Financial Exam Help 123™

2020 Level III Mock Exam

Morning Session Sample Exam Answers

Answer Question 1-Ai on This Page

To achieve Degenek's target asset allocation and target betas, **determine** the number of large-cap equity futures contracts to buy or sell (indicate which). **Show** your calculations.

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.

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

where:

N_{sf} = number of equity index futures contracts
β_T = target beta (0 for cash)
β_P = beta of existing portfolio (1.15 for the existing large-cap portfolio)
β_f = futures beta (1.02)
P = market value of portfolio to be reallocated (AUD 60,000,000)
f_s = equity index futures price (AUD 97,000)

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

$$= \frac{0.00 - 1.15}{1.02} \times \frac{\text{AUD } 60,000,000}{\text{AUD } 97,000} = \underline{-697.39}$$

To decrease the large-cap equity beta from 1.15 to 0.85 (on the new large-cap equity allocation of AUD 80,000,000 (= 40% × AUD 200,000,000)), the number of large-cap equity contracts that Degenek needs to execute is:

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

$$= \frac{0.85 - 1.15}{1.02} \times \frac{\text{AUD } 80,000,000}{\text{AUD } 97,000} = \underline{-242.57}$$

Answer Question 1-Ai on This Page (cont.)

The total number of bond contracts that Degenek needs to execute is:

$$-697.39 + (-242.57) = \underline{\underline{-939.96}}$$

Therefore, Degenek should sell (i.e., take the short position in) 940 large-cap equity futures contracts.

Alternatively, the existing AUD-beta (money beta) of the large-cap equity portfolio is:

$$\text{AUD } 140,000,000 \times 1.15 = \underline{\text{AUD } 161,000,000}$$

The target AUD-beta of the large-cap equity portfolio is:

$$\text{AUD } 80,000,000 \times 0.85 = \underline{\text{AUD } 68,000,000}$$

The AUD-beta of the large-cap equity futures contract is:

$$\text{AUD } 97,000 \times 1.02 = \underline{\text{AUD } 98,940}$$

Therefore, the number of contracts to execute to make the change in the large-cap equity portfolio's value and beta is:

$$\frac{\text{AUD } 68,000,000 - \text{AUD } 161,000,000}{\text{AUD } 98,940} = \underline{\underline{-939.96}}$$

Therefore, Degenek should sell (i.e., take the short position in) 940 large-cap equity futures contracts.

Allocation of marks:

6 marks for the correct answer (940 contracts, *sell* or *short position*)

If the answer is incorrect:

1 mark for the correct formula for reallocating equity to cash

1 mark for the correct calculation of the number of contracts to reallocate equity to cash
1 mark for the correct formula for changing the beta of the resulting equity allocation

1 mark for the correct calculation of the number of contracts to change the beta of the resulting equity allocation

1 mark for the correctly adding the numbers of contracts

1 mark for the correctly interpreting the negative sign as selling / taking the short 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.

Answer Question 1-Aii on This Page

To achieve Degenek's target asset allocation and target betas, **determine** the number of small-cap equity futures contracts to buy or sell (indicate which). **Show** your calculations.

To convert AUD 60,000,000 from cash to small-cap equity, the number of small-cap equity contracts that Degenek needs to execute is:

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

where:

N_{sf} = number of equity index futures contracts
β_T = target beta (0.90 for the existing small-cap equity portfolio)
β_P = beta of existing portfolio (0 for cash)
β_f = futures beta (1.30)
P = market value of portfolio to be reallocated (AUD 60,000,000)
f_s = equity index futures price (AUD 104,000)

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

$$= \frac{0.90 - 0.00}{1.30} \times \frac{\text{AUD } 60,000,000}{\text{AUD } 104,000} = \underline{399.41}$$

To increase the equity beta from 0.90 to 1.25 (on the new small-cap equity allocation of AUD 120,000,000 (= 60% × AUD 200,000,000)), the number of small-cap equity contracts that Degenek needs to execute is:

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

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

Answer Question 1-Aii on This Page (cont.)

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

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

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

Alternatively, the existing AUD-beta (money beta) of the small-cap equity portfolio is:

$$\text{AUD } 60,000,000 \times 0.90 = \text{AUD } 54,000,000$$

The target AUD-beta of the small-cap equity portfolio is:

$$\text{AUD } 120,000,000 \times 1.25 = \text{AUD } 150,000,000$$

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

$$\text{AUD } 104,000 \times 1.30 = \text{AUD } 135{,}200$$

Therefore, the number of small-cap equity contracts to execute to make the change in the small-cap equity portfolio's value and beta is:

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

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

Allocation of marks:

6 marks for the correct answer (516 contracts, *buy* or *long position*)

If the answer is incorrect:

1 mark for the correct formula for reallocating cash to equity

1 mark for the correct calculation of the number of contracts to reallocate cash to equity

1 mark for the correct formula for changing the beta of the resulting equity allocation
1 mark for the correct calculation of the number of contracts to change the beta of the resulting equity allocation

1 mark for the correctly adding the numbers of contracts

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

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.

Answer Question 1-B on This Page

State *two* alternative derivative strategies that Degenek could use to achieve his goals *instead of his proposed futures strategy*.	For *each* strategy, **identify** the derivative securities that Degenek would use, and **describe** his position (e.g., long, short, buy, sell, etc.) in *each* derivative security. Note: no calculations are required.
Strategy 1 Synthetic futures using options	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.
Strategy 2 Total return equity swap	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

1 mark for identifying the strategy of using an equity swap

1 mark for specifying total return on the equity swap

1 mark for specifying paying the large-cap equity total return

1 mark for specifying receiving the small-cap equity 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.

Answer Question 2 on This Page

	For *each* analyst, **recommend** the *appropriate* adjustment to the fund's ***duration*** consistent with their yield curve outlook. (Check one *each*)	For *each* analyst, **recommend** the *appropriate* adjustment to the fund's ***convexity*** consistent with their yield curve outlook. (Check one *each*)	For *each* analyst, **recommend** the type(s) of options (calls or puts) to ***buy***, if any, consistent with their yield curve outlook. (If none, leave the box blank.)	For *each* analyst, **recommend** the type(s) of options (calls or puts) to ***sell***, if any, consistent with their yield curve outlook. (If none, leave the box blank.)
			Note: selecting option actions that are inconsistent with the recommended duration/convexity adjustment will receive no credit.	
Kuvvatov	[Decrease] No change Increase	Decrease No change [Increase]	Put options	<none>
Arroyo	Decrease [No change] Increase	[Decrease] No change Increase	<none>	Call options & Put options
Deedson	Decrease [No change] Increase	Decrease No change [Increase]	Call options & Put options	<none>
Lugier	Decrease No change [Increase]	Decrease No change [Increase]	Call options	<none>

Explanation:

When interest rates are expected to rise, decreasing duration is beneficial as it will lead to smaller price decreases. When interest rates are expected to fall, increasing duration is beneficial as it will lead to larger price gains. When interest rates are expected to remain stable, or the direction of an interest rate change is unknown, there is no reason to adjust duration.

When interest rates are expected to change, increasing convexity is beneficial: greater price increases when interest rates fall, and smaller price decreases when interest rates rise. Conversely, when interest rates are expected to remain unchanged, decreasing convexity is beneficial: you can sell convexity and thereby enhance returns.

- Long call options increase duration and increase convexity
- Long put options decrease duration and increase convexity
- Short call options decrease duration and decrease convexity
- Short put options increase duration and decrease convexity

Kuvvatov expects a change in interest rates (so he should increase convexity): a rise (so he should decrease duration). Long put options decrease duration and increase convexity.

Arroyo expects no change in interest rates (so she should decrease convexity while leaving duration unchanged). Short call options decrease duration and decrease convexity, while short put options increase duration and decrease convexity. Taken together (in the correct proportions), they will decrease convexity while leaving duration unchanged.

Deedson expects a change in interest rates (so he should increase convexity), but is uncertain of the direction (so he should leave duration unchanged). Long call options increase duration and increase convexity, while long put options decrease duration and increase convexity. Taken together (in the correct proportions), they will increase convexity while leaving duration unchanged.

Lugier expects a change in interest rates (so she should increase convexity): a fall (so she should increase duration). Long call options increase duration and increase convexity.

Allocation of marks:

1 mark for each correctly identified duration adjustment

1 mark for each correctly identified convexity adjustment

1 mark for each correctly identified option (call or put) to buy

1 mark for each correctly identified option (call or put) to sell

Less: **1 mark** for any incorrectly identified option to buy or sell

Note: the total marks for the last two columns cannot be less than zero.

Reading:

Yield Curve Strategies

LOS e: Explain how derivatives may be used to implement yield curve strategies.

Answer Question 3 on This Page

	For *each* prospective client, **determine** which behavioral bias that client exhibits. (Check one)	For *each* prospective client, **explain** why that prospective client exhibits that bias based *solely* on the information given.	For *each* prospective client, **determine** whether Bian Thành should try to mitigate the client's bias or adapt to it. (Check one)
Labrada	availability confirmation framing hindsight mental accounting representativeness	"When he sees an equity investment, he immediately thinks, "high risk", and when he sees a fixed income investment , he immediately thinks, "low risk"."	Mitigate Adapt
Lionel	availability confirmation framing hindsight mental accounting representativeness	"Lionel currently maintains two investment accounts: her "core" account . . . and her "mad money" account . . . ."	Mitigate Adapt
Howell	availability confirmation framing hindsight mental accounting representativeness	"[He] tends to accept the advice from people who agree with him and argue with those who don't."	Mitigate Adapt

Note that all six of the biases listed are cognitive biases. Cognitive biases are much easier to mitigate than are emotional biases, which generally require adaptation. Given the option, mitigation is preferable to adaptation.

Allocation of marks:

For *each* prospective client:

1 mark for circling the correct behavioral bias

2 marks for an adequate explanation, based solely on the information given

1 mark for circling "mitigate"

Reading:

The Behavioral Biases of Individuals

LOS c: Identify and evaluate an individual's behavioral biases.