Level III

Question: 1
Topic: Portfolio Management – Individual
Minutes: 36

Reading References:
15. "Managing Individual Investor Portfolios," Ch. 2 *Managing Investment Portfolios: A Dynamic Process,* 3rd edition, James W. Bronson, Matthew H. Scanlan, and Jan R. Squires (CFA Institute, 2007)
20. "Goals-Based Investing: Integrating Traditional and Behavioral Finance," Daniel Nevins, *Journal of Wealth Management* (Institutional Investors, 2004)

Purpose:
Test individual portfolio management concepts.

LOS: 2008-III-4-15-j, k, l, n
15. "Managing Individual Investor Portfolios"
    The candidate should be able to:
    j)   explain how to set risk and return objectives for individual investor portfolios and discuss the impact that ability and willingness to take risk have on risk tolerance;
    k)   identify and explain each of the major constraint categories included in an individual investor's investment policy statement;
    l)   formulate and justify an investment policy statement for an individual investor;
    n)   compare and contrast traditional deterministic versus Monte Carlo approaches to retirement planning and explain the advantages of a Monte Carlo approach.

LOS: 2008-III-4-20-c, d
20. "Goals-Based Investing: Integrating Traditional and Behavioral Finance"
    c)   justify the use of absolute performance and cash flow matching objectives to meet the goal of lifestyle protection;
    d)   compare lifestyle protection strategies with fixed horizon strategies and explain when the use of each approach is appropriate.

Level III

Question: 1
Topic: Portfolio Management – Individual
Minutes: 36

Guideline Answer:

PART A

i.
The return objective for the Carvalhos' portfolio is to:
- provide for the mortgage payments for a home
- support their living expenses in retirement
- maintain the inflation-adjusted value of the portfolio

ii.
CASH FLOWS

	Current	Year 1
Inflows		
Salary	120,000	124,800
Trust Distributions	750,000	0
Total Inflows	870,000	124,800
Outflows		
Living Expenses	120,000	124,800
Down payment on home	255,000	0
Mortgage on home	0	55,000
Total Outflows	375,000	179,800
Net Inflows/(Outflows)	495,000	(55,000)

INVESTABLE ASSETS

Investable Assets	
Current savings portfolio	500,000
Current year net inflow	495,000
Total Investable Assets	995,000

CALCULATION OF REQUIRED RETURN

Outflows required next year	55,000		
Divided by investable assets	995,000	=	**5.53%**
Plus expected inflation			4.00%
Required After-Tax Nominal Return - arithmetic			**9.53%**
Or			
Required After Tax Nominal Return – geometric	1.0553 x 1.0400 =		**9.75%**

Level III

Question: 1
Topic: Portfolio Management – Individual
Minutes: 36

PART B
Template for Question 1-B

i. Identify *two* factors in the Carvalhos' situation that increase their ability to take risk.
- They have a long time horizon - They are young and have more human capital - They will receive another trust payout in 10 years - They will potentially inherit a large sum of money from Mariana's parents - They have stable income
ii. Identify *two* factors in the Carvalhos' situation that decrease their ability to take risk.
- They have a moderate asset base relative to required cash flows from the portfolio - There is no assurance the children's education will be covered by a scholarship and the cost could be substantial
iii. Determine whether the Carvalhos have below-average, average, or above-average ability to take risk. **(circle one)**
Below-average   Average   *(Above-average)*

Level III

Question: 1
Topic: Portfolio Management – Individual
Minutes: 36

PART C
Template for Question 1-C

Constraint	Prepare the following constraints of the Carvalhos' IPS.
i. Liquidity	The Carvalhos need their investment portfolio to provide BRL55,000 for next year's mortgage payment.
ii. Time horizon	The Carvalhos have a long-term multi-stage time horizon. In the short term, they must pay living expenses and provide a home for their family. They may also have to pay tuition for their children. Their second stage is retirement, thirty years from now.

PART D
i.
The revised return objective for the Carvalhos' portfolio is to:
      - provide for the mortgage on their home
      - support their living expenses in retirement
      - support charitable endeavors in retirement
      - provide a bequest for their children.

ii.
The after-tax nominal rate of return is 8.48%. The return is calculated using the following inputs:

Mortgage payments remaining   5
Annual mortgage amount   BRL55,000
Investment portfolio value (current) BRL10,200,000
Investment portfolio value (target)   BRL15,000,000

Using the HP12-C calculator, the following figures are used in the calculation when solving for *i*:

N = 5, PV = 10,200,000, PMT = -55,000, FV = -15,000,000, compute i = 8.48%
or
N = 5, PV = -10,200,000, PMT = 55,000, FV = 15,000,000, compute i = 8.48%

Note: Salaries/expenses are a wash.

Level III

Question:	2
Topic:	Portfolio Management – Individual/Behavioral
Minutes:	9

Reading References:
7. "Heuristic-Driven Bias: The First Theme," Ch. 2, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing,* Hersh Shefrin (Oxford University School Press, 2002)
8. "Frame Dependence: The Second Theme," Ch. 3, *Beyond Greed and Fear: Understanding Behavioral Finance and the Psychology of Investing,* Hersh Shefrin (Oxford University School Press, 2002)
11. "Investment Decision Making in Defined Contribution Pension Plans," *Pensions,* Alistair Byrne, (Palgrave McMillan 2004)
13. "A Survey of Behavioral Finance," Ch. 18, *Handbook of the Economics of Finance* Nicholas Barberis and Richard Thaler (Elsevier Science B.V., 2003)

Purpose:
Test behavioral finance concepts for individual

LOS: 2008-III-3-7-a
7.   "Heuristic-Driven Bias: The First Theme"
      The candidate should be able to:
      a)   evaluate the impact of heuristic-driven biases on investment decision-making including representativeness, overconfidence, anchoring-and-adjustment, and aversion to ambiguity.

LOS: 2008-III-3-8-a, b
8.   **"**Frame Dependence: The Second Theme"
      The candidate should be able to:
      a)   explain how loss aversion can result in investors' willingness to hold on to deteriorating investment positions;
      b)   evaluate the impacts that the emotional frames of self-control, regret minimization, and money illusion have on investor behavior;

LOS: 2008-III-3-11-b
11.   "Investment Decision Making in Defined Contribution Pension Plans"
      The candidate should be able to:
      b)   evaluate the impacts of status quo bias, myopic loss aversion, 1/n diversification, and the endorsement effect on DC plan participants' investment decisions and the risk profile of their investment plans.

Level III

Question: 2
Topic: Portfolio Management – Individual/Behavioral
Minutes: 9

Guideline Answer:

Template for Question 2

Donaldson's statement	Select the behavioral finance concept *best* exhibited in *each* of Donaldson's three statements. Note: No behavioral finance concept can be used more than once. (circle one)	Explain how the behavioral finance concept you selected affects Donaldson's investment decision making.
"My father was a buy-and-hold investor but I am an active trader. To keep trading costs low, I use an online brokerage firm. I have done well investing in technology companies because I know the industry."	Naïve diversification (Overconfidence) Representativeness Regret avoidance Self-control	Donaldson knows the technology industry and he considers himself an expert investor. Overconfidence frequently leads to excessive trading and underperformance.
"I am holding a large position in Omega Corporation with a large unrealized loss. Omega's stock price declined last year when reported sales and earnings failed to meet analyst expectations. I took advantage of the decline to increase my position. Omega sales growth has continued to slow over the last year, but I believe the stock is still a good investment."	Naïve diversification Overconfidence Representativeness (Regret avoidance) Self-control	Donaldson's reluctance to sell his losing position reflects both regret avoidance and belief perseverance. To avoid the stress associated with admitting a mistake, he hopes the stock will recover. Despite new information (slowing sales and lower than expected sales and earnings), Donaldson has held onto his beliefs. He has increased his position rather than admit a mistake by taking the loss.

Level III

Template for Question 2 (continued)

Donaldson's statement	Select the behavioral finance concept *best* exhibited in *each* of Donaldson's three statements. Note: No behavioral finance concept can be used more than once. (circle one)	Explain how the behavioral finance concept you selected affects Donaldson's investment decision making.
"I read a newspaper article reporting that commercial property values in the city have increased 14 percent annually since 2000. According to the article, the average commercial property in the city sold for $1.5 million last year. This makes me very happy because I just purchased a piece of commercial property last month. There is no doubt that it will be a good investment."	Naïve diversification Overconfidence (Representativeness) Regret avoidance Self-control	Donaldson may have bought late in the cycle, but believes that commercial property values will continue to increase. Donaldson, by relying on the representativeness heuristic, has become overly optimistic about a past winner.

Level III

Question: 3
Topic: Portfolio Management – Institutional
Minutes: 36

Reading Reference:
21. "Managing Institutional Investor Portfolios," Ch. 3, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, R. Charles Tschampion, Laurence B. Siegel, Dean J. Takahashi, and John L. Maginn (CFA Institute, 2007)

Purpose:
Test institutional portfolio management concepts

LOS: 2008-III-21-b, c, d, e, f
21.   "Managing Institutional Investor Portfolios"
        The candidate should be able to:
        b)   discuss investment objectives and constraints for defined-benefit plans;
        c)   evaluate pension fund risk tolerance when risk is considered from the perspective of the (1) plan surplus, (2) sponsor financial status and profitability, (3) sponsor and pension fund common risk exposures, (4) plan features, and (5) workforce characteristics;
        d)   formulate an investment policy statement for a defined-benefit plan;
        e)   evaluate the risk management considerations in investing pension plan assets;
        f)   formulate an investment policy statement for a defined-contribution plan;

Level III

Question: 3
Topic: Portfolio Management – Institutional
Minutes: 36

Guideline Answer:

PART A
The most likely effect of a decrease in the discount rate to 6.5% from 7.0% would be to increase the calculated present value of TEPP's liabilities (i.e., projected benefit obligation or PBO).

PART B
The excess return target in 2008 will increase to 3.0 percent from 2.5 percent. This is because the total return target, 9.5%, in 2008 will remain the same as in 2007, but the discount rate is reduced to 6.5 percent from 7.0 percent. The excess return target for 2008 is calculated as follows.

	Arithmetic Approach	Geometric Approach
2007 Discount Rate	7.0%	1.0700
Plus: 2007 Excess Return Target	+ 2.5%	× 1.0250
2007 Total Return Objective	9.5%	1.0968 – 1 = 9.68%
2008 Total Return Objective	9.5%	1.0968
Less: 2008 Discount Rate	–6.5%	÷ 1.0650
2008 Excess Return Target	3.0%	1.0298 – 1 = 2.98%

PART C
TEPP's risk objective is to invest so as to minimize the probability that the market value of plan assets will fall below 65% of PBO.

Level III

Question: 3
Topic: Portfolio Management – Institutional
Minutes: 36
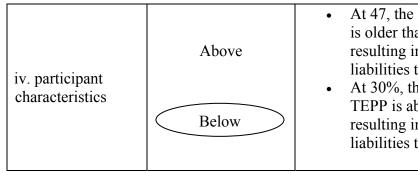
PART D
Template for Question 3-D

Attribute	Determine whether *each* of the four attributes indicates TEPP's ability to take risk is above or below the airline industry average. (circle one)	Justify *each* determination based on *one* comparison between TEPP and the airline industry related to the attribute. Note: Consider each attribute independently.
i. sponsor financial condition	Above (Below)	• Titan's debt/asset ratio of .48 is higher than the industry average of .39. • Titan's operating loss margin of (7.63%) is below the industry average loss margin of (4.01%);
ii. plan funding status	Above (Below)	• TEPP's funding level of 70% of PBO is less than the airline industry average. • TEPP anticipates sponsor contributions of only 90% of the payments to beneficiaries, which is less than average for the airline industry.
iii. plan provisions	Above (Below)	• Titan employees over age 50 are allowed to retire early, while most airline industry employees are not allowed to retire early. The early retirement feature increases the present value of TEPP's benefit payments compared to the airline industry. • Titan's retiring participants have the option to receive up to 50% of their benefit in a lump sum, while most airline industry employees do not have this option. The lump-sum option increases the present value of TEPP's benefit payments compared to the airline industry.

Question: 3
Topic: Portfolio Management – Institutional
Minutes: 36

iv. participant characteristics	Above (Below)	• At 47, the average age of TEPP participants is older than the airline industry average, resulting in a shorter duration for TEPP's liabilities than that of the airline industry. • At 30%, the proportion of retired lives in TEPP is above the airline industry average, resulting in a shorter duration for TEPP's liabilities than that of the airline industry.

PART E

Liquidity requirements for TEPP are determined by the expected net cash outflow of the plan defined as the difference between payments to beneficiaries and contributions received from Titan. Titan's planned contribution in 2008 of $927 million falls short of anticipated benefits payments of $1,030 million. As a result, TEPP expects a net cash outflow in 2008. Assuming that expected contributions and benefits are realized, TEPP will have a liquidity requirement in 2008 of $103 million, ($1,030 - $927).

PART F

i. Benefit payment obligations in the retired-lives pool are exposed to *less* inflation risk because, unlike the active-lives pool, payments are fixed in nominal terms and do not adjust for inflation. Benefit payment obligations in the active-lives pool are exposed to *more* inflation risk than in the retired-lives pool because, unlike the retired-lives pool, active Titan employees accrue pension benefits based on salary increases, which include inflation as a component.

ii. Liabilities in the active-lives pool will have a relatively *longer* average duration than liabilities in the retired lives pool, reflecting the time remaining before active employees retire. Active employees tend to be younger than retired employees. The age difference is indicated by the fact that the minimum retirement age is 50 and that 30% of all TEPP participants are retired.

PART G

Barrows is incorrect. Titan's risk management committee indicated that an asset-liability management (ALM) objective to maintain the market value of pension assets at or above 65% of PBO. From an ALM perspective, pension investments should be managed relative to pension liabilities and not to external index benchmarks. The ALM goal is to limit the volatility of the shortfall, but large holdings in stocks will increase the volatility of the shortfall because changes in equity values will not correlate closely to changes in the value of plan liabilities. The shortfall stands presently at 30% of liabilities. A downward move in stock prices occurring while Titan remains unable to fully fund the plan would worsen the shortfall.

Tate is incorrect. The mismatch between short-term, risk-free securities and the 14-year duration of Titan's pension benefit obligation implies that changes in asset values will not correlate

Question: 3
Topic: Portfolio Management – Institutional
Minutes: 36

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closely to changes in the value of plan liabilities, adding to the volatility of the funding shortfall. Moreover, short-term, risk free assets would not be expected to earn a rate of return equal to the actuarial discount rate during a period in which a normal, upward-sloping yield curve prevails, causing the shortfall to worsen.

Level III

Question:	4
Topic:	Portfolio Management – Asset Allocation
Minutes:	17

Reading References:
25. "Asset Allocation," Ch. 5, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, William F. Sharpe, Peng Chen, Jerald E. Pinto, and Dennis W. McLeavey (CFA Institute, 2007)
26. "Linking Pension Liabilities to Assets," Aaron Meder and Renato Staub (UBS Global Asset Management, 2006)

Purpose:
To test knowledge and use of asset allocation

LOS: 2008-III-07-25-d, e, f, m
25. "Asset Allocation"
    The candidate should be able to:
    d) contrast the asset-only and asset/liability management (ALM) approaches to asset allocation;
    e) explain the advantage of dynamic over static asset allocation and evaluate the trade-offs of complexity and cost;
    f) evaluate return and risk objectives in relation to strategic asset allocation;
    m) formulate and justify a strategic asset allocation, given an investment policy statement and capital market expectations;

LOS: 2008-III-07-26-a, b, c
26. "Linking Pension Liabilities to Assets"
    The candidate should be able to:
    a) contrast the assumptions concerning pension liability risk in asset-only and liability-relative approaches to asset allocation;
    b) discuss the fundamental and economic exposures of pension liabilities and identify asset types that mimic these liability exposures;
    c) compare pension portfolios built from a traditional asset-only perspective to portfolios designed relative to liabilities and discuss why corporations may choose not to fully implement the liability mimicking portfolio.

Level III

Question: 4
Topic: Portfolio Management – Asset Allocation
Minutes: 17

Guideline Answer:

PART A

i.   Given Thurlow's return requirement of 9.4%, corner portfolios #3 and #4 are the two most appropriate portfolios to combine.

In addition to achieving the return requirement, the combination of portfolios #3 and #4:
1. is consistent with Thurlow's risk tolerance of a maximum portfolio standard deviation of 10%,
2. lies on the efficient frontier, and
3. will result in the highest Sharpe ratio among the all portfolio combinations that meet Thurlow's return requirement. [Sharpe ratio = (.25 x .46) + (.75 x .51) = .4975]

ii.   Based on the return requirement of 9.4%, the optimal weights of Portfolio 3 and Portfolio 4 is given by:

Required Return = (Return on Portfolio 3) x (percentage of overall portfolio invested in Portfolio 3) + (Return on Portfolio 4) x (1 - percentage of overall portfolio invested in Portfolio 3)

9.4% = 10.3% x w + 9.1% (1-w)
Solving for w = .25
Where: w = percentage of overall portfolio invested in Portfolio 3

Therefore, the optimal weighting of Portfolio 3 equals 25% and the optimal weighting for Portfolio 4 equals 75%.

The weight of total equities in the portfolio = weight of US equities + weight of non-US equities.

The weight of US equities = (the weight of portfolio 3) x (the allocation to US equities in portfolio 3) + (the weight of portfolio 4) x (the allocation to US equities in portfolio 4)

The weight of US equities = .25(74.1%) + .75(33.7%) = 43.8%

The weight of non-US equities = (the weight of portfolio 3) x (the allocation to non-US equities in portfolio 3) + (the weight of portfolio 4) x (the allocation to non-US equities in portfolio 4)

The weight of non-US equities = .25(4.0%) + .75(12.0%) = 10.0%

Therefore, the weight of total equities = 43.8% + 10.0% = 53.8%.

Level III

Question: 4
Topic: Portfolio Management – Asset Allocation
Minutes: 17

PART B

i.   The most appropriate asset allocation is 106.5% of investable funds to Corner portfolio 4 while borrowing 6.5% of investable funds at the risk-free rate.

Thurlow's return requirement is 9.4%. Therefore the optimal allocation to Portfolio 4 is determined as:

Required Return = (Return on Portfolio 4) x (percentage of overall portfolio invested in Portfolio 4) + (Risk-free rate) x (1 - percentage of overall portfolio invested in Portfolio 4)

9.4% = 9.1% (w) + 4.5% (1-w)
Solving for w = 1.065 = weight of portfolio 4

Where:
   Expected return on Portfolio 4 = 9.1%
   Expected risk-free rate = 4.5%
   w = optimal allocation to Portfolio 4

The optimal asset allocation for the overall portfolio is:

Asset Class		Weight
US Equities	1.065 x 33.7	35.9%
Non-US Equities	1.065 x 12.0	12.8%
Long-term bonds	1.065 x 36.7	39.1%
Real Estate	1.065 x 17.6	18.7%
Risk free asset	1.0 – 1.065	-6.5%

ii.   By combining the tangency portfolio with the risk-free security, the expected risk-adjusted return (Sharpe ratio) will improve from .49 to .51. This Sharpe Ratio for this combination is higher than any other portfolio solution that meets the 9.4% return requirement. The standard deviation of this portfolio is (approximately) 9.69%. This standard deviation is lower than the 10% standard deviation of the optimal portfolio (the optimal combination of portfolio 3 and portfolio 4 with no leverage).

iii.   The weight of total equities in the portfolio equals 48.7% = weight of US equities + weight of Non- US equities = 35.9% + 12.8% = 48.7%

PART C

i.   The advantages of the resampled efficient frontier approach relative to the mean-variance efficient frontier approach are:

Level III

Question: 4
Topic: Portfolio Management – Asset Allocation
Minutes: 17

1. the optimal portfolios resulting from the re-sampling process are more diversified;
2. the optimal portfolio weights from the re-sampled portfolios are more stable through time.

ii.   Asset Liability Management (ALM) is preferred because:

1. ALM reduces risk by explicitly considering the liability exposures of the pension plan.
2. The Asset Only approach can result in inefficient investment policies that may expose the plan to excessive and unrewarded risk relative to liabilities.
3. ALM approaches typically result in an optimal portfolio with a higher fixed income allocation.

Level III

Question: 5
Topic: Portfolio Management – Fixed Income Investments
Minutes: 13

Reading References:

27. "Fixed-Income Portfolio Management-Part I," Ch. 6, sections 1-4 (pages 1-40) *Managing Investment Portfolios: A Dynamic Process,* 3rd edition, H. Gifford Fong and Larry D. Guin (CFA Institute, 2007)
28. "Relative-Value Methodologies for Global Credit Bond Portfolio Management," Ch. 5, Jack Malvey*, Fixed Income Readings for the Chartered Financial Analyst$^®$ Program*, 2nd edition, Frank J. Fabozzi, editor (CFA Institute, 2005)
30. "Hedging Mortgage Securities to Capture Relative Value," Ch. 8, Kenneth B. Dunn, Roberto M. Sella, and Frank J. Fabozzi, *Fixed Income Readings for the Chartered Financial Analyst$^®$ Program*, 2nd edition, Frank J. Fabozzi, editor (CFA Institute, 2005)

Purpose:
To test fixed income portfolio management strategies.

LOS: 2008-III-8-27-h
27. **"**Fixed Income Portfolio Management-Part I"
The candidate should be able to:
   a. explain the importance of spread duration;

LOS: 2008-III-28-d, e

28. "Relative-Value Methodologies for Global Credit Bond Portfolio Management"
The candidate should be able to:
   d) discuss the primary reasons for secondary market trading, including yield/spread pickup trades, credit-upside trades, credit-defense trades, new issue swaps, sector-rotation trades, yield curve-adjustment trades, structure trades, and cash flow reinvestment;
   e) discuss and evaluate corporate bond portfolio strategies that are based on relative value, including total return analysis, primary market analysis, liquidity and trading analysis, secondary trading rationales and trading constraints, spread analysis, structure analysis, credit curve analysis, credit analysis, and asset allocation/sector analysis.

Level III

Question: 5
Topic: Portfolio Management – Fixed Income Investments
Minutes: 13

LOS: 2008-III-9-30-a, b, d
30.   "Hedging Mortgage Securities to Capture Relative Value"
        The candidate should be able to:
   a)   demonstrate how a mortgage security's negative convexity will affect the
          performance of a hedge;
   b)   explain the risks associated with investing in mortgage securities and discuss
          whether these risks can be effectively hedged;
   d)   compare and contrast duration-based approaches versus interest rate sensitivity
          approaches to hedging mortgage securities;

Level III

Question: 5
Topic: Portfolio Management – Fixed Income Investments
Minutes: 13

Guideline Answer:

PART A
Template for Question 5-A
Note: Ignore transaction costs.

Trade	Determine the expected effect on the portfolio's value over the next two weeks for *each* potential trade, given the strategist's market expectations. (circle one)	Justify *each* expectation with *one* reason.
1. Buy 7-year Ba2/BB industrial corporate bonds; Sell 7-year Baa3/BBB industrial corporate bonds.	Positive (Negative)	Lower quality corporate bond spreads widen more than higher quality bond spreads in a weak economic environment due to a higher risk of default.
2. Buy 5-year callable corporate bonds; Sell 5-year non-callable corporate bonds of the same issuer.	Positive (Negative)	The negative convexity of callable bonds limits the price appreciation relative to non-callable bonds in a falling rate environment.
3. Buy 7-year high coupon mortgage pass-through bonds; Sell 7-year low coupon mortgage pass-through bonds.	Positive (Negative)	Higher coupon, mortgage pass-through bonds will experience higher level of prepayments and will have to be reinvested into lower interest bearing securities when interest rates decline.

Level III

Question: 5
Topic: Portfolio Management – Fixed Income Investments
Minutes: 13

PART B
Sector rotation occurs when an investment manager shifts the portfolio from a sector that is expected to underperform to one that is expected to outperform. Sector rotation trading strategies do not perform well in the corporate bond market, as compared to the equity market, because the corporate bond market generally has less liquidity than the equity market and higher trading costs than the equity market.

Level III

Question: 6
Topic: Portfolio Management – Alternative Investments
Minutes: 11

Reading References:
34.   "Alternative Investments Portfolio Management," Ch. 9, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Jot K. Yau, Thomas Schneeweis, Thomas R. Robinson, and Lisa R. Weiss (CFA Institute, 2007)
36.   "Commodity Forwards and Futures," Ch. 6, *Derivatives Markets*, 2nd edition, Robert L. McDonald (Addison Wesley, 2006)

Purpose:
To test knowledge and use of alternative assets

LOS: 2008-III-11-34-n
34.   "Alternative Investments Portfolio Management"
      The candidate should be able to:
      n)   explain the three components of return for a commodity futures contract and the effect that an upward- or downward-sloping term structure of futures prices will have on roll yield;

LOS: 2008-III-11-36-1-a, b, c
36.   "Commodity Forwards and Futures"
      The candidate should be able to:
      a)   discuss the unique pricing factors for commodity forwards and futures, including storability, storage costs, production, and demand, and their influence on lease rates and the forward curve;
      b)   identify and explain the arbitrage situations which arise as a result of the convenience yield of a commodity and commodity spreads;
      c)   compare and contrast the basis risk of commodity futures with that of financial futures.

Level III

Question: 6
Topic: Portfolio Management – Alternative Investments
Minutes: 11

Guideline Answer:

PART A
To implement the reverse cash-and-carry arbitrage, Dalk will need to short copper in the spot market and establish a long synthetic position in the copper forward market. The long synthetic commodity position consists of:
- a long position in the forward contract that expires in three months, and
- Zero-coupon bonds with a maturity date identical to the forward expiration date, and a face value equal to the forward price at maturity.

PART B
The reverse cash-and-carry arbitrage involves the following transactions:
1. Go long the forward contract. There is no cost associated with the purchase of the contract, but a payment of 313 cents/lb in three months is required.
2. Short the spot copper contract. This generates 316 cents/lb now. The short position must be covered in three months, at the maturity of the forward contract. Given a lease rate of 6% and a contract maturity of 3 months, a lease payment of 4.78 cents/lb ($316e^{(.06)(3/12)}$ - 316) is due at maturity.
3. Lend the proceeds of short sale. The proceeds of the short sale (316 cents/lb) can be invested (loaned) for three months at a yield of 5%. At maturity, the proceeds of loan is will be 319.97 cents/lb ($316e^{(.05)(3/12)}$).

The profit associated with the reverse cash-and-carry arbitrage is 2.19 cents/lb.

Reverse cash-and-carry arbitrage

Transaction	Cash Flows	
	Time 0	**Time T = 3/12**
Long forward	0	-313 cents/lb
Short sell copper @ lease rate = 6%	316 cents/lb	
Pay lease rate		-4.78 cents/lb
Lend short-sale proceeds @ 5%	-316 cents/lb	319.97 cents/lb
Total	0	2.19 cents/lb

PART C
The no-arbitrage price range for the forward price is:

$$S_0\, e^{(r+\lambda-c)T} \le F_{0,T} \le S_0\, e^{(r+\lambda)T}.$$

Question: 6
Topic: Portfolio Management – Alternative Investments
Minutes: 11

Where:
S_0 - spot price of the asset
r – the continuously compounded interest rate
T – time until expiration of the forward contract
$F_{0,T}$ – today's price of forward contract that matures at T
λ – storage cost
c – convenience yield

The convenience yield is the benefit from physical ownership. The convenience yield affects the no-arbitrage range for the forward price through the cost of short selling. An arbitrageur who wants to short spot copper would need to compensate the lender of copper for the loss of the convenience yield. Thus, a higher convenience yield will increase the cost of shorting spot copper and decrease the lower bound of the no-arbitrage range for the forward contract. The upper bound is unaffected, resulting in a wider no-arbitrage price range.

Level III

Question: 7
Topic: Portfolio Management – Risk Management
Minutes: 17

Reading Reference:
37.   "Risk Management" Ch. 9, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Don M. Chance, Kenneth Grant, and John Marsland, (CFA Institute, 2007)

Purpose:
To test principles of risk management

LOS: 2008-III-SS#-37-b, h, i
37.   "Risk Management"
       The candidate should be able to:
b)   recommend and justify the risk exposures an analyst should report as part of an enterprise risk management system;
h)   compare and contrast alternative types of stress testing and discuss the advantages and disadvantages of each;
i)   evaluate the credit risk of an investment position, including forward contract, swap, and option positions;

Level III

Question: 7
Topic: Portfolio Management – Risk Management
Minutes: 17

Guideline Answer:

PART A
Template for Question 7-A

Risk	Describe *one* source of *each* of the following risks facing RR. Note: A single source may not be used for both liquidity and settlement risk.
i. Liquidity risk	RR has recently made an acquisition through a relatively large short-term syndicated loan. If RR faces difficulty in raising funds to pay back the short-term syndicated loan at maturity, RR may be forced to sell securities from its investment portfolio on short notice, and at unfavorable prices. RR invests in OTC derivatives. RR could be required to liquidate positions prior to expiration at unfavorable prices.
ii. Settlement risk	RR invests in OTC derivatives that involve settlement through the execution of bilateral agreements. The risk is that one party could be in the process of paying the counterparty while the counterparty is declaring bankruptcy. In the case of currency swaps, settlement risk is increased because the contracts often require the exchange of principal in addition to interest payments.

Level III

Question: 7
Topic: Portfolio Management – Risk Management
Minutes: 17

PART B
Template for Question 7-B

Recommend *one* other stress testing method, in addition to stylized scenarios, to effectively supplement VAR.	Explain *one* advantage of this method.
Actual extreme events	Focuses on the portfolio effects of events that have occurred in the past but may have a higher probability than given by the probability model or specific historic time period used in developing the VAR estimate.
Hypothetical events	Focuses on the portfolio effects of events that have not occurred and are assigned a low probability.
Stressing models, including factor push	Emphasizes a range of possibilities and may give insight into the probability of different scenarios, and portfolio sensitivities to various combinations of events.
Stressing models, including maximum loss optimization or worst case scenario analysis	Identifies the risks that are most likely to occur in the worst case and are most important to control.

PART C
Template for Question 7-C

Contract	Identify whether RR or its counterparty bears the credit risk for *each* position. (circle one)	Justify *each* response with *one* reason.
Forward	⬭ Red River ⬭ Counterparty	Based on the comparison between the forward rate 15.00 JPY/ZAR and the spot rate 17.50 JPY/ZAR, the short-yen counterparty (RR) receives the payment, so RR bears the credit risk.

Level III

Question: 7
Topic: Portfolio Management – Risk Management
Minutes: 17

Swap	Red River Counterparty	For Red River, the present value of the liability side of this swap (fixed-leg) is greater than the present value of the asset side of the swap (floating-leg). Therefore, the market value of the swap for RR is negative. The counterparty's market value of the swap is positive, thus subjecting the counterparty to credit risk. The present values of the fixed-leg and floating-leg are: The PV of floating-leg equals 1 (the notional principal) plus the next floating payment discounted by the 2-month factor. PV(floating-leg) =(1+(0.054*(180/360))*0.9911)=**1.0179** The PV(fixed-leg) = ((1+(0.055*(180/360)*0.9911)+ ((1+(0.055*(180/360)))*0.9649)=**1.0187** Therefore the market value of swap to RR equals = 1.0179-1.0187 = (0.0008) Where the PV factors for 2 and 8 months are, respectively: 1/(1+0.0535*(60/360))=0.9911 1/(1+0.0545*(240/360))=0.9649
Call option	Red River Counterparty	Red River is short the call option and is not subject to credit risk. The option is in the money and can be exercised at any time, so the counterparty is subject to credit risk.

Level III

Question: 8
Topic: Portfolio Management – Execution of Portfolio Decisions
Minutes: 14

Reading Reference:
41. "Execution of Portfolio Decisions," Ch. 10, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Ananth Madhavan, Jack L. Treynor, and Wayne H. Wagner (CFA Institute, 2007)

Purpose:
To test principles of execution of portfolio decisions.

LOS: 2008-III-SS #-34-k, l, m
41. "Execution of Portfolio Decisions"
    The candidate should be able to:
    k) describe the suitable uses of major trading tactics, evaluate their relative costs, advantages, and weaknesses, and recommend a trading tactic when given a description of the investor's motivation to trade, the size of the trade, and key market characteristics;
    l) explain the motivation for algorithmic trading and discuss the basic classes of algorithmic trading strategies;
    m) discuss and justify the factors that typically determine the selection of a specific algorithmic trading strategy, including order size, average daily trading volume, bid-ask spread, and the urgency of the order;

Level III

Question: 8
Topic: Portfolio Management – Execution of Portfolio Decisions
Minutes: 14

Guideline Answer:

PART A
Template for Question 8-A

i. Recommend the *best* trading strategy for Brock. (circle one)	Justify the recommended strategy with *two* reasons. Note: A correct justification will cite specific information provided in the case.
Limit order **(Market order)**	1. Brock is anticipating that the press conference scheduled for the next day will diminish the value of information he currently possesses. As such, he must buy the shares quickly. A market order is appropriate because it emphasizes the immediacy of execution.
Principal trade order Crossing networks order	2. The market for Nano stock is liquid and can absorb a large order without a significant price impact. The depth of the market for Nano makes a market order appropriate as there will be little, if any, price concession upon execution.
ii. Recommend the *best* trading strategy for Jordan. (circle one)	Justify the recommended strategy with *two* reasons. Note: A correct justification will cite specific information provided in the case.
Limit order	1. The trade is not urgent. Jordan has six months to liquidate the Jesco position.
Market order	2. Jesco shares are held by institutions which frequently provide liquidity for (electronic) crossing network orders.
Principal trade order **(Crossing networks order)**	3. Anonymity is important since the shares to be liquidated represent 150% of Jesco's average daily volume.

Level III

Question: 8
Topic: Portfolio Management – Execution of Portfolio Decisions
Minutes: 14

PART B
Template for Question 8-B

Recommend the security *best* suited to be purchased using a VWAP strategy. (circle one)	Identify, for *each* of the securities not chosen, *one* trading characteristic that makes it unsuitable to be purchased using a VWAP strategy. Note: A trading characteristic cannot be used more than once.
BDC	Urgency to complete trade: The urgency is high making VWAP unsuitable for BDC.
CHA (circled)	
DPF	Urgency to complete trade: The urgency is high making VWAP unsuitable for DPF. Size of trade relative to average daily volume: The size of the order represents a very high percentage of average daily volume and the VWAP algorithm would not have high likelihood of success. Bid/ask spread: A large volume trade will have a major impact on DPF's price and will not have high likelihood of success with the VWAP algorithm.
ROD	Size of trade relative to average daily volume: The size of the order represents a high percentage of average daily volume and the VWAP algorithm would not have high likelihood of success.

Level III

Question: 8
Topic: Portfolio Management – Execution of Portfolio Decisions
Minutes: 14

PART C
Template for Question 8-C

Recommend the security *best* suited to be purchased using an implementation shortfall strategy. (circle one)	Identify, for *each* of the securities not chosen, *one* trading characteristic that makes it unsuitable to be purchased using an implementation shortfall strategy. **Note: A trading characteristic cannot be used more than once.**
(BDC)	
CHA	Trading volume pattern: Higher volumes toward the end of the day would make a front-loaded implementation shortfall strategy (ISS) less suitable. Urgency to complete trade: The urgency is low making ISS less suitable.
DPF	Trading volume pattern: Higher volumes toward end of day would make front-loaded ISS less suitable. Size of trade relative to average daily volume: The size of the order represents a very high percentage of average daily volume and algorithm would not have high likelihood of success. Bid/ask spread: Large volume trade will have a major impact on price and not have high likelihood of success with algorithm.
ROD	Size of trade relative to average daily volume: The size of the order represents a high percentage of average daily volume and algorithm would not have high likelihood of success. Urgency to complete trade: The urgency is low making ISS less suitable.

Level III

Question: 9
Topic: Portfolio Management – Monitoring and Rebalancing
Minutes: 9

Reading Reference:
42.   "Monitoring and Rebalancing" Ch. 11, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Robert D. Arnott, Terence E. Burns, Lisa Plaxco, and Philip Moore (CFA Institute, 2007) V5 pp 369-370 and A29

Purpose:
To test knowledge of monitoring and rebalancing concepts

LOS: 2007-III-15-42-d, e, h, i, j
42.   "Monitoring and Rebalancing"
       The candidate should be able to:
       d)   discuss the benefits and costs of rebalancing a portfolio to the investor's strategic asset allocation;
       e)   contrast calendar rebalancing to percentage-of-portfolio rebalancing;
       h)   explain the performance consequences, in up, down, and nontrending markets, or (1) rebalancing to a constant mix of equities and bills, (2) buying and holding equities, and (3) constant-proportion portfolio insurance (CPPI);
       i)   distinguish among linear, concave, and convex rebalancing strategies;
       j)   judge the appropriateness of constant mix, buy-and-hold, and CPPI rebalancing strategies when given an investor's risk tolerance and asset return expectations;

Level III

Question: 9
Topic: Portfolio Management – Monitoring and Rebalancing
Minutes: 9

Guideline Answer:

PART A
Template for Question 9-A

	Calculate the portfolio value at the end of the quarter.	**Determine any appropriate rebalancing trades (buy, sell, or no trade of the S&P 500 Index fund). (circle one)**	**Determine the dollar size of the trade, if any.**
i. Grace	End of quarter value: Cash $ 800,000 Equities $1,200,000 * 1.08 = $1,296,000 Total Portfolio = $2,096,000	Buy (Sell) No trade	Constant mix rebalances to original allocation of 60% equities and 40% cash as follows: New portfolio value = $2,096,000 Equity allocation $2,096,000 * 60% = $1,257,600 Current equity allocation $1,296,000 Size of trade $1,257,600 - $1,296,000 = ($38,400) The absolute dollar size of the sale is $38,400.

Level III

Question: 9
Topic: Portfolio Management – Monitoring and Rebalancing
Minutes: 9

ii. Matlin	Initial portfolio value $2,000,000 Initial portfolio allocation Total Value $2,000,000 Less floor $1,000,000 Cushion $1,000,000 Equity Allocation Cushion $1,000,000 multiplier 130% Equity allocation $1,300,000 Cash Allocation $700,000 **End of quarter** End of quarter value: Cash $ 700,000 Equities $1,300,000 * 1.08 = $1,404,000 Total Portfolio = $2,104,000	**Buy** Sell No trade	Current portfolio value $2,104,000 Current portfolio reallocation: Total Value $2,104,000 Less floor $1,000,000 Cushion $1,104,000 Equity Allocation: Cushion $1,104,000 x 130% Equity $1,435,200 Current equity allocation $1,404,000 Size of trade $1,435,200 - $1,404,000 = $31,200 The absolute size of the purchase is $31,200.

Level III

Question: 9
Topic: Portfolio Management – Monitoring and Rebalancing
Minutes: 9

PART B
Template for Question 9-B

Determine whether Matlin's actual return resulting from the rebalancing strategy over the past two years was *most likely* higher, the same, or lower, compared to a buy-and-hold strategy. (circle one)	Justify your response with *one* reason.
Higher The same ~~Lower~~ (circled)	CPPI is a dynamic strategy in which the investor sets a floor value below which he does not wish the portfolio's value to fall. The investor maintains an exposure to equities that is a constant multiple greater than 1 times the cushion (portfolio value minus floor value). The portfolio value minus the equity allocation is invested in cash. As equity values rise (fall), the CPPI strategy requires the investor to buy (sell) additional equities. This strategy performs best in trending (up or down) markets, but does poorly in flat, oscillating markets, especially those characterized by sharp market reversals. Therefore, Matlin's actual return is most likely lower since he sold equities at lower prices and purchased equities at higher prices.

Level III

Question: 10
Topic: Portfolio Management – Performance Evaluation
Minutes: 9

Reading Reference:
43.   "Evaluating Portfolio Performance," Ch. 12 *Managing Investment Portfolios: A Dynamic Process*, 3rd edition, Jeffrey V. Bailey, Thomas M. Richards, and David E. Tierney (CFA Institute, 2007)

Purpose
To test performance evaluation and attribution concepts

LOS: 2008-III-16-43-n, o
43.   "Evaluating Portfolio Performance"
        The candidate should be able to:
        n)   differentiate between the effect of the interest rate environment and the effect of active management on fixed-income portfolio returns;
        o)   explain the management factors that contribute to a fixed-income portfolio's total return and interpret the results of a fixed-income performance attribution analysis;

Level III

Question: 10
Topic: Portfolio Management – Performance Evaluation
Minutes: 9

Guideline Answer:

PART A

i.   Sullivan's outperformance is not consistent with its strategy. Other Management Effects consist of three components – sector/quality effects, security selection and transaction costs. These components generated a negative return as indicated by the -0.12% return in Other Management Effects. Sullivan's outperformance resulted from Interest Rate Management (0.05%) and Trading Activity (0.15%).

ii.   Paolello's outperformance is consistent with its strategy. The Interest Rate Management Effect (returns due to duration, convexity, and yield-curve shape change) generated an excess return of 0.58% vs. the Bond Portfolio Index. Other Management Effects and Trading Activities Return contributed to Paolello's outperformance but were not as significant.

PART B

i.   The expected interest rate effect of 5.76% is the expected return of the portfolio based on the implied forward rates in the term structure of Treasury securities calculated at the beginning of the period.

ii.   The unexpected interest rate effect of 2.53% is the difference between the actual realized return of the portfolio and the expected interest rate effect. A positive unexpected interest rate effect is consistent with unexpected falling yields or a favorable twist in the yield curve resulting in rising prices over the time period.

Level III

Question: 11
Topic: Portfolio Management – Global Context
Minutes: 9

Reading Reference:
"Currency Risk Management," Ch. 11, *International Investments,* 5th edition, Bruno Solnik and Dennis McLeavey (Addison Wesley, 2003)

Purpose:
To test global aspects of currency risk management.

LOS: 2008-III-17-46-a
46.   "Currency Risk Management"
        The candidate should be able to:
        a) demonstrate and explain the use of foreign exchange futures to hedge the currency exposure associated with the principal value of a foreign investment;

Level III

Question: 11
Topic: Portfolio Management – Global Context
Minutes: 9

Guideline Answer:

PART A

- The Tanaka fund value decreases when the Yen strengthens. In order to fully hedge the currency exchange rate moves, the manager must *sell* dollar futures contracts and *sell* euro futures contracts.

- The appropriate number of contracts required to fully hedge exchange rate risk is a function of the principal value being hedged and the futures contract size. A full hedge would require $900,000,000/$100,000 = **9,000** dollar contracts and €700,000,000/€100,000 = **7,000** euro contracts.

PART B
The international return
$945/$900 -1 = 5% Dollar Return
€735/€700 -1 = 5% Euro Return

The unhedged return in Yen

Return on the unhedged portfolio in Yen (¥ millions)

Date	Dollar Investments	Euro Investments	Total Portfolio
1 July 2008	¥104,310 ($900 x 115.90)	¥109,025 (€700 x 155.75)	¥213,333
1 September 2008	¥104,800.50 ($945 x 110.90)	¥106,391.25 (€735 x 144.75)	¥211,191.75
Profit / (Loss)	¥490.50	(¥2,633.75)	(¥2,141.25)
	0.47%	-2.42%	-1.00%

(¥2,141.25) / ¥213,333 = -1.00% or a 1% loss

Level III

Question: 11
Topic: Portfolio Management – Global Context
Minutes: 9

The hedged return

Futures returns in Yen (¥ millions):
Yen Gain/(Loss) on $ futures = (115.70 - 110.77) x 900 =   4.93 x 900 = **¥ 4,437**
Yen Gain/(Loss) on € futures = (156.70 - 144.80) x 700 = 11.90 x 700 = **¥ 8,330**

Hedged Yen return = Unhedged Yen return + Futures returns in Yen (¥ millions)

Return on the hedged portfolio in Yen (¥ millions)

	Dollar Investments	Euro Investments	Total Portfolio
Unhedged Return	¥490.50	(¥2,633.75)	(¥2,141.25)
Futures Return	¥4,437.00	¥8,330.00	¥12,767.00
Profit / (Loss)	¥4,927.50	¥5,696.25	¥10,625.75
	4.72%	5.22%	4.98%

Since Saturn's objective was to fully hedge the fund's currency risk, the hedge was very effective. The hedged return of 4.98% is close to the 5.00% from the US and European portfolios before accounting for currency effects.