Financial Exam Help 123™

2023 Level III Mock Exam

Morning Session Sample Exam
Full Guideline Answers

Question 1 relates to Derivative Securities

AJBWU Case Scenario

1.1   To achieve Degenek's target asset allocation and target betas, **determine** the action (buy or sell) and the number of small-cap equity futures contracts required.

Degenek wants to reallocate 30% of AUD 200,000,000 – AUD 60,000,000 – from large-cap equity to small-cap equity. To do this, he will, in essence, convert AUD 60,000,000 from large-cap equity to cash (with a beta of zero), then convert AUD 60,000,000 of cash to small-cap equity. He also wants to increase the beta on the small-cap equity allocation from 0.90 to 1.25.

To accomplish this, there are broadly three approaches Degenek can follow:

1. First reallocate the portfolio, then increase the beta of the resulting small-cap equity portfolio.
2. First increase the beta of the existing small-cap equity portfolio, then reallocate the portfolio.
3. Increase the beta of the existing small-cap equity portfolio and reallocate the portfolio simultaneously.

I'll cover all three approaches.

Reallocation, then Beta

Graphically. changing the allocation, then changing the beta, looks like this:

Changing Allocation, then Beta
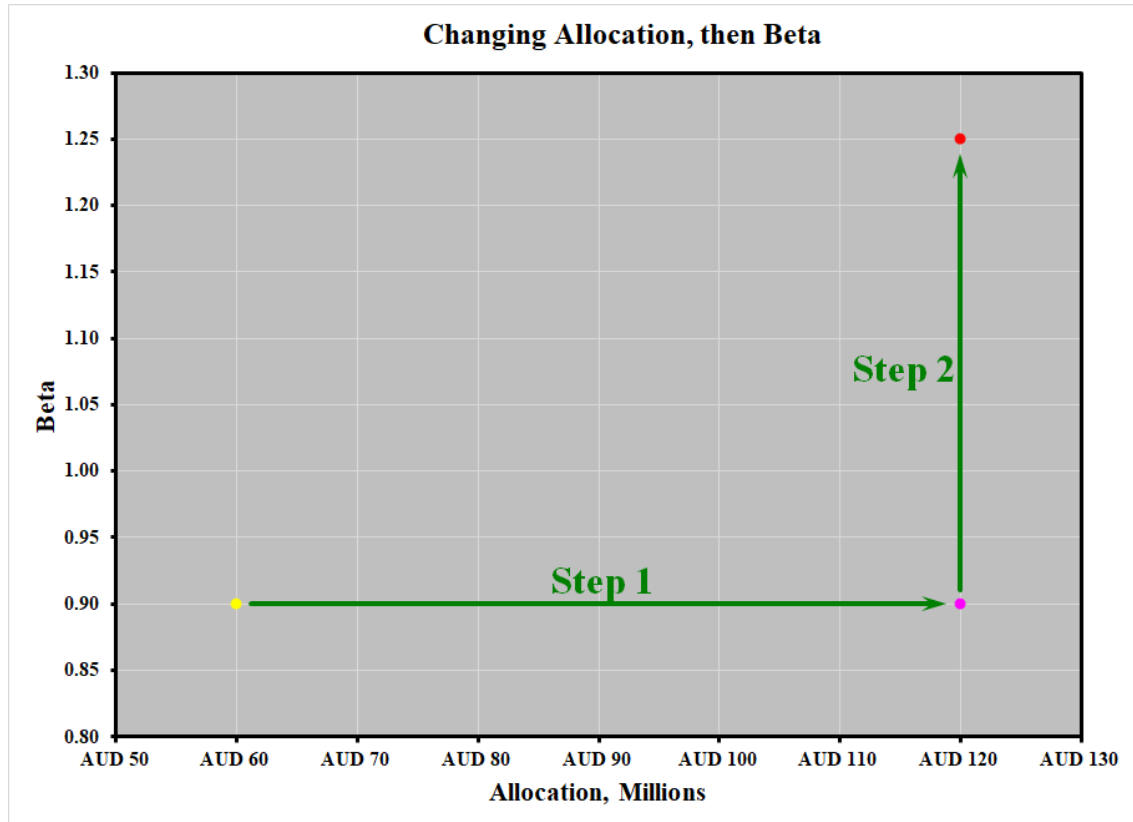
Step 1: To change the allocation from AUD 60,000,000 (= AUD 200,000,000 × 30%) to AUD 120,000,000 (= AUD 200,000,000 × 60%), the number of small-cap equity index futures contracts that Degenek needs to execute is:

$$N_{sf} = \frac{S_T - S_P}{f_s} \times \frac{\beta_P}{\beta_f}$$

where:

N_{sf} = number of small-cap equity index (stock) futures contracts
S_T = target portfolio size (AUD 120,000,000)
S_P = existing portfolio size (AUD 60,000,000)
f_s = small-cap equity index (stock) futures price (AUD 104,000)
β_P = beta of the existing small-cap portfolio (0.90)
β_s = beta of the small-cap equity index futures contract (1.30)

$$N_{sf} = \frac{S_T - S_P}{f_s} \times \frac{\beta_P}{\beta_f}$$

$$= \frac{AUD\ 120,000,000 - AUD\ 60,000,000}{AUD\ 104,000} \times \frac{0.90}{1.30} = \underline{399.41}$$

Step 2: To increase the beta from 0.90 to 1.25 (on the new small-cap equity allocation of AUD 120,000,000), the number of small-cap equity futures contracts that Degenek needs to execute is:

$$N_{sf} = \frac{\beta_T - \beta_P}{\beta_f} \times \frac{S_P}{f_s}$$

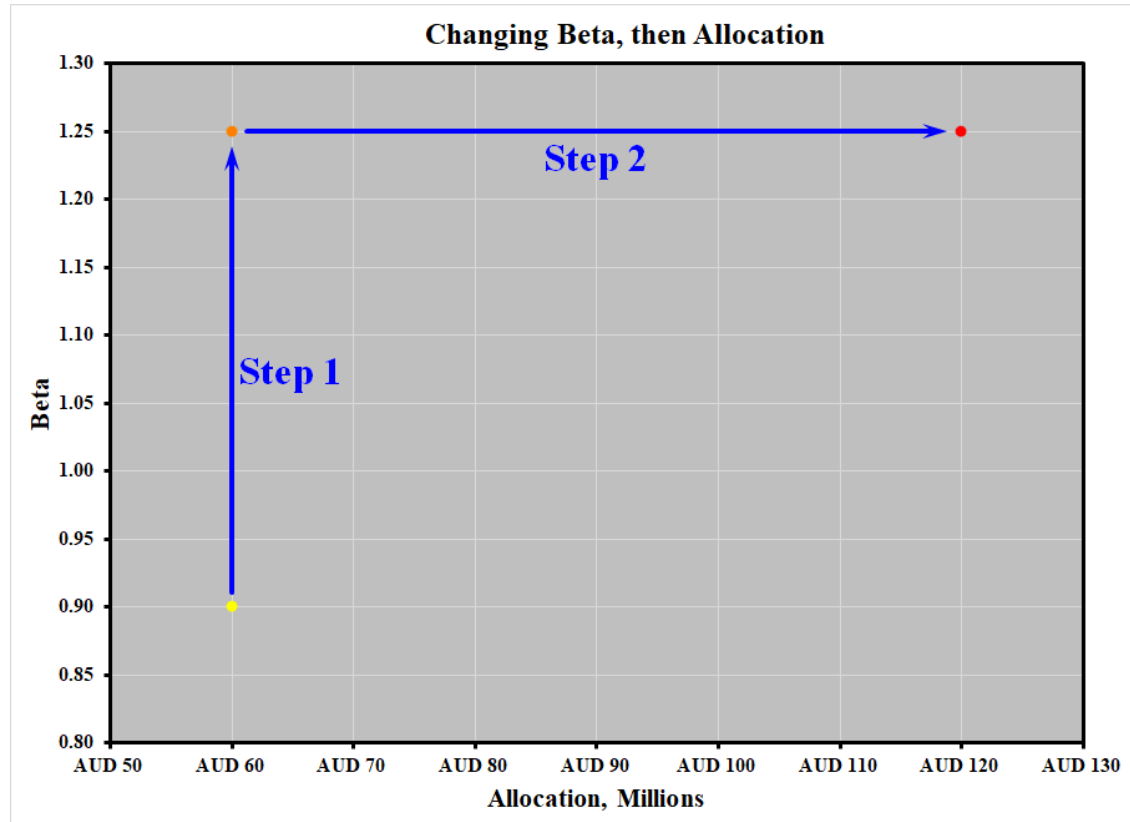$$= \frac{1.25 - 0.90}{1.30} \times \frac{AUD\ 120,000,000}{AUD\ 104,000} = \underline{310.65}$$

The total number of small-cap equity index futures contracts that Degenek needs to execute is:

$$399.41 + 310.65 = \underline{710.06}$$

Therefore, Degenek should buy (i.e., take the long position in) 710 small-cap equity index futures contracts.

Beta, then Reallocation

Graphically. changing the beta, then changing the allocation, looks like this:

Changing Beta, then Allocation

Step 1: To increase the beta from 0.90 to 1.25 (on the existing small-cap allocation of AUD 60,000,000 (= 30% × AUD 200,000,000)), the number of small-cap equity futures contracts that Degenek needs to execute is:

$$N_{sf} = \frac{\beta_T - \beta_P}{\beta_f} \times \frac{S_P}{f_s}$$

$$= \frac{1.25 - 0.90}{1.30} \times \frac{AUD\ 60,000,000}{AUD\ 104,000} = \underline{\underline{155.33}}$$

Step 2: To change the allocation from AUD 60,000,000 (= AUD 200,000,000 × 30%) to AUD 120,000,000 (= AUD 200,000,000 × 60%) on a portfolio that now has a beta of 1.25, the number of small-cap equity index futures contracts that Degenek needs to execute is:

$$N_{sf} = \frac{S_T - S_P}{f_s} \times \frac{\beta_P}{\beta_f}$$

$$= \frac{AUD\ 120,000,000 - AUD\ 60,000,000}{AUD\ 104,000} \times \frac{1.25}{1.30} = \underline{\underline{554.73}}$$

The total number of small-cap equity index futures contracts that Degenek needs to execute is:

$$155.33 + 554.73 = \underline{\underline{710.06}}$$

Therefore, Degenek should buy (i.e., take the long position in) 710 small-cap equity index futures contracts.

<u>Reallocation and Beta Simultaneously</u>

Graphically. changing the allocation and beta simultaneously looks like this:

Changing Allocation and Beta Simultaneously
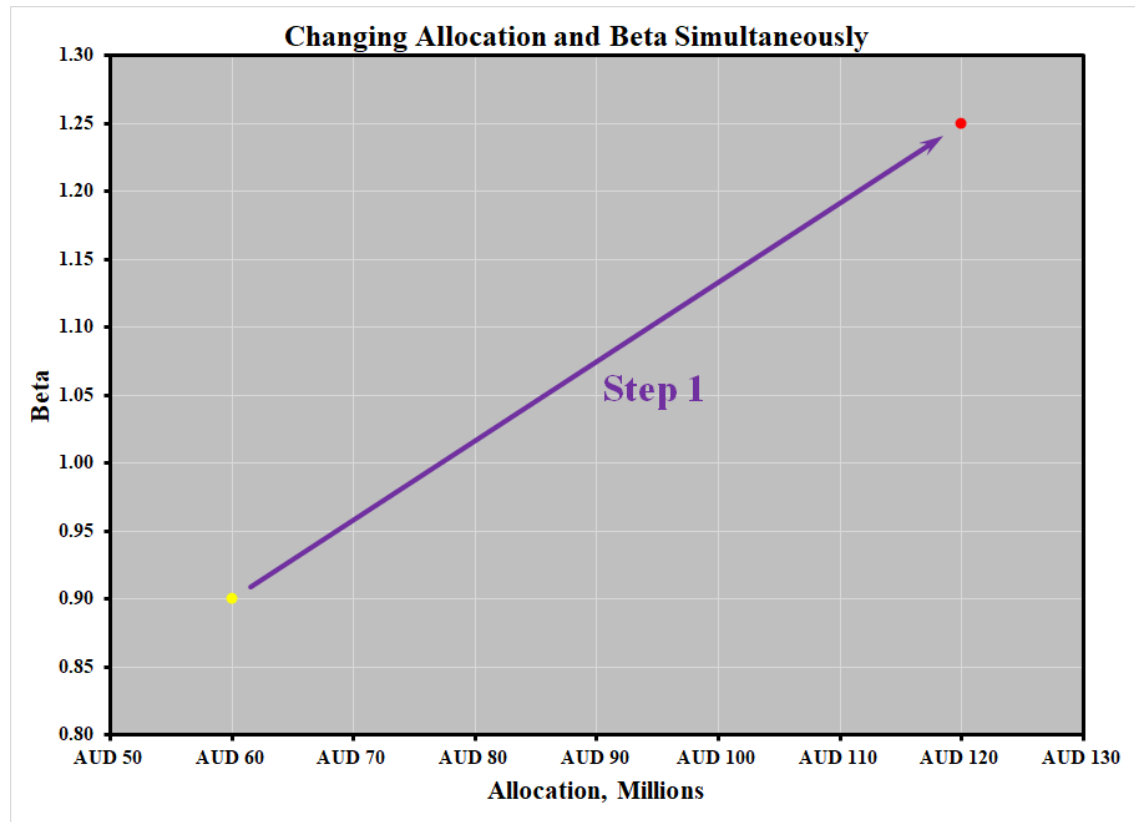
Step 1: The existing AUD-beta (money beta) of the small-cap portfolio is:

$$AUD\ 60,000,000 \times 0.90 = AUD\ 54,000,000$$

The target AUD-beta of the portfolio is:

$$AUD\ 120,000,000 \times 1.25 = AUD\ 150,000,000$$

The AUD-beta of a small-cap equity index futures contract is:

$$AUD\ 104,000 \times 1.30 = AUD\ 135,200$$

The number of small-cap equity index futures contracts to execute to change the small-cap equity portfolio's value and beta is:

$$N_{sf} = \frac{\text{money-}\beta_T - \text{money-}\beta_P}{\text{money-}\beta_f}$$

$$= \frac{\text{AUD } 150,000,000 - \text{AUD } 54,000,000}{\text{AUD } 135,200} = \underline{710.06}$$

Therefore, Degenek should buy (i.e., take the long position in) 710 small-cap equity index futures contracts.

Allocation of marks:

> **6 marks** for the correct answer (710 contracts, *buy* or *long position*)

> If the answer is incorrect:

>> **1 mark** for the correct formula for increasing the allocation to small-cap equity

>> **1 mark** for the correct calculation of the number of contracts to increase the allocation to small-cap equity

>> **1 mark** for the correct formula for changing the beta of the resulting small-cap equity allocation

>> **1 mark** for the correct calculation of the number of contracts to change the beta of the resulting small-cap equity allocation

>> **1 mark** for correctly adding the numbers of contracts

>> **1 mark** for correctly interpreting the positive sign as buying / taking the long position

Reading:

Swaps, Forwards, and Futures Strategies

LOS a: Demonstrate how interest rate swaps, forwards, and futures can be used to modify a portfolio's risk and return.

1.2   **Identify** *one* alternative derivative strategy that Degenek could use to achieve his goals *instead of his proposed futures strategy.*

> Synthetic futures using options
>
> – or –
>
> Total return equity swap

Identify the derivative security(ies) that Degenek would use, and **describe** his position (e.g., long, short, buy, sell, etc.) in *each* derivative security.

> The short position in large-cap equity index futures can be created synthetically with a combination of a short position in large-cap equity index call options and a long position in large-cap equity index put options. To duplicate the futures position exactly, the strike price on the options would have to equal the large-cap equity index futures price.
>
> The long position in small-cap equity index futures can be created synthetically with a combination of a long position in small-cap equity index call options and a short position in small-cap equity index put options. To duplicate the futures position exactly, the strike price on the options would have to equal the small-cap equity index futures price.
>
> – or (respectively) –
>
> The short position in large-cap equity index futures and the long position in small-cap equity index futures can be approximated with a total return equity swap. In this case, Degenek would enter into the swap to pay the large-cap equity return and receive the small-cap equity return on a notional value equal to the value that Degenek wants to reallocate from large-cap to small-cap.
>
> A wrinkle in using the swap is that the notional value typically does not change over time, even though the values of the underlying equity portfolios will change over time. However, as swaps are custom derivatives, the details are open to negotiation; Degenek could negotiate to have the returns calculated on notional values that change over time.

Allocation of marks:

2 marks for identifying the strategy of creating a synthetic futures position using options

1 mark for identifying the short position in large-cap equity call options

1 mark for identifying the long position in large-cap equity put options

1 mark for identifying the long position in small-cap equity call options

1 mark for identifying the short position in small-cap equity put options

– or –

2 marks for identifying the strategy of using an equity swap

2 marks for specifying paying the large-cap equity total return

(Less: **1 mark** for not specifying *total* return)

2 marks for specifying receiving the small-cap equity total return

(Less: **1 mark** for not specifying *total* return)

Reading:

Swaps, Forwards, and Futures Strategies

LOS c: Demonstrate how equity swaps, forwards, and futures can be used to modify a portfolio's risk and return.

Question 2 relates to Equity Investments

SGIA Case Scenario

2.1   Each of the correlations that Garcia asks Chirwa to calculate is *most accurately* described as a:

> a.   Transfer coefficient (TC)
> b.   Pearson information coefficient (IC)
> c.   Spearman information coefficient (IC)

The correlation between factor exposures and stock returns is known as the information coefficient (IC). When a correlation is calculated on calculated values of the exposures and the calculated values of the returns (rather than ranking the calculated exposures, ranking the calculated returns, and computing the correlation of the rankings), it is known as a Pearson correlation. Thus, Chirwa's calculation is a Pearson IC.

Answer a. is incorrect: the transfer coefficient measures the manager's ability to translate his or her insight into investment decisions; here, it would be the correlation between the factor exposures and the corresponding active weights the manager would implement for those exposures.

Answer c. is incorrect: the Spearman IC is the correlation between the ranks of the exposures and the ranks of the return values, rather than between their respective calculated values.

Reading:

Active Equity Investing: Strategies

LOS h: Describe how quantitative active investment strategies are created.

2.2   The futures position undertaken be Edathodika is *best* described as a:

      a.   Currency overlay
      b.   Completion overlay
      c.   Rebalancing overlay

A completion overlay is used when an index portfolio has drifted from its proper (or mandated) exposures. A common example is a portfolio that has a large cash balance (e.g., from a large cash contribution, or from accumulated dividends that have not been reinvested), causing the portfolio's beta to be significantly lower than desired. This is exactly the situation that Edathodika is addressing with the futures position.

Answer a. is incorrect: a currency overlay transforms the return in one currency into a return in a different currency (e.g., by using currency forwards, currency futures, or currency swaps). A common use of a currency overlay is to hedge the returns on holdings denominated in foreign currencies back to the home currency of the investor.

Answer c. is incorrect: although a rebalancing overlay is also used when a portfolio's exposures have drifted from their desired levels, it is used specifically in situations where some securities would need to be sold and others purchased, which is not the case here (no securities need to be sold). A common use for a rebalancing overlay is in a mixed equity/fixed income portfolio to return the equity percentage and the fixed income percentage to their desired levels, which would normally involve selling stocks and buying bonds or vice versa.

Reading:

Passive Equity Investing

LOS c: Compare different approaches to passive equity investing.

2.3   The *most appropriate* management styles for Benjamin to employ for the Kendall and Geneva portfolios, respectively, are:

	Kendall	Geneva
a.	Active	Passive
b.	Active	Active/Passive Mix
c.	Active/Passive Mix	Passive

Kendall's board do not believe that markets are efficient, so they believe that there are opportunities for active management. Their restriction against certain types of investments (military, alcohol, tobacco, gaming) also suggests an active approach. Furthermore, their benchmark is a broad market index of actively traded stocks, so an active strategy can take advantage of market liquidity. Finally, as they are likely to be exempt from taxes (most foundations are), an active strategy is not constrained by concerns about taxable gains. All these characteristics point to an active strategy.

Geneva's management prefer sector-specific portfolios with sector-specific benchmarks, for which a passive strategy is likely more appropriate (as these benchmarks may not be broad enough to allow scope for additional alpha). As they have no specific ESG goals, it's likely that they will not object to any specific investments contained in any of these benchmarks. Finally, life insurance companies are taxable, so an active strategy runs the risk of generating taxable gains, whereas a passive strategy is less likely to do so. All of these characteristics point to a passive strategy.

Reading:

Overview of Equity Portfolio Management

LOS e: Describe rationales for equity investment across the passive-active spectrum.

2.4   The statements made by Álvarez and Mandouki are, respectively, *most likely*:

	Álvarez	Mandouki
a.	Correct	Incorrect
b.	Correct	Correct
c.	Incorrect	Incorrect

Álvarez' statement is correct:

- Suppose that you have a benchmark with 500 stocks, and a portfolio with 100 stocks. The Active Share is 80% (quite high), but if the portfolio is optimized to minimize tracking error (another name for active risk), then the active risk can be quite low, perhaps less than 2% annualized.
- Suppose that you have a benchmark with 500 stocks and that your portfolio holds 400 of those at the benchmark weights (totaling 80% of the portfolio weight). The Active Share is 20% (quite low). However, if the remaining 20% of the portfolio is invested in a stock whose returns are wildly different from those of the benchmark, it's possible that the tracking error (active risk) could be 10% or more annualized, which is rather high.

Mandouki's statement is incorrect. Active Share is controllable by the manager: the manager decides whether to overweight or underweight each security in the benchmark, and by how much. He is correct about active risk: the manager cannot control the returns on the securities held, which means that the manager cannot control active risk (except within extremely broad ranges).

Reading:

Active Equity Investing: Portfolio Construction

LOS c: Distinguish between Active Share and active risk and discuss how each measure relates to a manager's investment strategy.

Question 3 relates to Alternative Investments

Lake Volta Capital Case Scenario

3.1   **Determine** whether *each* manager (Mumin, Samir, Franque, Bekele) is appropriate for the Plan. For *each* manager who is appropriate, **identify** the *most accurate* classification for that manager's strategy according to LVC's list. For *each* manager who is inappropriate, **justify** your conclusion with *one* reason.

Mumin

Mumin is inappropriate for the Plan.

In Statement 2, the Plan's investment committee says that it will accept risks that are the main focus of a strategy, but that it wants other risks removed or eliminated: hedged. Mumin's strategy is exposed to credit risk, interest rate risk, and equity market volatility risk, which Mumin prefers not to hedge; thus, his approach does not comply with Statement 2, so Mumin is inappropriate for the Plan.

Samir

Samir is appropriate for the Plan.

Samir's quantitative market-neutral strategy is classified as an *equity-related* strategy, which is not restricted by the Plan's statements.

Franque

Franque is appropriate for the Plan.

Franque's relative value volatility arbitrage strategy is classified as a *specialist* strategy, which is not restricted by the Plan's statements.

Bekele

Bekele is appropriate for the Plan.

Bekele's fixed income arbitrage strategy is classified as a *relative value* strategy, which is not restricted by the Plan's statements.

Allocation of marks:

For *each* manager:

1 mark for writing the correct conclusion: whether the manager is appropriate for the Plan or not

For *each appropriate* manager:

1 mark for *one* the correct categorization

For *each inappropriate* manager:

2 marks for *one* correct justification

(Note: no marks are earned for justifying an incorrect conclusion.)

Reading:

Hedge Fund Strategies

LOS a: Discuss how hedge fund strategies may be classified.

LOS b: Discuss investment characteristics, strategy implementation, and role in a portfolio of *equity-related* hedge fund strategies.

LOS c: Discuss investment characteristics, strategy implementation, and role in a portfolio of *event-driven* hedge fund strategies.

LOS d: Discuss investment characteristics, strategy implementation, and role in a portfolio of *relative value* hedge fund strategies.

LOS f: Discuss investment characteristics, strategy implementation, and role in a portfolio of *specialist* hedge fund strategies.

Reading:

Portfolio Management for Institutional Investors

LOS g: Evaluate the investment policy statement of an institutional investor.

3.2   **Identify** the *most appropriate* proxy for the Endowment's private real assets investment (public REITs, high-yield bonds, commodity futures). **Justify** your identification.

The most appropriate proxy for an investment in private real assets is an investment in commodity futures.

Private real assets comprises timber, commodities, farmland, energy, and infrastructure assets. Therefore, a proxy for real assets should have the characteristics of an investment in timber, commodities, farmland, energy, or infrastructure.

Public REITs are real estate investments, and so would be a proxy for private real estate investments, but not real assets. High-yield bonds would be a proxy for private credit investments, but not real assets. Only commodity futures would be a proxy for private real asset investments.

Allocation of marks:

   1 mark for writing "Commodity futures"

   2 marks for an appropriate justification

   (Note: no marks are earned for justifying an incorrect selection.)

Readings:

Asset Allocation to Alternative Investments

LOS d: Discuss investment considerations that are important in allocating to different types of alternative investments.