2018

CFA® EXAM REVIEW

MORNING SESSION

LEVEL III CFA®

MOCK EXAM 1

WILEY

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Level III Mock Exam A
Morning Session: Questions

The Morning Session of this Level III CFA® mock exam has 11 questions. For grading purposes, the maximum point value for each question is equal to the number of minutes allocated to the question.

Question	**Topic**	**Minutes**
1	Portfolio Management—Individual	23
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3	Portfolio Management—Individual/Behavioral	14
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7	Portfolio Management—Risk Management	15
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9	Portfolio Management—Fixed Income	12
10	Portfolio Management—Equity	16
11	Portfolio Management—Monitor/Rebalance/Execution	16
	Total	**180**

Morning Session

Question 1

Question 1 has four parts for a total of 23 minutes

Part A

Stephan and Lelia Jackson are both 41 years old, with two young children aged 2 and 6 months.

Stephan is an information technology (IT) contractor who earns a current pretax annual income of \$225,000. A majority of the contracts that Stephan engages in are short-term contracts for financial services companies, and as such his earnings are highly related to stock markets. Lelia, having been in the same line of work as Stephan with the same levels of income, has recently retrained as a schoolteacher. She has started a new job, with a current secure salary of \$62,000. Current living expenses of the family are \$103,000 per year. Both income and expenses are expected to increase in line with inflation.

The Jacksons intend to work until their children go to college in approximately 18 years' time, at which point they hope to have enough funds to provide for the tuition fees of the children and for their own retirement. They estimate that tuition fees will be \$100,000 for each child and that they will require funds of \$2 million to provide for their retirement, both stated in real terms.

The Jacksons own a residence valued at \$1 million, with a mortgage of \$225,000 against the property. Mortgage payments are fixed at \$1,000 per month, a figure that has been included in annual living expenses given above. They are making improvements to the property over the next year, which they estimate will cost \$310,000. They have a taxable investment portfolio with a current market value of \$455,000.

The tax rate on all income and investment returns is 30%. The inflation rate is expected to be 2% per year.

A. **State** the return objective portion of the Jackson's investment policy statement (IPS). **Calculate** the Jackson's required average pretax nominal required rate of return from their investment portfolio. **Show** your calculations.

(10 minutes)

Part B

B. **Discuss** two factors specific to the Jackson's situation that increase their ability to take risk.

(4 minutes)

Part C

C. Considered individually, and based *only* on the nature of their human capital, **determine** whether a high allocation to fixed income would be *more* appropriate for either Stephan or Lelia. Briefly **justify** your response with *one* reason.

(3 minutes)

Part D

Ten years have passed, and due to a decade of poor performance in equity markets, the Jacksons' portfolio has failed to meet the pretax nominal required return calculated in part A. Earnings of both Stephan and Lelia have developed as expected; however, Stephan is now also changing employment and moving from IT contracting into school teaching.

D. **Discuss** how *each* of the following investment constraints have changed for the Jacksons:

   i. Time horizon
   ii. Liquidity needs

   State how the changes in the investment constraints are likely to impact the Jacksons' level of risk tolerance.

Note: No calculations are required for part D.

(6 minutes)

Answer Question 1-A on This Page

A. **State** the return objective portion of the Jackson's investment policy statement (IPS). **Calculate** the Jackson's required average pretax nominal required rate of return from their investment portfolio. **Show** your calculations.

Answer Question 1-B on This Page

B. **Discuss** two factors specific to the Jackson's situation that increase their ability to take risk.

Answer Question 1-C on This Page

C. Considered individually, and based *only* on the nature of their human capital, **determine** whether a high allocation to fixed income would be *more* appropriate for Stephan or Lelia. Briefly **justify** your response with *one* reason.

Answer Question 1-D on This Page

D. **Discuss** how *each* of the following investment constraints have changed for the Jacksons:

i. Time horizon

ii. Liquidity needs

Question 2

Question 2 has four parts for a total of 22 minutes

Part A

Lelia Jackson has two parents, George and Enid Cooper, who are 90 and 85 years old, respectively, and in good health.

The Coopers have approached an estate planning consultant, Ben Holt, to discuss the most efficient arrangements for inheritance of their estate.

The Coopers reside in a retirement home, having sold their family home 10 years ago. On the sale of the property, they used part of the proceeds to purchase a whole life annuity of $15,000 after tax each year. George is a participant in a defined benefit pension plan from his previous employer, which pays him $30,000 annually after taxes. Annual expenses of the Coopers, including the fees of the retirement home, are $85,000. All income and expenses are expected to remain stable. The Coopers have an investment portfolio valued at $1 million that is being used to meet the shortfall of their income versus expenses.

Holt has asked an actuary to provide a table of mortality probabilities for the Coopers, an extract from which is shown in Exhibit 1.

Exhibit 1
Extract from Mortality Probabilities for the Coopers

	George		**Enid**	
Year	**Age**	***p*(survival)**	**Age**	***p*(survival)**
1	91	0.9245	86	0.9888
2	92	0.8367	87	0.9443
3	93	0.7614	88	0.9065
4	94	0.6967	89	0.8748
5	95	0.6409	90	0.8486
Real Risk-Free Rate			2%	
Expected Inflation			2%	

A. **Calculate** the capitalized value of the core capital spending needs of the Coopers over the next two years. **Show** your calculations.

(4 minutes)

Part B

George Cooper has had two previous marriages that have ended acrimoniously, with Cooper paying large divorce settlements. He wishes to protect his estate from future claims by his ex-wives.

He is also keen to explore tax-efficient transfer of wealth to the grandchildren. Given the young age of the grandchildren, Cooper is keen to ensure responsible stewardship of any assets transferred in a tax-favorable environment until they are aged 21. At this point, Cooper wishes for the assets to be distributed in the most tax-efficient manner given the circumstances of the grandchildren at the time. He is also keen that the trust assets are protected should the grandchildren experience any claims against their assets from future ex-spouses. Cooper does not trust his daughter and her husband to provide this responsible stewardship due to Stephan having a history of gambling addiction.

Holt suggests establishing a trust offshore in a favorable tax environment to meet his planning needs.

Answer Question 2-B in the Template Provided.

B. **Determine** which of the following types of trust structure would be *more likely* to meet the planning needs of Cooper:

i. Revocable trust versus irrevocable trust

ii. Fixed trust versus discretionary trust

Justify your choices with *two* reasons for each choice.

(10 minutes)

Part C

Holt also recommends that the Coopers consider generation skipping as an estate planning strategy, with the Coopers paying the gift taxes incurred on the transfer.

C. **Identify** *three* reasons why generation skipping with the donor paying the gift taxes is an appropriate strategy for the Coopers.

(6 minutes)

Part D

Twenty-five years have passed. The Coopers did establish an offshore trust in a favorable tax environment, and the grandchildren, now adults, are receiving distributions from the trust. Due to changes in international tax regimes, the location of the trust now applies tax at source on distribution from the trust of 10%, while the residence of the grandchildren applies a tax of 20% on worldwide income. The residence country provides relief from double taxation using the exemption method.

D. **Calculate** the effective tax rate paid by the grandchildren on distributions from the trust. **Show** your calculations.

(2 minutes)

Answer Question 2-A on This Page

A. **Calculate** the capitalized value of the core capital spending needs of the Coopers over the next two years. **Show** your calculations.

Answer Question 2-B on This Page

Determine which of the following types of trust would be *more likely* to meet the planning needs of Cooper. (Circle one)	**Justify your choices with *two* reasons for each choice.**
Revocable trust versus irrevocable trust	
Fixed trust versus discretionary trust	

Answer Question 2-C on This Page

C. **Identify** *three* reasons why generation skipping with the donor paying the gift taxes is an appropriate strategy for the Coopers.

Answer Question 2-D on This Page

D. **Calculate** the effective tax rate paid by the grandchildren on distributions from the trust. **Show** your calculations.

Question 3

Question 3 has two parts for a total of 14 minutes

Part A

The Jacksons turn to financial adviser Jhan Murphy for advice on their financial situation.

In the Jacksons' first meeting with Murphy, they discuss their outlook on investing. Four comments from the meeting are shown in Exhibit 1.

Exhibit 1
Selected Comments Made in the Jacksons–Murphy Meeting

Comment Number	Speaker	Comment
1	Stephan	"I don't know how people could have invested properly before the Internet and 24-hour financial news channels. There's not a single investment idea in my portfolio that has not originated from these outlets, and I couldn't invest without them."
2	Stephan	"I only invest in riskier assets with money that I can afford to lose. I don't gamble with funds earmarked for my current lifestyle or my kids' education."
3	Lelia	"The recent market turmoil has been difficult. All the gains that I have made and locked in over the last year have been wiped out by a couple of investments that have turned bad in the last month."
4	Lelia	"If I started with a blank piece of paper and wrote down my best ideas, I'm not sure I'd write down the portfolio that I hold today. However, I do know a lot about the stocks I hold, so I'm probably doing the best thing holding on to them."

Murphy is concerned that the Jacksons may not be able to meet their required return objectives. He also suspects that the Jacksons are exhibiting a range of cognitive and emotional behavioral biases, in particular:

- Endowment
- Mental accounting
- Availability

Answer Question 3-A in the Template Provided.

A. **Identify** the comment that *best* illustrates *each* of the behavioral biases suspected by Murphy. **Justify** *each* response with *one* reason.

(9 minutes)

Part B

B. **Recommend** whether Murphy should primarily attempt to moderate Stephan's biases or adapt his recommendations to better reflect Stephan's biases. **Justify** your response with *two* reasons.

(5 minutes)

Answer Question 3-A on This Page

Behavioral Bias	Identify the comment that *best* illustrates *each* of the behavioral biases suspected by Murphy. (Circle the comment number from Exhibit 1.)	Justify each response with one reason.
Endowment	1 2 3 4	
Mental accounting	1 2 3 4	
Availability	1 2 3 4	

Answer Question 3-B on This Page

B. **Recommend** whether Murphy should primarily attempt to moderate Stephan's biases or adapt his recommendations to better reflect Stephan's biases. **Justify** your response with *two* reasons.

Question 4

Question 4 consists of four parts for a total of 19 minutes

Part A

Guy Boutin is a portfolio manager of a defined benefit pension scheme of a major French retail company, Larette S.A.

The company has been historically generous with its pension provision, promising inflation-linked final salary benefits to its staff. However, in line with many companies, it has recently decided to close this pension plan to new participants. After some months of negotiation with the labor unions, this situation has been resolved, and new employees will participate only in the defined contribution scheme of the company. The directors of Larette were pleased that the unions also accepted a reduction in flexibility of the scheme. Unlike most comparable large companies, benefits cannot be taken early. The retirement age for the plan is 61 for both men and women.

In France, assets held in the pension fund are legally separate from the company. They are managed by pension fund trustees, who are legally obliged to consider the best interests of the beneficiaries of the fund. For actuarial purposes the assumed long-term rate of return on plan assets is 6%. The discount rate applied to the fund's assets is 5%. Larette directors believe that the fund should aim for a 7.5% return to reduce the contributions the company has to make to the fund and release more cash to invest in the company's online operations. The trustees take the view that the fund should aim to build up a small surplus by exceeding the required return by 50 basis points (bps).

Boutin conducts an analysis of the situation of Larette and the Larette pension plan (LPP) compared to other major French companies with defined benefit schemes in the CAC 40, an equity index of France's largest capitalized companies. His findings are shown in Exhibit 1.

Exhibit 1
French Defined Benefit Schemes Company Data

	Workforce Average Age	Workforce Average Service Length (years)	Retired Lives to Active Lives Ratio	Pension Fund Status	Correlation Coefficient of Plan Assets to Business	Debt/ Equity Ratio	% Held in Govt Bonds
Larette	39	9	0.58	Fully funded	0.45	0.74	80
CAC 40 average	43	13	0.75	Deficit	0.39	0.86	75

A. **State** *four* factors that would lead to LPP fund having a higher risk tolerance than the average CAC 40 company. **Support** your response with reasons from the scenario, explaining why they would impact the risk tolerance.

(8 minutes)

Part B

B. **Calculate** the required return for LPP. Show your calculations.

(3 minutes)

Part C

Answer Question 4-C in the Template Provided.

C. **Formulate** the following two constraints for LPP. Support each answer with *two* reasons from the scenario.

i. Liquidity
ii. Time horizon

(6 minutes)

Part D

D. The trustees are considering whether the current actuarial assumptions are appropriate. If the discount rate applied to the fund liabilities was increased, how might this affect the plan's ability to take risk? **Explain** your answer.

(2 minutes)

Answer Question 4-A on This Page

A. **State** *four* factors that would lead to LPP fund having a higher risk tolerance than the average CAC 40 company. **Support** your response with reasons from the scenario, explaining why they would impact the risk tolerance.

Answer Question 4-B on This Page

B. **Calculate** the required return for LPP. Show your calculations.

Answer Question 4-C on This Page

Constraint	**Formulate the following two constraints for the Larette pension plan (LPP). Support each answer with *two* reasons from the scenario.**
Liquidity	
Time horizon	

Answer Question 4-D on This Page

D. The trustees are considering whether the current actuarial assumptions are appropriate. If the discount rate applied to the fund liabilities was increased, how might this affect the plan's ability to take risk? **Explain** your answer.

Question 5

Question 5 consists of two parts for a total of 13 minutes

Part A

Southern Regional Bank (SRB) is a small regional U.S. retail bank offering a range of traditional banking products and services to local individuals and corporations.

An executive summary of balance sheet data and relevant information for SRB for the current period and five years ago is presented in Exhibit 1.

Exhibit 1
SRB Balance Sheet Data and Relevant Information

	5 Years Ago	Now
Assets		
Cash	5	10
Commercial loans and mortgages (medium maturity)	100	220
Personal loans and residential mortgages (long maturity)	200	101
Securities portfolio	100	139
PPE	20	30
Other	75	95
Total Assets	500	595
Liabilities and Equity		
Demand deposits	315	133
Time deposits (average 4 years)	112	375
Other	15	2
Equity capital	58	85
Total Liabilities and Equity	**500**	**595**
Average yield on earning assets	5.5%	5.1%
Average cost of interest-bearing liabilities	3.5%	2.1%

Extracts from the Management Discussion and Analysis section of the most recent set of financial accounts of the bank are displayed in Exhibit 2.

Exhibit 2
SRB Management Discussion and Analysis Disclosures

Management Comments
"We have greatly increased the use of collateralized debt obligations and asset-backed securities in recent years, which has markedly improved our ability to divest loans from the balance sheet."
"Due to the interest rate and competitive environments, the opportunities that we are seeing in our loan business will involve making loans to borrowers of lower credit quality in the future."
"Regulatory conditions continue to tighten, with pledging requirements increasing for all depositary institutions."
"Loan demand has been increasing due to a robust economy, and we expect this trend to continue."

The board also states the overall risk tolerance level of the bank as a commercial entity has not changed over the past five years. With regard to our view on interest rate rates, five years ago we were confident that interest rates would fall, and this turned out to be a correct view. While we still believe interest rates have farther to fall, we have less confidence in that view and have altered our leverage-adjusted duration gap accordingly.

A. **Describe** how the changes in the composition of the balance sheet outlined in Exhibit 1 are *most likely* to have changed the leverage-adjusted duration gap of the bank. **Explain** whether this change is consistent with the management view on interest rates.

Note: No calculations required.

(5 minutes)

Part B

Answer Question 5-B in the Template Provided.

B. **Evaluate** the effect (higher, lower, unchanged) of *each* of the management comments in Exhibit 2 on the ability to take risk in the bank's securities portfolio. **Justify** *each* response with *one* reason.

(8 minutes)

Answer Question 5-A on This Page

A. **Describe** how the changes in the composition of the balance sheet outlined in Exhibit 1 are *most likely* to have changed the leverage-adjusted duration gap of the bank. **Explain** whether this change is consistent with the management view on interest rates.

Answer Question 5-B on This Page

Management Comment	Evaluate the effect (higher, lower, unchanged) of *each* of the management comments in Exhibit 2 on the ability to take risk in the bank's securities portfolio. (Circle one)	Justify *each* response with *one* reason.
"We have greatly increased the use of collateralized debt obligations and asset-backed securities in recent years, which has markedly improved our ability to divest loans from the balance sheet."	Higher Lower Unchanged	
"Due to the interest rate and competitive environments, the opportunities that we are seeing in our loan business will involve making loans to borrowers of lower credit quality in the future."	Higher Lower Unchanged	
"Regulatory conditions continue to tighten, with pledging requirements increasing for all depositary institutions."	Higher Lower Unchanged	
"Loan demand has been increasing due to a robust economy, and we expect this trend to continue. Expected returns on new loans exceed returns in the securities portfolio."	Higher Lower Unchanged	

Question 6

Question 6 has three parts for a total of 18 minutes

Part A

Patrick Sprague, CFA, is a multiasset global portfolio manager for Anchor Investments, Inc. Sprague is reviewing recent macroeconomic forecasts for the stock market of a country called Katonia, and collects the following economic forecasts from the reports of the central bank.

1. "A slowdown in emerging markets is likely to lead to consumer prices remaining subdued and maybe even a period of deflation."
2. "Recent turbulence in credit markets has led to companies turning to equity markets to bolster their balance sheets. As this turbulence subsides, we expect the rate of issuance of shares to decrease."
3. "The central bank will continue to do whatever it takes to support asset prices, as we deem this to be a central pillar to market confidence. As such, asset buying programs will be expanded and will be extended for the first time to the equity market with the open intention of raising stock market prices."

Answer Question 6-A in the Template Provided.

A. **Determine** which component of the Grinold Kroner Model (income, earnings growth, or repricing) is *most likely* to be affected by *each* forecast. **State** how the component is *most likely* to change (higher or lower). Briefly **justify** *each* response with *one* reason.

Note: Consider *each* expected change independently

(9 minutes)

Part B

Wolfram Alef, a member of Sprague's research team, suggests that the firm should consider using the Cobb-Douglas production function to model growth in real output of the Katonian economy. Alef makes the following two statements:

1. "The Cobb-Douglas function is often assumed to exhibit constant returns to scale. This means that a given increase in capital stock or labor input results in an equal percentage increase in output."
2. "As with most modernizing economies, the divorce rate and number of single-parent households has led to an uptick in household formation and will likely continue to increase. Under the Cobb-Douglas framework, this is likely to increase total national production in the intermediate term."

Answer Question 6-B in the Template Provided.

B. **Determine** whether Alef is correct or incorrect for *each* of his two statements about the Cobb-Douglas production function. Briefly **justify** *each* response with *one* reason.

(6 minutes)

Part C

Sprague has been using the Fed model to assess the valuation of equity markets relative to other assets. Alef suggests that the Yardini model may be a better model to use, and presents Sprague with the data in Exhibit 1.

Exhibit 1
Inputs to the Yardini Model for the Katonian Market

Corporate bond yield	5.46%
Forecast long-term earnings growth rate	8.50%
Forward earnings yield of equity market	7.25%
Weighting factor for earnings projections ("d")	0.05

C. **Determine**, based on the data in Exhibit 1, if the Katonian equity market is overvalued, fairly valued, or undervalued according to the Yardini model. **Show** your calculations.

(3 minutes)

Answer Question 6-A on This Page

Forecast	Determine which component of the Grinold Kroner Model is *most likely* to be affected by *each* forecast.	State how the component is *most likely* to change (higher or lower).	Briefly justify *each* response with *one* reason.
"A slowdown in emerging markets is likely to lead to consumer prices remaining subdued and maybe even a period of deflation."		Higher Lower	
"Recent turbulence in credit markets has led to companies turning to equity markets to bolster their balance sheets. As this turbulence subsides, we expect the rate of issuance of shares to decrease."		Higher Lower	
"The central bank will continue to do whatever it takes to support asset prices, as we deem this to be a central pillar to market confidence. As such, asset buying programs will be expanded and will be extended for the first time to the equity market, with the open intention of raising stock market prices."		Higher Lower	

Answer Question 6-B on This Page

Forecast	Determine whether Alef is correct or incorrect for *each* of his two statements about the Cobb-Douglas production function.	Briefly justify *each* response with *one* reason.
"The Cobb-Douglas function is often assumed to exhibit constant returns to scale. This means that a given increase in capital stock or labor input results in an equal percentage increase in output."	Correct Incorrect	
"As with most modernizing economies, the divorce rate and number of single-parent households has led to an uptick in household formation and will likely continue to increase. Under the Cobb-Douglas framework, this is likely to increase total national production in the intermediate term."	Correct Incorrect	

Answer Question 6-C on This Page

C. **Determine**, based on the data in Exhibit 1, if the Katonian equity market is overvalued, fairly valued, or undervalued according to the Yardini model. **Show** your calculations.

Question 7

Question 7 has four parts for a total of 15 minutes

Part A

Scarlet Zombub, CFA, has recently taken a role in the risk management function of Ceres Asset Management (CAM), an investment management firm. In line with best practice, the risk management department is centralized and as a result the team is expected to be familiar with the different risks affecting the various business areas of the firm.

Zombub is asked to prepare a figure for weekly value at risk (VaR) using CAM's daily returns data. The method the firm uses is the historic variance-covariance approach. She is provided with the information displayed in Exhibit 1.

Exhibit 1
CAM Daily Returns Data

Average historic daily return	0.028%
Average historic daily risk (standard deviation)	0.9%
Expected daily return	0.035%
Expected daily risk (standard deviation)	0.98%
Two-tailed 95% Z score	1.96
One-tailed 95% Z score	1.65
Total equity investments	£750 million

A. **Calculate** the weekly 95% VaR, assuming there are five working days in a week. **Show** your calculations.

(4 minutes)

Part B

One of Zumbob's colleagues states that historical variance-covariance VaR is the most appropriate method for a long-only equity fund, given that there is no exposure to options positions and hence there is no skew. He remarks that the markets have been relatively stable recently and that returns have conformed closely to the normal distribution.

B. Using the example of this long-only equity fund, **discuss** *two* limitations of using the historical variance-covariance method of calculating VaR.

(4 minutes)

Part C

Zombub is asked to provide practical suggestions to Paulo Brench, a fund manager who engages in over-the-counter (OTC) derivative positions. He is already using exposure limits to reduce the risk of too large a position with one counterparty. He does not wish to use credit derivatives, as he considers them too expensive.

C. **State** *two* practical methods that would provide Brench with protection against credit risk in OTC derivative positions.

(2 minutes)

Part D

Zombub moves on to looking at the risk exposures of a broadly diversified fixed income portfolio. The fund has a core investment in treasury securities, along with AA-rated or higher corporate bonds. The fund manager believes that the mortgage-backed securities (MBS) market is undervalued due to investors being wary of the sector since the financial crisis of 2007–2008 and therefore has placed a significant portion of the fund into this sector. Zombub feels that the historic variance-covariance method is not appropriate for this fund.

D. **Recommend** an alternative method for calculating VaR and give *two* reasons why you believe it to be superior to historical variance-covariance.

(5 minutes)

Answer Question 7-A on This Page

A. **Calculate** the weekly 95% VaR, assuming there are five working days in a week. **Show** your calculations.

Answer Question 7-B on This Page

B. Using the example of this long-only equity fund, **discuss** *two* limitations of using the historical variance-covariance method of calculating VaR.

Answer Question 7-C on This Page

C. **State** *two* practical methods that would provide Brench with protection against credit risk in OTC derivative positions.

Answer Question 7-D on This Page

D. **Recommend** an alternative method for calculating VaR and give *two* reasons why you believe it to be superior to historical variance-covariance.

Question 8

Question 8 has three parts for a total of 12 minutes.

Anton Cote is an investment advisor for high net worth clients. He uses goals-based asset allocation for his clients since he believes this has better outcomes both in terms of communication with the client and maximizing the probability that the client's goals are understood and met.

Cote meets with a new client, Sia Huang, who has recently transferred her account to Cote, having had unsatisfactory performance with her previous advisor, who used traditional asset allocation techniques, primarily mean-variance optimization (MVO).

Cote sets about ascertaining the goals of Huang. Huang is a 45-year-old successful entrepreneur who has a current portfolio worth $20 million. She lists the two goals presented in Exhibit 1:

Exhibit 1
Goals of Sia Huang

Goal 1:
"The most important goal I have is the need to provide for a standard of living in retirement that matches my current standard of living. I am targeting a retirement fund asset value of $15 million in 15 years' time to achieve this."

Goal 2:
"A secondary goal is a desire to create a family foundation when I retire, which I wish to fund with $5 million."

Cote uses a goals-based asset allocation system that allocates a required probability of success of 95% for goals described as "needs" and 75% for goals described as "desires."

Cote uses four sub-portfolio modules for his goals-based asset allocation. The expected returns and expected volatilities of the portfolios are displayed in Exhibit 2, along with the annualized minimum expected returns for these modules over a 15-year time horizon for different levels of required success.

Exhibit 2
Sub-Portfolio Modules under Different Probability Scenarios for 15-Year Investment Horizon

	Module			
	A	**B**	**C**	**D**
Portfolio Characteristics				
Expected return	4.2%	6.5%	7.3%	8.0%
Expected volatility	2.8%	5.0%	7.2%	10.0%
	Annualized Minimum Expected Returns			
Time Horizon (years)		**15**		
Required Success				
99%	2.8%	3.1%	3.1%	2.6%
95%	3.4%	4.0%	4.5%	4.6%
90%	3.7%	4.5%	5.5%	5.8%
75%	4.0%	5.1%	6.3%	6.9%

Cote has determined that any excess capital in the portfolio not required to meet Goals 1 and 2 should be held in module C.

A. Using the data in Exhibit 2, **calculate** the optimal allocation, rounded to the nearest whole percent, to modules A, B, C, and D that should be made by Cote to best meet the goals of Huang as described in Exhibit 1. **Show** your calculations.

(6 minutes)

Huang, intrigued by the techniques used by Cote, is interested in what drove Cote to use goals-based asset allocation techniques instead of tradition MVO techniques.

B. **State** two common criticisms of mean-variance optimization.

(2 minutes)

Huang has been told by a fellow investor that an alternative to traditional MVO is an asset allocation process referred to as "risk parity." She asks Cote if he uses such techniques, and Cote makes the following two statements:

Statement 1:
"A risk-parity asset allocation is based on the idea that each asset class should contribute equally to the total risk of a portfolio to be well diversified. As such, optimal weights are determined to be those weights that set the marginal contribution to risk of each asset class in the portfolio to be the same."

Statement 2:
"Risk-parity portfolios tend to give higher weights to lower-risk assets than portfolios derived from traditional MVO techniques."

Answer question 8-C in the template provided.

C. **Determine** whether Cote is correct or incorrect for *each* of his two statements about risk-parity-based asset allocation. If the statement is deemed incorrect, briefly **justify** *why* the comment is incorrect.

(4 minutes)

Answer Question 8-A on This Page

A. Using the data in Exhibit 2, **calculate** the optimal allocation to modules A, B, C, and D that should be made by Cote to best meet the goals of Huang as described in Exhibit 1. **Show** your calculations.

Answer Question 8-B on This Page

B. **State** two common criticisms of mean-variance optimization.

Answer Question 8-C on This Page

Statement	**Determine whether Cote is correct or incorrect for *each* of his two statements about risk-parity-based asset allocation. (Circle one.)**	**If the statement is deemed incorrect, briefly justify *why* the comment is incorrect.**
Statement 1: "A risk-parity asset allocation is based on the idea that each asset class should contribute equally to the total risk of a portfolio to be well diversified. As such, optimal weights are determined to be those weights that set the marginal contribution to risk of each asset class in the portfolio to be the same."	Correct Incorrect	
Statement 2: "Risk-parity portfolios tend to give higher weights to lower-risk assets than portfolios derived from traditional MVO techniques."	Correct Incorrect	

Question 9

Question 9 has four parts for a total of 12 minutes.

Louise Guidwife is a fixed-income portfolio manager for Verridge Advisers LLC. She is considering how to position her current portfolio valued at £100 million in order to profit from her view that the UK yield curve is likely to steepen and become less curved. She has identified three potential portfolios (A, B, C) of option-free UK fixed-income securities of similar credit quality and liquidity. The key-rate partial PVBPs of these portfolios are displayed in Exhibit 1:

Exhibit 1
Key Rate Durations: Portfolios Considered by Guidwife

Key Rate PVBPs	Total	1 Year	2 Year	3 Year	5 Year	10 Year	20 Year	30 Year
Portfolio A	0.077	0	0.0086	0.0103	0.0156	0.0157	0.0044	0.0221
Portfolio B	0.077	0	0.0126	0.007	0.0104	0.0149	0.0048	0.0268
Portfolio C	0.077	0	0.0046	0.0136	0.0208	0.0165	0.004	0.0174

A. Using the data in Exhibit 1, **determine** which portfolio, A, B, or C, should be selected by Guidwife given her market view. Briefly **justify** your choice. (Note: No calculations are required.)

(3 minutes)

Guidwife elects to invest all £100 million of her portfolio into Portfolio A. The par value of the total portfolio is £99 million. Shortly after this allocation, the UK yield curve undergoes the curve change displayed in Exhibit 2:

Exhibit 2
UK Yield Curve Change

Yield Curve Change			
Maturity	Beginning Curve	Ending Curve	Curve Shift (bps)
2 Year	0.822	0.872	5.0
3 Year	0.993	1.043	5.0
5 Year	1.351	1.401	5.0
10 Year	1.655	1.705	5.0
20 Year	1.941	1.991	5.0
30 Year	2.768	2.558	–21.0

B Using the data in Exhibit 2, **describe** the yield curve shape change that has taken place. Given this change in the yield curve, and using the data in Exhibit 1, **judge** whether Guidwife made the correct portfolio choice in picking Portfolio A. If Portfolio A is judged to be an incorrect choice, **state** which portfolio would have been more appropriate. (Note: No calculations are required.)

(4 minutes)

C. Using the data in Exhibits 1 and 2, **calculate** the expected portfolio impact (in £) due to the change in rates at the 10-year maturity. **Show** your calculations.

(3 minutes)

Guidwife comes across some research on yield curve strategies called butterfly spreads, and is interested to learn that they can be used to profit from yield curve views such as the one she currently holds.

D. **Describe** how to construct a butterfly trade by combining long and short positions in Portfolios A, B, and C in Exhibit 1 in order to profit from Guidwife's original view that the UK yield curve would steepen and become less curved. (Note: No calculations are required.)

(2 minutes)

Answer Question 9-A on This Page

A. Using the data in Exhibit 1, **determine** which portfolio, A, B, or C, should be selected by Guidwife given her market view. Briefly **justify** your choice. (Note: No calculations are required.)

Answer Question 9-B on This Page

B. Using the data in Exhibit 2, **describe** the yield curve shape change that has taken place. Given this change in the yield curve, and using the data in Exhibit 1, **judge** whether Guidwife made the correct portfolio choice in picking Portfolio A. If Portfolio A is judged to be an incorrect choice, **state** which portfolio would have been more appropriate. (Note: No calculations are required.)

Answer Question 9-C on This Page

Answer Question 9-D on This Page

D. **Describe** how to construct a butterfly spread by combining long and short positions in Portfolios A, B, and C in Exhibit 1 in order to profit from Guidwife's original view that the UK yield curve would steepen and become less curved. (Note: No calculations are required.)

Question 10

Question 10 has four parts for a total of 16 minutes

Part A

Andrew Laidlaw, CFA is chief investment officer of the pension fund of NOM A.G., a listed Swiss sports equipment manufacturer.

One of Laidlaw's outside managers for the U.S. equity portion of the portfolio is Western Alpha Advisers (WAA). WAA was hired to run the U.S. large-cap value component of the pension fund's equity allocation on an active basis.

Laidlaw can see from fund reports that WAA has remained 100% invested in U.S. stocks. He performs a returns-based style analysis (RBSA) using regressions of three years of monthly data with the following benchmarks as independent variables:

- USLCG Index (U.S. Large-Cap Growth Index)
- USLCV Index (U.S. Large-Cap Value Index)
- USMSCG Index (U.S. Mid/Small-Cap Growth Index)
- USMSCG Index (U.S. Mid/Small-Cap Growth Index)

The outputs of the RBSA are displayed in Exhibits 1, 2, and 3.

Exhibit 1
Returns-Based Style Analysis: Effective Style as of December 31, 2015

Index	Coefficient
USLCG	30%
USLCV	65%
USSCG	0%
USSCV	5%
R-squared	0.91

Exhibit 2
Rolling Style Chart, June 30, 2005, to December 31, 2015

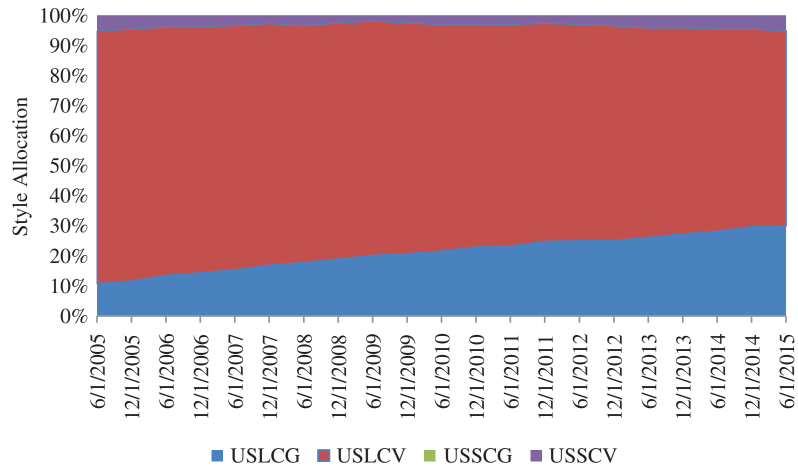
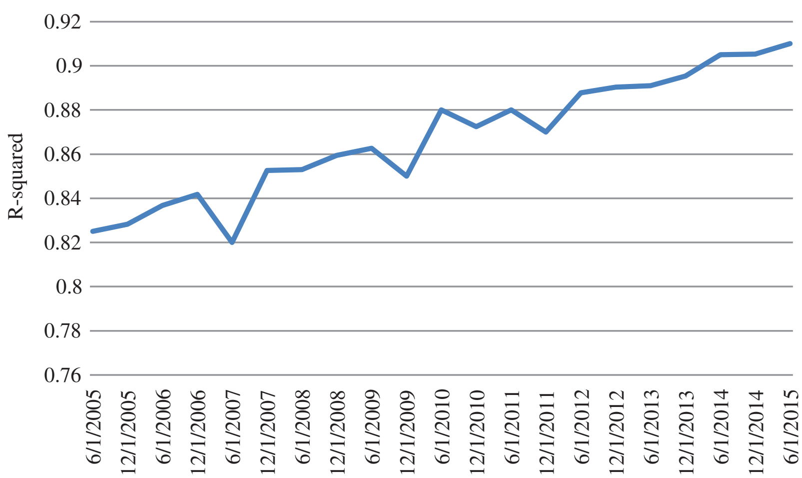


Exhibit 3
Rolling Style Fit, June 30, 2005, to December 31, 2015



A. The independent variables used in a returns-based style analysis should have *three* important features. **State** these three features, and **discuss** briefly how the indices selected by Laidlaw meet these characteristics.

(6 minutes)

Part B

B. Using the data in Exhibit 1 *only,* **state** and **justify** whether the WAA product in which NOM is invested is currently accurately described as an active U.S. large-cap value active equity product. If the current labeling of the fund is inappropriate, **state** a more appropriate label.

(4 minutes)

Part C

C. Using the data in Exhibits 2 and 3, **recommend** two questions that Laidlaw should address to the managers of WAA regarding their historical style.

(4 minutes)

Part D

Laidlaw is also keen to perform a holdings-based style analysis on the WAA fund, since this may give extra insight into the management style at the fund.

D. Briefly **describe** *two* advantages of holdings-based style analysis versus returns-based style analysis.

(2 minutes)

Answer Question 10-A on This Page

A. The independent variables used in a returns-based style analysis should have *three* important features. **State** these three features, and **discuss** briefly how the indices selected by Laidlaw meet these characteristics.

Answer Question 10-B on This Page

B. Using the data in Exhibit 1 *only*, **state** and **justify** whether the WAA product in which NOM is invested is currently accurately described as an active U.S. large-cap value active equity product. If the current labeling of the fund is inappropriate, **state** a more appropriate label.

Answer Question 10-C on This Page

C. Using the data in Exhibits 2 and 3, **recommend** two questions that Laidlaw should address to the managers of WAA regarding their historical style.

Answer Question 10-D on This Page

D. Briefly **describe** *two* advantages of holdings-based style analysis versus returns-based style analysis.

Question 11

Question 11 has three parts for a total of 16 minutes

Part A

Cameron Hunt, CFA, an investment adviser, meets with a major private client, Hasan Ibrahim, to discuss the rebalancing strategy of his portfolio.

Hunt makes the following notes from the meeting:

- Markets are expected to be flat and volatile.
- Ibrahim's risk tolerance increases more than proportionately with changes in wealth.
- Ibrahim desires a floor value to the portfolio that it will not fall below.

A. **Recommend** a rebalancing strategy for the portfolio of Ibrahim as either buy-and-hold, constant mix, or constant proportion portfolio insurance (CPPI).

(4 minutes)

Part B

One of Hunt's other clients, Nathan Didson, uses a constant mix rebalancing strategy. Didson uses calendar rebalancing at the end of each month, but is considering switching to percent-of-portfolio rebalancing with daily monitoring. Hunt collects the information regarding a potential percent-of-portfolio rebalancing strategy displayed in Exhibit 1.

Exhibit 1
Didson Portfolio Weights 2015

Asset Class	Weight December 31	Strategic Asset Allocation Target Weights
Domestic Equity	37%	35%
International Equity	20%	25%
Domestic Fixed Income	33%	30%
International Fixed Income	10%	10%
Corridor Width		+/– 15%

B. **Determine** whether the post-rebalancing portfolio weight in domestic equity would be higher, lower, or the same under the calendar rebalancing strategy versus the percent-of-portfolio rebalancing strategy. **Explain** your response.

(4 minutes)

Part C

Didson asks Hunt how the optimal corridor width is achieved for the domestic equity asset class. Didson replies that there are a number of factors, including:

- The correlation of domestic equity versus other asset classes
- The volatility of other asset classes
- The risk tolerance of the investor
- The volatility of domestic equity

Answer Question 11-C in the Template Provided.

C. For *each* of the factors affecting corridor width quoted by Hunt, **state** whether an increase in the factor will lead to the optimal corridor width being wider, narrower, or unchanged. **Explain** your answer.

(8 minutes)

Answer Question 11-A on This Page

A. **Recommend** a rebalancing strategy for the portfolio of Ibrahim as either buy-and-hold, constant mix, or constant proportion portfolio insurance (CPPI).

Answer Question 11-B on This Page

B. **Determine** whether the post-rebalancing portfolio weight in domestic equity would be higher, lower, or the same under the calendar rebalancing strategy versus the percent-of-portfolio rebalancing strategy. **Explain** your response.

Answer Question 11-C on This Page

Factor	State whether an increase in the factor will lead to the optimal corridor width being wider, narrower or unchanged. (Circle one).	Explain your answer.
The correlation of domestic equity versus other asset classes	Wider Narrower Unchanged	
The volatility of other asset classes	Wider Narrower Unchanged	
The risk tolerance of the investor	Wider Narrower Unchanged	
The volatility of domestic equity	Wider Narrower Unchanged	

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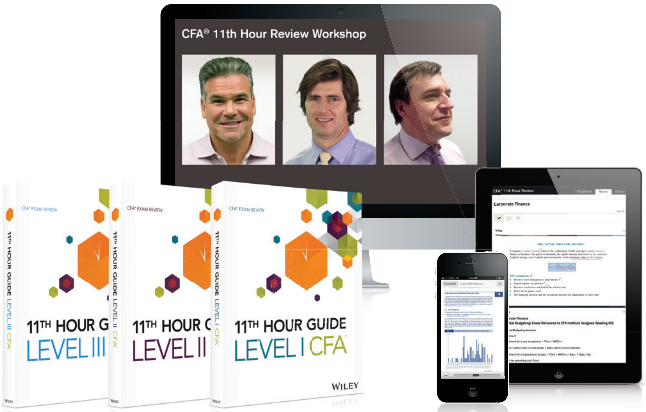

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