

## Tang

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Kim Tang, CFA, is a consultant reviewing a hedge fund, CleanTech Research Fund. CleanTech invests in high-risk and volatile "clean technology" companies. CleanTech has adopted the CFA Institute Code of Ethics and Standards of Professional Conduct.

Tang examines the various forms of advertising used by CleanTech to attract new clients. In one of its advertising messages, CleanTech states, "We have a very experienced research team and are proud they are all CFA's. Several of our managers serve as volunteers for CFA Institute. CFA Institute recognizes their expertise, and as a result, you can rely on our team for superior performance results."

In reviewing CleanTech's marketing brochure, Tang reads the following statements:

Statement 1: The share prices of companies in the clean technology sector have increased recently because of the growing awareness of climate change issues and the rising cost of energy. There are many risks in this sector, some of which include new technology that is unproven. Also, the addition or removal of government incentives can make markets dysfunctional. Nevertheless, it is our opinion that returns in this area will continue to be above average for several years. In fact, our proprietary investment analytics software has determined that investments in green transportation companies are likely to double in value in the next six months based on a multiple factor regression analysis. Key risks associated with analytics software include the fact that they rely on historical data and that a set of unknown factors could interfere with the anticipated results. We will earn a 200% return over the next year on one of our solar power company investments based on sales projections we prepared, assuming that last year's generous tax incentives stay in place.

Statement 2: The CleanTech fund invests in publicly traded and highly liquid companies and is recommended only for investors who are able to assume a high level of risk. Last month, we invested in EnergyAlgae, a "green energy" company that partnered with a global energy firm early last year to create oil from algae. EnergyAlgae's market capitalization quadrupled shortly after the partnership was formed. Recently, EnergyAlgae also patented a waste plastic-to-oil process that produces oil at less than \$30 a barrel. One of the founders of CleanTech is on the board of EnergyAlgae, and information he gave us on the company's patent process led us to purchase additional stock in EnergyAlgae before the patent became widely publicized with the release of the company's semiannual financial report.\* (\*Information supporting the statements made in this communication is available upon request.)

When Tang asks CleanTech's founders for supporting documents related to their investment in EnergyAlgae, she is told that this information is based on third-party research from Slar Brokerage (Slar), who maintains all necessary records. Tang completes a due diligence exercise on this research and learns that Slar has used sound assumptions and rigor in its analysis of EnergyAlgae. In particular, Tang learned that Slar used, at a minimum, the following attributes to form the basis of the recommendation: the company's past three years of operational history, current stage of the industry's business cycle, an annual research update, a historical financial analysis, and a one-year earnings forecast.

Tang also learns that the founders of CleanTech are majority shareholders of Slar, which underwrote the public offering of EnergyAlgae. Additionally, CleanTech's analysts inform Tang that they did not need to look at the quality of Slar's research because one of their former colleagues recently left CleanTech and established the research department at the brokerage firm.

In researching EnergyAlgae, Tang finds that potential customers and suppliers of EnergyAlgae are highly skeptical of the claims made regarding the companies' respective products. She also contacts several energy companies and is unable to locate anyone who has even heard of EnergyAlgae. When Tang reviews CleanTech's trading activity in EnergyAlgae shares, she finds that CleanTech liquidated its position in EnergyAlgae soon after CleanTech's portfolio managers presented positive views on EnergyAlgae in a number of media interviews. In addition, many of CleanTech's employees also sold their shares in EnergyAlgae immediately after CleanTech sold its shares of the company. The share price of EnergyAlgae dropped dramatically after the stock sales made by CleanTech and its employees.

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- 1.) CleanTech's advertising is *least likely* in violation of the CFA Institute Standards of Professional Conduct with respect to:

- A. use of the CFA designation.
- B. expected performance results.
- C. managers' volunteer activities.

Answer = C

"Guidance for Standards I–VII," CFA Institute

Standard VII(A): Conduct as Members and Candidates in the CFA Program; Standard

VII(B): Reference to CFA Institute, the CFA Designation, and the CFA Program

Disclosure of the managers' involvement with CFA Institute is not a violation of Standard VII(A): Conduct as Members and Candidates in the CFA Program, because it does not reveal any confidential information. But the CFA designation must always be used as an adjective. In this situation, the designation has not been used as an adjective, thus the statement is in violation of Standard VII(B): Reference to CFA Institute, the CFA Designation, and the CFA Program (i.e., the statement should read "the entire research team is made up of CFA charterholders," rather than "they are all CFA's"). Members must not exaggerate the meaning or implications of membership in CFA Institute or holding the CFA designation, which Tang does, violating Standard VII(B).

- 2.) In Statement 1, CleanTech management *most likely* violated the CFA Institute Standards of Professional Conduct with regard to their comments on:

- A. clean technology sector returns.
- B. investment analytics software.
- C. solar power company investment.

Answer = C

"Guidance for Standards I–VII," CFA Institute Standard V(B): Communication with Clients and Prospective Clients; Standard I(C): Misrepresentation

The performance return claim is a violation of Standard V(B): Communication with Clients and Prospective Clients, which requires opinion to be separated from fact. In addition, Standard I(C): Misrepresentation prohibits members and candidates from guaranteeing clients any specific return on volatile investments. In the case of complex analyses, such as proprietary investment analytics software used by CleanTech, analysts must clearly separate fact from statistical conjecture and should identify the known limitations of an analysis, which has been done.

3.) In Statement 2, CleanTech *most likely* violated which of the following Standards of Professional Conduct?

- A. Material Nonpublic Information
- B. Suitability
- C. Misrepresentation

Answer = A

"Guidance for Standards I–VII," CFA Institute  
Standard II(A): Material Nonpublic Information; Standard I(C): Misrepresentation

Standard II(A): Material Nonpublic Information has been violated by the board member who shared material nonpublic information with the hedge fund and by the fund because it acted on the information. Standard III(C): Suitability does not appear to have been violated because the fund is characterized as a high-risk investment, and it is clearly stated that EnergyAlgae is also a high-risk investment. CleanTech's statement that the hedge fund benefited from the increase in share value for EnergyAlgae last year is a violation of Standard I (C): Misrepresentation because the fund had only recently invested in the stock, so it did not benefit from the large move in the stock's price.

4.) To be in compliance with the CFA Institute Standards of Professional Conduct, CleanTech should *most likely* question the validity of Slar's research on EnergyAlgae for deficiencies in which of the following areas?

- A. Earnings projections
- B. Operational analysis
- C. Annual research update

Answer = C

"Guidance for Standards I–VII," CFA Institute  
Standard V(A): Diligence and Reasonable Basis

A reasonable and diligent effort was not made when the analysis on EnergyAlgae was updated on only an annual basis because the information on the company could change materially in such a high-risk industry, a violation of Standard V(A): Diligence and Reasonable Basis. In addition, when the company reports financial results on a semiannual basis, an annual update to a research report would not be timely.

- 5.) Tang's *most* appropriate course of action concerning the relationship between CleanTech and Slar is to recommend that CleanTech:
- A. sever the relationship immediately.
  - B. communicate relevant information to all clients.
  - C. explain the ownership structure to all clients.

Answer = B

"Guidance for Standards I–VII," CFA Institute  
Standard I(B): Independence and Objectivity

According to Standard I(B): Independence and Objectivity, full and fair disclosure of all matters that could reasonably be expected to impair independence and objectivity must be made to all clients. In this case, the controlling position in the broker held by the founders of CleanTech, as well as the fact that Slar has underwritten two stocks the hedge fund holds and whose recommendations the fund relied on to make these investments, must be disclosed to all clients so they are better able to judge motives and possible biases for themselves.

- 6.) The EnergyAlgae trades are *least likely* to have violated the CFA Institute Standards of Professional Conduct with regard to:
- A. share price distortion because of positive media presentations.
  - B. the order in which the shares were traded.
  - C. the adverse and skeptical opinions of EnergyAlgae products.

Answer = B

"Guidance for Standards I–VII," CFA Institute  
Standard II(B): Market Manipulation, Standard V(A): Diligence and Reasonable Basis

The hedge fund had priority in trading the stock ahead of employees. The hedge fund is effectively the client. But it does not alleviate the stock price manipulation that was engaged in by the fund and its employees, a violation of Standard II(B): Market Manipulation. In addition, there does not appear to be an adequate basis for recommending the stock (i.e., negative information on the company's products from potential customers and suppliers), a violation of Standard V(A): Diligence and Reasonable Basis.

## Vision

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Vision 2020 Capital Partners (V2020) has operated for the last 10 years originating and brokering corporate finance deals through private placements in emerging and frontier markets. Because of slow economic growth globally, investment-banking deals have declined, and V2020 has struggled to generate enough fees to sustain its business. The board of directors of V2020, composed of corporate finance experts, has identified opportunities to generate a new revenue stream.

One such opportunity is the creation of a division to manage an Emerging and Frontier Market Balanced Fund (the Fund). The board has had several inquiries from clients asking for such a product. The board believes the Fund is an ideal business line to meet client demand and create monthly asset management fees. The board thinks the Fund should also be required to act as a buyer of last resort for all its corporate finance client's private placements. The board believes this arrangement would act as a major incentive for private businesses to use their corporate finance services, thereby increasing revenues from their primary business activity.

Because none of the V2020 board members or senior managers are experienced in asset management, the board hires Lauren Akinyi, CFA, an independent consultant who works with various clients in the asset management industry. She is asked to undertake a study on an appropriate structure for the Fund to meet both corporate finance and fund client needs. She is also asked to help V2020 set up policies and procedures for the new fund to make certain all capital market regulations have been followed.

The board informs Akinyi that the policies and procedures should also ensure compliance with the CFA Institute Asset Manager Code of Professional Conduct (Asset Manager Code).

Subsequently, in a report to the board, Akinyi makes the following recommendations concerning compliance with the Asset Manager Code:

**Recommendation 1:** V2020 should abide by the following principles of conduct:

- Principle 1: Proceed with skill, competence, and diligence;
- Principle 2: Act with independence and objectivity; and
- Principle 3: Provide client performance within three days after month-end.

**Recommendation 2:** To take advantage of their vast business experience, the board of directors should implement new policies. Specifically, the board should

- Policy 1: take an active daily role in managing the Fund's assets,
- Policy 2: designate an existing employee as a compliance officer, and
- Policy 3: disclose any conflicts of interest arising from their business interests.

**Recommendation 3:** To avoid any conflicts of interest between the investment banking business and the new fund management business, a separate wholly owned subsidiary should be created to undertake the fund management business. The Fund would then provide a 100%

guarantee to buy the private placements of the corporate finance clients without having to disclose to all clients the relationship between the two entities.

**Recommendation 4:** To ensure timely and efficient trades in each of the markets in which the Fund invests, only one stockbroker in each market should be used. The board should also consider buying an equity stake in each of the appointed brokers as an added profit opportunity.

After the Fund completes its first year of operations, V2020 receives a letter from its regulator. The notification imposes heavy fines for poor disclosures to its fund clients and mandates the replacement of the senior fund manager as a condition for the renewal of V2020's asset management license. The board challenges the ruling in court, stating that the Fund made the necessary full disclosures. After six months, not wanting to incur further expensive legal fees or waste more precious time, the board, without admitting or denying fault, settles out of court, paying a smaller fine. Subsequently, the senior fund manager is terminated but receives a multimillion-dollar bonus upon leaving. After the replacement of the senior fund manager, the license is renewed for a further year. The regulatory body, however, gives a warning that if the Fund has any future violations, their license will be permanently revoked. Subsequently, the Fund discloses to its clients that the regulator has renewed its license for one year after the termination of the senior fund manager, a condition of the renewal. They also disclose the out-of-court settlement and the fine paid.

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- 1.) Given the board's intended purpose for starting the Fund, which of the following principles of conduct under the Asset Manager Code of Professional Conduct is *least likely* violated?
  - A. Act in a professional and ethical manner at all times.
  - B. Uphold the rules governing capital markets.
  - C. Act for the benefit of clients.

Answer = B

"Asset Manager Code of Professional Conduct," Kurt Schacht, Jonathan J. Stokes, and Glenn Doggett  
General Principles of Conduct: 1, 2, and 6

The board gave instructions to Akinyi to ensure compliance with capital markets regulations, thus upholding one of the general principles of conduct of the Asset Manager Code. But the desire for the Fund to act as a buyer of last resort violates the principle of acting for the benefit of clients (i.e., placing their interests before the firm's and their own). By putting the firm's interests in front of their clients, the board is not acting in a professional and ethical manner. Although the Fund may benefit corporate finance clients and meet the demand of some clients for a fund, not all Fund clients' interests may be protected by the Fund being the buyer of last resort (i.e., guaranteeing to buy 100% of the corporate finance clients' private placements if placement to other potential investors does not succeed). These placements may not meet the Fund's objectives and risk profile, thus not protecting the interests of the Fund's clients.

2.) Which of the principles in Akinyi's Recommendation 1 is *least likely* sufficient to meet the principles of the Asset Manager Code of Professional Conduct?

- A. Principle 3
- B. Principle 2
- C. Principle 1

Answer = A

"Asset Manager Code of Professional Conduct," by Kurt Schacht, Jonathan J. Stokes, and Glenn Doggett  
Appendix, Recommendations and Guidance, Section 6; Section E: Performance and Valuation

Although it is true that managers are recommended to provide performance data on a timely basis, they also have the responsibility to present performance information that is fair, accurate, relevant, and complete. Given this requirement, it may not always be possible to provide this information to clients within three days, particularly in complicated scenarios.

3.) Which of Akinyi's policies in Recommendation 2 would *least likely* comply with the Asset Manager Code of Professional Conduct and its general principles if implemented?

- A. Policy 1
- B. Policy 2
- C. Policy 3

Answer = A

"Asset Manager Code of Professional Conduct," Kurt Schacht, Jonathan J. Stokes, and Glenn Doggett  
General Principles of Conduct; Section F: Disclosures

The board of directors have corporate finance experience and business experience but not asset management experience. Consequently, they may not act with skill or competence, as required by the fourth principle of the General Principles of Conduct. Therefore, they should hire professional asset managers to manage the Fund.

4.) Which of the following would be *most* effective to prevent any violation of the Asset Manager Code of Professional Conduct as reflected in Akinyi's Recommendation 3?

- A. The Fund does not participate in any of V2020's private placements.
- B. V2020 discloses to all clients the relationship between V2020 and the Fund.
- C. The Fund only retains a minority shareholding in V2020.

Answer = B

"Asset Manager Code of Professional Conduct," Kurt Schacht, Jonathan J. Stokes, and Glenn Doggett

Section A: Loyalty to Clients; Section F: Disclosures

The Fund would comply with the Asset Manager Code if it made full disclosure to all of its clients regarding the relationship between the Fund and V2020's activities (the investment banking/corporate finance activities). Both parties should disclose any common ownership, even minority positions. If some of the private placements met the investment objectives of the Fund, it would harm the Fund's clients if the Fund was not able to invest in those private placements because of the potential conflict of interests.

- 5.) If Recommendation 4 was implemented, which aspect of the Asset Manager Code of Professional Conduct would *most likely* be violated?
- A. Priority of transactions
  - B. Fair dealing
  - C. Best execution

Answer = C

"Asset Manager Code of Professional Conduct," Kurt Schacht, Jonathan J. Stokes, and Glenn Doggett

Section C: Trading

The Asset Manager Code calls for the manager to maximize client portfolio value by seeking best execution for all client transactions. If trades only go through one stockbroker, best execution cannot be ensured. In addition, any equity ownership in these brokers should be disclosed because this arrangement has the potential for conflicts of interest.

- 6.) Does the Fund's disclosure to its clients regarding the renewal of the license *most likely* comply with the Asset Manager Code of Professional Conduct?
- A. Yes, the disclosure included the termination of the fund manager
  - B. No
  - C. Yes, the disclosure included the out-of-court settlement and payment of fine

Answer = B

"Asset Manager Code of Professional Conduct," Kurt Schacht, Jonathan J. Stokes, and Glenn Doggett

Section F: Disclosures

The Asset Manager Code calls for complete disclosures regarding significant changes in personnel and any regulatory or disciplinary action taken against the Fund. Although the



board disclosed the conditional license renewal and the removal of the Fund manager, they did not disclose the serious condition that any further violation would result in the Fund being closed. Clients should be told about the regulator's warning so they can make an informed decision regarding whether to continue their investment in the Fund. Disclosure is not required for the payment of bonuses or termination packages to employees.

## Ptolemy

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The Ptolemy Foundation was established to provide financial assistance for education in the field of astronomy. Tom Fiske, the foundation's chief investment officer, and his staff of three analysts use a top-down process that begins with an economic forecast, assignment of asset class weights, and selection of appropriate index funds. The team meets once a week to discuss a variety of topics ranging from economic modeling, economic outlook, portfolio performance, and investment opportunities, including those in emerging markets.

At the start of the meeting, Fiske asks the analysts, Len Tuoc, Kim Spenser, and Pier Poulsen, to describe The Ptolemy Foundation was established to provide financial assistance for education in the field of astronomy. Tom Fiske, the foundation's chief investment officer, and his staff of three analysts use a top-down process that begins with an economic forecast, assignment of asset class weights, and selection of appropriate index funds. The team meets once a week to discuss a variety of topics ranging from economic modeling, economic outlook, portfolio performance, and investment opportunities, including those in emerging markets.

At the start of the meeting, Fiske asks the analysts, Len Tuoc, Kim Spenser, and Pier Poulsen, to describe and justify their different approaches to economic forecasting. They reply as follows.

Tuoc: I prefer econometric modeling. Robust models built with detailed regression analysis can help predict recessions well because the established relationships among the variables seldom change.

Spenser: I like the economic indicators approach. For example, the composite of leading economic indicators is based on an analysis of its forecasting usefulness in past cycles. They are intuitive, simple to construct, require only a limited number of variables, and third-party versions are also available.

Poulsen: The checklist approach is my choice. This straightforward approach considers the widest range of data. Using simple statistical method, such as time-series analysis, an analyst can quickly assess which measures are extreme. This approach relies less on subjectivity and is less time-consuming."

The team then discusses what the long-term growth path for US GDP should be in the aftermath of exogenous shocks because of the financial crisis that began in 2008. They examine several reports from outside sources and develop a forecast for aggregate trend growth using the simple labor-based approach and appropriate data chosen from the items in Exhibit 1.

**Exhibit 1: 10-Year Forecast of US Macroeconomic Data**

<b>Growth in real consumer spending</b>	<b>3.10%</b>	<b>Yield on 10-year Treasury bonds</b>	<b>2.70%</b>
<b>Growth in potential labor force</b>	<b>1.90%</b>	<b>Growth in total factor productivity</b>	<b>0.50%</b>
<b>Growth in labor force participation</b>	<b>−0.3%</b>	<b>Change in trade deficit</b>	<b>−0.5%</b>
<b>Growth in labor productivity</b>	<b>1.40%</b>		

Upon a review of the portfolio and his discussion with the investment team, Fiske determines a need to increase US large-cap equities. He prefers to forecast the average annual return for US large-cap equities over the next 10 years using the Grinold–Kroner model and the data in Exhibit 2.

**Exhibit 2: Current and Expected Market Statistics, US Large-Cap Equities**

<b>Expected dividend yield</b>	2.10%	<b>Expected inflation rate</b>	2.30%
<b>Expected repurchase yield</b>	1.00%	<b>Current P/E</b>	15.6
<b>Expected real earnings growth</b>	2.60%	<b>Expected P/E 10 years prior</b>	15

The analysts think that adding to US Treasuries would fit portfolio objectives, but they are concerned that the US Federal Reserve Board is likely to raise the fed funds rate soon. They assemble the data in Exhibit 3 in order to use the Taylor rule (giving equal weights to inflation and output gaps) to help predict the Fed’s next move with respect to interest rates.

**Exhibit 3: Current Data and Forecasts from the Fed**

<b>Statistic</b>	<b>Status</b>	<b>Value (%)</b>
<b>Fed funds rate</b>	Current	3
	Neutral	2.5
<b>GDP growth rate</b>	Trend	4.5
	Forecast	3
<b>Inflation</b>	Target	2.5
	Forecast	3.2

To assess the attractiveness of emerging market equities, Fiske suggests that they use the data in Exhibit 4 and determine the expected return of small-cap emerging market equities using the Singer–Terhaar approach.

**Exhibit 4: Data for Analyzing Emerging Markets**

Asset Class	Standard Deviation	Correlation with GIM	Degree of Integration with GIM
Emerging small-cap equity	23%	0.85	65%
Global investable market (GIM)	7.00%		

**Additional information**

Risk-free rate: 2.5%

Illiquidity premium: 60 bps

Sharpe ratio for GIM and emerging small-cap equity: 0.31

Finally, after examining data pertaining to the European equity markets, the investment team believes that there are attractive investment opportunities in selected countries. Specifically, they compare the recent economic data with long-term average trends in three different countries, shown in Exhibit 5.

**Exhibit 5: Relationship of Current Economic Data to Historical Trends: Selected European Countries**

	Ireland	Spain	Hungary
Production	Above trend, declining	Well above trend	Below trend, rising
Inflation	Above trend, declining	Average, rising	Below trend, stable
Capacity utilization	Above trend	Average, rising	Below trend
Confidence	Average, declining	Well above trend	Below trend, rising
Fiscal/monetary policies	Cautionary	Restrictive	Stimulatory

- 1.) Regarding the approaches to economic forecasting, the statement by which analyst is *most* accurate?
- A. Poulsen
  - B. Tuoc
  - C. Spenser

Answer = C

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 4.5.4

Spenser's statement is most accurate. In the economic indicators approach, for example, the composite of leading economic indicators is based on an analysis of its forecasting usefulness in past cycles. The indicators are intuitive, simple to construct, require only a limited number of variables, and third-party versions are also available.

2.) Using the data in Exhibit 1 and the labor-based method chosen by the team, the *most likely* estimate for the 10-year annual GDP growth is:

- A. 3.5%.
- B. 3.6%.
- C. 3.0%.

Answer = C

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 4.2.2

The simplest way to analyze an economy's aggregate trend growth is to split it into growth from changes in employment (growth from labor inputs), and growth from changes in labor productivity.

For longer-term analysis, growth from changes in employment is broken down further into growth in the size of the potential labor force and growth in the actual labor force participation rate.

Growth from changes in		Percent
Employment	Growth in potential labor force	+1.9
	Growth in labor force participation	−0.3
+ Labor productivity	Growth in labor productivity	<u>+1.4</u>
=Estimate of GDP growth rate		3.0

- 3.) Using the data in Exhibit 2 and Fiske's preferred approach, the estimated expected annual return for US large-cap equities over the next 10 years is *closest* to:
- A. 7.9%.
  - B. 7.6%.
  - C. 7.4%.

Answer = B

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 3.1.2.1

The Grinold–Kroner model formula is

$$E(R) = D/P - \Delta S + i + g + \Delta PE.$$

First, compute the compound annual growth rate of the P/E:  $(15.0/15.6)^{1/10} - 1 = -0.4\%$ .

Next, compute, as a percentage, the expected return per the Grinold–Kroner model formula:

$$E(R) = 2.1 - (-1.0) + 2.3 + 2.6 - 0.4 = 7.6,$$

where

$E(R)$  = expected rate of return on equity

$D/P$  = expected dividend yield

$\Delta S$  = expected percent change in number of shares outstanding

$i$  = the expected inflation rate

$g$  = the expected real total earnings growth rate (not identical to EPS growth rate in general, with changes in shares outstanding)

$\Delta PE$  = per period percent change in the P/E multiple

4.) Using the data in Exhibit 3 and the investment team's approach to predict the Fed's next move, the new fed funds rate will *most likely* be:

- A. 2.9%.
- B. 2.1%.
- C. 2.6%.

Answer = B

“Capital Market Expectations,” John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 4.1.5.3

The Taylor rule is

$$R_{optimal} = R_{neutral} + [0.5 \times (GDP_{forecast} - GDP_{trend})] + [0.5 \times (I_{forecast} - I_{target})].$$

$$R_{optimal} = 2.5 + [0.5 \times (3.0 - 4.5)] + [0.5 \times (3.2 - 2.5)] = 2.5 - 0.75 + 0.35 = 2.10\%.$$

5.) Using the data in Exhibit 4 and Fiske's suggested approach, the forecast of the expected return for small-cap emerging market equities is *closest* to:

- A. 9.5%.
- B. 8.9%.
- C. 9.9%.

Answer = A

“Capital Market Expectations,” John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 3.1.4

The Singer–Terhaar approach for determining the expected return on an asset class involves determining the risk premium arising from systematic risk as a weighted average of the risk premiums arising from a fully integrated market and fully segmented market, where the weights for the fully integrated market are the degree of integration of the markets.

- The risk premium for the fully integrated market is given by

$$RP_i = \sigma_i \rho_{i, M} \left( \frac{RP_M}{\sigma_M} \right) \text{ where } \left( \frac{RP_M}{\sigma_M} \right) \text{ is the Sharpe ratio for the world market portfolio.}$$

- The risk premium for the fully segmented market is given by  $RP_i = \sigma_i \left( \frac{RP_M}{\sigma_M} \right)$ .
- In addition, if there are market imperfections, such as illiquidity premiums, they must be added in.
- Finally, the expected return on the asset class is determined by adding these risk premiums to the risk-free rate, in classical capital asset pricing model fashion.

Step 1:	Systematic risk premium in <b>fully integrated</b> market	
	Risk premium:	$RP_i = \sigma_i \rho_{i, M} \left( \frac{RP_M}{\sigma_M} \right)$ (23% × 0.85 × 0.31) = 6.06%
Step 2:	Systematic risk premium in <b>fully segmented</b> market	
	Risk premium:	$RP_i = \sigma_i \left( \frac{RP_M}{\sigma_M} \right)$ (23% × 0.31) = 7.13%
Step 3:	<b>Weight systematic risk premiums by degree of integration:</b> (0.65 × 6.06 + 0.35 × 7.13) = 6.43%	
Step 4:	Add the illiquidity premium	6.43% + 0.60% = 7.03%
Step 5:	Add the risk-free rate	2.5% + 7.03% = 9.53%

- 6.) Among the three countries examined by the investment team, which is in the *most* attractive phase of the business cycle for equity returns?
- A. Hungary  
B. Ireland  
C. Spain

Answer = A

“Capital Market Expectations,” John P. Calverley, Alan M. Meder, CFA, Brian D. Singer, CFA, and Renato Staub  
Sections 4.1.2, 4.6.2, 4.6.6

The most favorable phases when considering equity returns are initial recovery and early upswing whereas the late upswing, slowdown, and recession phases carry the greater risk for equities.



Hungary has the combination of factors consistent with the initial recovery/early upswing phases of the business cycle – increasing production, low inflation, improving confidence, stimulatory fiscal/monetary policies, and abundant capacity. These indicators point to strongly rising stock prices and therefore most attractive for equity returns.

## Rogers

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Ted Rogers is the director of a research team that analyzes traditional and non-traditional sources of energy for investment purposes. For traditional energy sources, a number of high-frequency historical data series are available. For non-traditional energy sources, the data are generally quarterly and tend to hide a great deal of the volatility that Rogers knows to exist because appraised values are used instead of market values. To supplement the quarterly data, Rogers's team uses an index of the top 30 firms in new and experimental technologies, called the "NEXT Index." Although not all of the firms in the NEXT are energy firms, the index is available as a weekly series. However, the NEXT does change its composite mix of firms frequently as firms in the index fail or are sold to larger firms that are not in the index.

To determine the correlation matrix within the different energy sectors, Rogers's team relies on a weighted average of correlations derived from multifactor models and historical correlations. Although the combined experience within the team favors emphasizing the correlations derived from the multifactor models, historical correlations are given a greater weight within the weighted average calculations to reduce the future expected performance estimates of different investment models being considered. This practice of purposefully understating the expected future performance of these investment models is viewed as a safety measure by the team and as a way to manage client expectations.

In a recent meeting, the team discussed how using the last two years of historical data for oil-related industries generated relationships between factors that had not existed in the past. One member of the team, Steve Phillips, stated: "The relationships reflect the fact that hurricane activity in the last two years has affected oil concerns worldwide. There is no reason to believe that such relationships will continue in the future."

Most of the team agreed with Phillips but conceded that a number of clients specifically requested an analysis of the previous two years of data with an expectation that new trends were emerging within the industry. The team decided to add more variables to the analysis in order to show that the relationships the team believed to be significant actually outweighed the importance of these recently found relationships. After adding several additional variables, the team found that the model did not improve in predictive ability, but the recently found relationships were indeed no longer significant.

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- 1.) The quarterly data available for non-traditional energy sources are *best* described as data with a:
  - A. time-period bias.
  - B. smoothing bias.
  - C. survivorship bias.

Answer = B

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 2.2.2

Smoothed, or appraisal, data arise when appraised values are used instead of market values, which tends to make correlation magnitudes smaller and underestimate volatility.

2.) The NEXT Index data *most likely* reflects:

- A. volatility clustering.
- B. transcription errors.
- C. survivorship bias.

Answer = C

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 2.2.2

Survivorship bias arises when a data series only reflects companies that exist at a given moment in time and not companies that may have left prior to the given moment in time (i.e., only the surviving firms are in the data). The NEXT Index has survivorship bias as evidenced by the frequent change in its component firms because of failure and acquisition by larger non-index firms.

3.) The approach taken by Rogers's team to calculate the correlation matrix is *best* described as which type of estimator?

- A. Historical
- B. Shrinkage
- C. Time series

Answer = B

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 3.1.1.2

To determine the correlation matrix in the different energy sectors, Rogers's team relies on a weighted average of correlations derived from multifactor models and historical correlations. A shrinkage estimator is a weighted average of correlation (or covariance) matrices created from at least two different correlation (or covariance) matrices generated from different sources.

4.) Which of the following psychological traps *best* describes the Rogers's team's decision to give historical correlation more weight in the correlation matrix?

- A. Prudence trap
- B. Anchoring trap
- C. Overconfidence trap

Answer = A

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 2.2.8

Rogers's team views giving more weight to the historical correlations as a safety measure and as a way to manage client expectations. They do not want to appear extreme. The prudence trap is the tendency to be cautious when making decisions that could be potentially expensive or damaging to the decision maker's career.

5.) Which of the following types of biases *best* describes Steve Phillips's statement about oil-related industry data?

- A. Time-period
- B. Data-mining
- C. Survivorship

Answer = A

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 2.2.5

Phillips believes the impact of hurricane activity will not necessarily continue in the future. A time-period bias occurs when particular relationships or sensitivities only occur during a particular period of time.

6.) The decision to add variables to the oil-related industry analysis will *most likely* lead to a(n):

- A. regime-switching bias.
- B. data-mining bias.
- C. appraisal bias.

Answer = B

"Capital Market Expectations," John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub  
Section 2.2.5

A data-mining bias occurs when variables are added to an analysis without any predictive merit (i.e., there is no causal relationship for adding the variables). In this case, the variables are not added to enhance prediction but to thwart the predictive relationship between other variables.

## Rioja

---

Andres Rioja is the treasurer of Empresas Crianza. His duties have recently been expanded to include oversight of the firm's pension fund. Given his limited experience in overseeing investments, he is relying on an outside consultant. Rioja prepares a number of questions for his first meeting with the consultant, Manolo Priorat of Consulta Jerez.

Priorat starts the meeting by summarizing for Rioja the status of the defined benefit pension plan and makes the following statement:

The pension liability has a duration of 14 years and a present value of \$4 billion. The liabilities are discounted using the spot rate on high-quality long-term corporate bonds. Presently, the asset portfolio covers 87.5% of these liabilities and is invested entirely in fixed-income assets. The plan assets have fallen short of the pension liabilities over the past five years because their durations are not properly matched. I am concerned that Crianza has selected the wrong benchmark for the pension plan. The current benchmark is a weighted average of the benchmarks for the various strategies used in the investment of pension assets. I believe the appropriate benchmark should be the liability itself.

Priorat and Rioja review the fixed-income funds in which the pension assets are currently invested. Portfolio managers have been given the mandate to meet or exceed their respective benchmarks based on their investment styles. Details of the various portfolios are provided in Exhibit 1.

**Exhibit 1: Portfolio Information**

Portfolio	Duration (years)	Asset Value (\$ thousands)	Benchmark	Investment Style
Money market	0.25	175,000	3-Month US T-Bill	Active management
Mortgage-backed securities fund	3	700,000	Barclays Mortgage	Enhanced indexing
Emerging market bond fund	4.6	675,000	JP Morgan EMBI	Active management
Long corporate bond fund	14	1,575,000	Barclays Long Corporate	Active management
Treasury bond STRIPs	24	375,000	Barclays 20+Year STRIP	Pure bond indexing

Rioja updates Priorat on Crianza's current plans for the pension plan. Rioja states: "Crianza will make a \$500 million contribution to fully fund the plan and invest the funds in Treasury STRIPs. In addition, we would like to completely reallocate pension investments away from the fund that presents the greatest contingent claim risk and into the long corporate bond fund."

Rioja then asks Priorat, “I would like to understand the risk profile of each index benchmark we have assigned to the portfolio managers. What measures are available to do this?” Priorat responds,

There are several key measures that come to mind. Effective duration measures the sensitivity of the index’s price to a relatively small parallel shift in interest rates. For large non-parallel changes in interest rates, a convexity adjustment is used to improve the accuracy of the index’s estimated price change. Key rate duration measures the effect of shifts in key points along the yield curve. Key rate durations are particularly useful for determining the relative attractiveness of various portfolio strategies, such as bullet strategies versus barbell strategies. Spread duration describes how a non-Treasury security’s price will change as a result of the widening or narrowing of the spread contribution.

Rioja then asks about the rationale for active managers to do secondary market trades. Priorat responds,

Secondary market trades should be evaluated in a total return framework. The exception is the yield or spread pickup trade, which should be evaluated in the context of additional yield. Credit-upside trades provide an opportunity for managers to capitalize on unexpected upgrades. Curve-adjustment trades are yet another example of investors expressing their interest rate views in the credit markets in anticipation of interest rate changes.

Finally, Priorat offers further explanation of how active managers can add value. He notes,

Structural analysis of corporate bonds is an important part of active management. Credit bullets in conjunction with long-end Treasury structures are used in a barbell strategy. Callable bonds provide a spread premium that can be valuable to an investor during periods of high interest rate volatility. Put structures will provide investors with some protection in the event that interest rates rise sharply but not if the issuer has an unexpected credit event.”

---

- 1.) Is Priorat's statement with regard to selecting a benchmark for the pension plan *most likely* correct?
  - A. No, because Crianza should select a high-quality long-term corporate bond index as the benchmark
  - B. Yes
  - C. No, because the current benchmark is appropriate to measure each strategy's performance

Answer = B

“Fixed-Income Portfolio Management—Part I,” H. Gifford Fong and Larry D. Guin  
Section 2

The investor with liabilities will measure success by whether the portfolio generates the funds necessary to pay the cash outflows associated with the liabilities. In other words, meeting the liabilities is the investment objective; as such, it also becomes the benchmark for the pension plan. Although Crianza should use the pension liabilities as the benchmark, this does not preclude managers of the various asset portfolios from being assigned an appropriate asset benchmark to manage against.

- 2.) For which portfolio in Exhibit 1 is a sampling approach *most likely* to be used in an attempt to match the primary index risk factors?
- A. Treasury STRIPs
  - B. Emerging market bond fund
  - C. Mortgage-backed securities fund

Answer = C

“Fixed-Income Portfolio Management—Part I,” H. Gifford Fong and Larry D. Guin  
Section 3.1

The mortgage-backed securities fund strategy uses enhanced indexing. This management style uses a sampling approach in an attempt to match the primary index risk factors and achieve a higher return than under full replication.

- 3.) If Rioja rebalances the portfolio as he proposes in his statement to Priorat, the dollar duration of the assets relative to the dollar duration of the liabilities is *most likely* to:
- A. fall well short.
  - B. be far exceeded.
  - C. be nearly matched.

Answer = C

“Fixed-Income Portfolio Management—Part I,” H. Gifford Fong and Larry D. Guin  
Section 4.1

The portfolio has to be rebalanced to match the dollar duration of the liabilities. The liabilities have dollar duration of \$4,000,000 (thousands)  $\times 14 = \$56,000,000$  (thousands). The mortgage-backed securities fund is the asset class that poses contingent claim risk, so it is being liquidated, and the \$700,000 thousand is being invested in the long corporate bond fund. The new \$500,000 thousand contribution is invested in Treasury STRIPs. The reallocated assets have dollar durations nearly identical to the liabilities as calculated in the following table:

Strategy	Old Market Value (\$ thousands)	New Market Value (\$ thousands)	Duration (years)	Dollar Duration (\$ thousands)
Money market	175,000	175,000	0.25	43,750
Mortgage-backed securities fund	700,000	0	3	0
Emerging market bond fund	675,000	675,000	4.6	3,105,000
Long corporate bond fund	1,575,000	2,275,000	14	31,850,000
Treasury STRIPs	<u>375,000</u>	<u>875,000</u>	24	<u>21,000,000</u>
Total	3,500,000	4,000,000		55,998,750

4.) In Priorat's response to Rioja regarding the explanation of key measures of an index's profile, he is *most likely* correct regarding:

- A. key rate duration and incorrect regarding convexity adjustment.
- B. spread duration and incorrect regarding effective duration.
- C. convexity adjustment and incorrect regarding key rate duration.

Answer = A

"Fixed-Income Portfolio Management—Part I," H. Gifford Fong and Larry D. Guin  
Section 3.2

Priorat's explanation of key rate duration is accurate, whereas his explanation of convexity adjustment is incorrect. A convexity adjustment is used to improve the accuracy of the index's estimated price change for large parallel changes in interest rates. A convexity adjustment is an estimate of the change in price that is not explained by duration.

5.) With regard to evaluating secondary market trades, Priorat is *least likely* correct with respect to:

- A. credit-upside trades.
- B. yield/spread pickup trades.
- C. curve-adjustment trades.

Answer = B



“Relative-Value Methodologies for Global Credit Bond Portfolio Management,” Jack Malvey  
Section 6

Yield/spread pickup trades should be evaluated in a total return framework. In a total return framework, both yield and spread, as well as price appreciation or depreciation, should be considered. A bond that offers higher yield may pose the potential for a capital loss if it is riskier than a lower-yielding security.

6.) Priorat is *most likely* correct with regard to which structural trade?

- A. Putables
- B. Bullets
- C. Callables

Answer = B

“Relative-Value Methodologies for Global Credit Bond Portfolio Management,” Jack Malvey  
Section 8

Front-end bullets (i.e., bullet structures with one-year to five-year maturities) have great appeal for investors who pursue a barbell strategy in which both the short and long end of the barbell are US Treasury securities. There are “barbellers” who use credit securities at the front or short end of the curve and Treasuries at the long end of the yield curve.

William Gatchell, CFA, is an investment analyst with the Sonera Endowment Fund. Sonera is considering hiring a new equity investment manager. In preparation, Gatchell meets with Anjou Lafite, another analyst at the fund, to review a relevant part of the endowment's investment policy statement:

Funds will be invested in the most efficient vehicle that meets the investment objective. Each manager must demonstrate the efficiency with which the tracking error they use delivers active return. In addition, each manager must consistently adhere to his or her stated style.

Gatchell is given the task of reviewing three investment managers and selecting a manager that is most likely to adhere to Sonera's investment policy statement. Information about the investment managers is shown in Exhibit 1.

**Exhibit 1: Investment Manager Data**

	Investment Manager		
	A	B	C
Assets under management (\$ millions)	1,325	3,912	524
Information ratio	-0.27	0.5	0.75
Small-cap value index, beta	0.95	0.98	1.05
Small-cap growth index, beta	0.32	0.43	0.48
Large-cap value index, beta	1.05	1.1	0.96
Large-cap growth index, beta	0.47	0.39	0.37
Manager-stated style	Value	Value	Growth
Manager-stated sub-style	Low P/E	High yield	Momentum

Gatchell is reviewing the fee structures proposed by the three investment managers. He finds the following reference in Sonera's investment policy statement:

The fee structure must be easy to understand and avoid undue complexity wherever possible. Also, the fee structure must be predictable, so Sonera can reasonably forecast these costs on a yearly basis as an input to the annual budgeting process.

He understands there are many different fee structures, and he wants to make sure he chooses the most appropriate one for the Sonera. Gatchell prepares a recommendation for the investment policy committee regarding the most appropriate fee structure.

Sonera has followed an active investment style for many years. Gatchell would like to recommend to the investment policy committee that a portion of the funds be invested using a passive investment style. His research shows there are a number of methods used to weight the stocks in an index, each having its own characteristics. The one key feature he believes is important is that the method chosen not be biased toward small-capitalization stocks.

Gatchell is also examining different ways to establish passive equity exposure. He states to Lafite:

There are a number of ways to get passive equity exposure; we can invest in an equity index mutual fund, a stock index futures contract, or a total return equity swap. Stock index futures and equity swaps are low-cost alternatives to equity index mutual funds; however, a drawback of stock index futures is that they have to be rolled over periodically. One advantage of investing in equity mutual funds is that shares can be redeemed at any point during the trading day.

Gatchell is reviewing the performance of another investment manager, Far North, which uses a value-oriented approach and specializes in the Canadian market. Gatchell would like to recommend to the investment policy committee that the fund diversify geographically. The information for Far North and the related returns are shown in Exhibit 2.

**Exhibit 2: Far North—Return Information**

	Rate of Return
Far North	14%
True active return	−1%
Misfit active return	5%

The investment policy committee reviews the information in Exhibit 2 and is not familiar with the terms “true active return” and “misfit active return.” Gatchell responds with the following statement:

The true active return is the return Far North made above its normal benchmark return. The misfit active return is the return Far North made above the investor’s benchmark return. The term “investor’s benchmark” refers to the benchmark the investor uses to evaluate performance for a given portfolio or asset class.

- 
- 1.) Based on Exhibit 1, which investment manager *most likely* meets the criteria established in the endowment's investment policy statement?
    - A. Manager B
    - B. Manager C
    - C. Manager A

Answer = A

"Equity Portfolio Management," Gary L. Gastineau, Andrew R. Olma, and Robert G. Zielinski  
Sections 3, 5.1.4

Manager B has a positive information ratio, demonstrating that he has been able to deliver active returns relative to his level of tracking error. Manager B's investment style

is consistent with a value investment style, with a higher beta for the two value indices—the small-cap value index and the large-cap value index.

- 2.) Based on Exhibit 1, is there sufficient information for Gatchell to create and interpret the results of a style box?
- A. No, because additional holdings data are required
  - B. Yes
  - C. No, because additional index data are required

Answer = A

"Equity Portfolio Management," Gary L. Gastineau, Andrew R. Olma, and Robert G. Zielinski  
Sections 5.1.5, 5.1.6

Holdings data are required to create a style box and interpret the results. Gatchell is given the styles and the assets under management but not each individual investment or holding that each investment manager has selected.

- 3.) Which fee structure is *most* appropriate for Sonera, based on the criteria in the investment policy statement?
- A. An *ad valorem* fee structure
  - B. A performance-based fee structure with a high-water mark
  - C. A performance-based fee structure with a fee cap

Answer = A

"Equity Portfolio Management," Gary L. Gastineau, Andrew R. Olma, and Robert G. Zielinski  
Section 8.3

*Ad valorem* fee structures are both simple and predictable. The *ad valorem* fee structure is calculated by multiplying the value of the assets by a percentage.

- 4.) If the investment policy committee decides to accept Gatchell's recommendation to also use passive investing, the index structure that *least likely* meets Gatchell's requirement is:
- A. a price-weighted index.
  - B. an equal-weighted index.
  - C. a value-weighted index.

Answer = B

"Equity Portfolio Management," Gary L. Gastineau, Andrew R. Olma, and Robert G. Zielinski

#### Section 4.1.1

An equal-weighted index is biased toward small-capitalization stocks.

5.) In his statement to Lafite, Gatchell is *least likely* correct with respect to:

- A. periodic rollover.
- B. redemption.
- C. cost.

Answer = B

"Equity Portfolio Management," Gary L. Gastineau, Andrew R. Olma, and Robert G. Zielinski

#### Section 4.2

Gatchell is correct that stock index futures and equity swaps are low-cost alternatives to equity index mutual funds. He is also correct that a drawback of stock index futures is that they have to be rolled over periodically. He is incorrect about the pricing of mutual funds: They are priced once daily

6.) Is Gatchell's statement regarding true active return and misfit active return correct?

- A. Yes
- B. No, he is incorrect about misfit active return
- C. No, he is incorrect about true active return

Answer = B

"Equity Portfolio Management," Gary L. Gastineau, Andrew R. Olma, and Robert G. Zielinski

#### Section 7.1

The definition of misfit active return is incorrect. Misfit active return is the difference between the normal benchmark and the investor's benchmark.

## Whitney

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Mark Whitney, CFA, is the chief investment officer of Granite State Partners, a fixed-income investment boutique serving institutional pension funds. Paula Norris, a partner at consulting firm Franconia Notch Associates, is conducting due diligence of Granite's capabilities. At a meeting, they go over a presentation Whitney has prepared.

The first page of the presentation addresses Granite's investment style for managing portfolios. It states:

"Granite adjusts the portfolio's duration slightly from the benchmark and attempts to increase relative return by tilting the portfolios in terms of sector weights, varying the quality of issues, and anticipating changes in term structure. The mismatches are expected to provide additional returns to cover administrative and management costs."

Norris asks Whitney about Granite's ability to successfully reflect, in its portfolios, its views on the market and the direction of interest rates. Whitney makes the following statements:

- Statement 1: Granite uses effective duration to measure the sensitivity of the portfolio's price to a relatively small parallel shift in interest rates. For large parallel changes in interest rates, we make a convexity adjustment to improve the accuracy of the estimated price change. We believe that parallel shifts in the yield curve are relatively rare; thus duration by itself is inadequate to capture the full effect of changes in interest rates.
- Statement 2: We address yield curve risk by using key rate durations. When using this method, we stress the spot rates for all points along the yield curve simultaneously. By changing the spot rates across maturities, we are able to measure a portfolio's sensitivity to those changes.
- Statement 3: We also measure spread duration contribution. This analysis is not related to interest rate risk. This measure describes how securities, such as corporate bonds or mortgages, will change in price as a result of the widening or narrowing of the spread to Treasuries.

Norris provides information on three clients she might refer to Whitney for portfolio management services and asks him to design a dedication strategy for each. Whitney makes the following recommendations:

- Client 1: This bank has sold a five-year guaranteed investment contract that guarantees an interest rate of 5.00% per year. I would purchase a bond with a target yield of 5.00% maturing in five years. Regardless of the direction of rates, the guaranteed value is achieved.
- Client 2: The defined benefit pension plan for this client has an economic surplus of zero. In order to meet the liabilities for this plan, I will construct the portfolio duration

to be equal to that of the liabilities. In addition, I will have the portfolio payments be less dispersed in time than the liabilities.

Client 3: This client's long-term medical benefits plan has known outflows over 10 years. Because perfect matching is not possible, I propose a minimum immunization risk approach, which is superior to the sophisticated linear program model used in the current cash flow matching strategy.

Norris asks Whitney what steps he takes to reestablish the dollar duration of a portfolio to the desired level in an asset/liability matching application. Whitney responds: "First, I calculate a new dollar duration for the portfolio after moving forward in time and shifting the yield curve. Second, I calculate the rebalancing ratio by dividing the original dollar duration by the new dollar duration and subtracting one to get a percentage change. Third, I multiply the new market value of the portfolio by the desired percentage change from step two."

Norris then asks Whitney, "What sectors are you currently recommending for client portfolios?" Whitney responds: "I recommend investing 25% of the portfolio in mortgage-backed securities because they are trading at attractive valuations. I would not, however, buy floating-rate securities because these do not hedge liabilities appropriately."

Norris asks how changing market conditions lead to secondary market trading in Granite's client portfolios. Whitney responds: "Our research teams run models to assess relative value across fixed-income sectors, which, combined with our economic outlook, leads to trade ideas. For example, our macroeconomic team currently is concerned about the situations in several sovereign nations and the spillover effect to capital markets. These issues range from geopolitical risks that will likely increase the price of oil to outright sovereign defaults or restructuring."

---

- 1.) The style of investing described in Whitney's presentation is *most likely*:
- A. a full replication approach.
  - B. enhanced indexing by small risk factor mismatches.
  - C. active management by larger risk factor mismatches.

Answer = C

"Fixed-Income Portfolio Management – Part I," H. Gifford Fong and Larry D. Guin  
Section 3.1

Granite is not only tilting the portfolios with regard to certain sectors, quality, or term structure as an enhanced indexer would, but it is also making duration adjustments. An indexer (full replication approach) or enhanced indexer would keep the duration matched to the index.

- 2.) Which of Whitney's statements with regard to implementing its market and interest rate views is *least likely* correct?

- A. Statement 2
- B. Statement 3
- C. Statement 1

Answer = A

"Fixed-Income Portfolio Management – Part I," H. Gifford Fong and Larry D. Guin  
Sections 3.2.2, 4.1.1.6

The statement regarding key rate durations is incorrect. Key rate duration is one established method for measuring the effect of shifts in key points along the yield curve. In this method, the spot rates are held constant for all points along the yield curve but one. By changing the spot rate for that key maturity, a portfolio's sensitivity to a change in that maturity can be measured. The process can be repeated for other key points (e.g., 3, 7, 10, and 15 years) to measure their sensitivities as well. Simulations of twists in the yield curve can then be conducted to see how the portfolio would react to these changes.

- 3.) Which of the following statements regarding Whitney's recommendations for Norris's three clients is *most likely* correct?
- A. Client 2 will meet the necessary conditions for a multiple-liability immunization in the case of a non-parallel rate shift.
  - B. Client 3 will require less money to fund liabilities with the proposed strategy relative to cash flow matching.
  - C. Client 1 will only achieve the guaranteed value if the term structure of interest rates is downward sloping.

Answer = B

"Fixed-Income Portfolio Management – Part I," H. Gifford Fong and Larry D. Guin  
Sections 4.2, 4.2.1

Perfect matching of assets and liabilities is unlikely given the difficulty in finding all the bonds in the market that exactly match the liabilities. As a result, cash flow matching requires a relatively conservative rate of return assumption for short-term cash, and cash balances may occasionally be substantial.

- 4.) Is Whitney's approach to rebalancing a portfolio using dollar duration *most likely* correct?
- A. No, the steps do not provide the amount of cash needed for rebalancing
  - B. No, there is no need to move forward in time
  - C. Yes

Answer = C



"Fixed-Income Portfolio Management – Part I," H. Gifford Fong and Larry D. Guin  
Section 4.1.1.5

Whitney has correctly outlined the three steps necessary to rebalance a portfolio to reestablish a desired dollar duration.

- 5.) What are the two risks that Whitney is *most likely* exposed to, given his recommendations on sectors?
- A. Interest rate risk and contingent claim risk
  - B. Contingent claim risk and cap risk
  - C. Interest rate risk and cap risk

Answer = A

"Fixed-Income Portfolio Management – Part I," H. Gifford Fong and Larry D. Guin  
Section 4.1.2.2

When such assets as mortgage-backed securities have a contingent claim provision, explicit or implicit, there is an associated risk. As rates fall, the security might have coupons halted and principal repaid, which results in reinvestment risk and also limits any potential upside as would be generated by a non-callable security. In addition, all fixed-income securities that have fixed rather than floating interest rates are exposed to interest rate risk because prices move in the opposite direction of rates.

- 6.) Whitney's secondary trading rationale is *best* described as:
- A. credit-defense trades.
  - B. sector-rotation trades.
  - C. structure trades.

Answer = A

"Fixed-Income Portfolio Management – Part I," H. Gifford Fong and Larry D. Guin  
Section 6

Credit-defense trades become more popular as geopolitical and economic uncertainty increase. Secular sector changes often generate uncertainties and induce defensive positioning by investors.

## Lehigh

---

Anna Lehigh, CFA, is a portfolio manager for Brown and White Capital Management (B&W), a US-based institutional investment management firm whose clients include university endowments.

Packer College is a small liberal arts college whose endowment is managed by B&W. Lehigh is considering a number of derivative strategies to tactically adjust the Packer portfolio to reflect specific investment viewpoints discussed at a meeting with Packer's investment committee. At the meeting, the committee reviews Packer's current portfolio, whose characteristics are shown in Exhibit 1.

**Exhibit 1: Packer Portfolio Characteristics**

Investment	Amount (\$ millions)	Risk Measure
Mountain Hawk, Inc. common stock	20	Beta: 1.30
US large-cap stocks	30	Beta: 0.95
US mid-cap stocks	10	Beta: 1.20
Eurozone large-cap stocks (unhedged, US\$ equivalent)	10	Beta: 1.10
S&P 500 Index call options (notional amount)	10	Delta: 0.50
A rated corporate bonds	20	Duration: 5.0
<b>Total</b>	<b>100</b>	

Kemal Gulen, a member of the investment committee, asks Lehigh how she manages the risk exposure of the call options investment. Lehigh responds by stating that she ensures that her call option positions are delta hedged. She notes, however, that in some instances, at an option's expiration, the option gamma is very high and maintaining a delta hedged position becomes very difficult.

Lehigh intends to synthetically modify the duration of the corporate bond component of the portfolio to a target of 3.0 in anticipation of rising interest rates. Interest rate swap data are provided in Exhibit 2.

**Exhibit 2: Pay-Fixed Interest Rate Swaps**

Swap	Maturity	Duration
A	2 years	-2.125
B	3 years	-3.375
C	3.5 years	-3.625

Lehigh notes the holding of Mountain Hawk common stock. The shares were recently donated by an alumnus who mandated that they not be sold for three years. Lehigh provides three potential options strategies to use in order to benefit from changes in Mountain Hawk's stock price, which is presently \$100.00. Options strategies are provided in Exhibit 3.

**Exhibit 3: Options Strategies for Mountain Hawk Stock**

Strategy	Lower Strike (US dollars)	Upper Strike (US dollars)
Straddle	95	95
Bull (call) spread	105	110
Bear(put) spread	90	100

Lehigh tells the committee she believes US large-cap stocks will perform well over the next year. The committee agrees and wants B&W to adjust the beta of the US large-cap part of the portfolio to a target of 1.10 by purchasing large-cap futures contracts. Lehigh proposes purchasing 15 contracts. For each contract, the beta is 1.00 and the price is \$100,000.

The committee is concerned that Europe's sovereign debt crisis may lead to volatility in European stock markets and the euro currency. It considers the hedging strategies outlined in Exhibit 4

**Exhibit 4: Hedging Strategies**

Strategy	Forwards	Futures
1	Sell euro and buy US dollars	Buy US stock market
2	Sell euro and buy US dollars	Sell European stock market
3	Buy euro and sell US dollars	Sell European stock market

Finally, Lehigh discusses B&W's market view that over the next 24 months, mid-cap stocks will underperform small-cap stocks and the Libor rate will be less than the percentage increase in the small-cap index but greater than the percentage change in the mid-cap index. She recommends executing a swap transaction in order to alter the stock and bond allocation and thus capture the economic benefit of B&W's market view. The investment committee considers the swap strategies outlined in Exhibit 5.

**Exhibit 5: Swap Strategies**

Swap Strategies	Receive	Pay
Swap 1	Libor	Mid-cap index
Swap 2	Mid-cap index	Small-cap index
Swap 3	Small-cap index	Libor

- 
- 1.) Lehigh's response to Gulen is *most likely* correct when the option is:

- A. out of the money.
- B. in the money.
- C. at the money.

Answer = C

"Risk Management Application of Option Strategies," Don M. Chance  
Section 4.2

At expiration, at-the-money call options move very rapidly to a delta of 1 or 0. At this point, the gamma is the highest and it is very difficult to maintain a delta-hedged position.

- 2.) Based on the data in Exhibit 2, modifying the duration of the fixed-income allocation to its target will require an interest rate swap that has notional principal *closest* to:
- A. \$11,030,000.
  - B. \$17,777,000
  - C. \$9,412,000.

Answer = A

"Risk Management Application of Option Strategies," Don M. Chance  
Section 2.2

$$NP = B \times \frac{(MDUR_t - MDUR_b)}{MDUR_s}$$

where;

NP = notional principal

B = bond portfolio

MDUR<sub>t</sub> = duration target of portfolio

MDUR<sub>b</sub> = duration of bond portfolio

MDUR<sub>s</sub> = duration of swap

$$11,030,000 = 20,000,000 \times \frac{3-5}{-3.625}$$

- 3.) If the price of Mountain Hawk stock declines to \$88.00, which options strategy will *most likely* have the highest value at expiration?
- A. Bull spread
  - B. Straddle

C. Bear spread

Answer = C

“Risk Management Application of Option Strategies,” Don M. Chance  
Sections 2.3, 2.4

The bear spread strategy will have a value of \$10. A bear (put) spread entails buying the put with the higher exercise price (\$100) and selling the put with the lower exercise price (\$90).

Value at expiration =  $\max(0, 100 - 88) - \max(0, 90 - 88) = 10$ .

- 4.) Will Lehigh's purchase of US large-cap futures contracts *most likely* result in the committee's beta objective for the US large-cap investment being attained?
- A. No, because the beta will be above the target
  - B. Yes
  - C. No, because the beta will be below the target

Answer = C

“Risk Management Application of Option Strategies,” Don M. Chance  
Section 3.2

Purchasing 15 futures contracts increases the beta to 1.00, not 1.10. Purchasing 45 futures contracts is necessary to attain the beta target.

$$N_f = \frac{(\beta_t - \beta_s)}{\beta_f} \times \frac{S}{f}$$

where

$N_f$  = number of futures

$\beta_t$  = beta target

$\beta_s$  = beta of the stock portfolio

$\beta_f$  = beta of the futures contract

$S$  = stock portfolio value

$f$  = price of the futures contract

$$45 = \frac{(1.10 - 0.95)}{1.00} \times \frac{30,000,000}{100,000}$$

5.) Given the committee's view about the sovereign debt crisis, which hedging strategy is *most likely* to result in Packer earning the US risk-free rate of return?

- A. Strategy 3
- B. Strategy 1
- C. Strategy 2

Answer = C

“Risk Management Application of Option Strategies,” Don M. Chance  
Section 5.3

Shorting European stock market futures, selling euros, and buying US dollars will result in the Packer endowment fund earning the US risk-free rate.

6.) Which of the following swaps will *least likely* capture the greatest economic benefit, based on the committee's 24-month market view?

- A. Swap 1
- B. Swap 3
- C. Swap 2

Answer = C

“Risk Management Application of Option Strategies,” Don M. Chance  
Section 4.3

Receiving the underperforming index (mid cap) and paying the outperforming index (small cap) will result in a net negative payment.

Manuel Silva is a principal at Raintree Partners, a financial advisory firm, and a specialist in providing advice on risk management and trading strategies using derivatives. Raintree's clients include high-net-worth individuals, corporations, banks, hedge funds, and other financial market participants.

One of Silva's clients, Iria Sampras, is meeting with Silva to discuss the use of options in her portfolio. Silva has collected information on S&P 500 Index options, which is shown in Exhibit 1.

**Exhibit 1: Options Data for S&P 500 Stock Index**  
(options expire in six months; multiplier = \$100)

Exercise Price	Call Price	Put Price
\$1,100	\$95.85	\$42.60
\$1,125	\$80.50	\$48.00
\$1,150	\$64.70	\$60.00

At the beginning of the meeting, Sampras states: "My investment in Eagle Corporation stock has increased considerably in value, and I would like suggestions on options strategies I can use to protect my gains." Silva responds:

There are two strategies that you may want to consider: covered calls or protective puts. Covered calls provide a way to protect your gains in Eagle Corporation stock. Adding a short call to your long position in Eagle stock will provide protection against losses on the stock position, but it will also limit upside gains. A protective put also provides downside protection, but it retains upside potential. Unlike covered calls, protective puts require an upfront premium payment.

At the end of the meeting, Sampras asks Silva to provide a written analysis of the following option strategies:

Strategy A: A butterfly spread strategy using the options information provided in Exhibit 1.

Strategy B: A straddle strategy using the options in Exhibit 1 with an exercise price of \$1,125.

Strategy C: A collar strategy using the options information in Exhibit 1.

On 16 March 2012, First Citizen Bank (FCB) approached Silva for advice on a loan commitment. At that time, FCB had committed to lend \$100 million in 30 days (on 15 April 2012), with interest and principal due on 12 October 2012, or 180 days from the date of the loan. The interest rate on the loan was 180-day Libor + 50 bps, and FCB was concerned about interest rates declining between March and April. Silva advised FCB to purchase a \$100 million interest rate put on 180-day Libor with an exercise rate of 5.75% and expiring on 15 April 2012. The put premium was \$25,000. Libor rates on 16 March 2012 and 15 April 2012 were 6% and 4%, respectively. The

option was exercised on 15 April 2012, and the payoff was received on 12 October 2012. FCB has asked for a written evaluation of the success of the strategy.

On 15 October 2013, another client, Short Hills Corporation (SHC), indicates it expects to take out a \$25 million dollar loan on 15 December 2013. The loan rate is 90-day Libor + 100 bps. Interest and principal will be paid on 15 March 2014, 90 days after the loan is made on 15 December 2013. SHC is concerned about rising interest rates and has approached Silva for recommendations on addressing this issue. On Silva's advice, SHC purchases a \$25 million interest rate call on 90-day Libor with an exercise rate of 3.5%. The option premium is \$45,000, and it expires in 61 days, on 15 December 2013. If the option is exercised on 15 December 2013, the payoff will be received on 15 March 2014. SHC has asked Silva to provide a report on possible outcomes relative to potential interest rate scenarios.

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1.) Is Silva's response to Sampras regarding reducing exposure to Eagle Corporation stock *most likely* correct?

- A. No, he is incorrect about covered calls
- B. No, he is incorrect about protective puts
- C. Yes

Answer = A

"Risk Management Applications of Option Strategies," Don M. Chance  
Section 2.2

Silva is incorrect about covered calls. Covered calls do not provide protection against downside losses. They do limit upside gains

2.) Based on the information in Exhibit 1, the maximum profit per contract for Strategy A is *closest* to:

- A. \$9,015.
- B. \$5,855.
- C. \$2,545.

Answer = C

"Risk Management Applications of Option Strategies," Don M. Chance  
Section 2.3.3

In the butterfly spread, using calls the investor goes long the \$1,100 and \$1,150 strikes and short two of the \$1,125 strike. The maximum profit is when the index is at \$1,125. The maximum profit per contract = Profit on long \$1,100 + Profit on two short \$1,125 + Profit on long \$1,150 =  $(\$1,125 - \$1,100) - \$95.85 + (2 \times \$80.50) - \$64.70 = \$25.45$ . The profit per contract =  $\$25.45 \times \$100 = \$2,545$ .



3.) Based on the information presented in Exhibit 1, the maximum loss per contract for Strategy B is *closest* to:

- A. \$20,900.
- B. \$10,350.
- C. \$12,850.

Answer = C

"Risk Management Applications of Option Strategies," Don M. Chance  
Section 2.4.2

The straddle consists of a long call and a long put at a strike price of \$1,125. The maximum loss occurs when the index is at \$1,125, when the call and put are at the money. The maximum loss = Call premium + Put premium = \$80.50 + \$48.00 = \$128.50. Per the contract, the loss is  $\$100 \times \$128.50 = \$12,850$ .

4.) The expected volatility of the S&P 500, relative to market expectations, is *least likely* to be a factor in the decision to implement:

- A. Strategy A.
- B. Strategy C.
- C. Strategy B.

Answer = B

"Risk Management Applications of Option Strategies," Don M. Chance  
Sections 2.3.3, 2.4.1, 2.4.2

Strategy C is a collar, which is a directional strategy; that is, its performance is dependent on the direction of the movement of the underlying (in this instance, the S&P 500). The performance of Strategy A (butterfly spread) and Strategy B (straddle) are based on the expected volatility (relative to the rest of the market) of the S&P 500.

5.) Based on Silva's advice, the effective annual interest rate for First Citizen Bank's loan is *closest* to:

- A. 5.75%.
- B. 4.56%.
- C. 6.38%.

Answer = C

"Risk Management Applications of Option Strategies," Don M. Chance  
Section 3.2

The effective annual rate is calculated as follows:

Future value of put premium on 15 April:

$$\$25,000 \left[ 1 + (0.06 + 0.005) \left( \frac{30}{360} \right) \right] = \$25,135.42$$

Effective loan outlay = \$100,000,000 + \$25,135.42 = \$100,025,135.42.

Loan interest is calculated as;

$$\$100,000,000 \left[ (0.04 + 0.005) \left( \frac{180}{360} \right) \right] = \$2,250,000$$

Put Payoff:

$$\$100,000,000 \left[ \max \left( 0, 0.0575 - 0.04 \right) \left( \frac{180}{360} \right) \right] = \$875,000$$

Effective interest = \$2,250,000 + \$875,000 = \$3,125,000.

Effective annualized loan rate:

$$\left[ \frac{100,000,000 + 3,125,000}{100,025,135} \right]^{\frac{365}{180}} - 1 = 0.0638$$

- 6.) Assuming Silva's advice is followed and Libor rates are 5% and 6% on 15 October 2013 and 15 December 2013, respectively, the effective annual interest rate on Short Hills Corporation's loan is *closest* to:

- A. 3.50%.
- B. 5.42%.
- C. 4.64%.

Answer = B

"Risk Management Applications of Option Strategies," Don M. Chance  
Section 3.1

The effective annual rate is calculated as follows:

Future value of call premium on 15 December:

$$45,000 \left[ 1 + \left( 0.05 + 0.01 \right) \left( \frac{61}{360} \right) \right] = \$45,457.50$$

Effective loan proceeds = \$25,000,000 – \$45,457.50 = \$24,954,542.50.

Loan Interest:

$$25,000,000 \left[ \left( 0.06 + 0.01 \right) \left( \frac{90}{360} \right) \right] = \$437,500$$

Call payoff:

$$25,000,000 \left[ \max(0, 0.06 - 0.035) \left( \frac{90}{360} \right) \right] = \$156,250$$

Effective interest = \$437,500 – \$156,250 = \$281,250.

Effective annualized loan rate:

$$\left[ \frac{25,000,000 + 281,250}{24,954,542} \right]^{\frac{365}{90}} - 1 = 0.0542$$

## Watanabe

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Kamiko Watanabe, CFA, is a portfolio adviser at Wakasa Bay Securities. She specializes in the use of derivatives to alter and manage the exposures of Japanese equity and fixed-income portfolios. She has meetings today with two clients, Isao Sato and Reiko Kondo.

Sato is the manager of the Tsushima Manufacturing pension fund, which has a target asset allocation of 60% equity and 40% bonds. The fund has separate equity and fixed-income portfolios, whose characteristics are provided in Exhibits 1 and 2. Sato expects equity values to increase in the coming two years and, in order to avoid substantial transaction costs now and in two years, would like to use derivatives to temporarily rebalance the portfolio. He wants to maintain the current beta of the equity portfolio and the current duration of the bond portfolio.

**Exhibit 1: Tsushima Pension Fund  
Equity Portfolio Characteristics**

Current market value	¥27.5 billion
Benchmark	Nikkei 225 Index
Current beta	1.15

**Exhibit 2: Tsushima Pension Fund  
Bond Portfolio Characteristics**

Current market value	¥27.5 billion
Benchmark	Nikko Bond Performance Index composite
Current duration	4.75

In order to rebalance the pension fund to its target allocations to equity and bonds, Watanabe recommends using Nikkei 225 Index futures contracts, which have a beta of 1.05 and a current contract price of ¥1,525,000, and Nikko Bond Performance Index futures, which have a duration of 6.90 and a current contract price of ¥4,830,000. She assumes the cash position has a duration of 0.25.

Sato wants to know if other derivatives could be used to rebalance the portfolio. In response, Watanabe describes the characteristics of a pair of swaps that, together, would accomplish the same rebalancing as the proposed futures contracts strategy.

Kondo manages a fixed-income portfolio for the Akito Trust. The portfolio's market value is ¥640 million, and its duration is 6.40. Kondo believes interest rates will rise and asks Watanabe to explain how to use a swap to decrease the portfolio's duration to 3.50. Watanabe proposes a strategy that uses a pay-fixed position in a three-year interest rate swap with semi-annual payments. Kondo decides he wants to use a four-year swap to manage the portfolio's duration. After some calculations, Watanabe tells him a pay-fixed position in a four-year interest rate swap with a duration of -2.875 would require a notional principal of ¥683 million (rounded to the nearest million yen) to achieve his goals.

Kondo asks Watanabe whether it would be possible to cancel the swap prior to its maturity. Watanabe responds with three statements:

- Statement 1: If you purchase a swaption from the same counterparty as the original swap, it is common to require the payments of the two swaps be netted or cash settled if the swaption is exercised.
- Statement 2: You could purchase a payer swaption with the same terms as the original swap. This approach would protect you from falling fixed swap rates but at the cost of the premium you would pay to the swaption counterparty.
- Statement 3: During the life of the swap, you could enter into a new pay-floating swap with the same terms as the original swap, except it would have a maturity equal to the remaining maturity of the original swap. However, the fixed rate you receive might be lower than the fixed rate you are paying on the original swap.
- 

- 1.) The number of Nikko Bond Performance Index futures Sato must sell to rebalance the Tsushima pension fund to its target allocation is *closest to*:

- A. 743.
- B. 149.
- C. 1,594.

Answer = A

“Risk Management Applications of Forward and Futures Strategies,” Don M. Chance  
Section 4.1

The total value of the portfolio is ¥55.0 billion, and the 40% target allocation to bonds would be ¥22.0 billion, but the current allocation is ¥27.5, or ¥5.5 billion more. In order to correct this discrepancy, the equivalent of ¥5.5 billion in bonds with a duration of 4.75 must be sold using bond futures and then converted to equity exposure with a 1.15 beta using stock futures. The number of bond futures contracts to be sold (shorted) is

$$N_{bf} = \frac{(MDUR_T - MDUR_B)}{MDUR_f} \times \left( \frac{B}{f_B} \right),$$

where  $MDUR_T$  is the target modified duration (0.25 for cash),  $MDUR_B$  is the current bond portfolio duration (4.75),  $MDUR_f$  is the modified duration of the futures contract (6.90),  $B$  is the value of the bonds being converted to cash (¥5.5 billion), and  $f_B$  is the price of one bond futures contract (¥4,830,000). Therefore, the number of contacts is;

$$N_{bf} = \frac{(0.25 - 4.75)}{6.90} \times \left( \frac{5,500,000,000}{4,830,000} \right) = -742.64$$

or sell 743 bond contacts.

- 2.) The number of Nikkei 225 Index futures Sato must buy to rebalance the Tsushima pension fund to its target allocation is *closest to*:

- A. 4,148.
- B. 3,293.
- C. 3,950.

Answer = C

"Risk Management Applications of Forward and Futures Strategies," Don M. Chance  
Section 4.1

The total value of the portfolio is ¥55.0 billion and the 60% target allocation to equity would be ¥33.0 billion, but the current allocation is ¥27.5 or ¥5.5 billion less. In order to correct this discrepancy, the equivalent of ¥5.5 billion in bonds with a duration of 4.75 must be sold using bond futures (converted to synthetic cash) and then converted to equity exposure with a 1.15 beta using stock futures. The number of equity futures contracts to be bought is;

$$N_{sf} = \frac{(\beta_T - \beta_S)}{\beta_f} \times \left( \frac{S}{f_S} \right),$$

where  $\beta_T$  is the target beta (1.15),  $\beta_S$  is the beta of the synthetic cash position (0),  $\beta_f$  is the beta of the futures contract (1.05),  $S$  is the value of the stock being created from the synthetic cash position (¥5.5 billion), and  $f_S$  is the price of one equity futures contract (¥1,525,000). Therefore, the number of contracts is;

$$N_{sf} = \frac{(1.15 - 0.00)}{1.05} \times \left( \frac{5,500,000,000}{1,525,000} \right) = -3,950.04$$

- 3.) Which of these is *most likely* to be a characteristic of one of the two swaps Watanabe describes to Sato?

- A. Receive return on Nikko Bond Performance Index
- B. Pay return on Nikkei 225 Index
- C. Receive Libor

Answer = C

"Risk Management Applications of Swap Strategies," Don M. Chance  
Section 4.3

One of the swaps would be pay Nikko Bond Performance Index return and receive Libor.

- 4.) The duration of the swap in Watanabe's first proposal to Kondo is closest to:

- A. -1.75.

- B. -2.00.
- C. -2.75.

Answer = B

"Risk Management Applications of Swap Strategies," Don M. Chance  
Section 2.1

A pay-fixed (receive-floating) position in an interest rate swap is similar to issuing a fixed-rate bond and buying a floating-rate bond with the proceeds. The duration of the fixed-rate bond is approximately 75% of the maturity, and the swap is short this duration. The duration of the floating-rate bond is approximately half its repricing frequency, and the swap is long this duration. Therefore, the duration of the three-year swap with semi-annual payments is  $(0.5 \times 0.5) - (0.75 \times 3) = -2.00$ .

- 5.) Is the notional principal of the swap Watanabe recommends to Kondo *most likely* correct?
- A. No, it is too high
  - B. Yes
  - C. No, it is too low

Answer = A

"Risk Management Applications of Swap Strategies," Don M. Chance  
Section 2.2

The notional principal needed is;

$$NP = B \times \left( \frac{MDUR_T - MDUR_B}{MDUR_S} \right)$$

where  $B$  is the value of the fixed-income portfolio, and  $MDUR$  is the duration of  $T$  = target,  $B$  = current portfolio, and  $S$  = swap. Therefore, the correct notional principal is;

$$NP = 640 \times \left( \frac{3.50 - 6.40}{-2.875} \right) = 645.57$$

or ¥646 million rounded to the nearest million yen. Watanabe recommends a notional principal of ¥683, which is too high.

- 6.) Which of Watanabe's three statements to Kondo is *least likely* correct?
- A. Statement 3
  - B. Statement 1
  - C. Statement 2

Answer = C

"Risk Management Applications of Swap Strategies," Don M. Chance  
Section 5

The original swap is pay-fixed, implying that the offsetting swap would be pay-floating. A receiver swaption provides its owner with the right to enter a pay-floating (receive-fixed) in a swap at the exercise fixed rate, whereas a payer swaption provides the right to enter the swap in a pay-fixed position.