

EXAMPLE 1.1: ABSOLUTE AND RELATIVE RISK

An investment manager is given the task of beating a benchmark. Hence the risk should be measured in terms of

- a. Loss relative to the initial investment
- b. Loss relative to the expected portfolio value
- c. Loss relative to the benchmark
- d. Loss attributed to the benchmark

EXAMPLE 1.2: FRM EXAM 2009—QUESTION 1-11

Based on the risk assessment of the CRO, Bank United's CEO decided to make a large investment in a levered portfolio of CDOs. The CRO had estimated that the portfolio had a 1% chance of losing \$1 billion or more over one year, a loss that would make the bank insolvent. At the end of the first year the portfolio has lost \$2 billion and the bank was closed by regulators.

Which of the following statements is correct?

- a. The outcome demonstrates a risk management failure because the bank did not eliminate the possibility of financial distress.
- b. The outcome demonstrates a risk management failure because the fact that an extremely unlikely outcome occurred means that the probability of the outcome was poorly estimated.
- c. The outcome demonstrates a risk management failure because the CRO failed to go to regulators to stop the shutdown.
- d. Based on the information provided, one cannot determine whether it was a risk management failure.

EXAMPLE 1.3: FRM EXAM 2009—QUESTION 1-4

An analyst at CAPM Research Inc. is projecting a return of 21% on Portfolio A. The market risk premium is 11%, the volatility of the market portfolio is 14%, and the risk-free rate is 4.5%. Portfolio A has a beta of 1.5. According to the capital asset pricing model, which of the following statements is true?

- a. The expected return of Portfolio A is greater than the expected return of the market portfolio.
- b. The expected return of Portfolio A is less than the expected return of the market portfolio.
- c. The return of Portfolio A has lower volatility than the market portfolio.
- d. The expected return of Portfolio A is equal to the expected return of the market portfolio.

EXAMPLE 1.4: FRM EXAM 2009—QUESTION 1-6

Suppose Portfolio A has an expected return of 8%, volatility of 20%, and beta of 0.5. Suppose the market has an expected return of 10% and volatility of 25%. Finally, suppose the risk-free rate is 5%. What is Jensen's alpha for Portfolio A?

- a. 10.0%
- b. 1.0%
- c. 0.5%
- d. 15%

EXAMPLE 1.5: FRM EXAM 2007—QUESTION 132

Which of the following statements about the Sharpe ratio is *false*?

- a. The Sharpe ratio considers both the systematic and unsystematic risks of a portfolio.
- b. The Sharpe ratio is equal to the excess return of a portfolio over the risk-free rate divided by the total risk of the portfolio.
- c. The Sharpe ratio cannot be used to evaluate relative performance of undiversified portfolios.
- d. The Sharpe ratio is derived from the capital market line.

EXAMPLE 1.6: SHARPE AND INFORMATION RATIOS

A portfolio manager returns 10% with a volatility of 20%. The benchmark returns 8% with risk of 14%. The correlation between the two is 0.98. The risk-free rate is 3%. Which of the following statements is *correct*?

- a. The portfolio has higher SR than the benchmark.
- b. The portfolio has negative IR.
- c. The IR is 0.35.
- d. The IR is 0.29.

EXAMPLE 1.7: FRM EXAM 2009—QUESTION 1-8

In perfect markets, risk management expenditures aimed at reducing a firm's diversifiable risk serve to

- a. Make the firm more attractive to shareholders as long as costs of risk management are reasonable
- b. Increase the firm's value by lowering its cost of equity
- c. Decrease the firm's value whenever the costs of such risk management are positive
- d. Has no impact on firm value

EXAMPLE 1.8: FRM EXAM 2009—QUESTION 1-2

By reducing the risk of financial distress and bankruptcy, a firm's use of derivatives contracts to hedge its cash flow uncertainty will

- a. Lower its value due to the transaction costs of derivatives trading
- b. Enhance its value since investors cannot hedge such risks by themselves
- c. Have no impact on its value as investors can costlessly diversify this risk
- d. Have no impact as only systematic risks can be hedged with derivatives

1.7 ANSWERS TO CHAPTER EXAMPLES

Example 1.1: Absolute and Relative Risk

c. This is an example of risk measured in terms of deviations of the active portfolio relative to the benchmark. Answers a. and b. are incorrect because they refer to absolute risk. Answer d. is also incorrect because it refers to the absolute risk of the benchmark.

Example 1.2: FRM Exam 2009—Question 1-11

d. It is the role of the CEO to decide on such investments, not the CRO. The CRO had correctly estimated that there was some chance of losing \$1 billion or more. In addition, there is no information on the distribution beyond VAR. So, this could have been bad luck. A risk management failure could have occurred if the CRO had stated that this probability was zero.

Example 1.3: FRM Exam 2009—Question 1-4

a. According to the CAPM, the required return on Portfolio A is $R_F + \beta[E(R_M) - R_F] = 4.5 + 1.5[11] = 21\%$ indeed. Because the beta is greater than 1, it must be greater than the expected return on the market, which is 15.5%. Note that the question has a lot of extraneous information.

Example 1.4: FRM Exam 2009—Question 1-8

c. This is the reverse problem. The CAPM return is $R_F + \beta[E(R_M) - R_F] = 5 + 0.5[10 - 5] = 7.5\%$. Hence the alpha is $8 - 7.5 = 0.5\%$.

Example 1.5: FRM Exam 2007—Question 132

c. The SR considers total risk, which includes systematic and unsystematic risks, so a. and b. are correct statements, and incorrect answers. Similarly, the SR is derived from the CML, which states that the market is mean-variance efficient and hence has the highest Sharpe ratio of any feasible portfolio. Finally, the SR can be used to evaluate undiversified portfolios, precisely because it includes idiosyncratic risk.

Example 1.6: Sharpe and Information Ratios

d. The Sharpe ratios of the portfolio and benchmark are $(10\% - 3\%)/20\% = 0.35$ and $(8\% - 3\%)/14\% = 0.36$, respectively. So the SR of the portfolio is lower than that of the benchmark; answer a. is incorrect. The TEV is the square root of $20\%^2 + 14\%^2 - 2 \times 0.98 \times 20\% \times 14\%$, which is $\sqrt{0.00472} = 6.87\%$. So, the IR of the portfolio is $(10\% - 8\%)/6.87\% = 0.29$. This is positive, so answer b. is incorrect. Answer c. is the SR of the portfolio, not the IR, so it is incorrect.

Example 1.7: FRM Exam 2009—Question 1-8

c. In perfect markets, risk management actions that lower the firm's diversifiable risk should not affect its cost of capital, and hence will not increase value. Further, if these activities are costly, the firm value should decrease.

Example 1.8: FRM Exam 2009—Question 1-2

b. The cost of financial distress is a market imperfection, or deadweight cost. By hedging, firms will lower this cost, which should increase the economic value of the firm.