CFE 101 Model Solutions
November 2025

1. **Learning Objectives:**

1. The candidate will understand the foundations of ERM and be able to apply them to organizations.

Learning Outcomes:

(2) The Internal Environment

(a) Recommend an appropriate enterprise risk management framework for an organization

(b) Analyze the ERM roles and responsibilities of the people within an organization and how the different groups can collaborate effectively

(c) Demonstrate an understanding of governance issues, such as agency, compliance and legal risks and the need for audit and market conduct compliance activities

(d) Evaluate the elements and structure of a successful risk management function

(3) The External Environment

(a) Examine the impact of the external environment on an organization's ability to achieve its objectives

Sources:

CFE101-102-25: Leveraging COSO Across The Three Lines Of Defenses (p 6, 17-18)

CFE101-108-25: PSI ESG Underwriting Guide for Life & Health Insurance: Managing environmental, Social, and governance risks (p 27)

CFE101-110-25: IAA Paper: Importance of Climate-Related Risks for Actuaries (p 12)

CFE101-112-25: Internal Controls Toolkit by Christine H. Doxey, Chapter 1 (p 30-32)

CFE101-115-25: How CEOs Can Mitigate Compounding Risks (p 2-3)

Regulatory Risk and North American Insurance Organizations (p 40, 43)

Commentary on Question:

This question tests candidate's understanding of the roles and responsibilities of effective risk management in an organization, including use of controls and for risks that are not easily quantifiable. The candidate should demonstrate knowledge of the three lines of defense, elements for successful risk management, and management of compounding risk.

1. Continued

Solution:

(a)

(i) Identify three key responsibilities that an actuary in Risk & Compliance might typically have for determining how ESG risks should be managed.

(ii) Describe how each type of compounding risk could arise within the ESG risk framework.

(iii) Describe one action Spirit Life can take to address ESG-related compounding risk.

Commentary on Part a(i)

Candidates were generally able to identify 3 tasks but sometimes identified tasks generally involved in ongoing management of existing risks rather than tasks needed when determining how risks should be managed.

Solution for Part a(i):

As the Second Line of Defense at a smaller company, an actuary in Risk & Compliance typically has oversight of, but may also manage, some risks & controls for the business. Three key tasks for a Risk actuary include:

1. Describing the risk appetite statements and tolerances/limits for risks
2. Identifying, describing, and maintaining the ESG risks in an inventory

   Implementing a risk-scoring methodology to prioritize ESG risks across other risks & functions.

Commentary on Part a(ii)

Most candidates were able to identify and define the three types of compounding risk. Strong candidates were able to solidify their description by including an example related to ESG risks.

Solution for Part a(ii)

Connected Risk: when multiple sources of risks are assumed to be independent are actually connect through a broader system.

The increase in environmental related events could cause stricter regulation for reporting related to ESG issues due to increased public advocacy and it could also create higher mortality at the same time. In addition, investments could lose value if the environmental event exposes the companies invested in to losses. This means that one event could have cascading impacts across the organization from compliance, marketing and brand management, underwriting and pricing, and finance and investments. The framework may only measure these impacts independently and assume that not all of them will happen at the same time, which will underestimate the impact.

1. Continued

Combined risks: when one or more risks build over time until a trigger point causes a major disruption.

- One social media post about the companies ESG risk practices or investments could spread virally, causing widespread reputational damage. Escalation thresholds may be set too high so this issue would not be detected. For example, the framework may measure number of social media posts that adversely impact the company related to ESG risks. Although the number of posts may be low, the building of viral spreading of this one post can cause severe damage that would not have been detected in the framework.

Novel risks: when multiple risks interact in unexpected ways to create a new risk.
The long-term impact of climate change and its interaction with the broader economy and market could create a novel risk. Disruptions due to natural disasters or other climate related risks could interact with both mortality and longevity experience and the supply chain of the companies that Spirit life is invested in. The unknown severity and impact of this interaction makes it difficult to use traditional risk management to mitigate. The framework may not consider these novel risks or allocate enough resources to them, as they may be very unlikely and far into the future past the normal strategic time horizon considered.

Commentary on Part a(iii)
Most candidates were able to identify a general risk management best practice but many candidates did not draw a connection to ESG compounding risk or adequately explain why their recommendation was appropriate.

Solution for Part a(iii):
A Horizon Planning Approach is one action Spirit Life could introduce. The business would monitor trends and consider how any climate-change-related events or updates in medical research:

1. would impact the current core life & annuity products.
2. could develop on new and emerging business in the strategic plan.
3. should influence creating genuinely new products or business opportunities that take advantage of perceived shifts or potential disruptions.

(b) The CFO of Spirit Life indicates that the company has sufficient coverage of ESG risks through activities already in place, especially in the areas of investments and modeling.

- Spirit Life follows specific guidelines from the Task Force on Climate-Related Financial Disclosure of the Financial Stability Board and participates in industry climate surveys. However, the company does not have a risk appetite statement or policy around investments in climate-related industries.

1. Continued

- The company has an established Model Governance Committee, responsible for oversight of the Model Risk Policy and the controls for financial, pricing, projection, and valuation models. A small team that supports model validation reviews, as part of complying with the policy, reports to the CFO. The team leader suggests the existing policy and controls may address the use of Artificial Intelligence and Machine Learning in underwriting but believes that use of these emerging technologies may introduce unfamiliar risk, especially with new regulations.

  The CFO asserts that these activities provide adequate assurance to the Board that ESG controls are effective.

(i) Evaluate the CFO's assertion.

(ii) Explain what your role should be, as an actuary in Risk & Compliance at Spirit Life, in establishing a risk appetite for investment in certain climate-related industries.

(iii) Recommend how Spirit Life's existing Model Risk Policy and controls framework could serve as a template for addressing the company's regulatory risk.

Commentary on Part b(i)
Most candidates correctly noted that the controls were not effective as-is. Strong candidates were able to identify specific positives and negatives in the existing controls, providing provide support for their evaluation that went beyond the language in the question stem.

Solution for Part b(i):

The steps above are good first steps in controlling and managing ESG risks. It unfortunately is not enough. It is good to use guidelines from a reputable source like the Task Force on Climate-Related Financial Disclosure but a risk appetite statement and policy around investments around climate-related industries is needed to ensure the investment department is making the right decisions when it comes to investing. Having this risk appetite statement and policy makes sure that there is a common fall back point if there are ever questions for what to do when investing. Participating in climate surveys is good, since participating will likely mean you get to use the data once collected, but it doesn't protect the company from ESG risk.

1. Continued

It is also good that there is a policy in place for model risk and that validation is taking place of the models by a separate team from the people who create the models. Additionally, I agree that artificial intelligence and machine learning will create additional unfamiliar risk. That means the Model Risk policy needs to be updated to include these risks.

Commentary on Part b(ii)
Most candidates were able to identify 2nd line roles/tasks that were related to general risk management practices. Strong candidates were able to map out a course of action for establishing a new risk appetite that included 1st line & 2nd line actuarial tasks, given that Spirit Life is a smaller insurer.

Solution for Part b(ii):
The second line responsibility is to establish risk appetite and tolerances or assess appropriateness of existing ones as the organization grows or shifts. An actuary provides professional accountability to the climate-risk-related activities that help the company define and operate within a risk appetite statement.
Actuaries are likely involved in some of the following activities that help build or inform a risk appetite statement:

- Calculate climate-related exposures on assets
- Analyze and stress the portfolio to quantify climate-related risks
- Develop and monitor investment management strategies that consider investment in climate-related industries.
- Report on climate-related risks and exposures to climate-related industries.

In a smaller company like Spirit Life, an actuary may take a more active part in developing and overseeing the investment strategy to define and operate within a risk appetite. They may perform a bottom-up assessment of the existing ESG risk exposure, conduct interviews with senior management and the Board to determine risk strategy, align the risk appetite with corporate strategy, create a formal risk management policy with mitigation strategies and metrics to monitor risks, and communicate this to relevant stakeholders within the company.

Commentary on Part b(iii)
Candidates would generally have benefited from a more thorough reading of the question. Strong answers identified specific positive elements of the existing policy and framework that would also apply to regulatory risk, described additional regulatory risk considerations and made an appropriate recommendation for the company.

1. Continued

Solution for Part b(iii):

Regulatory Risk deals with risks from changes to or introduction of regulations that affect products and business processes. While typically a Strategic risk, at a smaller company, it and Model Risk may both be considered on Operational Risk, and the existing policy and controls could be expanded to include those specifically related to regulatory risk on the company's models and operational processes.

Regulatory Risk is a broader company risk, however. Management of Regulatory Risk reflects the culture of the entire company, across all 3 lines of defense. With the CEO concerns on reputation and strategy from ESG risks, driven by regulatory changes, Spirit Life would benefit from developing specific company-wide policy and controls. There are two very positive aspects of the model risk policy and controls framework, namely the existence of a specific model governance committee, and the existence of team supporting validations. Both ideas could be used as template for managing regulatory risks.

Furthermore, a smaller company might choose simply to expand the duties of each Governance Committee, like for Model risk, to consider and manage relevant Regulatory risks. Again, given the heightened CEO concerns, Spirit Life could also designate or hire a person (or team) to own Regulatory Risk, to coordinate Regulatory Risk Policy activities across the various functions in the company, such as:

- Government Relations function in the 1st line or
- Regulatory Risk or Compliance (or Legal) team member in the 2nd line

The Audit team would be able to provide assurance on the effectiveness of these controls within their existing duties, such as for Model Risk controls.

2. Learning Objectives:

3. The candidate will understand how an organization can articulate its approach to risk and how to assess risk and return trade-offs. The candidate will understand the approaches for managing risk. The candidate will understand different concepts of risk capital, risk measures in capital assessment and techniques to allocate risk capital once aggregated.

Learning Outcomes:

(3) Risk Capital
- (a) Explain how to develop a capital model for a hypothetical organization
- (b) Demonstrate a conceptual understanding of economic measures of value and capital requirements (e.g., EVA, embedded value, economic capital, regulatory measures, and accounting measures) and their uses in decision-making processes
- (c) Apply risk measures (such as VaR and TVaR) and demonstrate how to use them in value and capital assessment
- (d) Demonstrate the use of techniques to allocate risk once aggregated
- (e) Propose techniques of attributing the "cost" of risk/capital strategies to business units in order to gauge performance (e.g. returns on marginal capital)

Sources:

Embedded Value Calculation for a Life Insurance Company; Page 4-6, 13-14, 19- 24

Quantitative Enterprise Risk Management by M. Hardy & D. Saunders, Chapter 3: Risk Measures; Page 95-96, 374.

Commentary on Question:

The goal of this question is to evaluate the candidate's conceptual understanding of economic measures of value and capital requirements, including embedded value and related frameworks, and their ability to apply risk measures, in the assessment of value and capital. Additionally, it assesses the candidate's capacity to integrate these concepts to inform sound decision-making in practical contexts, such as potential M&A transactions.

Solution:

(a) As part of this analysis, an XYZ actuary has proposed the following considerations for calculating EV and assessing an appropriate purchase price of ABC.

I. XYZ can evaluate ABC's EV without factoring its capacity to generate new business.

II. XYZ can assess ABC's after-tax profit by using the change in reserve based on company-specific economic assumptions.

III. In its calculation of normal increase in EV, XYZ should assume that ABC's free capital is growing at the hurdle rate from one period to the next.

2. Continued

IV. As a public company, the calculated EV of ABC is an appropriate value to use as the purchase price without modification.

Evaluate each of the considerations in the proposal.

Commentary on Question:
To receive full points, candidates needed to have correct assessments and support with good explanations. For II, candidates needed to point out that reserves use prescribed assumptions. For III, candidates needed to point out that free capital grows at a rate lower than the hurdle rate.

(i) This statement is true. EV only considers inforce business and doesn't consider the ability to generate new business.
(ii) The statement is false. In the AT profit calculation, the increase in statutory actuarial reserve was accounted for, where it was evaluated by using prescribed conservative assumptions.
(iii) It is false, the free capital cannot earn the hurdle rate because the free capital is assumed to be returned to the shareholder at the beginning of the projection because it is more than the locked-in capital. It usually uses a rate lower than the hurdle rate.
(iv) False. For a public insurance company, Embedded Value (EV) on its own is not an appropriate measure to use directly as the purchase price. EV does not fully reflect market-consistent adjustments, future new business value, potential synergies, transaction costs, or investor-required returns. In practice, purchase price is based on a range of valuation methods (e.g., multiples, appraisal value), and EV would typically be adjusted before being used as a basis for M&A pricing.

(b) Understanding the potential impact of extreme losses is crucial for assessing the financial stability of ABC. To help XYZ prepare for extreme events that could significantly impact ABC's risk profile, an actuarial analyst has simulated 100 scenarios from a Weibull distribution. Results are shown in the "Q2.b" tab of the Excel spreadsheet, with the parameters and Cumulative Distribution Function provided below:

- $F(x) = 1 - e^{-(\frac{x}{\theta})^{\tau}}$
- $\tau = 2$
- $\theta = 3$
- x is the loss variable

Refer to tab "Q2.b" of the Excel spreadsheet.

2. Continued

(i) Calculate the loss amounts based on the Weibull distribution with the given parameters by using the simulated percentiles in the Excel workbook. Show your work.

(ii) Calculate the Expected Shortfall at the 90% confidence level by using the losses calculated in part (i). Show your work.

Commentary on Question:
Most candidates performed well on this question. To receive full credit, candidates needed to correctly calculate the inverse function. For (ii), candidates were expected to rank the losses and take the average of the top 10 losses. Inaccurate answers in (i) did not affect the grading of (ii).

See Excel Workbook for Solution

(c) The Profits to Shareholders Method and the Cost of Capital Method are two approaches for calculating EV.

Your manager asks you to use the given information to demonstrate the following equality by performing the calculations of each of the following components:

$$\begin{aligned} &PV\ of\ Increase\ in\ Capital \\ &\quad = LockedInCapital \\ &\quad + PV\ of\ Hurdle\ Rate\ Multiplied\ by\ the\ Change\ in\ Capital \end{aligned}$$

You are given the following assumptions:

- Hurdle Rate: 15%
- Risk-Free Rate: 10%
- Projected Capital: Provided for each year over 100 years; the projected capital on and after 12/31/2124 is assumed to be 0.

Refer to tab "Q2.c" of the Excel spreadsheet.

(i) Calculate the present value of increase in capital. Show your work.

(ii) Calculate the present value of hurdle rate multiplied by the change in capital. Show your work.

(iii) Calculate the locked-in capital. Show your work.

(iv) Evaluate what additional information is needed to make a recommendation about whether to purchase ABC.

2. Continued

Commentary on Question:
For (i), most candidates failed to correctly calculate the present value of increase in capital by using the hurdle rate. For (ii), the formula in the question was shown incorrectly so an alternative solution was also given full points (see Excel file). For (iii), most candidates failed to acknowledge the locked-in capital is the time 0 capital give in the question. For (iv), to receive full points, candidates need to identify at least 3 additional items and support with sufficient explanations. Good answers needed to mention new business, ERM structure, and other M&A considerations. Reasonable answers with sufficient explanations are given full points.

See Excel Workbook for Solution

3. **Learning Objectives:**

1. The candidate will understand the foundations of ERM and be able to apply them to organizations.

2. The candidate will understand the types of risks faced by an entity and be able to identify and assess these risks.

3. The candidate will understand how an organization can articulate its approach to risk and how to assess risk and return trade-offs. The candidate will understand the approaches for managing risk. The candidate will understand different concepts of risk capital, risk measures in capital assessment and techniques to allocate risk capital once aggregated.

Learning Outcomes:

(3) The External Environment
(a) Examine the impact of the external environment on an organization's ability to achieve its objectives

(2) Risk Assessment
(f) Demonstrate an understanding of model risk

(2) Responding to Risks
(b) Demonstrate the use of controls in an organizational process
(f) Demonstrate possible techniques for managing non-financial risks

(3) Risk Capital
(b) Demonstrate a conceptual understanding of economic measures of value and capital requirements (e.g., EVA, embedded value, economic capital, regulatory measures, and accounting measures) and their uses in decision-making processes
(c) Apply risk measures (such as VaR and TVaR) and demonstrate how to use them in value and capital assessment

Sources:

Quantitative Enterprise Risk Management, Hardy, Mary and Saunders, David, 2022, Chapter 14 Model Risk and Governance

CFE101-109-25: Managing 21st Century Political Risk

Regulatory Capital Adequacy for Life Insurance Companies: A Comparison of Four Jurisdictions

CFE101-112-25: Internal Controls Toolkit by Christine H. Doxey, Chapter 1

3. Continued

Commentary on Question:
This question tests candidates' understanding of political risk, model risk, and the interrelationship between the two. Candidates who received full marks were able to clearly articulate their understanding of both concepts, in the context of Helios. For parts (a) and (b), many candidates lost points by providing general comments, or failed to tie their responses to Helios. In part (c), most candidates performed well on the calculations, but some candidates struggled to articulate

Solution:

(a) Propose three types of political risk that the consultant should consider as most relevant to Helios when building the predictive analytics model for political risk. Justify your selections.

Commentary on Question:
This question tested candidates' knowledge of political risk categories, as it applied to Helios. It was critical that knowledge of Helios and the predictive analytics model was demonstrated. Responses with a general listing of types of political risk received no marks. Candidates who demonstrated knowledge of types of political risk without explicitly naming them received partial or full marks.

Geopolitics – wars can significantly impact the portfolio of Helios because its portfolio has exposure to Eastern Europe; wars and unrest can lower the value of companies; it could force international companies to exit a country without being able to recoup investments made in local infrastructure and employee training.

Internal conflict – Social unrest and civil wars could significantly disrupt the operations of a company and cause depreciation of bonds, private equity, MBS, etc. Services and financial industry companies can be especially vulnerable to internal conflict and the Helios investment portfolio has a high concentration in those industries.

Law and regulation changes – business-unfriendly regulatory and law changes in Asia could increase the cost of doing business or even force companies out of business, resulting in portfolio losses. New tariffs and trade wars could lead to inflation, lower consumer demand, job losses, and potentially result in economic slowdown hurting investment returns. With a significant international footprint, Helios will be challenged to effectively manage its asset portfolio for this political risk.

3. Continued

(b) You are reviewing the predictive analytics model built by the consultant and the accompanying documentation in the Case Study.

(i) Describe three relevant sources of model risk and how they apply to the model.

(ii) Propose model governance controls that address each of the risk sources identified in part b(i). Justify your answer.

(iii) Assess how well the proposed controls in b(ii) fit a risk-based controls approach.

Commentary on Question:
Candidates had mixed responses on this question. Many lost points in part (i) for including less than three sources of model risk – it is important to answer the question as it's asked. Most candidates struggled on part (iii). In part (ii), strong candidates were able to propose valid controls with a clear demonstration of mitigating risks identified in part (i). Many candidates lost points for not tying their response to their answer in part (ii) or not discussing elements of a risk-based controls approach.

(i)
Data quality – The significant number of model inputs increases the likelihood that data might not be available for proper annual calibration in the future. The use of social media feeds could bias the model results and would require significant investment of time and effort to ensure such bias is not present.

Model errors – Due to the model's complexity, it would be challenging to identify model flaws. Additionally, political risk is not easily quantifiable, and a replication tool is not available, increasing the risk of an implementation error being undetected.

Inappropriate use of a model – This model was built for the specific purpose of modeling political risk impacts on the investment portfolio. There is a heightened risk of inappropriate use since the model was built by an external consultant and Helios employees might not fully understand the limitations of the model.

3. Continued

(ii)

Input data validation – Helios should implement controls on completeness and accuracy of data. The controls should be automated due to the large amount of input data. Additionally, less reliable sources like social media feeds should be reviewed regularly to ensure they do not introduce bias in the model results.

Checks and validation – Built-in checks and constraints will help avoid fat-finger issues and mitigate risk of model errors. Helios' actuary should be well-trained on how to use the model and implement an independent peer review as part of the model update process.

Inappropriate use of model - Proper documentation can mitigate the risk of inappropriate use of the model. The purpose of the model should be clearly documented so that testers can verify that the model is fit for purpose and used as intended. Model limitations should also be documented by the consultant.

(iii)

The controls in b(ii) focus mostly on the model and modeling process. Additional controls need to be created to ensure proper end-to-end control process, including processes used to generate inputs and processing impacting the quality of output. Management approval of the controls should be part of the controls process. There should also be separation of duties where, for example, one actuary would make coding changes, and another actuary is responsible for running the model. Model validation should not only identify potential model issues but also identify potential model improvements. Considering the complexity of predictive analytics models and the dynamic nature of political risk, continuous model improvement is required to ensure reliable results.

(c) The newly built model is now in use and the economic capital provision for political risk in the investment portfolio is aggregated into the counterparty default solvency capital risk.

The Solvency II correlation factors associated with each of the solvency capital risks, the economic capital estimates, and a summary balance sheet are provided in tab "Q3" of the Excel file.

(i) Calculate the change in the Basic Solvency Capital Requirement because of including the political risk provision. Show your work.

(ii) Calculate Basic Solvency Capital ratios after the inclusion of the political risk provision in c(i). Show your work.

(iii) Assess, using the results from c(ii), the need for regulatory intervention according to the European defined capital requirement actions.

3. Continued

(iv) Critique the approach Helios has chosen to use to include a political risk provision.

Commentary on Question:
Most candidates performed well on parts (i) & (ii). Responses were mixed for (iii) and (iv). In part (iii), many candidates confused Solvency II requirements with RBC levels. In part (iv), candidates who received full credit critiqued both the inclusion of political risk purely under counterparty default risk and the continued use of the existing correlation matrix despite adding political risk.

Refer to Excel template for solution.

4. Learning Objectives:

3. The candidate will understand how an organization can articulate its approach to risk and how to assess risk and return trade-offs. The candidate will understand the approaches for managing risk. The candidate will understand different concepts of risk capital, risk measures in capital assessment and techniques to allocate risk capital once aggregated.

Learning Outcomes:

(1) Making Decisions

(a) Describe how an organization can articulate its approach to risk using risk appetite and risk limits

(2) Responding to Risks

(e) Analyze how ALM and similar risk strategies can be used to manage or reduce risk in an organization

Sources:

CFE101-103-25: ORSA and the Regulator (page 16-17)

CFE101-120-25: Asset Liability Management, IAA Risk Book

- page 6 （three main ways to increase the yield on their portfolio）
- Page 13 (carve-out strategy)

Risk Appetite: Linkage with Strategic Planning Report

- page 11 three increasing detailed levels
- page 12 enterprise risk tolerance statements

Commentary on Question:

This question is based heavily on the provided case study, which serves as a practical foundation. Candidates should demonstrate a deep understanding of the course material by applying their knowledge to real-world situations. This includes:

- *Setting up ERM risk tolerance based on strategic decisions.*
- *Assessing an ORSA report and analyze what it reveals about the company's ERM process.*
- *Improving an ALM profile using different techniques.*

Solution:

(a) Describe three key considerations when evaluating the maturity of Lyon's ERM practices in the areas of risk appetite, risk tolerance, and risk limits.

4. Continued

Commentary on Question:
The Own Risk and Solvency Assessment (ORSA) has emerged as a pivotal process for both companies and regulators in evaluating the maturity of an insurance company's risk management framework. Mastery of ORSA concepts is essential for candidates, as it demonstrates a comprehensive understanding of enterprise risk management and regulatory expectations upon completion of this course. Many candidates demonstrated limited understanding of the characteristics that define a mature ORSA process from a regulator's perspective.

- Formality of the approval processes: Clearly specify the level of sign-off required for each component and the frequency with which risk appetites, tolerances, and limits are reviewed and updated. The Lyon Board should review and approve the risk appetite statement and risk tolerances annually, while the Risk Committee should review and approve the risk limits on an annual basis.
- Integration into planning and strategic decisions: Articulate the degree to which risk appetites, tolerances, and limits inform the planning process and other significant strategic decisions. The objectives of the corporate ERM department reflect consideration of risk appetite and limits during planning. In a highly mature ERM framework, risk appetite analysis should be systematically embedded in all key enterprise decision-making processes.
- Management of limit breaches and responses: Define the extent to which risk limits are breached and the actions taken when breaches occur. The corporate ERM department's objectives emphasize ensuring appropriate management actions are implemented for any breached risk limits. However, it remains unclear whether the analysis evaluates if risk limits are set too broadly, resulting in infrequent breaches. A more mature risk appetite framework would monitor both breaches and available capacity, triggering appropriate actions in either case.

(b) Lyon's Board seeks to update Lyon's ERM strategy to ensure resilience under extreme conditions while optimizing capital deployment. The Board is satisfied with the current financial and debt rating from Kelly Rating, which provides a favorable balance of risk and cost of capital. However, considering the Kelly Rating analysis, the Board wants to emphasize the importance of maintaining earnings stability and regulatory solvency, even under the extreme conditions of a 1-in-200-year stress event.

4. Continued

The updated strategy aims to:

A. Preserve enterprise financial stability.
B. Prevent a 10% reduction in projected earnings.
C. Ensure the Risk-Based Capital ratio remains 50% above the regulatory minimum.
D. Uphold a strict no-appetite policy for reputational risk.

These measures safeguard stakeholder interests, support sustainable growth, and maintain the company's financial strength and reputation under adverse conditions.

Propose an enterprise risk tolerance statement for Lyon Group given the new objectives outlined above.

Commentary on Question:
Candidates generally miss the financial strength element (ratings) in a risk tolerance statement.

Proposed Enterprise Risk Tolerance Statement

- Credit rating
  - Financial strength rating: Maintain an A financial strength rating (Kelly rating)
  - Debt rating: Maintain a minimum of BBB rating for corporate debt (Kelly rating).
- Earnings at risk: IFRS/U.S. GAAP earnings reduction is no more than 10% under 1-in-200-year stress event.
- Capital at risk: maintain RBC ratio greater than 50% above the regulatory solvency ratio under 1-in-200-year event
- The company has no risk appetite to reputation risk.

(c) SLIC is considering improving its Asset-Liability Management (ALM).

Refer to Section 3.2 of the Case Study.

(i) Describe three methods that insurers can increase the yield on their portfolios.

SLIC is evaluating the implementation of a carve-out strategy with dollar duration immunization for its ALM:

4. Continued

- The current Fixed-Income asset allocation is 75% of the total portfolio;
- The ALM team also determines the company is comfortable raising the Non-Fixed-Income asset allocation to 35%.

(ii) Describe two methods that can be used to determine the carve-out point in a carve-out strategy.

Commentary on Question:

(i) Many candidates could list out the three methods, but only a few have good understanding of the risk implications.

(ii) Most candidates exhibited limited understanding of the carve-out strategy. Only a few correctly identified that, under the second method, once the non-fixed income (NFI) allocation is determined, the remaining fixed income (FI) assets should be used to establish the carve-out point. This gap indicates that many candidates lack a clear appreciation of the role of NFI assets within asset-liability management (ALM) and how these allocations interact within the carve-out framework.

(i)

a. Incorporate credit spread: Enhance portfolio yield by accepting lower credit quality. (1) Credit spreads are often significantly wider for BBB- and BB-rated (lower-rated) assets compared to higher-rated securities. (2) The company could explore increasing its allocation to these assets while ensuring compliance with credit risk limits and liquidity constraints.
b. Increase exposure to riskier asset classes: Allocate more to high-risk categories such as public and private equity, private debt, and real estate. (3) A greater weighting in these assets will elevate required capital, thereby reducing the solvency ratio for both Risk-Based Capital (RBC) and Economic Capital (EC), (4) while also amplifying financial statement volatility.
c. Riding on term structure: (5) Risk and return considerations should be taken into account when swapping short-term assets for long-term assets. (6) Any yield enhancement pursued through riding on term structure should avoid widening the asset-liability duration mismatch beyond 0.5 years.

4. Continued

(ii)

Method one: First, the carve-out point is determined by identifying the latest date at which all liability cash flows up to that point can be matched in dollar duration using the available 75% of the portfolio's total assets allocated to fixed income securities. Immunization is then performed up to this carve-out point using these fixed income assets. Finally, the remaining 25% of the portfolio's assets are invested in non-fixed income (NFI) assets to manage the portion of liabilities beyond the carve-out point.

Method Two: First, the allocation to non-fixed income (NFI) assets is determined, which can be specified either as a dollar amount or a percentage of the total portfolio assets; in this case, the NFI asset allocation is set at 35% of the portfolio's total assets. Next, the carve-out point is calculated based on the liability cash flows that can be matched in dollar duration using the remaining 65% of the portfolio's assets invested in fixed income securities. Lastly, immunization is applied up to this carve-out point using the fixed income assets, ensuring the liabilities up to that point are covered while the NFI assets address the remaining liabilities.