- B. estimating the security characteristic line.
- C. estimating the security market line.
- D.** all of the above.
- E. none of the above.

These three basic steps, establishing sample data, estimating security characteristic lines and estimating the security market line, were all necessary to test the implications of the CAPM.

*Bodie - Chapter 13 #28  
Difficulty: Easy*

29. According to Roll, the only testable hypothesis associated with the CAPM is
- A. the number of ex post mean-variance efficient portfolios.
  - B. The exact composition of the market portfolio.
  - C.** whether the market portfolio is mean-variance efficient.
  - D. the SML relationship.
  - E. none of the above.

According to Roll, the only testable hypothesis about the CAPM is that the market portfolio is mean-variance efficient.

*Bodie - Chapter 13 #29  
Difficulty: Easy*

30. One way that Black, Jensen and Scholes overcame the problem of measurement error was to:
- A.** group securities into portfolios.
  - B. use a two-stage regression methodology.
  - C. reduce the precision of beta estimates.
  - D. Set alpha equal to one.
  - E. None of the above.

Black, Jensen and Scholes, in their landmark study, found that grouping securities into well-diversified portfolios significantly reduced measurement error.

*Bodie - Chapter 13 #30  
Difficulty: Moderate*

31. Strongest evidence in support of the CAPM has come from demonstrating that
- A. the market beta is equal to 1.0.
  - B. non-systematic risk has significant explanatory power in estimating security returns.
  - C. The average return-beta relationship is highly significant.
  - D. The intercept in tests of the excess returns-beta relationship is exactly zero.
  - E.** professional investors do not generally out-perform market indexes, demonstrating that the market is efficient.

Although tests of CAPM have not found A, B, C or D to be true, the CAPM is qualitatively supported by findings that the market portfolio is efficient.

*Bodie - Chapter 13 #31  
Difficulty: Moderate*

32. Which of the following would be required for tests of the multifactor CAPM and APT?
- A. Specification of risk factors.
  - B. Identification of portfolios that hedge these fundamental risk factors.
  - C. Tests of the explanatory power and risk premiums of the hedge portfolios.
  - D.** All of the above are true.
  - E. None of the above is true.

Tests of multifactor models require a three-stage process described by A, B, and C.

*Bodie - Chapter 13 #32  
Difficulty: Easy*

33. Tests of multifactor models indicate
- A. the single-factor model has better explanatory power in estimating security returns.
  - B. macroeconomic variables have no explanatory power in estimating security returns.
  - C.** it may be possible to hedge some economic factors that affect future consumption risk with appropriate portfolios.
  - D. multifactor models do not work.
  - E. none of the above is true.

Tests of multifactor models suggest that industrial production, the risk premium on bonds and unanticipated inflation have significant explanatory power for security returns and it may be possible to hedge these risks if appropriate hedge portfolios can be constructed.

*Bodie - Chapter 13 #33  
Difficulty: Easy*

34. Fama and French, in their 1992 study, found that
- A.** firm size had better explanatory power than beta in describing portfolio returns.
  - B. beta had better explanatory power than firm size in describing portfolio returns.
  - C. beta had better explanatory power than book-to-market ratios in describing portfolio returns.
  - D. macroeconomic factors had better explanatory power than beta in describing portfolio returns.
  - E. none of the above is true.

Fama and French found that firm size and book-to-market ratios had significant explanatory power for portfolio returns, while beta did not.

*Bodie - Chapter 13 #34  
Difficulty: Moderate*

35. Which of the following statements is **true** about models that attempt to measure the empirical performance of the CAPM?
- A. The conventional CAPM works better than the conditional CAPM with human capital.
  - B. The conventional CAPM works about the same as the conditional CAPM with human capital.
  - C.** The conditional CAPM with human capital yields a better fit for empirical returns than the conventional CAPM.
  - D. Adding firm size to the model specification dramatically improves the fit.
  - E. Adding firm size to the model specification worsens the fit.

The results are presented in Table 13.2.

*Bodie - Chapter 13 #35  
Difficulty: Moderate*

36. Which of the following statements is **false** about models that attempt to measure the empirical performance of the CAPM?
- A. The conventional CAPM works better than the conditional CAPM with human capital.
  - B. The conventional CAPM works about the same as the conditional CAPM with human capital.
  - C. The conditional CAPM with human capital yields a better fit for empirical returns than the conventional CAPM.
  - D.** A and B
  - E. B and C.

The results are presented in Table 13.2.

*Bodie - Chapter 13 #36  
Difficulty: Moderate*

37. A study by Mehra and Prescott (1985) covered a period of \_\_\_\_\_ years and found that historical average excess returns \_\_\_\_\_.
- A. 25, have been too small to be consistent with rational security pricing.
  - B. 25, have been too large to be consistent with rational security pricing.
  - C. 90, have been too small to be consistent with rational security pricing.
  - D.** 90, have been too large to be consistent with rational security pricing.
  - E. 25, are consistent with rational security pricing.

They found that the average reward investors have earned has been "too generous".

*Bodie - Chapter 13 #37  
Difficulty: Moderate*

38. Fama and French (2002) studied the equity premium puzzle by breaking their sample into subperiods and found that
- A. the equity premium was largest throughout the entire 1872-1999 period.
  - B. the equity premium was largest during the 1872-1949 subperiod.
  - C.** the equity premium was largest during the 1950-1999 subperiod.
  - D. the differences in equity premiums for the three time periods were statistically insignificant.
  - E. the constant-growth dividend-discount model never works.

They concluded that the equity premium puzzle has occurred mostly in modern times. This may be due to the difference between the dividend-discount model's (DDM) result of expected return in comparison to actual returns earned. The DDM yields a smaller risk premium during the 1950-1999 period, while actual returns have been higher. This may be due to unanticipated capital gains.

*Bodie - Chapter 13 #38  
Difficulty: Moderate*

39. Which of the following is (are) a result(s) of the Fama and French (2002) study of the equity premium puzzle?
- I) Average realized returns during 1950-1999 exceeded the internal rate of return (IRR) for corporate investments.
  - II) The statistical precision of average historical returns is far higher than the precision of estimates from the dividend-discount model (DDM).
  - III) The reward-to-variability ratio (Sharpe) ratio derived from the DDM is far more stable than that derived from realized returns.
  - IV) There is no difference between DDM estimates and actual returns with regard to IRR, statistical precision, or the Sharpe measure.
- A. I, II, and III
  - B.** I and III
  - C. I and II
  - D. II and III
  - E. IV

The study also predicts that future excess returns will be significantly lower than those experienced in recent decades. This has important implications for current investors.

*Bodie - Chapter 13 #39  
Difficulty: Difficult*

40. Equity premium puzzle studies may be subject to survivorship bias because

- A. the time period covered was not long enough.
- B. an inappropriate index was used.
- C. the indexes used did not exist for the whole period of the study.
- D. both U.S. and foreign data were used.
- E.** only U.S. data were used.

The Jurion and Goetzmann (1999) study offers a database of capital appreciation indexes from 1926-1996. As shown in Figure 13.9, the U.S. markets have been in existence the longest and have offered the highest average annual return.

*Bodie - Chapter 13 #40  
Difficulty: Moderate*

41. Tests of the CAPM that use regression techniques are subject to inaccuracies because

- A. the statistical results used are almost always incorrect.
- B.** the slope coefficient of the regression equation is biased downward.
- C. the slope coefficient of the regression equation is biased upward.
- D. the intercept of the regression equation is biased downward.
- E. the intercept of the regression equation is equal to the risk-free rate.

This would be a problem even if it were possible to use the returns on the true market portfolio in these regressions. It is due to the fact that the independent variable (the beta that is found in the first-pass regression and used as the independent variable in the second-pass regression) is measured with error.

*Bodie - Chapter 13 #41  
Difficulty: Difficult*

42. Which of the following must be done to test the multifactor CAPM or the APT?

- I) specify the risk factors
- II) identify portfolios that hedge the risk factors
- III) test the explanatory power of hedge portfolios
- IV) test the risk premiums of hedge portfolios

- A. I and II
- B. II, and IV
- C. II, and III
- D. I, II, and IV
- E.** I, II, III, and IV

All of these tasks must be completed. An example is the Chen, Roll, and Ross (1986) study, although they skipped II because they used the factors themselves and assumed that factor portfolios existed that could proxy for the factors.

*Bodie - Chapter 13 #42  
Difficulty: Moderate*

43. The Fama and French three factor model uses \_\_\_\_, \_\_\_\_, and \_\_\_\_ as factors.

- A. industrial production, term spread, default spread
- B. industrial production, inflation, default spread
- C.** firm size, book-to-market ratio, market index
- D. firm size, book-to-market ratio, default spread
- E. none of the above

The Fama and French three factor model uses firm size, book-to-market ratio, and market index as factors.

*Bodie - Chapter 13 #43  
Difficulty: Easy*

44. The Fama and French three factor model does **not** use \_\_\_\_ as one of the explanatory factors.

- A. industrial production
- B. inflation
- C. firm size
- D. book-to-market ratio
- E.** both A and B

The Fama and French three factor model does **not** use industrial production or inflation as explanatory factors.

*Bodie - Chapter 13 #44  
Difficulty: Easy*

45. Davis, Fama, and French (2000) created three B/M ratio groups. The firms with a high B/M ratio are often called

- A.** value firms.
- B. growth firms.
- C. midcap firms.
- D. blend firms.
- E. none of the above.

Firms with a high B/M ratio are value firms.

*Bodie - Chapter 13 #45  
Difficulty: Moderate*

46. Jagannathan and Wang (2006) find that the CCAPM explains returns \_\_\_\_\_ the Fama-French 3-factor model and that the the Fama-French 3-factor model explains returns \_\_\_\_\_ than the traditional CAPM.
- A. worse than; worse than
  - B. worse than; better than
  - C. better than; better than**
  - D. better than; worse than
  - E. equally as well as; equally as well as

Jagannathan and Wang (2006) find that the CCAPM explains returns better than the Fama-French 3-factor model and that the the Fama-French 3-factor model explains returns better than than the traditional CAPM.

*Bodie - Chapter 13 #46  
Difficulty: Moderate*

47. A major finding by Heaton and Lucas (2000) is that:
- A. the market rate of return does not help explain the rate of return of individual securities and CAPM must be rejected.
  - B. the market rate of return does explain the rate of return of individual securities.
  - C. the change in proprietary wealth helps explain the rate of return of individual securities.
  - D. A and C.**
  - E. none of the above

A major finding by Heaton and Lucas (2000) is that the market rate of return does not help explain the rate of return of individual securities and CAPM must be rejected and the change in proprietary wealth helps explain the rate of return of individual securities.

*Bodie - Chapter 13 #47  
Difficulty: Moderate*

48. Liew and Vassalou (2000) show that returns on style portfolios (SMB and HML)
- A. seem like statistical flukes.
  - B. seem to predict GDP growth.
  - C. may be proxies for business cycle risk.
  - D. B and C.**
  - E. none of the above

Liew and Vassalou (2000) show that returns on style portfolios (SMB and HML) seem to predict GDP growth and may be proxies for business cycle risk.

*Bodie - Chapter 13 #48  
Difficulty: Moderate*

49. Petkova and Zhang (2005) examine the relationship between beta and the market risk premium and find
- A. a countercyclical beta.
  - B. the beta of the HML portfolio is negative in good economies and positive in bad economies.
  - C. a cyclical beta.
  - D. the beta of the HML portfolio is positive in good economies and negatives in bad economies.
  - E. A and B.**

Petkova and Zhang (2005) examine the relationship between beta and the market risk premium and find a countercyclical beta and the beta of the HML portfolio is negative in good economies and positive in bad economies.

*Bodie - Chapter 13 #49  
Difficulty: Moderate*

50. Studies by Chan, Karceski, and Lakonishok (2003) and La Porta, Lakonishok, Shleifer, and Vishny (1997) report that
- A. the value premium is a manifestation of market irrationality.**
  - B. the value premium is a rational risk premia.
  - C. the value premium is a statistical artifact found only in the U.S.
  - D. all of the above
  - E. none of the above

Studies by Chan, Karceski, and Lakonishok (2003) and La Porta, Lakonishok, Shleifer, and Vishny (1997) report that the value premium is a manifestation of market irrationality.

*Bodie - Chapter 13 #50  
Difficulty: Moderate*

51. The Fama-French model
- I) is a useful tool for benchmarking performance against a well-defined set of factors.
  - II) premia are determined by market irrationality.
  - III) premia are determined by rational risk factors.
  - IV) the reason for the premia is unsettled.
  - V) is not a useful tool for benchmarking performance against a well-defined set of factors.
- A. I only.
  - B. V only
  - C. I and II
  - D. I and IV**
  - E. II and V

The Fama-French model is a useful tool for benchmarking performance against a well-defined set of factors and the reason for the premia is unsettled.

*Bodie - Chapter 13 #51  
Difficulty: Moderate*

52. Acharya and Pedersen (2005) examine the effects of liquidity and find that

- A. liquidity risk helps explain size effects in assets returns but not book to market effects.
- B. liquidity risk helps explain size and book to market effects in assets returns.
- C. liquidity risk helps explain book to market effects in assets returns but not size effects.
- D. liquidity risk does not help explain size or book to market effects in assets returns.
- E. none of the above.

Acharya and Pedersen (2005) examine the effects of liquidity and find that liquidity risk helps explain size effects in assets returns but not book to market effects.

*Bodie - Chapter 13 #52  
Difficulty: Moderate*

53. GARCH models are used to estimate

- A. conditional average returns of stocks, indices, or portfolios.
- B. unconditional average returns of stocks, indices, or portfolios.
- C. conditional variance of stocks, indices, or portfolios.
- D. unconditional variance of stocks, indices, or portfolios.
- E. none of the above

GARCH models are used to estimate conditional variance of stocks, indices, or portfolios.

*Bodie - Chapter 13 #53  
Difficulty: Moderate*

54. GARCH models were pioneered by

- A. Robert Engle
- B. Bodie, Kane, and Marcus
- C. William Sharpe
- D. Michael Jensen
- E. Fama and French

GARCH models were pioneered by Robert Engle.

*Bodie - Chapter 13 #54  
Difficulty: Moderate*

55. Discuss the results of the studies of **John Lintner (1965)** and **Merton Miller and Myron Scholes (1972)** in terms of the **validity of the capital asset pricing model (CAPM)**.

These studies examined the returns of 631 NYSE listed stocks over the period, 1954 - 1963. These results indicated that the SML was "too flat", i.e., the  $g_1$  coefficient was too small and the slope was too small, as predicted by the CAPM. These results were statistically significant. In addition, nonsystematic risk, not systematic risk, appeared to predict expected excess returns. However, these studies contained two methodological problems. First, the statistical variation in stock returns introduces **measurement error** into the beta estimates (the **b** coefficients from the first-pass regressions). Using these estimates rather than the true beta coefficients in the estimation of the second-pass regression for the SML biases the estimates in the direction observed: the measurements errors in the beta coefficients will lead to an estimate of the SML that is too flat and that has a positive (rather than zero) intercept. In addition, the variance of the residuals is correlated with the beta coefficients of the stocks, i.e., stocks with high betas tend also to have high nonsystematic risk. Add this effect to the measurement problem, and the coefficient of nonsystematic risk,  $g_2$ , in the second-pass regression will be upward biased.

Feedback: The purpose of this question is to insure that the student understands that, very soon after the concepts of the CAPM appeared in the literature, empirical tests of the theory cast doubts upon the validity of the theory.

*Bodie - Chapter 13 #55  
Difficulty: Moderate*

56. Discuss the **Black Jensen Scholes (BJS)** study of the **zero-beta version of the CAPM**.

**Black, Jensen, and Scholes** studied all available NYSE stock returns over the period 1931 to 1965. Their results indicated that the **zero-beta version of the CAPM** might better explain observed market relationships than the simple version of the CAPM. When borrowing is restricted, the CAPM expected return-beta relationship must be amended; that is, the risk-free rate must be replaced with the expected rate of return on the zero-beta portfolio (the efficient portfolio uncorrelated with the market portfolio). The zero-beta version of the CAPM is also consistent with the finding that the empirical SML is flatter than that predicted by the simple CAPM.

Feedback: The purpose of this question is to show that although the CAPM in the simple, originally proposed form, does not appear to be valid based on empirical tests, that later proposed variations of the model appear to have more empirical validity.

*Bodie - Chapter 13 #56  
Difficulty: Moderate*

57. Discuss Roll's **critique of the CAPM**.

In 1977, **Richard Roll** published a **critique** of the **capital asset pricing model**, in which he argued not only that the empirical tests of the expected return-beta relationship are invalid, but also that it is doubtful that the CAPM can be tested. The essence of Roll's critique is as follows: There is a single testable hypothesis associated with the CAPM, which is that the market portfolio is mean-variance efficient; all other relationships of the model, including the linear risk-return trade-off follow from the mean-variance efficiency tenet and are not independently testable; in any sample of observations of individual returns, there will be an infinite number of ex post mean-variance efficient portfolios using the sample period of returns and covariances (as opposed to ex ante expected returns and covariances); betas calculated from such portfolios will satisfy the SML relationship whether or not the true market portfolio is mean-variance efficient, ex ante; the CAPM, as we know it, is not testable unless the exact composition of the market portfolio is known, which implies that the theory is not testable unless **all** individual assets are included in the market portfolio; using a market proxy, such as the S&P 500, has two problems: the proxy might be mean-variance efficient, even if the market portfolio is not, and vice versa; and most market proxies are highly positively correlated with each other and with the true market portfolio, which makes the exact composition of the market portfolio appear to be unimportant, although the use of different market proxies result in different conclusions (benchmark error).  
Feedback: The purpose of this question is to ascertain the student's understanding of one of the most important critiques of the CAPM.

*Bodie - Chapter 13 #57  
Difficulty: Moderate*

58. Describe some of the ways the CAPM is applied in practice.

The four items mentioned at the beginning of the chapter are

- Professional portfolio managers use the CAPM to determine appropriate security returns. These managers also have their performances evaluated based on the reward-to-variability ratios of their portfolios relative to the CML or SML.
- Regulatory commissions use the CAPM to help determine the appropriate cost of capital for regulated firms.
- Courts use the CAPM to determine the discount rate to use in calculating the present value of lost future income.
- Firms use the SML to find a benchmark hurdle rate to use in discounting cash flows for capital budgeting projects.

Feedback: This confirms that the student understands that there are "real-world" applications to the theoretical CAPM model.

*Bodie - Chapter 13 #58  
Difficulty: Moderate*

59. When portfolio performance is measured, what type of benchmark may be used? Explain what Roll meant by benchmark error.

The benchmark portfolio should be broadly based since it is a proxy for the unobservable market portfolio. Examples include, but are not limited to, the S&P500 Index, the NYSE Composite Index, and the Wilshire 5000 Index.

Benchmark error refers to the fact that the proxy for the market portfolio may not be mean-variance efficient when the true market portfolio is not efficient. The proxy index may also be inefficient. Also, different proxies may lead to substantially different conclusions even though they tend to be highly correlated with each other.

Feedback: This question tests whether the student understands some of the difficulties that are encountered when trying to apply the CAPM, especially the ideas of expected returns versus actual returns and finding a proxy for the unobservable market portfolio.

# ch13 Summary

| <u>Category</u>       | <u># of Questions</u> |
|-----------------------|-----------------------|
| Bodie - Chapter 13    | 59                    |
| Difficulty: Difficult | 3                     |
| Difficulty: Easy      | 11                    |
| Difficulty: Moderate  | 45                    |