1 Jennifer Durant is evaluating the existing risk management system of Silverman Asset Management. She is asked to match the following events to the corresponding type of risk. Identify each numbered event as a market risk, credit risk, operational risk, or legal risk event.

Event:

1. Insufficient training leads to misuse of order management system.
2. Credit spreads widen following recent bankruptcies.
3. Option writer does not have the resources required to honor a contract.
4. Credit swaps with counterparty cannot be netted because they originated in multiple jurisdictions.

A. 1: legal risk, 2: credit risk, 3: operational risk, 4: credit risk

B. 1: operational risk, 2: credit risk, 3: operational risk, 4: legal risk

C. 1: operational risk, 2: market risk, 3: credit risk, 4: legal risk

D. 1: operational risk, 2: market risk, 3: operational risk, 4: legal risk

**1. Answer: C**

Insufficient training lead to misuse of order management system is an example of operational risk.

Widening of credit spreads represents an increase in market risk. An option writer not honoring the obligation in a contract is a credit risk event. When a contract is originated in multiple jurisdictions leading to problems with enforceability, there is legal risk.

2 There are many reasons why risk management increases shareholder wealth. Which of the following risk management policies is least likely to increase shareholder wealth?

A. Hedging strategies to lower the probability of financial distress and bankruptcy.

B. Risk management policies designed to reduce the probability of debt overhang.

C. Well-designed compensation structure for managers that sets incentives for managers to take appropriate risks.

D. Risk management policies to eliminate projects with high volatility.

**2. Answer: D**

The first three are examples of where risk management can increase firm value. The last one is invalid because eliminate projects with high volatility may eliminate projects with extremely high payoffs.

3 Which of the following statements regarding risk and risk management is correct?

A. Risk management is more concerned with unexpected losses versus expected losses.

B. There is a relationship between the amount of risk taken and the size of the potential loss.

C. The final step of the risk management process involves developing a risk mitigation strategy.

D. If executed properly, the risk management process may allow for risk elimination within an economy.

**3. Answer: A**

Risk management is more concerned with the variability of losses, especially ones that could rise to unexpectedly high levels or ones that suddenly occur that were not anticipated (unexpected losses).

4 Which of the following statements regarding the role of the firm's audit committee is most accurate?

A. At least one member of the audit committee must possess sufficient financial knowledge.

B. The audit committee may consist of some members of the management team.

C. The audit committee is only responsible for the accuracy of the financial statements.

D. The audit committee is meant to work dependently with management.

**4. Answer: B**

The audit committee consists primarily of non-management members but there may be some management members. (e.g., chief financial officer). The audit committee could work with management members but should keep independent with them.

5 A board of directors is evaluating the implementation of a new ERM program at an asset management company. Which statement below is consistent across the various current definitions of an ERM program and most appropriate to be included in the company's ERM definition and goals?

A. The ERM program should reduce costs by transferring or insuring most of the company's major risk exposures.

B. The major goal of the new ERM program should be to reduce earnings volatility.

C. The ERM program should be managed separately from the operational side of the company.

D. The ERM program should provide an integrated strategy to manage risk across the company as a whole.

**5. Answer: D**

An effective ERM program should be integrated at several levels, across the company as a whole and integrated with the operational side of the company.

6 Let's assume a firm's investors are exposed either to systematic or firm-specific (idiosyncratic, non-systematic) risk. Do the firm's equity investors want its managers to hedge risk?

A. Always, if the firm strategy is to retain the risk.

B. Never, unless hedging enables managers to meet short-term targets linked to their compensation.

C. No, if the investor is diversified and financial markets are perfect and frictionless.

D. Yes, if the investor is diversified and the strategy is sufficiently complex to suit the investor.

**6. Answer: C**

When markets are perfect and there are no frictions, in theory, internal risk management adds value neither by hedging systematic nor idiosyncratic risks. The value of hedging is revealed by market imperfections (e.g., cost of financial distress) and frictions; e.g., taxes.

7 The risk department at an investment firm has been asked to evaluate the impact of environmental, social, and governance (ESG) factors on some of its fund investments. In regard to climate change, the staff has determined that climate change does present a risk that is important, and possibly very large, but they cannot currently calculate the risk. Among the following four classic risks (which constitute part of the second building block in GARP risk management process: Analyze), which most accurately describes the firm's orientation toward climate change?

A. Expected loss

B. Unexpected loss

C. Knightian uncertainty

D. Unknown unknown

**7. Answer: C**

The answer is Knightian uncertainty, because to the firm it is "known unknown". Knight distinguished between variability that cannot be quantified at all, which he called uncertainty, and “true” risk that can be quantified in terms of statistical science. Incalculable Knightian uncertainties can be very large and important. Nuclear war is a major threat to the world, but its chances of happening are impossible to estimate.

8 In regard to limits policies, optimal risk governance requires the ability to link risk appetite and limits to specific business practices. Accordingly, appropriate limits need to be developed for each business as well as for the specific risks associated with the business (as well as for the entire portfolio of the enterprise). Most institutions set two types of limits, tier I and tier II limits. About these limits, which of the following is

TRUE?

A. Firms should choose and either adopt tier I or tier II limits but not both simultaneously
B. Tier I limit exceedances must be cleared or corrected immediately, while tier II exceedances are less urgent and can be cleared within a few days or a week.
C. Tier II limits are specific and often include an overall limit by asset class, an overall stress-test limit, and a maximum drawdown limit.
D. Tier I limits are more generalized and relate to areas of business activity as well as aggregated exposures categorized by credit rating, industry, maturity, and region.

**8. Answer: B**

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Most institutions set two types of limits. Tier I limits are specific and often include an overall limit by asset class, an overall stress-test limit, and a maximum drawdown limit. Tier II limits are more generalized and relate to areas of business activity as well as aggregated exposures categorized by credit rating, industry, maturity, region, and so on.

9 From the perspective of a bank，which of the following is not an advantage of using a collateralized debt obligation (CDO) to transfer credit risk?

A. Bank profitability can be accelerated due to higher loan turnover.
B. Credit risk is effectively transferred to investors.
C. There will always be a market for CDO products.
D. A larger pool of potential borrowers will exist due to less concern for lending (underwriting) standards.

**9. Answer: C**

Collateralized debt obligations transfer credit risk from banks to investors. This process enables banks to accelerate the loan origination cycle and therefore enjoy potentially higher profitability due to sourcing more loans than would otherwise be accessible. The

pool of potential borrowers is increased because banks are less concerned with lending standards. However， when investors lose interest in CDO products due to higher-than-expected default rates，the loan originator (the bank) can be stuck with a large amount of credit risk on their balance sheet.

10 Jimi Chong is a risk analyst at a mid-sized financial institution. He has recently come across an article that described the enterprise risk management (ERM) process. Chong does not believe this is a well-written article，and he identified four statements that he thinks are incorrect. Which of the following statements identified by Chong is actually correct?

A. One of the drawbacks of a fully centralized ERM process is overhedging risks and taking out excessive insurance coverage.

B. ERM benefits include better management of risks at the business level, improved business performance，and better risk reporting.

C. ERM uses sensitivity analysis instead of scenario analysis to analyze potential threats.

D. A strong ERM program allows a firm to focus on the largest risks facing the enterprise.

**10. Answer: D**

A strong ERM program allows a firm to focus on the largest risks facing the enterprise. Overhedging risks and taking out excessive insurance coverage are issues faced by companies that do not have an integrated ERM strategy. Managing risks at the business level is not an advantage of an ERM program. ERM programs use scenario analysis and stress testing, rather than sensitivity analysis，to assess potential threats.

11 Luke Drake has been recently appointed as the chief risk officer (CRO) of a bank. Drake is looking to implement a comprehensive enterprise risk management (ERM) program and had several discussions with senior management on this topic. During one of these discussions, Drake made the following statements:

Statement 1: "Stress test scenarios should focus on the bank's ability to withstand historical shocks such as the Russian financial crisis of 1998 or the subprime debt crisis of 2008."

Statement 2: “In order for us to develop a successful ERM program, governance is important. This means senior management and the board of directors must engage in defining our risk appetite and risk and loss tolerance levels."

Is Drake correct regarding stress testing and corporate governance?

| | Stress Testing | Corporate Governance |
|---|---|---|
| A. | Correct | Incorrect |
| B. | Incorrect | Incorrect |
| C. | Correct | Correct |
| D. | Incorrect | Correct |

**11. Answer: D**

The first statement is incorrect in that it is backward looking. The Federal Reserve conducts stress tests and requires banks to consider baseline, adverse, and severely adverse scenarios，which may include historical variables but also include factors that have not necessarily happened before. The second statement is correct. Corporate governance requires managers, executives，and the board to be fully engaged in defining the firm's risk appetite and tolerable losses.

12 Which of the following is strictly true about the standard version of the capital asset pricing model (CAPM)?

A. The security market line (SML) states that the expected return on any security is the riskless rate of interest plus the market price of risk times the amount of risk in the security or portfolio.

B. If CAPM is valid, then the return of a high-beta should be higher than the return of a low- beta stock over the next calendar year, or for that matter, any given calendar year.

C. All other things being equal, the security market line (SML) implies that higher non- systematic (aka, idiosyncratic) risk will produce higher expected returns.

D. While CAPM characterizes equilibrium in terms of rate of return, it cannot be similarly extended to prices.

**12. Answer: A**

B is false. Invariably, when a group of investors is first exposed to the CAPM, one or more investors will find a high- Beta stock that last year produced a smaller return than low-Beta stocks. The CAPM is an equilibrium relationship. High- Beta stocks are expected to give a higher return than low- Beta stocks because they are more risky. This does not mean that they will give a higher return over all intervals of time. In fact, if they always gave a higher return, they would be less risky, not more risky, than low- Beta stocks. Rather, because they are more risky, they will sometimes produce lower returns. However, over long periods of time, they should on the average produce higher returns.

C is false and it is important in the CAPM. One of the greatest insights that comes from this equation arises from what it states is unimportant in determining return. The risk of any stock could be divided into systematic and unsystematic risk. Beta was the index of systematic risk. This equation validates the conclusion that systematic risk is the only important ingredient in determining expected returns and that nonsystematic risk plays no role. In other words, the investor gets rewarded for bearing systematic risk. It is not total variance of returns that affects expected returns, but only that part of the variance in returns that cannot be diversified away. This result has great economic intuition for, if investors can eliminate all nonsystematic risk through diversification, there is no reason they should be rewarded, in terms of higher return, for bearing it. All of these implications of the CAPM are empirically testable.

D is obviously false as the it can be extended to prices.

13 Which of the following is a DIFFERENCE between the capital asset pricing model (CAPM) and the capital market line (CML)

A. The CML does not include the risk-free asset, but CAPM does.

B. CAPM is a special case of the CML, where the portfolio is diversified and efficient.

C. In CAPM, risk is systematic (beta) since it can apply to inefficient portfolios; but in CML, risk is total (volatility) since it only includes efficient portfolios.

D. CAPM assumes the portfolio is diversified and efficient, but CML allows for un-diversified and/or inefficient portfolios.

**13. Answer: C**

In regard to B, the inverse is true: CML is a special case of SML (CAPM) where the portfolio is efficient and perfectly correlated to the market portfolio.

14 In regard to the combination of two assets in the mean-variance framework, each of the following is true EXCEPT:

A. The lower (i.e., closer to -1.0) the correlation coefficient between assets, all other attributes held constant, the higher the payoff from diversification.

B. The combinations of two assets can never have more risk than that found on a straight line connecting the two assets in expected return standard deviation space.

C. The combinations of two assets, assuming no short selling, can never have less risk than the least risky asset in the portfolio.

D. When two assets are combined in a portfolio, there always exists a simple expression for finding the minimum variance portfolio.

**14. Answer: C**

The combinations of two assets, assuming no short selling, can have less risk
than the least risky asset in the portfolio.
For example, if sigma(a) = 10% and sigma(b) = 20%, then any correlation less than 0.5 allows for portfolios with volatility less than 10%, without short selling; e.g., at rho = 0.1, the minimum variance portfolio occurs at 82.6% invested in asset(a) for a portfolio volatility of 9.28%.

15 In regard to multi-factor models, including the arbitrage pricing model (APT), each of

the following is true EXCEPT:

A. A disadvantage of APT models, in general, is the curse of dimensionality, which means k factors requires the identification of k*(k+1)/2 values.

B. A multi-factor risk model is likely to employ fewer factors than a multi-factor alpha (i.e., expected return) model.

C. APT has advantages in flexibility over CAPM: APT is more flexible; does not require that returns are normally distributed; and merely assumes investors are risk-averse.

D. The factor sensitivities (betas) in APT are equal to Covariance(security's return, factor risk premium)/Variance(factor risk premium).

**15. Answer: A**

The curse of dimensionality is associated with the covariance matrix; but the reviewed APT/multifactor models SOLVE the curse by assuming factors are uncorrelated.
In regard to B, C and D, each is TRUE.
In regard to D, this is analogous to CAPM's beta.

16 Instead of residual-based information ratio (IR), it is also acceptable to compute information ratio (IR) based on active returns. The following table displays twelve (12) months of returns comparing a portfolio (P) to its benchmark (B); the final column shows the difference each month:

| Month | Port-folio (P) | Bench-mark (B) | (P-B) |
|---|---|---|---|
| 1 | 3.58% | 2.20% | 1.38% |
| 2 | -4.60% | -4.50% | -0.10% |
| 3 | 5.28% | 3.27% | 2.01% |
| 4 | 9.40% | 6.80% | 2.60% |
| 5 | 8.78% | 7.71% | 1.07% |
| 6 | 8.30% | 9.00% | -0.70% |
| 7 | -4.60% | -5.40% | 0.80% |
| 8 | 5.37% | 2.74% | 2.63% |
| 9 | -2.70% | -2.86% | 0.16% |
| 10 | 7.76% | 6.49% | 1.27% |
| 11 | -2.80% | -3.13% | 0.33% |
| 12 | 0.78% | 7.00% | -6.22% |
| **Average** | **2.88%** | **2.44%** | **0.44%** |
| **STDEV.S()** | **5.42%** | **5.19%** | **2.34%** |

The final two rows show the average and sample standard deviation of the monthly return statistics. Which is nearest to the annualized ex-post (active-based) information ratio (IR)?

A. 0.404

B. 0.651

C. 0.950

D. 1.237

**16. Answer: B**

$\text{Annualized ex post (active based) IR} = (0.0044 \times 12)/(0.0234 \times \sqrt{12}) = 0.65137$

17 An arbitrage pricing model (APT) characterizes excess security returns as a linear function of two indexes, I(1) and I(2). In this way, a security's excess return in percentage terms, ER(i), is given by $\text{ER(i)} = \text{R(i)} - \text{Rf} = \text{a} + \text{b(1)} \cdot \text{I(1)} + \text{b(2)} \cdot \text{I(2)}$, where b(i) is the factor sensitivity to the index, I(i). We observe three securities that fit the APT model, as follows:

Security 1: $\text{ER(1)} = \text{a} + 2.0 \cdot \text{b(1)} + 3.0 \cdot \text{b(2)} = 8.0$

Security 2: $\text{ER(2)} = \text{a} + 4.0 \cdot \text{b(1)} + 2.5 \cdot \text{b(2)} = 3.5$

Security 3: $\text{ER(3)} = \text{a} + 1.0 \cdot \text{b(1)} - 2.0 \cdot \text{b(2)} = -5.5$

Which is the specification of the model?

A. $\text{ER(i)} = 1.0 + 2.5 \cdot \text{I(1)} + 3.0 \cdot \text{I(2)}$

B. $\text{ER(i)} = 2.0 - 1.5 \cdot \text{I(1)} + 3.0 \cdot \text{I(2)}$

C. $\text{ER(i)} = 3.0 + 0.5 \cdot \text{I(1)} + 0.5 \cdot \text{I(2)}$

D. $\text{ER(i)} = 4.0 - 3.0 \cdot \text{I(1)} - 1.0 \cdot \text{I(2)}$

**17. Answer: B**

We have three variables and three equations:

a+2.0·b(1)+3.0·b(2)=8.0

a+4.0·b(1)+2.5·b(2)=3.5

a+1.0·b(1)-2.0·b(2)=-5.5

Solving these equations we can get: I(1)=-1.5, I(2)=3, a=2. So the model is:

$\mathrm{ER(i)} = 2.0 - 1.5 \cdot \mathrm{b}(1) + 3.0 \cdot \mathrm{b}(2)$

18 Suppose that three factors have been identified for the U.S. economy:

- Expected inflation rate (IR) is +2.00%
- Expected 10-year Treasury yield (T-NOTE) is 2.40%
- Expected growth in productivity (PROD) is +3.00%

A stock with an expected return of 9.0% has the following betas with respect to these factors: β(IR) = +1.50, β(T-NOTE) = -1.20 and β(PROD) = 0.70. In turns out that that economy's actual factor performance is the given by the following set of results:

- Actual inflation rate (IR) is + 2.60%
- Actual 10-year Treasury yield (T-NOTE) is 3.00%
- Actual growth in productivity (PROD) +2.00%

What is the revised estimate of the stock's expected rate of return?

A. 8.480%

B. 9.000%

C. 9.250%

D. 10.375%

**18. Answer: A**

$$\text{Revised estimate} = 9.0\% + [1.5 \cdot (2.6\% - 2.0\%)] + [-1.20 \cdot (3.0\% - 2.4\%)] + [0.70 \cdot (2.0\% - 3.0\%)] = 8.480\%$$

19 In a single-factor economy, each of the following portfolios (A, B, and C) is well-diversified:

| | |
|---|---|
| Riskfree rate | 3.0% |
| Volatility of market index, σ[M] | 30.0% |

| Portfolio | Beta | E[R(i)] | σ[e(i)] |
|---|---|---|---|
| A | 0.60 | 12.0% | 10.0% |
| B | 0.80 | 15.0% | 25.0% |
| C | 1.20 | ??? | 42.0% |

You discover there is NOT an arbitrage strategy among these three portfolios. In this case, what should be the expected return of Portfolio (C)?

A. 13.3%

B. 16.3%

C. 18.5%

D. 21.0%

**19. Answer: D**

All three portfolios must lie on the same SML such that Portfolio C's Treynor ratio must be the same as the others.

$\text{Treynor(Portfolio A)} = (12.0\% - 3.0\%)/0.60 = 0.15$

$\text{Tryenor(Portfolio B)} = (15.0\% - 3.0\%)/0.80 = 0.15$

$\text{Treynor(Portfolio C)} = (\text{R} - 3.0\%)/1.20 = 0.15$

We can get R = 21%, which means the return must be 21.0%.

20 Consider below the multifactor (APT) model of security returns for a particular stock. In addition to factor betas and risk premiums, two of the factors experience "surprises." Specifically, while interest rates change as expected, actual inflation is +2.0% (compared to expected +1.0%) and actual GDP growth is +1.5% (compared to

| | |
|---|---|
| Riskfree rate | 2.0% |

| | Factor | | Rate of Change | |
|---|---|---|---|---|
| Factor | Beta | Risk Premium | Expected | Actual |
| Δ inflation (Δi) | 0.80 | 2.0% | 1.0% | 2.0% |
| Δ interest rates (Δr) | (0.50) | 1.0% | 1.0% | 1.0% |
| ΔGDP | 1.30 | 3.0% | 0.5% | 1.5% |

expected +0.5%):

What is the expected rate of return on the security?

A. 6.8%

B. 7.2%

C. 9.10%

D. 11.5%

**20. Answer: C**

$\mathrm{E(r)} = 2.0\% + 0.80 \cdot 2.0\% - 0.50 \cdot 1.0\% + 1.30 \cdot 3.0\% = 7.00\%.$

$\text{Unexpected return} = 0.80 \cdot (2.0 - 1.0\%) - 0.50 \cdot (1.0\% - 1.0\%) + 1.30 \cdot (1.5\% - 0.5\%)$

$= 0.80\% + 1.30\% = 2.10\%$

$\text{Revised } \mathrm{E(r)} = 7.00\% + 2.10\% = 9.10\%$

21 Sally Smith, FRM, is considering a switch in the theoretical basis of her risk model from a simple single-factor capital asset pricing model (CAPM) to a multi-factor arbitrage pricing theory (APT) model. To her manager, she claims the following differences between the two models. Each of her statements below is correct EXCEPT which is not?

A. Compared to only one specific factor (i.e., market index) in the simple CAPM, the APT model will be able to recognize multiple systematic risk factors.

B. While the CAPM requires a mean-variance efficient market portfolio and assumes normally distributed returns, APT requires neither of these assumptions.

C. Although APT does not require several of the restrictive assumptions of the CAPM, it is largely silent on where to look for priced sources of risk.

D. In contrast to the simple CAPM, the APT cannot include the market index as a common factor, nor can it be extended over multiple periods.

**21. Answer: D**

Both components are false: APT can include the market portfolio as a common factor; and APT can be extended over multiple periods

In regard to A, B and C, each is true.

22 Consider the following three well-diversified portfolios that exist in a single-factor economy:

| Riskfree rate | 1.0% |
|---|---|

| Portfolio | E( r) | Beta |
|---|---|---|
| A | 9.0% | 1.60 |
| B | 7.0% | 1.10 |
| C | 4.0% | 0.60 |

Is there an arbitrage opportunity?

A. No, all three well-diversified portfolios plot on the security market line.

B. Yes, an arbitrage includes buying portfolio (A) and selling a combination of (B) and (C).

C. Yes, an arbitrage includes buying portfolio (B) and selling a combination of (A) and (C).

D. Yes, an arbitrage includes buying portfolio (C) and selling a combination of (A) and (B).

**22. Answer: C**

There is no arbitrage opportunity if all three well-diversified portfolios plot on the security market line (SML). This can be tested by calculating their respective Treynor ratios.

$\text{Treynor(A)} = (9.0\% - 1.0\%)/1.60 = 0.050$

$\text{Treynor(B)} = (7.0\% - 1.0\%)/1.10 = 0.0545$

$\text{Treynor(C)} = (4.0\% - 1.0\%)/0.60 = 0.050$

Our arbitrage is to buy the "cheap" Portfolio B (with the higher Treynor) and sell the "expensive" blend of Portfolios (A) and (C).

23 The efficient frontier is defined by the set of portfolios that, for each volatility level, maximizes the expected return. According to the capital asset pricing model (CAPM),

which of the following statements are correct with respect to the efficient frontier?

I The capital market line is the straight line connecting the risk-free asset with the zero beta minimum variance portfolio.

II The capital market line always has a positive slope and its steepness depends on the market risk premium and the volatility of the market portfolio.

III The complete efficient frontier without a risk-free asset can be obtained by combining the minimum variance portfolio and the market portfolio.

IV The efficient frontier allows different individuals to have different portfolios of risky assets based upon their own risk aversion and forecast for asset returns.

V The efficient frontier assumes no transaction costs, no taxes, a common investment horizon for all investors, and that the return distribution has no skewness.

A. II, III and V

B. I, II and III

C. I, IV and V

D. II, III and IV

**23. Answer: A**

Within modern portfolio theory, the efficient frontier is a combination of assets that has the best possible expected level of return for its level of risk. The efficient frontier is the positively sloped portion of the opportunity set that offers the highest expected return for a given risk level. The efficient frontier is at the top of the feasible set of portfolio combinations. II, III and V are correct statements.

The capital market line connects the risk-free asset and the market portfolio. The efficient frontier does allow investors to have different risk aversions, but assumes that they all have the same forecast for asset returns.

24 All of the following are assumptions of the Capital Asset Pricing Model except:

A. Each investor seeks to maximize the expected utility of wealth at the end of that investor’s horizon.

B. Investors can borrow and lend at the same risk-free rate.

C. Investors have the same expectations concerning returns.

D. The time horizons of investors are normally distributed.

**24. Answer: D**

The CAPM assumes that investors all have the same horizon (as well as expectations). This means that the distribution of the horizons is not normal because normality implies a bell-shaped curve distribution, which would have a positive variance and, hence, dispersion.

25 Patricia Franklin makes buy and sell stock recommendations using the capital asset pricing model. Franklin has derived the following information for the broad market and for the stock of the CostSave Company (CS):

- Expected market risk premium 8%
- Risk-free rate 5%
- Historical beta for CostSave 1.50

Franklin believes that historical betas do not provide good forecasts of future beta, and therefore uses the following formula to forecast beta:

$$\text{forecasted beta} = 0.80 + 0.20 \times \text{historical beta}$$

After conducting a thorough examination of market trends and the CS financial statements, Franklin predicts that the CS return will equal 10%. Franklin should derive the following required return for CS along with the following valuation decision (undervalued or overvalued):

| | Valuation | CAPM required return |
|---|---|---|
| A. | overvalued | 8.3% |
| B. | overvalued | 13.8% |
| C. | undervalued | 8.3% |
| D. | undervalued | 13.8% |

**25. Answer: B**

The CAPM equation is: $E(R_i) = R_f + \beta_i \times [E(R_M) - R_f]$

Franklin forecasts the beta for CostSave as follows:

$\text{beta forecast} = 0.80 + 0.20 \times \text{historical beta} = 0.80 + 0.20 \times 1.50 = 1.10$

The CAPM required return for CostSave Company is: $0.05 + 1.1 \times (0.08) = 13.8\%$

Note that the market premium, $E(R_M) - R_f$, is provided in the question (8%).

Franklin should decide that the stock is overvalued because she forecasts that the CostSave return will equal only 10%, whereas the required return (minimum acceptable return) is 13.8%.

26 Suppose that the correlation of the return of a portfolio with the return of its benchmark is 0.8, the volatility of the return of the portfolio is 5%, and the volatility of the return of the benchmark is 4%. What is the beta of the portfolio?

A. 1.00

B. 0.80

C. 0.64

D. -1.00

**26. Answer: A**

The following equation is used to calculate beta: $\beta = \rho \times \frac{\sigma_P}{\sigma_B} = 0.8 \times \frac{0.05}{0.04} = 1.00$

27 The market portfolio (M) contains the optimal allocation of only risky assets and no risky assets. Let the $S_1$be the Sharpe ratio of this market portfolio. There exists a risk-free asset. Initially, an investor is fully (100%) invested in M with a portfolio Sharpe ratio of $S_1$. Subsequently, the investor borrows 30% at the risk-free rate, such that she is 130% invested in the market portfolio (M) where this leverage portfolio has a Sharpe ratio of $S_2$. After the leverage (i.e., borrowing at the risk-free rate to invest + 30% in M, is the investor still on the efficient frontier and how do the Sharpe ratios?

A. No (no longer efficient), and $S_2 < S_1$.

B. No, but $S_2 = S_1$.

C. Yes (still efficient), but $S_2 < S_1$.

D. Yes, and $S_2 = S_1$.

**27. Answer: D**

The ability to borrowing or lend morphs the concave/convex efficient frontier into the linear CML; i.e., the leveraged portfolio is efficient with higher risk and higher return.

All portfolios on the CML have the same Sharpe ratio: the slope of the CML.

28 An analyst is estimating the sensitivity of the return of stock A to different macroeconomic factors. He prepares the following estimates for the factor betas:

$$\beta_{\text{industrial production}} = 1.3 \qquad \beta_{\text{interest rate}} = -0.75$$

Under baseline expectations, with industrial production growth of 3% and an interest rate of 1.5%, the expected return for Stock A is estimated to be 5%.

The economic research department is forecasting an acceleration of economic activity for the following year, with industrial production forecast to grow 4.2% and interest rates increasing 25 basis points to 1.75%.

What return of Stock A can be expected for next year according to this forecast?

A. 4.8%

B. 6.4%

C. 6.8%

D. 7.8%

**28. Answer: B**

The expected return for Stock A equals the expected return for the stock under the baseline scenario, plus the impact of "shocks", or excess returns of, both factors. Since the baseline scenario incorporates 3% industrial production growth and a 1.5% interest rate, the "shocks" are 1.2% for the GDP factor and 0.25% for the interest rate factor.

Therefore the expected return for the new scenario

$$= \text{Baseline scenario expected return} + \beta_{\text{industrial production}} \times \text{Industrial production shock} + \beta_{\text{interest rate}} \times \text{Interest rate shock}$$

$$= 5\% + (1.3 \times 1.2\%) + (-0.75 \times 0.25\%) = 6.37\%$$

29 Assume the slope of the security market line (SML) is 0.060 while the risk-free rate is

2.0%. What is the Treynor measure of a security with an alpha of 2.40% and beta of 0.30?

A. 0.140

B. 0.280

C. 0.560

D. 1.120

**29. Answer: A**

The slope of the SML is the market's excess return such that the security's excess return is $0.060 \times 0.30 + 2.40\% = 4.20\%$

The security's Treynor measure is therefore $4.20\%/0.30 = 0.140$

There is one thing we need to pay attention to. Here we cannot use SML formula to calculate the expected return of the security, because the Treynor ratio requires the actual return of the security.

30 A portfolio with a volatility of 30.0% has a Treynor measure of 0.080. The portfolio has a correlation of 0.50 with the market index which itself has a volatility of 20.0%. What is the portfolio's Sharpe measure?

A. 0.095

B. 0.200

C. 0.330

D. 0.475

**30. Answer: B**

$\beta = 0.50 \times 30\%/20\% = 0.750$

$\mathrm{TR} = \dfrac{\mathrm{E}(\mathrm{R_P}) - \mathrm{R_f}}{\beta_\mathrm{P}} = 0.08 \rightarrow \mathrm{E}(\mathrm{R_P}) - \mathrm{R_f} = 0.75 \times 0.08 = 0.06$

$\mathrm{SR} = 0.06/30.0\% = 0.20$

31 Assume the market index return is 8.0% while the risk-free rate is 3.0%. A portfolio with a volatility of 12.0% has a Sharpe measure of 0.50 and a Treynor measure of 0.20. What is the portfolio's alpha?

A. -2.79%

B. 1.16%

C. 3.83%

D. 4.50%

**31. Answer: D**

$$\text{The portfolio's excess return} = \text{Sharpe ratio} \times \text{volatility} = 0.50 \times 12\% = 6.0\%$$

$$\text{Its beta} = (\text{excess return})/\text{Treynor ratio} = 6.0\%/0.20 = 0.30$$

$$\text{Portfolio alpha} = (\text{portfolio's excess return}) - \text{beta} * (\text{market premium})$$
$$= 6.0\% - 0.30 \times 5.0\% = 4.5\%$$

32 Consider the following already-annualized statistics for portfolio (P):

- Risk-free rate = 2.00%
- Realized portfolio (P) return (average) = 9.50%
- Portfolio (P) excess return = 9.50% - 2.00% = 7.50%
- Standard deviation of portfolio (P) returns = 14.70%
- Minimum acceptable return (MAR) = 6.00%
- Downside deviation of portfolio (P) returns = 5.60%

Which are nearest, respectively, to the Sharpe measure and Sortino ratio?

A. 0.280 (Sharpe) and 0.100 (Sortino)

B. 0.350 (Sharpe) and 0.433 (Sortino)

C. 0.510 (Sharpe) and 0.625 (Sortino)

D. 0.740 (Sharpe) and 1.290 (Sortino)

**32. Answer: C**

$\text{Sharpe ratio} = 0.0750/0.1470 = 0.510$

$\text{Sortino Ratio} = (9.50\% - 6.00\%)/5.60\% = 0.6250$

33 If a portfolio's volatility (i.e., annualized standard deviation) was 24%, what is the tracking error (TE) if the benchmark is cash with a constant return of 2% and no volatility?

A. Less than 24%

B. 24%

C. Greater than 24%

D. Need more information

**33. Answer: B**

$\text{VAR}(\text{A} - \text{B}) = \text{VAR}(\text{A}) + \text{VAR}(\text{B}) - 2\text{COV}(\text{A}, \text{B})$, and if $\text{VAR}(\text{B}) = 0$, then

$\text{VAR}\ (\text{A} - \text{B}) = \text{VAR}(\text{A}) + 0 - 0 = \text{VAR}(\text{A})$

34 Donaldson Capital Management, a regional money management firm, manages nearly $400 million allocated among three investment managers. All portfolios have the same objective, which is to produce superior risk-adjusted returns (by beating the market) for their clients. You have been hired as a consultant to measure the performance of the portfolio managers. You have collected the following information based on the last ten years of returns.

| Portfolio Manager | Mean Annualized Rate of Return | Beta | Standard Deviation of Return |
|---|---|---|---|
| a | 0.18 | 1.35 | 0.24 |
| b | 0.21 | 1.95 | 0.25 |
| c | 0.24 | 2.10 | 0.22 |

During the same time period the average annual rate of return on the market portfolio

was 13% with a standard deviation of 19%. In order to assess the portfolio performance of the above managers, you should use:

A. The Treynor measure of performance

B. The Sharpe measure of performance

C. The Jensen measure of performance

D. The Sortino measure of performance

**34. Answer: B**

The Treynor measure is most appropriate for comparing well-diversified portfolios. That is, the Treynor measure is the best to compare the excess returns per unit of systematic risk earned by portfolio managers, provided all portfolios are well-diversified.

All three portfolios managed by Donaldson Capital Management are clearly less diversified than the market portfolio. Standard deviation of returns for each of the three portfolios is higher than the standard deviation of the market portfolio, reflecting a low level of diversification.

Jensen's alpha is the most appropriate measure for comparing portfolios that have the same beta. The Sharpe measure can be applied to all portfolios because it uses total risk and it is more widely used than the other two measures. Also, the Sharpe ratio evaluates the portfolio performance based on realized returns and diversification. A less-diversified portfolio will have higher total risk and vice versa.

35 A high net worth investor is monitoring the performance of an index tracking fund in which she has invested. The performance figures of the fund and the benchmark portfolio are summarized in the table below:

| Year | Benchmark Return | Fund Return |
|---|---|---|
| 2005 | 9.00% | 1.00% |
| 2006 | 7.00% | 3.00% |
| 2007 | 7.00% | 5.00% |
| 2008 | 5.00% | 4.00% |
| 2009 | 2.00% | 1.50% |

What is the tracking error volatility of the fund over this period?

A. 0.09%

B. 1.10%

C. 3.05%

D. 4.09%

**35. Answer: C**

Relative risk measures risk relative to a benchmark index, and measures it in terms of tracking error or deviation from the index.

We need to calculate the standard deviation of the series: {0.08, 0.04, 0.02, 0.01, 0.005}

Perform the calculation by computing the difference of each data point from the mean, square the result of each, take the average of those values, and then take the square root. This is equal to 3.04%.

36 Tim is evaluating 4 funds run by 4 independent managers relative to a benchmark portfolio that has an expected return of 7.4% and volatility of 14%. He is interested in investing in the fund with the highest information ratio that also meets the following conditions in his investment guidelines:

I Expected residual return must be at least 2%.

II Residual risk relative to the benchmark portfolio must be less than 2.5%.

Based on the following information which fund should he choose?

| Fund | Expected Return | Volatility | Residual Risk | Information Ratio |
|---|---|---|---|---|
| A | 9.3% | 15.3% | | 0.8 |
| B | | 16.4% | 2.4% | 0.9 |
| C | | 15.8% | 1.5% | 1.3 |
| D | 9.4% | | 1.8% | |

A. Fund A

B. Fund B

C. Fund C

D. Fund D

**36. Answer: D**

$\text{Expected residual return} = r_P - r_B$

$\text{Information ratio} = (r_P - r_B)/\text{residual risk}$

$\text{Expected residual return}_A = 9.3\% - 7.4\% = 1.9\%$

$\text{Expected residual return}_B = 0.9 \times 2.4\% \ = 2.16\%$

$\text{Expected residual return}_C = 1.3 \times 1.5\% = 1.95\%$

$\text{Expected residual return}_D = 9.4\% - 7.4\% = 2\%$

$\text{Information ratio}_D = 2\% \ / \ 1.8\% = 1.1$

37 A stack-and-roll hedge as described in the Metallgesellschaft case is best described as:

A. Buying futures contracts of different expirations and allowing them to expire in sequence.

B. Buying futures contracts of different expirations and closing out the position shortly before expiration.

C. Using short-term futures to hedge a long-term risk exposure by replacing them with longer-term contracts shortly before they expire.

D. Using short-term futures contracts with a larger notional value than the long-term risk they are meant to hedge.

**37. Answer: C**

A stack is a bundle of futures contracts with the same expiration. Over time, a firm may acquire stacks with various expiry dates. To hedge a long-term risk exposure, a firm would close out each stack as it approaches expiry and enter into a contract with a more distant delivery, known as a roll. This strategy is called a stack-and-roll hedge and is designed to hedge long-term risk exposures with short-term contracts.

38 Based on the assigned reading, what was arguably the largest single failure by the management of Barings?

A. They did not implement position limits for all possible instruments.

B. They allowed Leeson to be both chief trader and head of settlements.

C. Positions should have required daily cash settlement (margin would have exposed the losses).

D. They did not hire a consultant to implement training to build risk awareness and promote a risk culture.

**38. Answer: B**

The most egregious violation was that Leeson was allowed to simultaneously, effectively manage both the front and back offices.

39 Which of the following statements about asset-backed securities (ABSs) is least accurate?

A. The waterfall structure of an ABS alters the priority of principal and interest cash flows.

B. The highest expected return, lowest-risk tranche is the senior tranche.

C. A 5% overcollateralization indicates that for every $100 in an ABS created, $105 in underlying mortgages is required.

D. The total cash flow of the underlying mortgages and the total cash flow of the ABS are almost the same.

**39. Answer: B**

The senior tranche is the lowest-risk tranche but also is the lowest expected return tranche (the equity tranche has the highest risk but offers the highest expected return). All other statements are accurate.

40 Jeffrey Gibson, a bank supervisor with a national regulatory agency, has requested as part of a bank examination that Star Bank, a global systemically important bank (G-SIB)，improve its aggregation and reporting of risk data. Star Bank has experienced significant losses resulting from multiple causes, ranging from poor lending decisions to bad decisions regarding the use of derivatives. The bank is now undercapitalized because of losses. Gibson refers Star Bank's risk managers to the

Basel Committee's recommendations for effective risk data aggregation. He informs risk committee members and senior management that one of the potential direct benefits of effective risk data aggregation, particularly in light of Star Bank's current troubles, is

A. increased bank efficiency.

B. more effective IT infrastructure.

C. improved resolvability of bank problems.

D. a clearer definition of the bank's risk appetite.

**40. Answer: C**

There are several benefits that accrue to banks that have effective risk data aggregation and reporting systems in place. These benefits include an increased ability to anticipate problems. Also, in times of severe financial stress, effective risk data aggregation enhances a bank's ability to identify alternative routes to restore financial health. Regulatory authorities should have access to aggregated risk data to resolve issues related to bank health and viability. This aids regulators in resolving problems in the event of financial stress. By strengthening a bank's risk function, the bank is better able to make strategic decisions, increase efficiency, reduce the probability of loss and ultimately increase profitability. In this case, the bank appears to be in financial stress, so the most relevant benefit is improved resolvability.