

### LEVEL III

**Question:** 1  
**Topic:** Portfolio Management - Individual  
**Minutes:** 33

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**Reading References:**

19. “Managing Individual Investor Portfolios,” Ch. 2, James W. Bronson, Matthew H. Scanlan, and Jan R. Squires, *Managing Investment Portfolios: A Dynamic Process*, 3<sup>rd</sup> edition (CFA Institute)

**Purpose:**

To test the candidate’s ability to create an investment policy statement for an individual investor.

**LOS:** 2007-III-5-19-g, j, k, l, m, n

19. “Managing Individual Investor Portfolios”  
The candidate should be able to:
- g) formulate the relationship of risk attitudes and decision-making styles with individual investor personality types;
  - j) discuss each of the major objectives that an individual investor’s investment policy statement includes;
  - k) distinguish between an individual investor’s ability to take risk and willingness to take risk;
  - l) discuss how to set risk and return objectives for individual investor portfolios;
  - m) discuss each of the major constraints that an individual investor’s investment policy statement includes;
  - n) formulate and justify an investment policy statement for an individual investor;

## Guideline Answer:

### Part A

Jack and Ruth Ingram Investment Policy Statement  
Return Objective:

The return requirement reflects two main factors: first, the need to cover annual inflation-adjusted living expenses of C\$ 200,000; and second, the desire to make testamentary inflation-adjusted gifts of C\$ 3,000,000.

Living expenses and taxes in one year (inflation adjusted) = C\$ 205,000  
(C\$ 200,000  $\times$  1.025)

#### Asset base

Inheritance	C\$ 2,400,000
Bonds and cash	800,000
Stock in Pitt Manufacturing	1,000,000
Less: immediate 1 <sup>st</sup> year cash withdrawal	<u>(200,000)</u>
Total asset base	<u>C\$ 4,000,000</u>

The value of the real estate has been removed from the return calculation as it will be donated.

Present value of asset base	C\$ 4,000,000
Required terminal value of asset base (real dollars)	C\$ 3,000,000

Planning Horizon 35 years

Calculation of nominal pre-tax return requirement:

N=35, pv = 4 million, pmt = -205,000, fv = -3 million, compute i/y = 4.84%

*or*

N=35, pv = -4 million, pmt = 205,000, fv = 3 million, compute i/y = 4.84%

Real required return =	4.84%	or	1.0484	
Inflation adjustment	<u>2.50%</u>		$\times$ <u>1.0250</u>	
Nominal, pre-tax return requirement	<u>7.34%</u>		1.0746	- 1 = <u>7.46%</u>

Therefore, the Ingrams have a nominal pre-tax return objective of 7.34% or 7.46% for their portfolio.

**Part B**

**Template for Question 1-B**

<b>Characterize the Ingrams as below-average, average, or above-average in their ability to take risk. (circle one)</b>	<b>Justify your response with <i>three</i> reasons based on the Ingrams' specific circumstances.</b>
<div>Below-average</div> <div>Average</div> <div>Above-average</div>	1. Given their life expectancies, the Ingrams are using a long term (35 year) planning horizon.
	2. The Ingrams have a substantial asset base relative to their spending needs.
	3. In the event that their performance is not satisfactory, the Ingrams may reduce or eliminate the planned testamentary gifts. This larger margin for error allows them to accommodate volatility in the portfolio.
	4. The Ingrams could change their plans to donate the house/land.
	5. Opportunities for additional income exist (reemployment, etc.).

**Part C**

**Template for Question 1-C**

<b>Select the investor personality type for i. Jack and ii. Ruth. (circle one for each)</b>		<b>Justify <i>each</i> selection with <i>one</i> fact from the information about the Ingrams presented in Exhibit 1.</b>
i. Jack	Cautious Methodical Spontaneous Individualist	<ul style="list-style-type: none"><li>• Jack’s desire for facts rather than generalities</li><li>• Jack’s interest in reading articles and other information about investments</li></ul>
ii. Ruth	Cautious Methodical Spontaneous Individualist	<ul style="list-style-type: none"><li>• Ruth’s prior experience of living through economic hardship caused by poor investment performance</li><li>• Ruth’s unease with volatility</li></ul>

**Part D**

**Template for Question 1-D**

<b>Prepare the constraints section of an IPS for the Ingrams.</b>
<b>Time horizon</b> The Ingrams have a long, single-stage time horizon.
<b>Liquidity</b> The Ingrams require pre-tax annual distributions of \$200,000 starting immediately and adjusted for inflation in future years. There will be no major outflows from the portfolio until death.
<b>Taxes</b> A large portion of the Ingrams' portfolio is invested in the stock of a single company. This stock has been purchased over time and has a low average cost basis. Rebalancing the portfolio would create a tax liability which would need to be paid from the portfolio's assets.
<b>Legal and regulatory</b> Post retirement, Jack will become a member of the board of the company he worked for during his career. Jack has significant amounts of company stock which should be re-balanced to create a diversified portfolio. However, Jack will continue to be an insider, thus the timing and disclosure requirements must be considered.
<b>Unique circumstances</b> The Ingrams have a valuable piece of real estate that they have decided to bequeath to the provincial park rather than selling it. They have asked that this property not be considered in their financial planning; as such it is not included in the asset base.

### LEVEL III

**Question:** 2  
**Topic:** Portfolio Management – Individual  
**Minutes:** 20

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#### **Reading References:**

23. “Low-Basis Stock,” Ch.10, *Integrated Wealth Management: The New Direction for Portfolio Managers*, Jean L.P. Brunel (Euromoney Institutional Investor Plc, 2002)
31. “Asset Allocation,” Ch. 5, William F. Sharpe, Peng Chen, Jerald E. Pinto, and Dennis W. McLeavey, *Managing Investment Portfolios: A Dynamic Process*, 3<sup>rd</sup> edition (CFA Institute)

#### **Purpose:**

To test the candidate’s understanding of asset allocation for a individual investor.

#### **LOS: 2007-III-5-23-c**

23. “Low-Basis Stock”  
The candidate should be able to:
- c) judge the effectiveness of outright sales, exchange funds, completion portfolios, and hedging as financial strategies to reduce concentrated equity risk.

#### **LOS: 2007-III-8-31-n, o, p**

31. “Asset Allocation”  
The candidate should be able to:
- n) determine and justify a strategic asset allocation, given an investment policy statement and capital market expectations;
  - o) summarize the characteristic issues relating to asset allocation for individual investors and for institutional investors (i.e., defined-benefit plans, foundations, endowments, insurance companies, banks) and critique a proposed asset allocation in light of those issues;
  - p) critique and revise a strategic asset allocation, given an investment policy statement and capital market expectations;

**Part A**  
**Template for Question 2-A**

Candidate may choose one of two strategies as most appropriate. Although Equity Collar is the most appropriate choice, the guideline answer and grading key allow a private exchange fund (versus a public exchange fund) to earn points.

If **Equity collar** is chosen, the template is as follows:

<p><b>Determine which of the four strategies is the <i>most</i> appropriate given the Ingrams' instructions. (circle one)</b></p>	<p><b>Justify your response with <i>two</i> reasons.</b></p>
<p>Outright sale</p>	<p>An equity collar <b>would not</b> require the sale of Pitt and therefore avoids the realization of capital gains and associated taxes.</p>
<p>Equity collar</p>	<p>An equity collar provides protection at or close to the current market price of Pitt and therefore limits downside risk associated with the position in the concentrated holding.</p>
<p>Exchange fund</p>	<p>An equity collar would allow some exposure to potential upside price movements of Pitt.</p>
<p>Completion portfolio</p>	

If **Exchange fund** is chosen, the template is as follows:

<p><b>Determine which of the four strategies is the <i>most</i> appropriate given the Ingrams' instructions. (circle one)</b></p>	<p><b>Justify your response with <i>two</i> reasons.</b></p>
<p>Outright sale</p> <p>Equity collar</p> <p>Exchange fund</p> <p>Completion portfolio</p>	<p>A private exchange fund creates an opportunity to borrow against the stock without creating the additional risks associated with leverage.</p> <p>A private exchange fund will retain some exposure to potential upside price movements.</p>

**Part B**  
**Template for Question 2-B**

If candidate chose **Equity collar** as the most appropriate strategy in Part A, the template is as follows:

Strategies not selected in Part A	<p><b>State, for <i>each</i> of the strategies not selected in Part A, <i>one</i> reason why it is <i>not</i> the most appropriate for the Ingrams.</b></p> <p><b>Note: Justifying your answer by simply reversing your response to Part A will receive no credit.</b></p>
1. Outright sale	<p>An outright sale of the low basis Pitt stock will result in a realized gain and a tax liability for the Ingrams.</p> <p>An outright sale would also eliminate any upside price potential of the position in Pitt.</p>
2. Exchange funds	<p>This strategy would eliminate any significant upside price potential associated with the position in Pitt.</p>
3. Completion portfolio	<p>Constructing a completion portfolio requires significant liquidity.</p> <p>Constructing a completion portfolio can require significant time.</p> <p>Even though the Ingrams have 13% of their assets in cash equivalents, this is likely insufficient liquidity to structure a completion portfolio for such a large position in Pitt. Also, they cannot raise cash by leveraging their portfolio.</p>

If candidate chose **Exchange fund** as the most appropriate strategy in Part A, the template is as follows:

Strategies not selected in Part A	<p><b>State, for <i>each</i> of the strategies not selected in Part A, <i>one</i> reason why it is <i>not</i> the most appropriate for the Ingrams.</b></p> <p><b>Note: Justifying your answer by simply reversing your response to Part A will receive no credit.</b></p>
1. Outright sale	<p>An outright sale of the low basis Pitt stock will result in a realized gain and a tax liability for the Ingrams.</p> <p>An outright sale would also eliminate any upside price potential of the position in Pitt.</p>
2. Completion portfolio	<p>Constructing a completion portfolio requires significant liquidity.</p> <p>Constructing a completion portfolio can require significant time.</p> <p>Even though the Ingrams have 13% of their assets in cash equivalents, this is likely insufficient liquidity to structure a completion portfolio for such a large position in Pitt. Also, they cannot raise cash by leveraging their portfolio.</p>

The above is an acceptable answer if exchange fund is chosen as the most appropriate strategy. However, Equity Collar is not an inappropriate choice.

**Part C**

**Template for Question 2-C**

<b>Identify, based on the Ingrams' IPS, <i>three</i> other problems in the current asset allocation.</b>	<b>Support <i>each</i> of your responses with <i>one</i> reason.</b>
1. Liquidity (in the form of cash equivalents) is too high at 13% of the portfolio.	The 13% cash position is not consistent with the Ingrams' low liquidity constraint.
2. Shortfall risk of the portfolio exceeds the stated limit of –12% return in any one year.	<p>Swann has concluded that the Ingrams' shortfall risk threshold is –12% in any given year. The current portfolio exceeds this limit.</p> <p>Expected return = 7.1%  Less: Two standard deviations = <math>12.1 \times 2 = (24.2\%)</math>  Shortfall risk = –17.1%</p>
3. Excess concentration in small cap stocks (even excluding the 25% Pitt)  <i>or</i> Portfolio is not adequately diversified.	<p>The portfolio is too risky (volatile) for the Ingrams' risk tolerance.</p> <p><i>or</i>  Additional asset classes should be included (e.g. international equities)</p> <p><i>or</i>  When including the Pitt stock, a Canadian stock that also has small cap characteristics, the portfolio is even more highly concentrated at 66% (41% + 25%).</p>
4. Expected return is too low.	The expected return of the portfolio of 7.1% is less than the return objective specified in the Ingrams' IPS.

### LEVEL III

**Question:** 3

**Topic:** Portfolio Management – Institutional/Behavioral

**Minutes:** 12

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**Reading References:**

18. “Alpha Hunters and Beta Grazers,” Martin L. Leibowitz, *Financial Analysts Journal* (CFA Institute, September/October 2005)
26. “Capital Market Expectations,” Ch. 4, John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition (CFA Institute)

**Purpose:**

To test the candidate’s knowledge of behavioral finance concepts.

**LOS:** 2007-III-4-18-b

18. “Alpha Hunters and Beta Grazers”  
The candidate should be able to:
  - b) discuss the behavior of different market actors, specifically “holders,” “rebalancers,” “valuators,” and “shifters,” and the impacts of these investor types on market movements;

**LOS:** 2007-III-7-26-b

26. “Capital Market Expectations”  
The candidate should be able to:
  - b) discuss, in relation to capital markets expectations: the limitations of economic data; data measurement errors and biases; the limitations of historical estimates; *ex post* risk as a biased measure of *ex ante* risk; biases in analysts’ methods; the failure to account for conditioning information; the misinterpretation of correlations; psychological traps; and model uncertainty;

### Template for Question 3

For <i>each</i> Nultione and Hyatt:		
i. Identify <i>two</i> psychological traps they have fallen into.  Note: Four different psychological traps must be identified.		ii. Justify your position by stating evidence from the information provided.
Nultione	1. Overconfidence trap - the tendency of individuals to overestimate the accuracy of their forecasts.	Nultione is convinced that his models are more accurate than could reasonably be expected from financial forecasts. This is evidenced by the overly precise nature of his prediction both as to expected returns and associated timings. He would not consider the possibility of failure in his predictions.
	2. Confirming evidence trap - the bias that leads individuals to give greater weight to information that supports an existing or preferred point of view than evidence that contradicts it.	Nultione has fallen into the confirming evidence trap in that he gives more weight to information that supports his preferred point of view rather than evidence that contradicts it. When asked by Hyatt to reassess his optimistic market forecast, he seeks out information that supports his existing point of view and dismisses information that does not. He rejects 17 analysts with contrary views and chooses to focus on 3 reports that agree with his conclusion.
	3. Recallability trap - the tendency of forecasts to be overly influenced by events that have left a strong impression on a person's memory, particularly in the case of catastrophic or dramatic past events.	Nultione was disturbed when he missed the market low and the associated buying opportunity several years earlier. Now his forecasts are influenced by this memory in the direction of not missing another market low.

**Template for Question 3 (continued)**

Hyatt	1. Anchoring trap - the tendency to give disproportionate weight to the first (or early) information received on a topic. Initial impressions, estimates, or data “anchor” subsequent judgments.	Hyatt has fallen into the anchoring trap in that he is unable to take an objective view of Nultione’s work. This is because he has familiarity with Singh’s work from hearing him at a conference. Although Nultione points out that some of the key variables used in Singh’s analysis have changed since the conference, Hyatt’s views do not change. Also, Nultione has only recently been hired by EA.
	2. Status quo trap - the tendency for forecasts to perpetuate recent observations. To predict no change from recent past.	Hyatt has fallen into the status quo trap in that he is convinced that the current weak performance of the U.S. market will continue. A trend itself is not sufficient evidence to predict that it will continue. Acting to change the status quo may lead to regret if the decision is wrong, as is evidenced by Hyatt’s concern about the performance impact if Nultione is wrong.
	3. Prudence trap - the tendency to temper forecasts so that they do not appear extreme, or the tendency to be overly cautious in forecasting.	This trap is evidenced by Hyatt’s concern that implementing forecasts as extreme as Nultione’s can produce large negative relative performance impacts, perhaps even jeopardizing his career with EA.

### LEVEL III

**Question:** 4  
**Topic:** Portfolio Management – Individual  
**Minutes:** 14

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**Reading References:**

31. “Asset Allocation,” Ch. 5, William F. Sharpe, Peng Chen, Jerald E. Pinto, and Dennis W. McLeavey, *Managing Investment Portfolios: A Dynamic Process*, 3<sup>rd</sup> edition (CFA Institute)

**Purpose:**

To test the candidate’s ability to determine an appropriate asset allocation for an individual investor.

**LOS:** 2007-III-8-31-i, j, l

31. “Asset Allocation”

The candidate should be able to:

- i) select and justify an appropriate set of asset classes for an investor;
- j) evaluate the theoretical and practical effects of including an additional asset class such as inflation-protected securities, large cap developed markets or emerging market securities, or alternative assets in an asset allocation;
- l) compare and contrast the following approaches to asset allocation: mean–variance, resampled efficient frontier, Black–Litterman, Monte Carlo simulation, ALM, and experience based;

## **Part A**

Inflation-protected bonds should be considered as a separate asset class because:

- The inflation-protected bonds have a low correlation with the nominal fixed rate corporate and government bonds, meeting the criterion that an asset class be diversifying.
- The economics of inflation-protected bonds are significantly different from nominal bonds. The volatility of inflation-protected bonds depends on the volatility of the relevant real interest rates, while the nominal bond volatility depends on the volatility of nominal interest rates. Thus, inflation-protected bonds have attributes that are distinct from those of nominal bonds; an asset class including both types of bonds would fail to meet the criterion that assets within an asset class be relatively homogenous.
- Inflation-protected bonds, as represented by TIPs, are empirically strongly correlated with each other across maturities; i.e., they are relatively homogenous.
- Inflation-protected bonds provide inflation and deflation protections that complement those of nominal bonds (floating or fixed coupon). Each type of bond considered separately (but not together) is relatively homogenous.

## **Part B**

Asset classes as a group should make up the preponderance of world investable wealth. A number of asset classes are omitted, including non-U.S. securities.

Asset classes should be homogeneous. Assets within an asset class should have similar attributes and react in the same way to market forces. The U.S. balanced fund is not a homogeneous asset class, as it contains equity and fixed income securities which react differently to market movements.

Asset classes should be mutually exclusive. Overlapping asset classes will reduce the effectiveness of strategic asset allocation in controlling risk and also cause problems in developing asset class return expectations. The U.S. balanced fund overlaps nominal U.S. corporate bonds and the S&P 500 Index Fund.

Asset classes should be diversifying. For risk control purposes, an included asset class should not have extremely high expected correlations with other asset classes or with a linear combination of the other asset classes. Nominal U.S. corporate bonds and nominal U.S. government bonds have an expected correlation of 0.85.

## Part C

How integrating the Black–Litterman methodology into the asset allocation process would affect:

- i. Specification of expected return inputs – Using historical data assumes that future expected returns will equal historic means. Black–Litterman reverse engineers the expected returns implicit in a diversified market portfolio and combines them with the investor’s own views (if any) on expected returns in a systematic way that takes into account the investor’s confidence in his or her views. Historical mean returns do not reflect either current market equilibrium returns or the investor’s views.
- ii. Level of market diversification of the resulting portfolio – The use of historical mean returns as expected return inputs often results in highly concentrated (undiversified) portfolios. The Black–Litterman approach is anchored to a well diversified portfolio, and ensures the strategic asset allocation is well diversified. Combining the investor’s views with equilibrium returns helps dampen the effect of any extreme views that could otherwise dominate the optimization.

### LEVEL III

**Question:** 5  
**Topic:** Portfolio Management – Institutional  
**Minutes:** 23

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**Reading References:**

25. “Managing Institutional Investor Portfolios,” Ch. 3, R. Charles Tschampion, Laurence B. Siegel, Dean J. Takahashi, and John L. Maginn, *Managing Investment Portfolios: A Dynamic Process*, 3<sup>rd</sup> edition (CFA Institute)
45. “Alternative Investments Portfolio Management,” Ch. 8, Jot K. Yau, Thomas Schneeweis, Thomas R. Robinson, and Lisa R. Weiss, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition (CFA Institute)

**Purpose:**

To test the candidate’s ability to create an appropriate investment policy statement for an institutional investor.

**LOS:** 2007-III-6-25-i, j, l

25. “Managing Institutional Investor Portfolios”  
The candidate should be able to:
- i) discuss investment objectives and constraints for foundations, endowments, insurance companies, and banks;
  - j) formulate an investment policy statement for a foundation, an endowment, an insurance company, and a bank;
  - l) evaluate the factors that affect the investment policies of pension funds, foundations, endowments, life and non-life insurance companies, and banks;

**LOS:** 2007-III-12-45-f, g

45. “Alternative Investments Portfolio Management”  
The candidate should be able to:
- f) review the investment characteristics of the major types of investment within alternative investment groups, including risks and liquidity;
  - g) identify and evaluate any return enhancement and/or risk diversification effects of an alternative investment relative to a comparison portfolio (e.g., one invested in common equity and bonds) given relevant data, and justify any identified benefits in terms of characteristics and/or market opportunity exploited by the alternative investment;

## **Guideline Answer:**

### **Part A**

The Endowment's return objective is to maintain the real value (purchasing power) of the portfolio and to grow the portfolio in order to provide on-going support equal to 5% of the university budget. The required rate of return for the endowment is 8.08%. This level of return is needed to cover the cost of the 4.00% spending rule, the university's inflation rate of 3.25%, and the annual investment management expense of 0.65%.

This is calculated by a multiplicative formulation:

$$(1.040)(1.0325)(1.0065) - 1.0 = 0.0808 \text{ or } 8.08\%$$

### **Part B**

- i. With respect to the endowment's ability to take risk:

The endowment has an increased ability to tolerate short-term risk with respect to its role in the university's operating budget. The endowment contributes a relatively low percentage (5%) of CU's budget. A drop in the endowment value should not have a major impact on CU's ability to carry out its operations; therefore the endowment is able to pursue investments with greater risk.

- ii. The CU endowment's past performance as reflected in the year-end market values of the endowment:

CU endowment's current market value (\$500 million) reflects an approximate 0.5% compound growth rate over 2002–2006. The endowment is just meeting the support expectation of CU. Thus, the endowment's recent weak investment performance is a factor tending to decrease its ability to take risk.

### **Part C**

#### *Liquidity*

In order to meet the spending needs of the endowment, the liquidity need is 4.0% of the previous fiscal year end market value, or 4.65%, including investment management expense.

#### *Time Horizon*

The endowment has a single-stage, long-term time horizon, as it is expected to support the CU's budget in perpetuity.

## **Part D**

The rolling three-year average spending rule will dampen the volatility of the amount available to spend each year, which would allow the portfolio to accept more volatility, increasing the endowment's ability to take on risk while striving for higher long-term returns. The higher returns should translate into a larger spending allowance, which could be used for scholarships.

## **Part E**

Palmer's proposed asset allocation would likely affect the portfolio as follows:

- i. *Return*  
The long-term returns of the NAREIT and Hedge Fund investments have been higher than both stocks and bonds. Commodity future returns have been slightly lower than the bond investment returns. The proposed portfolio's expected return would be higher than the existing portfolio.
- ii. *Risk*  
The correlations of all three alternative investments with global equity and global fixed income are all much less than 1.00, indicating these alternative investments have sources of return that are different from stocks and bonds and offer good potential for portfolio risk reduction.
- iii. *Liquidity*  
Indirect real estate investments and commodity futures investments are exchange traded, offering relatively high levels of liquidity. Hedge funds are often subject to lock-up periods, so they are not a liquid investment. Adding these three asset classes in equal proportion to constitute in total 15% of the portfolio should not affect, or only slightly reduce, the overall liquidity of the portfolio.

### LEVEL III

**Question:** 6  
**Topic:** Portfolio Management – Institutional  
**Minutes:** 23

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**Reading References:**

25. “Managing Institutional Investor Portfolios,” Ch. 3, R. Charles Tschampion, Laurence B. Siegel, Dean J. Takahashi, and John L. Maginn, *Managing Investment Portfolios: A Dynamic Process*, 3<sup>rd</sup> edition (CFA Institute)

**Purpose:**

To test the candidate’s ability to create an appropriate investment policy statement for the institutional investor.

**LOS:** 2007-III-6-25-i, j, l, o

25. “Managing Institutional Investor Portfolios”  
The candidate should be able to:
- i) discuss investment objectives and constraints for foundations, endowments, insurance companies, and banks;
  - j) formulate an investment policy statement for a foundation, an endowment, an insurance company, and a bank;
  - l) evaluate the factors that affect the investment policies of pension funds, foundations, endowments, life and non-life insurance companies, and banks;
  - o) compare and contrast the investment objectives and constraints of institutional investors given relevant data such as descriptions of their financial circumstances and attitudes toward risk.

**Guideline Answer:**

**Part A**

**Template for Question 6-A**

<b>Identify <i>two</i> constraints in the investment policy statement that are affected <i>solely</i> by the change in business mix using the information given in Exhibit 1.</b>	<b>Justify your response with <i>one</i> reason for <i>each</i> constraint.</b>
1. Liquidity	<p>In a rising rate environment, fixed rate annuities are more likely to be subject to disintermediation. Without sufficient liquidity, Pawtucket would be forced to sell securities at a loss to meet surrenders of policies and annuity contract disbursements.</p> <p><i>or</i></p> <p>The fixed rate annuities will require a higher level of liquidity in order to meet the <i>current</i> periodic payouts to annuity holders.</p>
2. Time Horizon	<p>Pawtucket's time horizon is shorter due to the changing product mix. Since Pawtucket's life insurance contracts have significantly higher duration than the fixed rate annuities, the change in business mix toward annuities has decreased the duration of Pawtucket's liabilities from 12.6 to 11.1.</p>

**Part B**  
**Template for Question 6-B**

<p><b>Determine whether Pawtucket Mutual's ability to take risk has increased or decreased based solely on the change in business mix. (circle one)</b></p>	<p><b>Justify your response with <i>two</i> reasons.</b></p>
<p>Increased</p> <p>Decreased</p>	<p>The following reasons justify a decrease in Pawtucket's ability to take risk:</p> <ol style="list-style-type: none"> <li>1. Time Horizon: Since the duration of the liabilities is decreasing, the time horizon of the investment portfolio should be reduced accordingly, thus lowering Pawtucket's ability to take risk.</li> <li>2. Reinvestment risk: As the fixed rate annuity product grows as a percentage of Pawtucket Mutual's business, reinvestment risk increases since contract rates are guaranteed using estimates of the rate at which interest payments will be reinvested. The fixed rate nature of the annuities reduces Pawtucket's ability to take risk.</li> <li>3. Pawtucket's surplus has dropped from \$500 million to \$475 million, thus reducing its ability to take risk.</li> <li>4. Liquidity needs – As fixed rate annuities make up a larger share of the business mix, a higher level of liquidity is required in order to meet the <i>current</i> periodic payouts to annuity holders. The need for greater liquidity reduces Pawtucket's ability to take risk.</li> <li>5. Liquidity needs – In a rising rate environment, fixed rate annuities are more likely to be subject to disintermediation. Without sufficient liquidity, Pawtucket would be forced to sell securities at a loss to meet surrenders of policies and annuity contract disbursements. The need for greater liquidity reduces Pawtucket's ability to take risk.</li> </ol>

**Part C**  
**Template for Question 6-C**

<b>Risk</b>	<b>Discuss the source of <i>each</i> risk contained in Pawtucket Mutual's investment portfolio based on Exhibits 2 and 3.</b>	<b>Indicate the likely effect (positive, negative, or no effect) of <i>each</i> risk on Pawtucket Mutual's surplus if Leander's forecast is correct. (circle one)</b>
1. Valuation risk	<p>The mismatch of assets and liabilities will have a negative effect on Pawtucket Mutual's financial health. Since the average duration of the assets exceeds the average duration of the liabilities, a rising rate environment will have a negative effect on surplus.</p> <p><b>or</b></p> <p>In a rising rate environment, the large holdings of mortgage backed securities may extend the duration of the assets, increasing the negative effect on surplus.</p>	<p>Positive</p> <p><input checked="" type="radio"/> Negative</p> <p>No effect</p>
2. Cash flow volatility risk	<p>The large holding in mortgage securities adds uncertainty to cash flows. When interest rates rise, slower prepayment rates reduce cash inflows and associated interest on interest yield. These cash flows are an integral part of the reserve funding formula and a source of surplus growth.</p>	<p>Positive</p> <p><input checked="" type="radio"/> Negative</p> <p>No effect</p>
3. Credit risk	<p>Credit risk in investment grade and high-yield fixed income holdings will affect surplus. The risk is that credit spreads can widen, leading to lower asset valuations and potential defaults. Either of these situations could lead to depleting the asset valuation reserve, thereby reducing surplus.</p>	<p>Positive</p> <p><input checked="" type="radio"/> Negative</p> <p>No effect</p>
4. Reinvestment risk	<p>The reinvestment risk/return of coupon and principal payments from corporate bonds and mortgage securities is influenced by interest rate volatility. Higher interest rates will lead to higher reinvestment rates, which would have a positive impact on surplus.</p>	<p><input checked="" type="radio"/> Positive</p> <p>Negative</p> <p>No effect</p>

### LEVEL III

**Question:** 7  
**Topic:** Portfolio Management – Institutional  
**Minutes:** 13

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**Reading References:**

54. “Monitoring and Rebalancing,” Ch. 11, Robert D. Arnott, Terence E. Burns, Lisa Plaxco, and Philip Moore, *Managing Investment Portfolios: A Dynamic Process*, 3<sup>rd</sup> edition (CFA Institute)

**Purpose:**

To test the candidate’s knowledge of monitoring and rebalancing portfolios.

**LOS:** 2007-III-15-54-g, h

54. “Monitoring and Rebalancing”  
The candidate should be able to:
- g) evaluate the effects of the following factors on an asset class’s optimal corridor width, assuming a percentage-of-portfolio rebalancing approach: transaction costs, risk tolerance, correlation, the asset class’s volatility, and the volatility of the remainder of the portfolio;
  - h) distinguish among the payoffs in up, down, and nontrending markets of (1) rebalancing to a constant mix of equities and bills, (2) buying and holding equities, and (3) constant-proportion portfolio insurance (CPPI);

**Guideline Answer:**

**Template for Question 7-A**

**Note: No calculations are required.**

<b>Asset class and revised market expectation</b>	<b>Determine, for <i>each</i> revised market expectation, whether the stated asset class corridor widths in Exhibit 1 should be wider, unchanged, or narrower. (circle one)</b>	<b>Justify <i>each</i> of your responses with <i>one</i> reason.</b>
Domestic fixed income:  Long-term positive correlations of domestic fixed income with the other asset classes are expected to fall.	Wider  Unchanged  <u>Narrower</u>	Expectations for lower correlations between domestic fixed income and other asset classes should result in a narrower corridor width for domestic fixed income. Domestic fixed income is less likely to move in synch with the other asset classes, thus resulting in higher likelihood of divergence from the optimal target asset allocation.
International fixed income:  International fixed income volatility is already relatively high and is expected to rise further due to increased foreign currency fluctuation. Pingshi's policy is not to hedge foreign currency risk.	Wider  Unchanged  <u>Narrower</u>	The expected higher volatility in international fixed income results in a greater chance of the asset class weight moving away from the target asset allocation. Hence, the corridor width should be narrower to remain close to the optimal target asset allocation.
Domestic real estate:  Liquidity in the domestic real estate market is expected to decline, and transaction costs are expected to rise.	<u>Wider</u>  Unchanged  Narrower	Higher relative transaction costs associated with real estate investments make it difficult for the benefits of rebalancing to overcome the associated transaction costs. Consequently, the corridor width should be wider so that rebalancing costs do not outweigh the benefits of being at or close to optimal target asset allocation.

## **Part B**

The CPPI strategy is expected to underperform the Constant-Mix strategy in equity markets that experience flat returns in the long term with periods of significant volatility. This is because under CPPI the target equity allocation (“cushion”) is positively related to the level of the market. CPPI requires a manager to sell shares after weaknesses and buy after strength; those transactions are unprofitable if market declines are followed by rebounds and increases are retraced.

The Constant-Mix strategy is expected to outperform CPPI in equity markets that experience flat returns in the long term with periods of significant volatility. This is because under Constant-Mix the target equity allocation is unrelated to the level of the equity market. Constant-Mix requires a manager to buy shares as the stock falls and to sell shares as stock values rise; those transactions are profitable if market declines are followed by rebounds and increases are retraced.

### LEVEL III

**Question:** 8

**Topic:** Portfolio Management – Institutional/Equity

**Minutes:** 14

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**Reading References:**

- 42. “Equity Portfolio Management,” Ch. 7, Gary Gastineau, Andrew R. Olma, and Robert G. Zielinski, *Managing Investment Portfolios: A Dynamic Process*, 3<sup>rd</sup> edition (CFA Institute)
- 43. “The Losers Game,” Charles D. Ellis, *Financial Analysts Journal* (AIMR, January–February 1995)
- 56. “Evaluating Portfolio Performance,” Ch. 12, Jeffrey V. Bailey, Thomas M. Richards, and David E. Tierney, *Managing Investment Portfolios: A Dynamic Process*, 3<sup>rd</sup> edition (CFA Institute)
- 59. “Global Performance Evaluation,” Ch. 12, *International Investments*, 5<sup>th</sup> edition, Bruno Solnik and Dennis McLeavey (Addison Wesley, 2003)

**Purpose:**

To test the candidate’s knowledge of monitoring and rebalancing portfolios.

**LOS:** 2007-III-11-42-h, j, o, p, r

- 42. “Equity Portfolio Management”  
The candidate should be able to:
  - h) discuss, compare, and contrast techniques for identifying investment styles and characterize the style of an investor given either a description of the investor’s security selection method, details on security holdings, or results of a returns-based style analysis;
  - j) explain and interpret the equity style box and evaluate the effects of style drift;
  - o) contrast derivatives-based and stock-based enhanced indexing strategies, and demonstrate the fundamental law of active management including its use to justify enhanced indexing;
  - p) explain and interpret a systematic approach to optimizing allocations to a group of managers;
  - r) distinguish among the components of total active return (“true” active return and “misfit” active return), their associated risk measures (“true” active risk and “misfit” risk), and explain their relevance for evaluating a portfolio of managers;

**LOS:** 2007-III-11-43

43. “The Losers Game”

The candidate should be able to: contrast a Winner’s Game to a Loser’s Game and explain the impediments for successfully investing in a market that is perceived to be a Loser’s Game.

**LOS:** 2007-III-16-56-v

56. “Evaluating Portfolio Performance”

The candidate should be able to:

v) distinguish between the information ratio and the Sharpe ratio;

**LOS:** 2007-III-16-59-c, d

59. “Global Performance Evaluation”

The candidate should be able to:

- c) explain the purpose of global performance attribution, and calculate the contribution of market allocation, currency allocation, and security selection;
- d) discuss the various risk measures used to appraise an investment manager’s performance;

### Part A

AVA was actively managed between 2002 and 2006, as shown by AVA's selection, which accounts for 12 percent of the return variation that is unexplained by its style fit of 88 percent, suggesting that AVA is not replicating passive benchmark returns.

### Part B

AVA did not experience significant style drift between 2002 and 2006, since its Sharpe style weight was consistently at or above 96% on the Russell 1000 Value Index. Variations in the Sharpe style weights across the other style indices were consistently low over the period.

### Part C

The information ratio can be calculated on either a gross or net basis; that is, based on returns either before or after fees.

$$\begin{aligned}\text{Gross-of-fees information ratio} &= \text{Expected Active Return} / \text{Expected Active Risk} \\ &= \frac{0.016}{0.016} = 1.0\end{aligned}$$

$$\begin{aligned}\text{Net-of-fees information ratio} &= (\text{Active Return} - \text{Fees}) / \text{Active Risk} \\ &= \frac{0.016 - 0.003}{0.016} = \frac{0.013}{0.016} = 0.8125 \approx 0.81\end{aligned}$$

### Part D

Taylor's recommendation of a core-satellite portfolio is appropriate for Xenius. There are three reasons supporting Taylor's recommendation:

- The expected after-fee active return of the core-satellite portfolio is 1.3%, which exceeds the policy target for active return of 1% (and the active return of the enhanced index manager, 1%).
- The expected active risk of the core-satellite portfolio is 1.6%, which is within the policy guideline for tracking error of 2%.
- The information ratio of the core-satellite portfolio is expected to be greater than that of the enhanced index manager on both a pre-fee basis (1.00 vs. 0.92) and an after-fee basis (0.81 vs. 0.77).

### LEVEL III

**Question:** 9

**Topic:** Portfolio Management – Performance Evaluation

**Minutes:** 9

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**Reading References:**

59. “Global Performance Evaluation,” Ch. 12, *International Investments*, 5<sup>th</sup> edition, Bruno Solnik and Dennis McLeavey (Addison Wesley, 2003)

**Purpose:**

To test the candidate’s knowledge of performance evaluation and attribution.

**LOS:** 2007-III-16-59-c

59. “Global Performance Evaluation”

The candidate should be able to:

- c) explain the purpose of global performance attribution, and calculate the contribution of market allocation, currency allocation, and security selection;

**Guideline Answer:**

- i. Market return measures the performance that would have been achieved had the manager invested in a local market index instead of individual securities.

$$\text{Market return} = \sum w_i \times \text{Local index return}_i$$

$$\text{Market return}_{\text{PPM}} = 0.30 \times 1.0\% = 0.30\%$$

$$\text{Market return}_{\text{SCM}} = 0.45 \times 10.7\% = 4.82\%$$

$$\text{Market return}_{\text{CTM}} = 0.25 \times 3.4\% = 0.85\%$$

$$\text{Market return} = 0.30\% + 4.82\% + 0.85\% = \underline{5.97\%}$$

- ii. Currency measures the effect of currency movements on the performance of security selection in the base currency.

$$\text{Currency} = \sum w_i \times \text{Currency contribution}_i, \text{ where Currency contribution}_i \text{ is } [\text{Security total return (base currency)}_i - \text{Security total return (local currency)}_i]$$

$$\text{Currency}_{\text{PPM}} = 0.30 \times (6.2\% - 8.5\%) = -0.69\%$$

$$\text{Currency}_{\text{SCM}} = 0.45 \times (3.4\% - 15.4\%) = -5.40\%$$

$$\text{Currency}_{\text{CTM}} = 0.25 \times (13.5\% - 13.5\%) = 0.00\%$$

$$\text{Hence, Currency} = -0.69\% + (-5.40\%) + 0.00\% = \underline{-6.09\%}$$

- iii. Security selection is the contribution made by the manager's individual security selection in the local currency.

$$\text{Security selection return} = \sum w_i \times \text{Security selection contribution}_i, \text{ where Security selection contribution}_i \text{ is } [\text{Security total return (local currency)}_i - \text{Local index return}_i]$$

$$\text{Security selection return}_{\text{PPM}} = 0.30 \times (8.5\% - 1.0\%) = 2.25\%$$

$$\text{Security selection return}_{\text{SCM}} = 0.45 \times (15.4\% - 10.7\%) = 2.12\%$$

$$\text{Security selection return}_{\text{CTM}} = 0.25 \times (13.5\% - 3.4\%) = 2.53\%$$

$$\text{Hence, Security selection return} = 2.25\% + 2.12\% + 2.53\% = \underline{6.90\%}$$

Note: Other methods of calculation could also be used to obtain the same result.

### LEVEL III

**Question:** 10

**Topic:** Portfolio Management – Economic Analysis

**Minutes:** 19

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**Reading References:**

- 26. “Capital Market Expectations,” Ch. 4, John P. Calverley, Alan M. Meder, Brian D. Singer, and Renato Staub, *Managing Investment Portfolios: A Dynamic Process*, 3rd edition (CFA Institute)
- 28. “Macroanalysis and Microvaluation of the Stock Market,” Ch. 12, *Investment Analysis and Portfolio Management*, 8th edition, Frank K. Reilly and Keith C. Brown (South-Western, 2006)

**Purpose:**

To test the candidate’s knowledge of economic concepts, particularly inflation.

**LOS:** 2007-III-7-26-c

- 26. “Capital Market Expectations”  
The candidate should be able to:
  - c) demonstrate the application of formal tools for setting capital market expectations including statistical tools, discounted cash flow models, the risk premium approach, and financial equilibrium models;

**LOS:** 2007-III-7-28-d

- 28. “Macroanalysis and Microvaluation”  
The candidate should be able to:
  - d) compare and contrast the different approaches to estimation of earnings per share, and how to estimate the different components.

**Guideline Answer:**

**Template for Question 10-A**

<b>i. Identify <i>three</i> variables from Exhibit 1 that are used to estimate the S&amp;P 500 aggregate operating profit margin.</b>	<b>ii. Determine, for <i>each</i> identified variable, the expected effect of the 2007 forecast on the S&amp;P 500 aggregate operating profit margin.</b> <b>Note: Consider each variable independently and assume all other variables remain constant. (circle one)</b>	<b>iii. Justify your answer to Part ii with <i>one</i> reason for <i>each</i> identified variable.</b>
1. Inflation rate	<p style="text-align: center;">Increase</p> <p style="text-align: center;"><u>Decrease</u></p> <p style="text-align: center;">No Change</p>	Without the ability to fully pass on price increases, an increase in inflation will decrease operating profit margin as costs increase without an offsetting increase in sales price.
2. Capacity utilization rate	<p style="text-align: center;"><u>Increase</u></p> <p style="text-align: center;">Decrease</p> <p style="text-align: center;">No Change</p>	Given the level of capacity utilization in Exhibit 1, an increase in capacity utilization will increase operating profit margin. As production levels increase, fixed costs are spread over a larger revenue base; i.e., per unit fixed costs decrease.
3. Unit labor costs (% change)	<p style="text-align: center;"><u>Increase</u></p> <p style="text-align: center;">Decrease</p> <p style="text-align: center;">No Change</p>	A decrease in unit labor costs will increase operating profit margin because it will cost less to produce the same amount of sales volume.
4. Depreciation expense	<p style="text-align: center;">Increase</p> <p style="text-align: center;"><u>Decrease</u></p> <p style="text-align: center;">No Change</p>	Assuming EBIT is used as the measure of operating profit, an increase in depreciation expense will decrease operating profit if there is no change in revenues or other costs.

## Part B

The Grinold–Kroner (GK) model is an extension of the Gordon growth model that takes explicit account of share repurchases. The model also provides a means for analysts to incorporate expectations of valuation levels through the P/E ratio. Based on the information provided in Exhibit 2, Steiner’s decision to use the GK model is based on:

1. The U.S. Data includes a share repurchase yield of 1%. The GK model takes explicit account of share repurchases and is therefore an appropriate model for Steiner’s analysis.
2. Exhibit 2 shows a per period change in P/E of 0.25%. The GK model allows changing P/E ratios to be incorporated and is therefore appropriate for Steiner’s analysis.

## Part C

The return to U.S. equities using the Grinold–Kroner model is calculated as follows:

$$E(R_e) = D/P - \Delta S + i + g + \Delta P/E$$

Where

- $E(R_e)$  is the expected return on equity
- $D/P$  is the expected dividend yield = 2%
- $\Delta S$  is the expected percent change in shares outstanding (the negative of the repurchase yield) = -1%
- $i$  is the expected inflation rate = 4%
- $g$  is the expected real total earnings growth rate = 4%
- $\Delta P/E$  is the per-period percent change in the P/E multiple = 0.25%

Therefore  $E(R_e) = 2\% - (-1\%) + 4\% + 4\% + 0.25\% = 11.25\%$