ERM Model Solutions
Spring 2025

1.

Learning Objectives:

1. The candidate will understand the ERM framework and process 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 analyze these risks.

3. The candidate will understand the concepts of risk modeling and be able to evaluate and understand the importance of risk models.

4. The candidate will understand how the risks faced by an entity can be quantified and the use of metrics to measure risk.

5. The candidate will understand the approaches for managing risks and how an entity makes decisions about appropriate techniques.

Learning Outcomes:

(1d) Assess the overall risk exposure arising from an organization's current and emerging risks.

(2b) Discuss risk taxonomy, including an awareness of how individual risks might be categorized in different ways.

(2c) Identify and analyze specific risks faced by an organization, including but not limited to: financial, environmental, operational, legal, reputational and strategic risks.

(3d) Demonstrate the use of scenario analysis and stress testing in the measurement of current and emerging risks.

(4c) Analyze risks that are not easily quantifiable, such as liquidity, operational, and environmental risks.

(5i) Choose appropriate techniques to measure, model and manage various financial and non-financial risks faced by an organization.

1. Continued

Sources:
ERM-120-14: IAA Note on Stress Testing and Scenario Analysis (pp. 1-6, 14-17 and Page 19-25)

ERM-145-21: IAA Paper: Importance of Climate-Related Risks for Actuaries (Pages 2-14)

Commentary on Question:
This question was designed to test candidates' comprehensive understanding of climate risk management within an actuarial and enterprise risk management context. Specifically, it assessed the ability to:

- *Translate theoretical climate risk knowledge into practical applications by requiring specific examples relevant to a company's business mix and geographic exposures, rather than generic climate risk descriptions.*
- *Demonstrate critical analytical skills by evaluating proposed risk monitoring approaches, requiring candidates to identify both strengths and limitations.*
- *Apply scenario development methodology from a stress testing framework, testing whether candidates understood the distinction between sensitivity scenarios and could design scenarios that would provide actionable business insights.*

Solution:
(a)

(i) Describe two examples of physical risk from a *chronic* shift of climate patterns specific to Pryde's Commercial Multiple Peril (CMP) line of business.

(ii) Assess the effectiveness of the two risk monitors proposed in the CRO e-mail in their ability to measure climate-related risk for Pryde.

(iii) Identify one additional consideration for each of the following climate-related risks as they relate specifically to Pryde:

- Transition Risk
- Legal Risk
- Reputational Risk

Justify your response.

Commentary on Question:
(i) – Candidates performed the best on this subpart of the question, with the majority receiving at least half credit and a good amount receiving full credit. Those who received less credit either did not respond with considerations that were specific to chronic climate risk or to the CMP line of business, as was required in the question.

1. Continued

(ii) – Candidate responses for this question varied significantly, with the majority of candidates receiving at least some credit, but rarely all of the available points. Candidates that struggled with this question tended to respond vaguely and not in the context of Pryde specifically. Many candidates offered support of the risk monitors without discussing any limitations or possible improvements.

(iii) – Generally candidates struggled with this question. Very few candidates received full credit, as most responses were not thoroughly justified. Similar to earlier parts of the question, many responses were not related to climate risk and instead spoke to general risks for an insurance or financial company. Candidates specifically struggled to distinguish between legal risk (risk of litigation) and regulatory insurance risk. Additionally, many did not understand that transition risk was referring to risk of transition to a lower-carbon economy, as defined in the source material. Most candidates demonstrated an understanding of reputational risk.

(i)

Gradual Sea Level Rise and Coastal Flooding

Gradual sea level rise represents a chronic physical risk that would significantly impact Pryde's CMP business, given their substantial exposure in coastal states. Over time, higher baseline sea levels increase the frequency and severity of coastal flooding during normal weather events, not just during major storms. This chronic shift would lead to:

- Increased property damage claims for commercial buildings in coastal areas
- More frequent business interruption claims as flooding disrupts operations more regularly
- Gradual migration of businesses away from increasingly flood-prone areas, affecting the composition of Pryde's book of business

Rising Average Temperatures and Heat Extremes

Chronic temperature increases create multiple exposures for Pryde's CMP line. Their concentration in California makes this particularly relevant given projected temperature increases in that region. Long-term warming trends would result in:

- Increased mechanical equipment breakdown claims due to air conditioning systems operating at higher capacity for longer periods
- More frequent power outages from grid strain, leading to business interruption

(ii)

Monitor 1: Total Property Insured Values Within 10-Mile Radius

This monitor effectively captures geographic concentration risk, which is crucial for cat-exposed business such as Pryde's CMP line. It provides actionable information for underwriting decisions and helps prevent excessive accumulation in high-risk areas. However, this monitor is static and doesn't account for changing risk profiles due to climate change. A location that appears safe today may become high-risk due to chronic climate shifts. It also doesn't differentiate between risk types (wind vs. flood vs. wildfire).

1. Continued

Monitor 2: 1-in-100 Year PML by Zip Code in Coastal States
This monitor is more sophisticated, incorporating probabilistic modeling and focusing on coastal areas where climate change impacts are currently most pronounced. It provides forward-looking risk assessment and can be updated as models incorporate new climate data. However, limiting to only coastal states misses inland flooding, wildfire, and heat-related risks.

Both monitors provide value but should be enhanced with dynamic elements that account for changing climate patterns and expanded to capture non-coastal climate risks relevant to Pryde's portfolio.

(iii)
Transition Risk
As governments implement carbon pricing mechanisms and stricter environmental regulations, Pryde's commercial clients will face increased compliance costs and operational changes. This creates exposure through:

- Increased business interruption claims as clients shut down operations to retrofit for compliance
- Higher liability exposures if clients' operations cause environmental damage
- Changes in client risk profiles as some industries become less viable

Pryde's diverse commercial client base across several states means exposure to varying regulatory regimes, making transition risk monitoring essential for pricing and underwriting decisions.

Legal Risk
Pryde faces exposure to lawsuits where plaintiffs claim specific weather events were worsened by climate change, potentially affecting coverage interpretation and claim costs.

- Courts may expand liability for weather-related damages based on climate science
- Policy language disputes over what constitutes "natural" versus "man-made" disasters
- Potential for coverage litigation if clients sue over denied climate-related claims

Given Pryde's willingness to offer "unusual coverages" and non-standardized policies, unclear policy language could create litigation exposure as climate attribution science advances.

Reputational Risk
Pryde faces reputational risk if perceived as inadequately addressing climate risks given changing customer expectations around the environment and a lower-carbon economy.

- Potential loss of commercial clients who have ESG mandates requiring climate-conscious vendors
- Difficulty attracting talent if perceived as climate-insensitive
- Potential regulatory scrutiny affecting competitive position

1. Continued

As a commercial lines insurer serving business clients increasingly focused on ESG criteria, Pryde's reputation regarding climate risk management directly affects business retention and growth prospects.

(b) You have been tasked with developing appropriate scenarios for assessing climate-related impacts to Pryde’s profitability and to the reinsurance in place for its CMP line.

Describe, using the Case Study, an example relevant to Pryde CMP claims for each of the following types of scenarios and explain how it might be useful to Pryde in assessing impacts.

I. Single Factor Sensitivity
II. Single Factor Multi-Period Scenario
III. Multi-Factor Stress Scenario

Commentary on Question:
Candidate performance was mixed on this question, with only about half of candidates receiving at least half credit. Those who received full credit not only identified scenarios that were climate-related in nature, but explained the usefulness of the scenarios to Pryde. Some candidates identified scenarios but did not go far enough in explaining how Pryde would use the scenarios. Additionally, some candidates provided scenarios that were not related to climate risk.

Single Factor Sensitivity
Test the impact of a 10% increase in average hurricane wind speeds across Pryde's coastal exposures. This sensitivity would apply the increased wind speeds to historical hurricane tracks affecting Pryde's book of business.

This scenario helps quantify how gradual increases in storm intensity affect claim costs and reinsurance program effectiveness. It provides actionable information for:

- Adjusting pricing adequacy assumptions for wind coverage
- Evaluating whether current reinsurance attachment points remain appropriate
- Informing risk appetite discussions about coastal exposure limits

Single Factor Multi-Period Scenario
Model California wildfire risk increasing over a 10-year period, with annual probability of major wildfire events affecting commercial properties increasing from current levels by 10% in year 1, 25% in year 5, and 50% in year 10. Apply this progression to Pryde's California exposures.

1. Continued

This multi-period approach captures the evolving nature of climate risks and helps with:

- Longer-term capital planning and reserve adequacy assessment
- Evaluating the sustainability of current California pricing over the business plan horizon
- Determining optimal reinsurance program evolution to address changing risk patterns

Multi-Factor Stress Scenario

A severe scenario combining multiple climate factors over 3 years:

- Year 1: major hurricane hits Atlantic coast, 20% above modeled expectations due to increased storm surge from sea level rise
- Year 2: severe California wildfire season with business interruption losses extended due to power grid failures
- Year 3: unprecedented flooding in Texas from extreme precipitation event, complicated by urban development in flood plains
- Throughout: credit downgrades for two major reinsurers in Pryde's program

This comprehensive stress scenario reveals:

- Cascading effects and interdependencies between climate risks and business operations
- Cumulative impact on capital position over multiple loss years
- Effectiveness of current reinsurance program under sustained stress
- Whether current risk appetite statements and capital targets remain appropriate under stressed conditions

2. Learning Objectives:

1. The candidate will understand the ERM framework and process and be able to apply them to organizations.

3. The candidate will understand the concepts of risk modeling and be able to evaluate and understand the importance of risk models.

5. The candidate will understand the approaches for managing risks and how an entity makes decisions about appropriate techniques.

6. The candidate will understand the concept of economic capital, risk measures in capital assessment and techniques to allocate the cost of risks within business units.

Learning Outcomes:

(1b) Demonstrate an understanding of the perspectives of regulators, rating agencies, stock analysts, auditors and company stakeholders and how they evaluate the risks and the risk management of an organization.

(3a) Demonstrate how each of the financial and non-financial risks faced by an organization can be amenable to quantitative analysis.

(3b) Demonstrate organization-wide risk aggregation techniques that illustrate the concept of risk diversification by incorporating the use of correlation.

(5a) Demonstrate risk optimization and analyze the risk and return trade-offs that result from changes in the organization's risk profile.

(6a) 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

(6b) Apply risk measures and demonstrate how to use them in value and capital assessment

(6c) Propose techniques of attributing the "cost" of risk/capital/hedge strategies to business units in order to gauge performance (e.g. returns on marginal capital)

Commentary on Question:

This question covers capital considerations from three different angles: regulators, rating agency, and internal company view. Candidates are expected to have a good understanding of all three and be able to tie these different views together. To get full points, candidates needed to be able to quantitatively analyze capital requirements and allocation methods, and provide analysis based on quantitative results.

2. Continued

Solution:

(a) MOK Life starts by evaluating how rating agencies view an expansion into a new product line. Rating agencies consider the following factors while evaluating MOK Life's balance sheet strength:

- Capital adequacy
- Investment and ALM strategies
- Liquidity

Explain how each of these three factors will be impacted with the addition of the new product line.

Commentary on Question:
Candidates appeared to struggle on this part, often providing responses that were not specific to MOK.

Capital Adequacy - Adding a new product line will change capital adequacy by changing available capital, required capital, and/or the assumed diversification effects. Annuity products often act as a natural hedge with life products, so it's likely that there will be a favorable diversification effect with MOK's various capital-related calculations.

Investment and ALM strategies - Adding the new payout annuity product line will require new investment and ALM strategies as the cash flow patterns will be different than other products on MOK's book. They will require shorter duration assets that pay regularly to meet the liability obligations of the annuities.

Liquidity - Adding an annuity line introduces different liquidity needs. The timing of cashflows is different for payout annuity products and they tend to be more predictable than mortality-based cashflows. MOK Life needs to ensure that it has enough high-quality liquid assets to maintain a healthy liquidity position while balancing long-term liquidity needs for their long-term products.

(b) MOK Life is concerned about the regulatory implications of adding a new product line. Currently, MOK Life's RBC results are as shown in the "Q2.b" tab of the Excel spreadsheet. The addition of the payout annuity product line is expected to cause an increase in C2 longevity risk capital amount of $350 million.

The C2 correlation factor between life products and annuity products is assumed to be -0.25, and the addition of the payout annuity product line is expected to have no immediate impact on Total Available Capital (TAC).

2. Continued

(i) Calculate the new C2 insurance risk charge after adding the payout annuity product line. Show your work.

(ii) Calculate the Authorized Control Level (ACL) and ACL ratio for MOK Life before and after the addition of the payout annuity product. Show your work.

(iii) Recommend if MOK Life should go ahead with the product expansion based on your previous responses. Justify your response.

Commentary on Question:

(i) Most candidates applied the diversification matrix, although some made minor formula errors. Partial points were earned if the candidate demonstrated an understanding even though there were calculation errors.

(ii) Most candidates were able to demonstrate an understanding of the ACL Ratio Formula, but many struggled to provide the correct formula for the RBC ACL amount.

(iii) Either recommendation could receive full points with sufficient justification. Candidates who had reasonable answers for previous parts in b (even if the responses were incorrect), were still able to receive full credit if their recommendation and commentary aligned with their results. Candidates who had non-sensical results in previous parts of b should have added commentary explaining why the results were non-sensical in addition to their other commentary.

ANSWER:
See excel workbook for parts b(i) and b(ii)

(iii) I recommend not going ahead with the expansion into the product line. With the addition of new product line, the ACL ratio drops to 202% which is close to, but still above, the Authorized Control Level. The new product appears to not be profitable as it would increase required capital without raising TAC. If MOK wants to pursue entering the new product line, it should consider raising additional capital.

(c) MOK Life decides to evaluate what impact adding the payout annuities to its product portfolio will have on its internal capital allocation model. Currently, MOK Life uses a correlation matrix for risk aggregation.

MOK decides to use the discrete marginal allocation method to allocate capital to its product lines.

2. Continued

(i) Calculate the total capital before and after the addition of payout annuities. Show your work.

(ii) Calculate capital allocation for MOK Life **before** the addition of payout annuities, assuming that capital is first allocated to the Whole Life product. Show your work.

(iii) Calculate capital allocation for MOK Life **after** addition of payout annuities, assuming the following orders for allocating capital to the individual product lines:

I. Whole Life, Term Life, Payout Annuity
II. Term Life, Payout Annuity, Whole Life
III. Payout Annuity, Whole Life, Term Life

Show your work.

Commentary on Question:
(i) Most candidates did well on this part. Some made minor formula errors. Partial points were earned if the candidate demonstrated an understanding even though there were calculation errors.
(ii) Most candidates earned full credit, demonstrating a basic understanding of capital allocation.
(iii) Many candidates struggled on this part. Partial points could be earned for demonstrating an understanding of the relationship between c(ii) and c(iii).

ANSWER:
See excel workbook.

3. **Learning Objectives:**

1. The candidate will understand the ERM framework and process 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 analyze these risks.

3. The candidate will understand the concepts of risk modeling and be able to evaluate and understand the importance of risk models.

5. The candidate will understand the approaches for managing risks and how an entity makes decisions about appropriate techniques.

Learning Outcomes:

(1b) Demonstrate an understanding of the perspectives of regulators, rating agencies, stock analysts, auditors and company stakeholders and how they evaluate the risks and the risk management of an organization.

(2c) Identify and analyze specific risks faced by an organization, including but not limited to: financial, environmental, operational, legal, reputational and strategic risks.

(3a) Demonstrate how each of the financial and non-financial risks faced by an organization can be amenable to quantitative analysis.

(3d) Demonstrate the use of scenario analysis and stress testing in the measurement of current and emerging risks.

(5b) Demonstrate application of the following responses to risk, including consideration of their costs and benefits: avoidance, acceptance, reduction without transfer, and transfer to a third party.

(5h) Demonstrate possible risk management strategies for non-financial risks.

(5i) Choose appropriate techniques to measure, model and manage various financial and non-financial risks faced by an organization.

Sources:

ERM-137-20: ORSA and the Regulator by American Academy of Actuaries

Financial Enterprise Risk Management, Sweeting, 2017 Ch. 16 Responses to Risk

ERM-131-18: Leveraging COSO Across The Three Lines Of Defenses

3. **Continued**

Commentary on Question:
This question was designed to test the various components of an ORSA report in the context of a potential acquisition by an insurance company.

Generally, candidates did well on most parts, receiving full or partial credits for various sub-parts. Candidates generally performed well on part (a), part (b)(i) while parts Part (b)(ii), b(iii) and part (c) were found to be more challenging.

To score maximum credit, candidates had to apply the concepts being tested for the situation in the question, rather than responding with generic answers.

Solution:
(a) ABC is currently assessing the potential integration of XYZ's businesses. ABC's management has highlighted the following potential challenges:

- Understanding sensitivity to interest rate and other asset-liability related sensitivities.
- Identifying the new risks introduced by the acquisition and assessing how to manage them.
- Determining the revised capital position and solvency ratios for ABC post-acquisition.

ABC's ERM department has rarely used Stress & Scenario Testing (SST) before but now wants to employ SST to address the challenges identified above.

Justify the use of SST by ABC for making strategic decisions related to XYZ's acquisition.

Commentary on Question:
Most candidates scored well on this question with many candidates getting full credit. While a wide range of responses were accepted and awarded partial to full credit, the quality of response was a key differentiator.

Candidates that provided generic details about SST and did not apply it to the situation in the question received limited or no points, depending on quality of response".

SST can help by combining all material risks or identifying interrelationship among risks and create a "first cut" view for their impacts. Management actions, in case any adverse scenario becomes reality, can be tested out.

ABC can test the impact of low-interest rates for ABC and XYZ's liability portfolio.

3. Continued

Various portfolio management strategies related to ALM, like duration matching or hedging, can be tested as well.

New risks like foreign exchange risk and liquidity risk can be tested using SST and it can help identify whether the risks are immaterial, catastrophic, or acceptable, based on the impacts

SST can be used to identify the "Break" scenarios for the post-acquisition combination of businesses.

Scenario testing will allow ABC to assess whether XYZ's capital position is in line with ABC's risk appetite under ABC's regulatory regime, and to adjust if necessary.

It will help to identify strategies that can be used to improve capital position.

(b) ABC is reviewing the various risk responses it currently employs and whether they would be appropriate for dealing with the increased risk exposure from the potential acquisition. ABC currently employs reinsurance as a risk transfer technique but is exploring alternative risk response options.

ABC's ERM department wants to update its risk register especially since the two companies, ABC and XYZ, have different underlying liability profiles.

(i) Identify the key features of a good risk response.

(ii) Explain two key financial risks that would be introduced or would have increased exposure because of the acquisition.

(iii) Suggest a risk mitigation technique as a risk response to each risk identified in (ii). Justify your response.

Commentary on Question:
Almost all candidates answered part (i) by giving the key features of a good risk response and received full credit.

For part (ii) and (iii), many candidates identified foreign exchange and liquidity risk as key risks with appropriate mitigation strategies and received full credit.

Some candidates provided details on non-financial risks or non-key risks, like mortality risk, thus only getting partial credit

Candidates that discussed only market risk or interest rate risk received partial credit.

3. **Continued**

Part (i)

Response should be economical, with benefit outweighing the cost.
Response should match with the risk it intends to control.
Response should be as simple as possible.
Response should be active, not just informative.

Part (ii)

Foreign exchange risk - Since ABC conducts business in the US and this acquisition is its first foreign subsidiary, this would introduce foreign exchange risk.

Liquidity Risk - The underlying asset and liability profiles of each company are different. Also, XYZ does not have a well-developed risk management framework and has struggled to raise capital in the past. Hence this risk would have increased exposure for the post-acquisition ABC.

Part (iii)

Foreign Exchange risk – Managed using derivatives/hedging
This is an industry wide approach for managing Foreign Exchange risk.
A wide variety of options/instruments available to suit the company's need.
It can be difficult to find other suitable risk responses which can be customized while being economical.

Liquidity Risk - Managing through investment strategy
ABC might already have an existing framework for managing liquidity, which can be extended to XYZ’s portfolio as well.
This approach is comprehensive and interrelated risks can also be accounted.
This approach would be easily understood by senior management as compared to adopting a new response, which might be costly and operationally challenging.

(c) ABC’s ERM department needs to understand the three lines of defense model as used by XYZ in order to identify shortcomings and to aid with the potential acquisition.

(i) Describe the role each of the three lines of defense should play in the acquisition of XYZ.

(ii) Explain how the risk framework feedback loop can be used by ABC in evaluating the potential acquisition.

3. Continued

Commentary on Question:
For Part (i), most candidates were able to list and provide the details for the 3 Lines of Defense, but few candidates could identify how they would be used in the purchase of XYZ by ABC. Depending on the quality of the explanation, a wide range of responses was accepted and awarded partial to full credit. Only partial credit was awarded to responses where generic definitions were provided without applying it to the specific situation.

Candidates struggled with Part (ii) with many receiving only partial credit. Few candidates described the risk framework feedback loop well but failed to apply it to the situation, receiving only partial credit.

Some candidates assumed ABC had done similar acquisitions in the past and would use the feedback method to assess any shortcomings in those acquisitions to evaluate its acquisition of XYZ. Based on the quality of the response, these responses were awarded partial to full credit.

Part (i)
Name: Operational management
Role: Own and Manage

This line relates to the business/process owners who are responsible on a day-to-day basis for the business operations.

These frontline managers from XYZ should share with ABC detailed knowledge of the individual risks they manage on a day-to-day basis, existing controls, how they evaluate deficiencies and communicate with other lines.

Name: Internal monitoring & oversight functions
Role: Monitor

As XYZ is lacking a CRO, most of these duties are merged with the first line.
It comprises of specialized functions for reviewing and monitoring risks such as compliance, legal, and risk management. It will provide oversight and guidance to keep the first line accountable and communicate with senior management.

This line will assess existing and emerging risks due to the acquisition and share details with the its senior management about risks that are within and those that exceed tolerances.

Name: Internal Audit
Role: Provide independent assurance

3. Continued

The third line of defense is the internal audit function and it reports directly to the Board of Directors. This line performs independent review of the activities performed by the first and second line of defense.

The internal audit team should share with ABC the information about the robustness of the existing controls and any shortcomings identified by the 1st and 2nd Lines of Defense.

Part (ii)
A Risk Framework Feedback Loop is a process where management uses the enterprise risk information to drive insurer strategy, business decisions, and business plans. It is a key feature of ERM and allows for continuous feedback and learning for the risk management framework.

ABC can check if XYZ’s business had any breaches of risk tolerances and limits and, if so, discuss how they were addressed.

ABC should also review its existing risk tolerance limits and assess if the potential acquisition would lead to them being breached.

ABC should revisit its business plan to assess the impact of the potential acquisition on its future capital requirements.

ABC can understand how XYZ’s 3 Lines of Defense model shared information within each layer and how such information can be used in ABC’s strategic planning process.

Using the feedback loop, ABC’s management can refine the terms of the acquisition to better aligns with its financial objectives and strategic goals.

4. Learning Objectives:

1. The candidate will understand the ERM framework and process and be able to apply them to organizations.

3. The candidate will understand the concepts of risk modeling and be able to evaluate and understand the importance of risk models.

5. The candidate will understand the approaches for managing risks and how an entity makes decisions about appropriate techniques.

Learning Outcomes:

(1c) Demonstrate how to articulate an organization's risk appetite, desired risk profile, quantified risk tolerances, risk philosophy and risk objectives.

(1e) Propose ERM solutions or strategies that effectively manage risk under different real (case study) and hypothetical situations facing financial and non-financial organizations.

(3d) Demonstrate the use of scenario analysis and stress testing in the measurement of current and emerging risks.

(5b) Demonstrate application of the following responses to risk, including consideration of their costs and benefits: avoidance, acceptance, reduction without transfer, and transfer to a third party.

(5e) Determine an appropriate choice of mitigation strategy for a given situation, which balances benefits with inherent costs (including exposure to moral hazard, credit, basis and other risks).

(5i) Choose appropriate techniques to measure, model and manage various financial and non-financial risks faced by an organization.

Sources:

Financial Enterprise Risk Management, Sweeting, 2017

ERM-120-14: IAA Note on Stress Testing and Scenario Analysis

ERM-151-22: Developing Key Risk Indicators to Strengthen Enterprise Risk]

Commentary on Question:

This question tests candidates' holistic understanding of risk management techniques including risk registers, scenario testing, Key Risk Indicators, and risk responses. Candidates who received full marks successfully applied risk management techniques to AHA's risk of high-loss weight loss drug claims and provided clear justification. Although a thorough understanding of health insurance was not required to receive full marks, some candidates lost marks for providing general responses.

4. Continued

Solution:

(a) Dr. Graham would like high-cost weight loss drugs to be added to the risk register.

Identify three factors of an ideal risk register entry for which AHA does not have sufficient internal data for this risk. Justify your response.

Commentary on Question:
This question tests candidate's knowledge of a risk register, and ability to apply that knowledge to AHA's situation. Many candidates lost marks by simply listing factors without justifying their responses.

<u>Quantifiable?:</u> Since AHA doesn't currently have data on the utilization rate of this drug or actual costs (they only know it exceeds $1,000 per month), it may be challenging to quantify and model the risk.

<u>Exposure period:</u> AHA is aware that these drugs are increasing in popularity; however, there's no clarity around how long that trend may persist.

<u>Residual risk:</u> There may be long-term side effects or other health consequences related to taking these drugs. Since AHA does not currently have sufficient data to quantify that, it may be difficult to determine knock-on impacts to claims.

(b) Dr. Graham would like to better understand scenario analysis as it pertains to the risk associated with high-cost weight loss prescription drugs. He would like to consider the following types of scenarios:

I. Reverse Scenario
II. Historical Scenario
III. Company-Specific Scenario

(i) Describe each of the types of scenarios.

(ii) Describe the pros and cons of each type of scenario as it pertains to the risk.

(iii) Recommend which one of the types of scenarios should be used to determine the potential financial impact to AHA. Justify your response.

4. **Continued**

Commentary on Question:
Overall, candidates scored well on this question, particularly on parts (i) and (ii). Most candidates were familiar with the types of scenarios and when they may be used. For (i), some candidates simply repeated the names of the scenario types in a different order – those candidates did not receive credit. In part (iii), candidates who struggled either repeated their pro's and con's list from part (ii), or didn't highlight why the scenario types they didn't select were less preferred. A recommendation for any of the 3 options was accepted for part (iii), provided that sufficient justification was given.

(i)
Reverse Scenario – Specify a given level of loss the company is interested in analyzing, and then identifies a scenario that will lead to that outcome.

Historical Scenario – Relies on data was observed in the past, possibly triggered by a specific historical event.

Company-Specific Scenario – Based on scenarios that include conditions which are specific to the firm's risk profile or specific to a certain portfolio in a firm.

(ii)
I – Reverse Scenario
Pro: Can help to identify key assumptions which may be monitored, to proactively reduce the likelihood of risk thresholds being breached.
Con: The risks identified may have correlations with other risks, which may not be captured in this analysis, resulting in a misspecified risk threshold.

II – Historical Scenario
Pro: High-cost drugs have been around for years. Since this is based on actual claims data for similar events, data is easy to obtain and apply in the risk model.
Con: Past occurrences don't necessarily predict the future. Although there may be similarities with other high-cost drug trends, the current environment may result in different impacts from what were previously observed.

III – Company-Specific Scenario
Pro: Since this is tailored to AHA's specific risk profile, it provides a closer estimation of how AHA's unique book of business may be impacted.
Con: Every company is different. Since we're focused on AHA's specific risk profile, there is a smaller pool of data available to analyze, which may lead to inaccurate conclusions.

4. Continued

(iii)
I recommend using reverse scenarios to analyze the impact of the weight loss drugs. AHA is looking to analyze the potential financial impact from these drugs. A reverse scenario will help AHA understand key drivers and set risk appetites, limits, and monitoring.

Historical and company-specific scenarios are not as beneficial. Given how new these high-cost weight loss drugs are, there may not be sufficient data to analyze, particularly on a company basis. Additionally, historical data for other high-cost drug releases may not follow the same claims pattern.

(c) Lyon Corporation has just been informed of this new risk. Lyon senior leaders are concerned that AHA did not alert them of this risk earlier.

Describe Key Risk Indicators that would have helped identify this risk sooner. Justify your answer.

Commentary on Question:
This question tests candidates understanding of Key Risk Indicators, as they apply to the high-cost weight loss drugs. There were a wide range of scores for this question. Successful candidates listed multiple KRIs and provided clear justification for how they applied to AHA's monitoring of high-cost weight loss drugs.

<u>Obesity-related claims:</u> AHA can leverage internal data and documentation from providers to track claims related to clients' weight. An increase in claims or treatments may provide an early alert that more clients may pursue these high-cost weight loss drugs.

<u>FDA Approvals:</u> AHA could track the frequency of FDA approval for new drugs. They can also follow the development stage for potential treatments in the pipeline, which will allow them to determine how many high-cost weight loss drugs may hit the market soon.

<u>Prescription drug costs:</u> An increase in the cost of prescription drugs, or cost of claims related to prescription drugs, may warrant further investigation. It may be a sign that AHA can expect to spend more on prescription drug claims.

4. Continued

(d)

(i) Describe a specific risk response AHA could implement for each of the following risk response types:

I. Reduce
II. Remove
III. Transfer

(ii) Describe the pros and cons for each of the risk responses you provided in part (i).

(iii) Recommend one of the responses you provided in part (i) that AHA should pursue to mitigate this risk. Justify your recommendation.

Commentary on Question:
This question assessed candidates' understanding of risk response techniques in the context of AHA. In general, candidates performed well on this question. Some candidates confused risk reduction and risk transfer. In part (d)(iii), candidates were expected to build on the pro's and cons identified in (d)(ii) and apply them towards the specifics of AHA's business.

(i)
I. Reduce – AHA can limit the risk of high-cost weight loss drugs by setting a cap on total reimbursement per plan member for these drugs.
II. Remove – AHA can remove the risk by excluding these types of drugs from plan coverage.
III. Transfer – AHA can reinsure a portion of the cost of these drugs to transfer a portion of the risk to reinsurers.

(ii)
I. Reduce
Pro: This will limit AHA's risk on these drugs to a fixed level per customer, which can be set based on AHA's risk tolerance.
Con: Limiting coverage may be the best health outcome for all customers, which may increase overall cost.

II. Remove
Pro: Completely eliminates the cost of these drugs from AHA's books, which will limit potential future losses.
Con: This may result in customer frustration and attrition, as plan members looking to use these high-cost weight loss drugs may seek out plans that cover them.

4. Continued

III. Transfer
Pro: Reinsurers may have additional data on these drugs, and can provide expertise to help guide AHA's future coverage actions and pricing.
Con: Reinsurance premiums may be expensive, particularly if these drugs are popular, which may erode profits.

(iii)
I recommend AHA transfer the risk of high-cost weight loss drugs through reinsurance. By purchasing excess-of-loss reinsurance, AHA can limit their total loss to a desired level. There is no impact to clients from this, so they will continue to receive the same coverage. Additionally, AHA may leverage the data and insights a reinsurer can provide, to optimize pricing. Given AHA's risk-taking nature, the reputational risk stemming from reducing or removing this drug coverage does not align with AHA's strategy. Additionally, enforcing a cap or excluding the drugs may not be a viable long-term solution help grow AHA's business.

5. **Learning Objectives:**

1. The candidate will understand the ERM framework and process 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 analyze these risks.

Learning Outcomes:

(1c) Demonstrate how to articulate an organization’s risk appetite, desired risk profile, quantified risk tolerances, risk philosophy and risk objectives.

(1d) Assess the overall risk exposure arising from an organization's current and emerging risks.

(2c) Identify and analyze specific risks faced by an organization, including but not limited to: financial, environmental, operational, legal, reputational and strategic risks.

Sources:

ERM-133-19: Emerging Risks and Enterprise Risk Management.

Risk Appetite: Linkage with Strategic Planning Report (Except Chapter 7)

ERM-149-22 Managing 21st-Century Political Risk

Commentary on Question:

Overall, candidate performance on this question was poor. While most sections were awarded partial credit, very few candidates demonstrated the depth of understanding sufficient for full credit. Candidates generally struggled to provide responses that were specific to Energetix and most failed to show clear understanding of political emerging risks.

Solution:

(a) Identify the three types of political risk other than social activism, that are most relevant to Energetix. Justify your response.

Commentary on Question:

Most candidates received partial credit for part (a). While many were able to identify some political risk types, most candidates failed to identify the most relevant political risks for Energetix. Some candidates identified three specific instances of regulatory risks instead of three broader political risk types. Other well justified political risks received full credit.

5. Continued

1. Laws, regulations and policies risk. Taxation and environmental regulations could impact Energetix operations, create changes in their pricing, require additional capital expenditures, and increase or reduce their competition. Any of these could significantly impact Energetix profits or balance sheet.
2. Cyberthreat risk. Theft of Energetix intellectual property, extortion, disruption of Energetix service, customer data breach or interruption to billing, advantage to their competitors, or ransom payments to get data back could all have reputational or financial impacts for Energetix
3. Terrorism risk. Attempts to physically damage power substations could affect service, create widespread need for repair personnel, cause harm to employees or customers, all leading to increased costs for Energetix. Loss of service would also mean loss of revenue for Energetix.

(b) The CFO states that political risks are emerging risks for Energetix and will need to be given greater priority within the context of all risks.

Assess the CFO's statement that political risk should be characterized as an emerging risk.

Commentary on Question:
Most candidates received partial credit for part (b). Many candidates failed to address all emerging risk characteristics and provide clear justification for whether the political risk is an emerging risk for Energetix. Many candidates defined emerging risk as "either unknown or known but not understood", but failed to support whether the political risk was well understood by Energetix.

Political risks should be viewed as emerging risks and included in our annual emerging risk assessment, since most of the criteria for emerging risks are met by political risks.

1. High level of uncertainty? Yes, for political risks - some risks are not known and many are frequently changing.
2. Lack of consensus? Mostly yes, risks can be identified but not everyone will agree.
3. Uncertain relevance? Mostly no, Caerus has outlined how many of these risks can be impactful to energy companies and there are ways to estimate impacts.
4. Difficult to communicate? Mostly no, those should be pretty clear once they occur.
5. Difficult to assign ownership? Yes, may not know the appropriate owners until something happens.
6. Systemic or business practice issues? Yes, Caerus has outlined several broad and business related impacts that could realistically be generated from political risks, such as the ability to provide services, the costs to provide it, the reputation of Energetix and its overall financial health.

5. **Continued**

(c) Recently, a social activist leaked a video of an Energetix board meeting to social media. In the video, a board member is seen talking about a project that is being discussed internally but has not yet moved forward. This project is controversial due to its potential for significant environmental impact. Fortunately, news of the video did not spread widely.

The Board of Directors would like Energetix to be better prepared to respond to a similar social activist situation.

Construct a crisis response plan for social activist risk, detailing the actions the company should take at each step.

Commentary on Question:
Some candidates went through the response plan and provided the steps for Energetix's specific situation, however most candidates either failed to clearly state and describe how all the steps should be implemented or only listed the steps without providing the specifics for Energetix. Other reasonable and well justified responses could receive credit.

1. Assess the situation. Determine how widely the video was shared, how damaging it could be to Energetix reputation, and who was involved.

2. Activate a response team. Team members to include CEO, Comm team, Legal team, Digital Marketing.

3. Lead with values. Remind consumers and the press what Energetix stands for. Taking care of our customers is still our priority.

4. Tell your story. Own the video, explain why this does not represent who we are, get this out in the press, and to your customers. Let actions speak louder than words.

5. Do not fan the flames. Energetix will not be defensive and will avoid escalating by focusing on the incident.

5. Continued

(d) Energetix senior management has developed a better understanding of the company's exposure to political risks and would like to establish a risk appetite statement. The following risk appetite statement for political risk has been proposed:

- *Energetix has a Moderate appetite for Political Risk.*
- *We chose Moderate since an energy company must accept some political risk as part of doing business.*
- *We will only accept the risk of operating in and trading with countries that are established U.S trading partners*
- *We will not accept the risk of trading with countries defined by the UN as State Sponsors of Terrorism*
- *We will accept Political Risk to the extent that our probability of remaining a going concern (solvent) does not go below 85%.*

Recommend improvements to this risk appetite statement. Justify your response.

Commentary on Question:
Most candidates received partial credit for this part, by providing a few valid recommendations on how to improve the risk appetite statement.

1. 85% would likely be deemed low. Solvency II uses 99.5%.
2. Timeframe is not defined. Is it 1 year? 20 years?. Should be stated clearly
3. Should address a broader range of quantitative components: e.g. Capital/Equity, Earnings, EV.
4. Should include external qualitative aspects like ratings agency ratings and regulatory bodies
5. The risk appetite statement in its current form focuses mostly on terrorism risk. Others including social activism, cyber, internal conflict, etc, should be included since this is a broader Political Risk appetite statement.
6. No mention of total risk exposure or measurement of risk exposure.
7. No mention of interaction or lack thereof, generating diversification with respect to other risks.