

Asset Allocation

CFA三级培训项目

讲师:

100% Construction Benefits Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING

Reading 12

Overview of Asset Allocation

100% Construction Benefits Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Meg and Cramer Law

- Meg and Cramer Law, a married couple aged 42 and 44, respectively, are meeting with their new investment adviser, Daniel Raye. The Laws have worked their entire careers at Whorton Solutions (WS), a multinational technology company. The Laws have two teenage children who will soon begin college.
- Raye reviews the Laws' current financial position. The Laws have an investment portfolio consisting of \$800,000 in equities and \$450,000 in fixed-income instruments. Raye notes that 80% of the equity portfolio consists of shares of WS. The Laws also own real estate valued at \$400,000, with \$225,000 in mortgage debt. Raye estimates the Laws' pre-retirement earnings from WS have a total present value of \$1,025,000. He estimates the Laws' future expected consumption expenditures have a total present value of \$750,000.

Case: Meg and Cramer Law



- The Laws express a very strong desire to fund their children's college education expenses, which have an estimated present value of \$275,000. The Laws also plan to fund an endowment at their alma mater in 20 years, which has an estimated present value of \$500,000. The Laws tell Raye they want a high probability of success funding the endowment. Raye uses this information to prepare an economic balance sheet for the Laws.
- In reviewing a financial plan written by the Laws' previous adviser, Raye notices the following asset class specifications.
 - **Equity:** US equities;
 - **Debt:** Global investment-grade corporate bonds and real estate;
 - **Derivatives:** Primarily large-capitalization foreign equities.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law

- The previous adviser's report notes the asset class returns on equity and derivatives are highly correlated. The report also notes the asset class returns on debt have a low correlation with equity and derivative returns.
- Raye is concerned that the asset allocation approach followed by the Laws' previous financial adviser resulted in an overlap in risk factors among asset classes for the portfolio. Raye plans to address this by examining the portfolio's sensitivity to various risk factors, such as inflation, liquidity, and volatility, to determine the desired exposure to each factor.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law

- Raye concludes that a portfolio of 75% global equities and 25% bonds reflects an appropriate balance of expected return and risk for the Laws with respect to a 20-year time horizon for most moderately important goals. Raye recommends the Laws follow a goals-based approach to asset allocation and offers three possible portfolios for the Laws to consider. Selected data on the three portfolios are presented in Exhibit 1.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



Exhibit 1. Proposed Portfolio Allocations for the Law Family

	Cash	Fixed Income	Global Equities	Diversifying Strategies*
Portfolio 1	35%	55%	10%	0%
Portfolio 2	10%	15%	65%	10%
Portfolio 3	10%	30%	40%	20%

* Diversifying strategies consists of hedge funds

- Raye uses a cost–benefit approach to rebalancing and recommends that global equities have a wider rebalancing range than the other asset classes.

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



- Using the economic balance sheet approach, the Laws' economic net worth is closest to:
 - \$925,000.
 - \$1,425,000.
 - \$1,675,000.

➤ Solution: A

The Laws' economic net worth is closest to \$925,000. An economic balance sheet includes conventional financial assets and liabilities, as well as extended portfolio assets and liabilities that are relevant in making asset allocation decisions. The economic balance sheet for the Law family is shown in the following exhibit.

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



Assets		Liabilities and Net Worth	
Financial Assets		Financial Liabilities	
	450,000	Mortgage debt	225,000
	400,000		
Equity	800,000		
Extended Assets		Extended Liabilities	
Human capital	1,025,000	Children's education	275,000
		Endowment funding	500,000
		Present value of consumption	750,000
Total Economic Assets	2,675,000	Total Economic Liabilities	1,750,000
		Economic Net Worth	925,000

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



Economic net worth is equal to total economic assets minus total economic liabilities ($\$2,675,000 - \$1,750,000 = \$925,000$).

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



- Using an economic balance sheet, which of the Laws' current financial assets is *most* concerning from an asset allocation perspective?

- Equities.
- Real estate.
- Fixed income.

➤ **Solution: A**

The Laws' equity portfolio is heavily concentrated in WS stock (80% of the equity portfolio), and both Laws work at WS. Should WS encounter difficult economic circumstances, the investment value of WS stock and the Laws' human capital are both likely to be adversely affected. Thus, their investment in WS should be reviewed and their equity portfolio diversified further.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



- Raye believes the previous adviser's specification for debt is incorrect given that, for purposes of asset allocation, asset classes should be:

- diversifying.
- mutually exclusive.
- relatively homogeneous.

➤ **Solution: C**

In order to effectively specify asset classes for the purpose of asset allocation, assets within an asset class should be relatively homogeneous and have similar attributes. The previous adviser's specification of the debt asset class includes global investment-grade corporate bonds and real estate. This definition results in a non-homogeneous asset class.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



- Raye believes the previous adviser's asset class specifications for equity and derivatives are inappropriate given that, for purposes of asset allocation, asset classes should be:
 - A. diversifying.
 - B. mutually exclusive.
 - C. relatively homogeneous.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



➤ Solution: A

For risk control purposes, an asset class should be diversifying and should not have extremely high expected correlations with other classes. Because the returns to the equity and the derivatives asset classes are noted as being highly correlated, inclusion of both asset classes will result in duplication of risk exposure. Including both asset classes is not diversifying to the asset allocation.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



- To address his concern regarding the previous adviser's asset allocation approach, Raye should assess the Laws' portfolio using:
 - A. a homogeneous and mutually exclusive asset class-based risk analysis.
 - B. a multifactor risk model to control systematic risk factors in asset allocation.
 - C. an asset class-based asset allocation approach to construct a diversified portfolio.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



➤ Solution: B

Raye believes the Laws' previous financial adviser followed an asset allocation approach that resulted in an overlap in risk factors among asset classes. A multifactor risk model approach can be used to address potential risk factor overlaps. Risk factor approaches to asset allocation focus on assigning investments to the investor's desired exposures to specified risk factors. These methods are premised on the observation that asset classes often exhibit some overlaps in sources of risk.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



- Based on Exhibit 1, which portfolio *best* meets the Laws' education goal for their children?
 - A. Portfolio 1.
 - B. Portfolio 2.
 - C. Portfolio 3.

➤ Solution: A

Portfolio 1 best meets the Laws' education goal for their children. The estimated present value of the Laws' expected education expense is \$275,000. Given that the children will be starting college soon, and the Laws have a very strong desire to achieve this goal, Portfolio 1, which stresses liquidity and stability, is most appropriate to meet the Laws' short-term education goal.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



- Based on Exhibit 1, which portfolio best meets the Laws' goal to fund an endowment for their alma mater?
 - A. Portfolio 1.
 - B. Portfolio 2.
 - C. Portfolio 3.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



➤ Solution: B

Portfolio 2 best meets the Laws' goal to fund an endowment for their alma mater in 20 years. In present value terms, the gift is valued at \$500,000, with the Laws desiring a high probability of achieving this goal. Although slightly more conservative than the 75/25 global equity/bond mix, Portfolio 2 has a greater growth emphasis compared with Portfolios 1 and 3. Therefore, Portfolio 2 is best for funding the endowment at their alma mater given the goal's long-term horizon and the Laws' desire for a high probability of achieving it.

100% Commitment Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Meg and Cramer Law



- Raye's approach to rebalancing global equities is consistent with:
 - A. the Laws' being risk averse.
 - B. global equities' having higher transaction costs than other asset classes.
 - C. global equities' having lower correlations with other asset classes.

➤ Solution: B

Using the cost–benefit approach, higher transaction costs for an asset class imply wider rebalancing ranges. Raye's recommendation for a wider rebalancing range for global equities is consistent with the presence of higher transaction costs for global equities.

100% Commitment Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING

Reading 13

Principles of Asset Allocation

100% Commitment Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



- Megan Beade and Hanna Müller are senior analysts for a large, multi-divisional money management firm. Beade supports the institutional portfolio managers, and Müller does the same for the private wealth portfolio managers.
- Beade reviews the asset allocation in Exhibit 1, derived from a mean-variance optimization (MVO) model for an institutional client, noting that details of the MVO are lacking.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



Exhibit 1. Asset Allocation and Market Weights (in percent)

Asset Classes	Asset Allocation	Investable Global Market Weights
Cash	0	—
US bonds	30	17
US TIPS	0	3
Non-US bonds	0	22
Emerging market equity	25	5
Non-US developed equity	20	29
US small- and mid-cap equity	25	4
US large-cap equity	0	20

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



- The firm's policy is to rebalance a portfolio when the asset class weight falls outside of a corridor around the target allocation. The width of each corridor is customized for each client and proportional to the target allocation. Beade recommends wider corridor widths for high-risk asset classes, narrower corridor widths for less liquid asset classes, and narrower corridor widths for taxable clients with high capital gains tax rates.
- One client sponsors a defined benefit pension plan where the present value of the liabilities is \$241 million and the market value of plan assets is \$205 million. Beade expects interest rates to rise and both the present value of plan liabilities and the market value of plan assets to decrease by \$25 million, changing the pension plan's funding ratio.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



- Beade uses a surplus optimization approach to liability-relative asset allocation based on the objective function

$$U_m^{LR} = E(R_{s,m}) - 0.005\lambda\sigma^2(R_{s,m})$$

- where $E(R_{s,m})$ is the expected surplus return for portfolio m , λ is the risk aversion coefficient, and $\sigma^2(R_{s,m})$ is the variance of the surplus return. Beade establishes the expected surplus return and surplus variance for three different asset allocations, shown in Exhibit 2. Given $\lambda = 1.50$, she chooses the optimal asset mix.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



Exhibit 2. Expected Surplus Return and Volatility for Three Portfolios

	Return	Standard Deviation
Portfolio 1	13.00%	24%
Portfolio 2	12.00%	18%
Portfolio 3	11.00%	19%

- Client Haunani Kealoha has a large fixed obligation due in 10 years. Beade assesses that Kealoha has substantially more funds than are required to meet the fixed obligation. The client wants to earn a competitive risk-adjusted rate of return while maintaining a high level of certainty that there will be sufficient assets to meet the fixed obligation.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



- In the private wealth area, the firm has designed five subportfolios with differing asset allocations that are used to fund different client goals over a five-year horizon. Exhibit 3 shows the expected returns and volatilities of the subportfolios and the probabilities that the subportfolios will exceed an expected minimum return. Client Luis Rodríguez wants to satisfy two goals. Goal 1 requires a conservative portfolio providing the highest possible minimum return that will be met at least 95% of the time. Goal 2 requires a riskier portfolio that provides the highest minimum return that will be exceeded at least 85% of the time.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING


Exhibit 3. Characteristics of Subportfolios

Subportfolio	A	B	C	D	E
Expected return, in percent	4.60	5.80	7.00	8.20	9.40
Expected volatility, in percent	3.46	5.51	8.08	10.80	13.59
Required Success Rate					
Minimum Expected Return for Success Rate					
99%	1.00	0.07	-1.40	-3.04	-4.74
95%	2.05	1.75	1.06	0.25	-0.60
90%	2.62	2.64	2.37	2.01	1.61
85%	3.00	3.25	3.26	3.19	3.10
75%	3.56	4.14	4.56	4.94	5.30

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE CREATING


Case: Megan Beade and Hanna Müller

- Müller uses a risk parity asset allocation approach with a client's four-asset class portfolio. The expected return of the domestic bond asset class is the lowest of the asset classes, and the returns of the domestic bond asset class have the lowest covariance with other asset class returns. Müller estimates the weight that should be placed on domestic bonds.
- Müller and a client discuss other approaches to asset allocation that are not based on optimization models or goals-based models. Müller makes the following comments to the client:

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE CREATING


Case: Megan Beade and Hanna Müller

- Comment 1: An advantage of the "120 minus your age" heuristic over the 60/40 stock/bond heuristic is that it incorporates an age-based stock/bond allocation.
- Comment 2: The Yale model emphasizes traditional investments and a commitment to active management.
- Comment 3: A client's asset allocation using the 1/N rule depends on the investment characteristics of each asset class.

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Megan Beade and Hanna Müller



- The asset allocation in Exhibit 1 *most likely* resulted from a mean-variance optimization using:
 - A. historical data.
 - B. reverse optimization.
 - C. Black–Litterman inputs.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



➤ Solution: A

The allocations in Exhibit 1 are most likely from an MVO model using historical data inputs. MVO tends to result in asset allocations that are concentrated in a subset of the available asset classes. The allocations in Exhibit 1 have heavy concentrations in four of the asset classes and no investment in the other four asset classes, and the weights differ greatly from global market weights. Compared to the use of historical inputs, the Black–Litterman and reverse-optimization models most likely would be less concentrated in a few asset classes and less distant from the global weights.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



- For clients concerned about rebalancing-related transactions costs, which of Beade's suggested changes in the corridor width of the rebalancing policy is correct? The change with respect to:
 - A. high-risk asset classes.
 - B. less liquid asset classes.
 - C. taxable clients with high capital gains tax rates.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



➤ Solution: A

Theoretically, higher-risk assets would warrant a narrow corridor because high-risk assets are more likely to stray from the desired strategic asset allocation. However, narrow corridors will likely result in more frequent rebalancing and increased transaction costs, so in practice corridor width is often specified to be proportionally greater the higher the asset class's volatility.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Megan Beade and Hanna Müller



Thus, higher-risk assets should have a wider corridor to avoid frequent, costly rebalancing costs. Her other suggestions are not correct. Less-liquid asset classes should have a wider, not narrower, corridor width. Less-liquid assets should have a wider corridor to avoid frequent rebalancing costs. For taxable investors, transactions trigger capital gains in jurisdictions that tax them. For such investors, higher tax rates on capital gains should be associated with wider (not narrower) corridor widths.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Megan Beade and Hanna Müller



- Based on Beade's interest rate expectations, the pension plan's funding ratio will:
 - A. decrease.
 - B. remain unchanged.
 - C. increase.

➤ Solution: A

The original funding ratio is the market value of assets divided by the present value of liabilities. This plan's ratio is \$205 million/\$241 million = 0.8506. When the assets and liabilities both decrease by \$25 million, the funding ratio will decrease to \$180 million/\$216 million = 0.8333.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Megan Beade and Hanna Müller



- Based on Exhibit 2, which portfolio provides the greatest objective function expected value?
 - Portfolio 1
 - Portfolio 2
 - Portfolio 3

➤ **Solution: B**

The objective function expected value is $U_m^{LR} = E(R_{s,m}) - 0.005\lambda\sigma^2(R_{s,m})$. λ is equal to 1.5, and the expected value of the objective function is shown in the rightmost column below.



Case: Megan Beade and Hanna Müller



Portfolio	$E(R_{s,m})$	$\sigma^2(R_{s,m})$	$U_m^{LR} = E(R_{s,m}) - 0.005\lambda\sigma^2(R_{s,m})$
1	13.00	576	8.68
2	12.00	324	9.57
3	11.00	361	8.29

Portfolio 2 generates the highest value, or utility, in the objective function.



Case: Megan Beade and Hanna Müller



- The asset allocation approach most appropriate for client Kealoha is best described as:

- a surplus optimization approach.
- an integrated asset-liability approach.
- a hedging/return-seeking portfolios approach.

➤ **Solution: C**

The hedging/return-seeking portfolios approach is best for this client. Beade should construct two portfolios, one that includes riskless bonds that will pay off the fixed obligation in 10 years and the other a risky portfolio that earns a competitive risk-adjusted return. This approach is a simple two-step process of hedging the fixed obligation and then investing the balance of the assets in a return-seeking portfolio.



Case: Megan Beade and Hanna Müller



- Based on Exhibit 3, which subportfolios *best* meet the two goals expressed by client Rodríguez?
 - Subportfolio A for Goal 1 and Subportfolio C for Goal 2.
 - Subportfolio B for Goal 1 and Subportfolio C for Goal 2.
 - Subportfolio E for Goal 1 and Subportfolio A for Goal 2.

- **Solution: A**

Goal 1 requires a success rate of at least 95%, and Subportfolio A has the highest minimum expected return (2.05%) meeting this requirement. Goal 2 requires the highest minimum expected return that will be achieved 85% of the time. Subportfolio C meets this requirement (and has a minimum expected return of 3.26%).

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller

- In the risk parity asset allocation approach that Müller uses, the weight that Müller places on domestic bonds should be:
 - less than 25%.
 - equal to 25%.
 - greater than 25%.

- **Solution: C**

A risk parity asset allocation is based on the notion that each asset class should contribute equally to the total risk of the portfolio. Bonds have the lowest risk level and must contribute 25% of the portfolio's total risk, so bonds must be overweighted (greater than 25%). The equal contribution of each asset class is calculated as:

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller

$$w_i \times \text{Cov}(r_i, r_p) = \frac{1}{n} \sigma_p^2$$

where

w_i = weight of asset i

$\text{Cov}(r_i, r_p)$ = covariance of asset i with the portfolio

n = number of assets

σ_p^2 = variance of the portfolio

In this example, there are four asset classes, and the variance of the total portfolio is assumed to be 25%; therefore, using a risk parity approach, the allocation to each asset class is expected to contribute $(1/4 \times 25\%) = 6.25\%$ of the total variance. Because bonds have the lowest covariance, they must have a higher relative weight to achieve the same contribution to risk as the other asset classes.

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



- Which of Müller's comments about the other approaches to asset allocation is correct?
 - A. Comment 1
 - B. Comment 2
 - C. Comment 3

100% Conviction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Megan Beade and Hanna Müller



➤ Solution: A

Comment 1 is correct because the "120 minus your age" rule reduces the equity allocation as the client ages, while the 60/40 rule makes no such adjustment. Comments 2 and 3 are not correct. The Yale model emphasizes investing in alternative assets (such as hedge funds, private equity, and real estate) as opposed to investing in traditional asset classes (such as stock and bonds). The 1/N rule allocates an equal weight to each asset without regard to its investment characteristics, treating all assets as indistinguishable in terms of mean returns, volatility, and correlations.

100% Conviction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Carl Monteo



- Investment adviser Carl Monteo determines client asset allocations using quantitative techniques such as mean-variance optimization (MVO) and risk budgets. Monteo is reviewing the allocations of three clients. Exhibit 1 shows the expected return and standard deviation of returns for three strategic asset allocations that apply to several of Monteo's clients.

100% Conviction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING


Exhibit 1. Strategic Asset Allocation Alternatives

Asset Allocation	Adviser's Forecasts	
	Expected Return (%)	Standard Deviation of Returns (%)
A	10	12.0
B	8	8.0
C	6	2.0

- Monteo interviews client Mary Perkins and develops a detailed assessment of her risk preference and capacity for risk, which is needed to apply MVO to asset allocation. Monteo estimates the risk aversion coefficient (λ) for Perkins to be 8 and uses the following utility function to determine a preferred asset allocation for Perkins:

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE CREATING


Case: Carl Monteo

$$U_m = E(R_m) - 0.005\lambda\sigma_m^2$$

- Another client, Lars Velky, represents Velky Partners (VP), a large institutional investor with \$500 million in investable assets. Velky is interested in adding less liquid asset classes, such as direct real estate, infrastructure, and private equity, to VP's portfolio. Velky and Monteo discuss the considerations involved in applying many of the common asset allocation techniques, such as MVO, to these asset classes. Before making any changes to the portfolio, Monteo asks Velky about his knowledge of risk budgeting. Velky makes the following statements:
 - Statement 1: An optimum risk budget minimizes total risk.
 - Statement 2: Risk budgeting decomposes total portfolio risk into its constituent parts.

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE CREATING


Case: Carl Monteo

- Statement 3: An asset allocation is optimal from a risk-budgeting perspective when the ratio of excess return to marginal contribution to risk is different for all assets in the portfolio.
- Monteo meets with a third client, Jayanta Chaterji, an individual investor. Monteo and Chaterji discuss mean-variance optimization. Chaterji expresses concern about using the output of MVOs for two reasons:
 - Criticism 1: The asset allocations are highly sensitive to changes in the model inputs.
 - Criticism 2: The asset allocations tend to be highly dispersed across all available asset classes.

100% Construction Breeds Professionalism!
PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Carl Monteo



- Monteo and Chaterji also discuss other approaches to asset allocation. Chaterji tells Monteo that he understands the factor-based approach to asset allocation to have two key characteristics:
 - Characteristic 1: The factors commonly used in the factor-based approach generally have low correlations with the market and with each other.
 - Characteristic 2: The factors commonly used in the factor-based approach are typically different from the fundamental or structural factors used in multifactor models.
- Monteo concludes the meeting with Chaterji after sharing his views on the factor-based approach.

100% Construction Breeds Professionals!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Carl Monteo



- Based on Exhibit 1 and the risk aversion coefficient, the preferred asset allocation for Perkins is:
 - A. Asset Allocation A.
 - B. Asset Allocation B.
 - C. Asset Allocation C.
- **Solution: C**

The risk aversion coefficient (λ) for Mary Perkins is 8. The utility of each asset allocation is calculated as follows:

Asset Allocation A: $U_A = 10.0\% - 0.005(8)(12\%)^2 = 4.24\%$.

Asset Allocation B: $U_B = 8.0\% - 0.005(8)(8\%)^2 = 5.44\%$.

Asset Allocation C: $U_C = 6.0\% - 0.005(8)(2\%)^2 = 5.84\%$.

100% Construction Breeds Professionals!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Carl Monteo



- In their discussion of the asset classes that Velky is interested in adding to the VP portfolio, Monteo should tell Velky that:
 - A. these asset classes can be readily diversified to eliminate idiosyncratic risk.
 - B. indexes are available for these asset classes that do an outstanding job of representing the performance characteristics of the asset classes.
 - C. the risk and return characteristics associated with actual investment vehicles for these asset classes are typically significantly different from the characteristics of the asset classes themselves.

100% Construction Breeds Professionals!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Carl Monteo



➤ Solution: C

- Less liquid asset classes—such as direct real estate, infrastructure, and private equity—represent unique challenges when applying many of the common asset allocation techniques. Common illiquid asset classes cannot be readily diversified to eliminate idiosyncratic risk, so representing overall asset class performance is problematic. Furthermore, there are far fewer indexes that attempt to represent aggregate performance for these less liquid asset classes than indexes of traditional highly liquid asset classes. Finally, the risk and return characteristics associated with actual investment vehicles—such as direct real estate funds, infrastructure funds, and private equity funds—are typically significantly different from the characteristics of the asset classes themselves.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Carl Monteo



- Which of Velky's statements about risk budgeting is correct?
 - Statement 1.
 - Statement 2.
 - Statement 3.

➤ Solution: B

The goal of risk budgeting is to maximize return per unit of risk. A risk budget identifies the total amount of risk and attributes risk to its constituent parts. An optimum risk budget allocates risk efficiently.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Carl Monteo



- Which of Chaterji's criticisms of MVO is/are valid?
 - Only Criticism 1.
 - Only Criticism 2.
 - Both Criticism 1 and Criticism 2.

➤ Solution: A

One common criticism of MVO is that the model outputs, the asset allocations, tend to be highly sensitive to changes in the model. Another common criticism of MVO is that the resulting asset allocations tend to be highly concentrated in a subset of the available asset classes.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



- Which of the characteristics put forth by Chaterji to describe the factor-based approach is/are correct?
- Only Characteristic 1.
 - Only Characteristic 2.
 - Both Characteristic 1 and Characteristic 2.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Carl Monteo



➤ **Solution: A**

The factors commonly used in the factor-based approach generally have low correlations with the market and with each other. This results from the fact that the factors typically represent what is referred to as a zero (dollar) investment or self-financing investment, in which the underperforming attribute is sold short to finance an offsetting long position in the better-performing attribute. Constructing factors in this manner removes most market exposure from the factors (because of the offsetting short and long positions); as a result, the factors generally have low correlations with the market and with one another. Also, the factors commonly used in the factor-based approach are typically similar to the fundamental or structural factors used in multifactor models.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING

Reading 14

Asset Allocation with Real-World Constraints

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- Rebecca Mayer is an asset management consultant for institutions and high-net-worth individuals. Mayer meets with Sebastian Capara, the newly appointed Investment Committee chairman for the Kinkardeen University Endowment (KUE), a very large tax-exempt fund.
- Capara and Mayer review KUE's current and strategic asset allocations, which are presented in Exhibit 1. Capara informs Mayer that over the last few years, Kinkardeen University has financed its operations primarily from tuition, with minimal need of financial support from KUE. Enrollment at the University has been rising in recent years, and the Board of Trustees expects enrollment growth to continue for the next five years. Consequently, the board expects very modest endowment support to be needed during that time.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- These expectations led the Investment Committee to approve a decrease in the endowment's annual spending rate starting in the next fiscal year.

Exhibit 1. Kinkardeen University Endowment—Strategic Asset Allocation Policy

Asset Class	Current Weight	Target Allocation	Lower Policy Limit	Upper Policy Limit
Developed markets equity	30%	30%	25%	35%
Emerging markets equity	28%	30%	25%	35%
Investment-grade bonds	15%	20%	15%	25%
Private real estate equity	15%	10%	5%	15%
Infrastructure	12%	10%	5%	15%

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- As an additional source of alpha, Mayer proposes tactically adjusting KUE's asset-class weights to profit from short-term return opportunities. To confirm his understanding of tactical asset allocation (TAA), Capara tells Mayer the following:
 - Statement 1: The Sharpe ratio is suitable for measuring the success of TAA relative to SAA.
 - Statement 2: Discretionary TAA attempts to capture asset-class-level return anomalies that have been shown to have some predictability and persistence.
 - Statement 3: TAA allows a manager to deviate from the IPS asset-class upper and lower limits if the shift is expected to produce higher expected risk-adjusted returns.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- Capara asks Mayer to recommend a TAA strategy based on excess return forecasts for the asset classes in KUE's portfolio, as shown in Exhibit 2.

Exhibit 2. Short-Term Excess Return Forecast

Asset Class	Expected Excess Return
Developed markets equity	2%
Emerging markets equity	5%
Investment-grade bonds	-3%
Private real estate equity	3%
Infrastructure	-1%

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- Following her consultation with Capara, Mayer meets with Roger Koval, a member of a wealthy family. Although Koval's baseline needs are secured by a family trust, Koval has a personal portfolio to fund his lifestyle goals.
- In Koval's country, interest income is taxed at progressively higher income tax rates. Dividend income and long-term capital gains are taxed at lower tax rates relative to interest and earned income. In taxable accounts, realized capital losses can be used to offset current or future realized capital gains. Koval is in a high tax bracket, and his taxable account currently holds, in equal weights, high-yield bonds, investment-grade bonds, and domestic equities focused on long-term capital gains.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- Koval asks Mayer about adding new asset classes to the taxable portfolio. Mayer suggests emerging markets equity given its positive short-term excess return forecast. However, Koval tells Mayer he is not interested in adding emerging markets equity to the account because he is convinced it is too risky. Koval justifies this belief by referring to significant losses the family trust suffered during the recent economic crisis.
- Mayer also suggests using two mean-variance portfolio optimization scenarios for the taxable account to evaluate potential asset allocations. Mayer recommends running two optimizations: one on a pre-tax basis and another on an after-tax basis.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- The change in the annual spending rate, in conjunction with the board's expectations regarding future enrollment and the need for endowment support, could justify that KUE's target weight for:
 - A. infrastructure be increased.
 - B. investment-grade bonds be increased.
 - C. private real estate equity be decreased.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



➤ Solution: A

A lower annual spending rate, in addition to the board's expectations of rising enrollment and minimal need for endowment support over the next five years, indicates a decreased need for liquidity. Therefore, KUE could justify an increase in the strategic allocation to less liquid asset classes (such as private real estate equity and infrastructure) and a decrease in the strategic allocation to liquid assets (such as investment-grade bonds).

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- Which of Capara's statements regarding tactical asset allocation is correct?
 - A. Statement 1.
 - B. Statement 2.
 - C. Statement 3.

➤ Solution: A

The Sharpe ratio is suitable for measuring the success of TAA relative to SAA. Specifically, the success of TAA decisions can be evaluated by comparing the Sharpe ratio realized under the TAA with the Sharpe ratio that would have been realized under the SAA.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- Based on Exhibits 1 and 2, to attempt to profit from the short-term excess return forecast, Capara should increase KUE's portfolio allocation to:
 - A. developed markets equity and decrease its allocation to infrastructure.
 - B. emerging markets equity and decrease its allocation to investment-grade bonds.
 - C. developed markets equity and increase its allocation to private real estate equity.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Rebecca Mayer



➤ Solution: A

The forecast for expected excess returns is positive for developed markets equity and negative for infrastructure. Therefore, to attempt to profit from the short-term excess return forecast, KUE can overweight developed markets equity and underweight infrastructure. These adjustments to the asset-class weights are within KUE's lower and upper policy limits.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Rebecca Mayer



- Given Koval's current portfolio and the tax laws of the country in which he lives, Koval's portfolio would be more tax efficient if he reallocated his taxable account to hold more:
 - A. high-yield bonds.
 - B. investment-grade bonds.
 - C. domestic equities focused on long-term capital gain opportunities.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Rebecca Mayer



➤ Solution: C

As a general rule, the portion of a taxable asset owner's assets that are eligible for lower tax rates and deferred capital gains tax treatment should first be allocated to the investor's taxable accounts. Assets that generate returns mainly from interest income tend to be less tax efficient and in Koval's country are taxed at progressively higher rates. Also, the standard deviation (volatility) of after-tax returns is lower when equities are held in a taxable account. Therefore, Koval's taxable account would become more tax efficient if it held more domestic equities focused on long-term capital gain opportunities.

100% Commitment Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- Koval's attitude toward emerging markets equity reflects which of the following behavioral biases?
- Hindsight bias.
 - Availability bias.
 - Illusion of control.

100% Commitment Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



➤ Solution: B

Availability bias is an information-processing bias in which people take a mental shortcut when estimating the probability of an outcome based on how easily the outcome comes to mind. On the basis of the losses incurred by his family trust during the recent economic crisis, Koval expresses a strong preference for avoiding the emerging markets equity asset class. Such behavior is consistent with availability bias, where investors who personally experience an adverse event are likely to assign a higher probability to such an event occurring again.

100% Commitment Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Rebecca Mayer



- In both of Mayer's optimization scenarios, which of the following model inputs could be used without adjustment?
 - Expected returns.
 - Correlation of returns.
 - Standard deviations of returns.

- **Solution: B**

After-tax portfolio optimization requires adjusting each asset class's expected return and risk for expected taxes. The correlation of returns is not affected by taxes and does not require an adjustment when performing after-tax portfolio optimization.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



- Elsbeth Quinn and Dean McCall are partners at Camel Asset Management (CAM). Quinn advises high-net-worth individuals, and McCall specializes in retirement plans for institutions.
- Quinn meets with Neal and Karina Martin, both age 44. The Martins plan to retire at age 62. Twenty percent of the Martins' \$600,000 in financial assets is held in cash and earmarked for funding their daughter Lara's university studies, which begin in one year. Lara's education and their own retirement are the Martins' highest-priority goals. Last week, the Martins learned that Lara was awarded a four-year full scholarship for university. Quinn reviews how the scholarship might affect the Martins' asset allocation strategy.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



- The Martins have assets in both taxable and tax-deferred accounts. For baseline retirement needs, Quinn recommends that the Martins maintain their current overall 60% equity/40% bonds (\pm 8% rebalancing range) strategic asset allocation. Quinn calculates that given current financial assets and expected future earnings, the Martins could reduce future retirement savings by 15% and still comfortably retire at 62. The Martins wish to allocate that 15% to a sub-portfolio with the goal of making a charitable gift to their alma mater from their estate. Although the gift is a low-priority goal, the Martins want the sub-portfolio to earn the highest return possible. Quinn promises to recommend an asset allocation strategy for the Martins' aspirational goal.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



- Next, Quinn discusses taxation of investments with the Martins. Their interest income is taxed at 35%, and capital gains and dividends are taxed at 20%. The Martins want to minimize taxes. Based on personal research, Neal makes the following two statements:
 - Statement 1: The after-tax return volatility of assets held in taxable accounts will be less than the pre-tax return volatility.
 - Statement 2: Assets that receive more favorable tax treatment should be held in tax-deferred accounts.

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



- The equity portion of the Martins' portfolios produced an annualized return of 20% for the past three years. As a result, the Martins' equity allocation in both their taxable and tax-deferred portfolios has increased to 71%, with bonds falling to 29%. The Martins want to keep the strategic asset allocation risk levels the same in both types of retirement portfolios. Quinn discusses rebalancing; however, Neal is somewhat reluctant to take money out of stocks, expressing confidence that strong investment returns will continue.

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



- Quinn's CAM associate, McCall, meets with Bruno Snead, the director of the Katt Company Pension Fund (KCPF). The strategic asset allocation for the fund is 65% stocks/35% bonds. Because of favorable returns during the past eight recession-free years, the KCPF is now overfunded. However, there are early signs of the economy weakening. Since Katt Company is in a cyclical industry, the Pension Committee is concerned about future market and economic risk and fears that the high-priority goal of maintaining a fully funded status may be adversely affected. McCall suggests to Snead that the KCPF might benefit from an updated IPS. Following a thorough review, McCall recommends a new IPS and strategic asset allocation.

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



- The proposed IPS revisions include a plan for short-term deviations from strategic asset allocation targets. The goal is to benefit from equity market trends by automatically increasing (decreasing) the allocation to equities by 5% whenever the S&P 500 Index 50-day moving average crosses above (below) the 200-day moving average.

100% Conviction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Elsbeth Quinn and Dean McCall



- Given the change in funding of Lara's education, the Martins' strategic asset allocation would *most likely* decrease exposure to:
 - A. cash.
 - B. bonds.
 - C. equities.

100% Conviction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Elsbeth Quinn and Dean McCall



➤ Solution: A

The changing character of liabilities through time affects the asset allocation to fund those liabilities. The Martins' investment horizon for some of their assets has changed. The amount of liquidity needed for Lara's near-term education has been greatly reduced owing to the receipt of the scholarship. The Martins will likely still have to pay for some university-related expenses; however, a large part of the \$120,000 in cash that is earmarked for Lara's expenses can now be allocated to the Martins' long-term goal of early retirement. Retirement is 18 years away, much longer than the one- to five-year horizon for university expenses. Therefore, the Martins' allocation to cash would likely decrease.

100% Conviction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Elsbeth Quinn and Dean McCall



- The *most* appropriate asset allocation for the Martins' new charitable gift sub-portfolio is:
 - 40% equities/60% bonds.
 - 70% equities/30% bonds.
 - 100% equities/0% bonds.

- **Solution: C**

The Martins' sub-portfolio is aspirational and a low priority. Investors are usually willing to take more risk on lower-priority, aspirational portfolios. The charitable gift will be made from their estate, which indicates a long time horizon. In addition, the Martins want the highest return possible. Therefore, the highest allocation to equities is most appropriate

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



- Which of Neal's statements regarding the taxation of investments is correct?
 - Statement 1 only.
 - Statement 2 only.
 - Both Statement 1 and Statement 2.

- **Solution: A**

Taxes alter the distribution of returns by both reducing the expected mean return and muting the dispersion of returns. The portion of an owner's taxable assets that are eligible for lower tax rates and deferred capital gains tax treatment should first be allocated to the investor's taxable accounts.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



- Given the Martins' risk and tax preferences, the taxable portfolio should be rebalanced:
 - less often than the tax-deferred portfolio.
 - as often as the tax-deferred portfolio.
 - more often than the tax-deferred portfolio.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE-CREATING



Case: Elsbeth Quinn and Dean McCall



➤ Solution: A

The Martins wish to maintain the same risk level for both retirement accounts based on their strategic asset allocation. However, more frequent rebalancing exposes the taxable asset owner to realized taxes that could have otherwise been deferred or even avoided. Rebalancing is discretionary, and the Martins' also wish to minimize taxes. Because after-tax return volatility is lower than pre-tax return volatility, it takes larger asset-class movements to materially alter the risk profile of a taxable portfolio. This suggests that rebalancing ranges for a taxable portfolio can be wider than those of a tax-exempt/tax-deferred portfolio with a similar risk profile; thus, rebalancing occurs less frequently.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Elsbeth Quinn and Dean McCall



- During the rebalancing discussion, which behavioral bias does Neal exhibit?
 - A. Framing bias.
 - B. Loss aversion.
 - C. Representative bias.

➤ Solution: C

Representative, or recency, bias is the tendency to overweight the importance of the most recent observations and information relative to a longer-dated or more comprehensive set of long-term observations and information. Return chasing is a common result of this bias, and it results in overweighting asset classes with strong recent performance.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Elsbeth Quinn and Dean McCall



- Given McCall's IPS recommendation, the *most* appropriate new strategic asset allocation for the KCPF is:
 - A. 40% stocks/60% bonds.
 - B. 65% stocks/35% bonds.
 - C. 75% stocks/25% bonds.

➤ Solution: A

McCall recommends a new IPS. Changes in the economic environment and capital market expectations or changes in the beliefs of committee members are factors that may lead to an altering of the principles that guide investment activities.

100% Construction Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Elsbeth Quinn and Dean McCall



Because the plan is now overfunded, there is less need to take a higher level of equity risk. The Pension Committee is concerned about the impact of future market and economic risks on the funding status of the plan. Katt Company operates in a cyclical industry and could have difficulty making pension contributions during a recession. Therefore, a substantial reduction in the allocation to stocks and an increase in bonds reduce risk. The 40% stocks/60% bonds alternative increases the allocation to bonds from 35% to 60%. Increasing the fixed-income allocation should moderate plan risk, provide a better hedge for liabilities, and reduce contribution uncertainty.

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Elsbeth Quinn and Dean McCall



- The proposal for short-term adjustments to the KCPF asset allocation strategy is known as:
 - A. de-risking.
 - B. systematic tactical asset allocation.
 - C. discretionary tactical asset allocation.

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING



Case: Elsbeth Quinn and Dean McCall



➤ Solution: B

Using rules-based, quantitative signals, systematic tactical asset allocation (TAA) attempts to capture asset-class-level return anomalies that have been shown to have some predictability and persistence. Trend signals are widely used in systematic TAA. A moving-average crossover is a trend signal that indicates an upward (downward) trend when the moving average of the shorter time frame, 50 days, is above (below) the moving average of the longer time frame, 200 days.

100% Contribution Breeds Professionalism!

PROFESSIONAL-INNOVATIVE-VALUE CREATING

◆ 问题反馈

- 如果您认为金程课程讲义/题库/视频或其他资料中存在错误，欢迎您告诉我们，所有提交的内容我们会在最快时间内核查并给予答复。
- 如何告诉我们？
 - 将您发现的问题通过电子邮件告知我们，具体的内容包含：
 - ✓ 您的姓名或网校账号
 - ✓ 所在班级（eg.1906CFA一级长线无忧班）
 - ✓ 问题所在科目（若未知科目，请提供章节、知识点）和页码
 - ✓ 您对问题的详细描述和您的见解
 - 请发送电子邮件至：academic.support@gfedu.net
- 非常感谢您对金程教育的支持，您的每一次反馈都是我们成长的动力。后续我们也将开通其他问题反馈渠道（如微信等）。

