

ILA 201-U Model Solutions

March 2026

1. Learning Objectives:

2. The candidate will understand how to explain and apply the methods, approaches and tools of financial capital management for life insurance company under a US regulatory framework.

Learning Outcomes:

- (2a) Explain and calculate required capital under a US regulatory framework.
- (2b) Describe the purpose and application of economic capital.
- (2c) Explain and evaluate the respective perspectives of regulators, investors, policyholders and insurance company management regarding the role and determination of capital.
- (2d) Explain and apply methods in capital management.

Sources:

Economic Capital for Life Insurance Companies, SOA Research Paper, Oct 2016

ILA201-801-25: Diversification of Longevity and Mortality Risk

Commentary on Question:

The question tested the candidates' knowledge on the purpose of economic capital, how internal/external stakeholders view capital, and how to calculate economic capital.

Solution:

- (a) Critique the following statements:
 - (i) *The primary objective of implementing an economic capital framework is to maximize shareholder profits by holding the minimum possible capital.*
 - (ii) *Economic capital should only be calculated with prescribed assumptions and methodology to improve consistency for external stakeholders.*
 - (iii) *Economic capital should be used as a performance measure to compare profitability across product lines.*

1. Continued

- (iv) *Economic capital would be adopted as the measure of capital for ABC. Because of this, intense pursuit of high diversification strategies should be implemented to lower the capital requirements.*

Commentary on Question:

Candidates generally struggled with each subpart of part A.

For subpart (i), candidates commonly stated that the primary objective is not to maximize shareholder profits. Full credit was given if the candidate also stated protecting policyholders and balancing costs of excess capital.

For subpart (ii), candidates commonly stated that best estimate or prudent assumptions should be used. Full credit was given if the candidate demonstrated knowledge that economic capital is also an internal metric.

For subpart (iii), candidates commonly stated that economic capital can be used in RORAC or embedded value calculations. Full credit was given if the candidate demonstrated knowledge that economic capital is also used for long term strategic planning.

For subpart (iv), candidates commonly stated the relationship between diversification and economic capital. Full credit was given if the candidate demonstrated knowledge on the importance of regulatory and rating-agency capital, and that intense pursuit of diversification can be detrimental.

- (i) False. The primary objective of economic capital is not to maximize shareholder profits by minimizing capital but to protect policyholders by ensuring benefit payments with high certainty, described as a moral imperative. While optimizing shareholder returns is a goal, balancing the costs of excess capital against distress costs, it is secondary to policyholder protection.
- (ii) False. Economic capital serves multiple stakeholders, including regulators, but its objectives extend beyond regulatory compliance. Internal EC, a key focus for companies like ABC Corp, is calculated based on the company's own risk assessment, valuation methodology, and business objectives, reflecting its specific business plan and management actions.

1. Continued

- (iii) False. EC by itself is not a performance measure. EC can be used in performance measurement using either RORAC or embedded value approach) to compare profitability across product lines. While protecting policyholders by covering claims is a core objective of EC, its purpose is broader and includes supporting long-term strategic goals. EC is applied in strategic planning to assess the economic impact of alternative strategies, such as product mixes or diversification between life insurance and annuities, on capital requirements.
 - (iv) False. Economic capital is an important internal view, but ABC should not use EC as the single measure of capital. Regulatory and rating-agency capital remain binding constraints, so management should triangulate across all three. Diversification can reduce EC when true offsets exist, but it should not be pursued intensely just to lower capital. Diversification actions should be taken only when economically justified based on marginal risk-adjusted return, stability of correlations in stress and tail, model-risk considerations in dependency assumptions, costs and operational complexity, liquidity and concentration limits, and alignment with risk appetite and policyholder protection.
- (b) Calculate the following at the company level:
- (i) Available capital
 - (ii) Return on Risk-Adjusted Capital (RORAC)
 - (iii) Economic capital diversification benefits

Commentary on Question:

Candidates generally performed well on this question. Candidates commonly and incorrectly used the same scenarios for each of the CTE calculations.

See Excel file

2. Learning Objectives:

1. The candidate will understand and apply U.S. valuation principles and methods applicable to individual life insurance and annuity products issued by U.S. life insurance companies.

Learning Outcomes:

- (1b) Describe, apply and evaluate the appropriate valuation methods, requirements, and techniques and related under the US GAAP framework, including the calculation of reserves and related items (e.g., DAC).

Sources:

US GAAP for Insurers Chapters 5 (Non-Participating Traditional Life Insurance) and 12 (Payout Annuities)

Commentary on Question:

In part a, the question was trying to test whether candidates understood how to calculate GAAP reserves, deferred profit liability (DPL), and Deferred Acquisition Cost (DAC) balance at a point in time for a deferred payout annuity given a set of information about the annuity. The deferred payout annuity provided a lifetime annuity payment of 200,000 per year starting at the beginning of year 11. Then in part b the question was trying to test if candidates could explain the impact on GAAP reserve, DPL, DAC, and Net Income at a point in time given a change in yield to the upper medium grade fixed income investment.

Solution:

- (a) Calculate the following at the end of the 7th year:
 - (i) GAAP reserve
 - (ii) Deferred profit liability
 - (iii) DAC balance

Commentary on Question:

Commentary for a(i): Many candidates had the correct reserve answer at the end of the 7th year. The most common mistake was that the timing in the present value of future benefits calculation was off by 1 duration, including or excluding an extra duration in the present value calculation. Some candidates assumed premium payments were ongoing or that the present value of premium should be included in the reserve calculation even though this annuity was single premium and the time of reserve was duration 7. Some candidates showed projected benefits starting in year 10 or another year. Most candidates tried to calculate the survival from the mortality, but some were off by a duration or more. Most candidates tried to calculate present values using the discount rate and mortality though not all did so correctly.

2. Continued

Commentary for a(ii): Only a few of the candidates were able to calculate the deferred profit liability (DPL). This is true even if credit was given for basing the answer on an incorrect calculation from part a(i). The most common mistake was calculating an incorrect DPL amortization percentage because it was not based on the correct present value of present value of future benefits (also known as the present value of future reserves). Even if the present value of future reserves was calculated correctly, some candidates used only the first duration instead of the sum in their DPL amortization percentage calculation. Some candidates forgot to calculate interest on the DPL and some applied it incorrectly by duration. Some candidates started with the wrong DPL at time zero amount (It should be premium less reserves at time 0). A few papers did have the correct DPL%, starting profit and showing the DPL amortization and interest and the DPL balance declining. The next best papers had the correct starting DPL amount and showed amortization based on a DPL percentage which was at least based on some calculation of present value of future reserves. The next best papers also attempted to calculate interest on the DPL to get a final DPL. Additionally, some of the mistakes involved a DPL Amount that increased by duration before it started to decrease in the calculation. Candidates did not recognize or comment on this increase.

Commentary for a(iii): Very few (or none) of the candidates were able to calculate the Deferred Acquisition Cost (DAC) balance. Many candidates did calculate the correct capitalization amount, \$3,000. Some did not amortize the DAC based on life expectancy. Some included interest in the DAC amortization. Many attempted to calculate the life expectancy as the sum of future probabilities over 1 instead of the sum of future probabilities over prior year probability of survival. This resulted in different amortization factors for DAC and a different DAC balance. The best papers calculated the \$3,000 and attempted to amortize DAC by a calculated life expectancy even if it wasn't correct. These papers did not include interest on DAC.

Since these answers are in an Excel spreadsheet, the solution is written out in words as indicated in the model solution instructions.

Model Solution to part a(i): To calculate the GAAP reserves at the end of duration 7 candidates should calculate the projected benefits starting at year 11 based on a payment of 200,000 per year. The projected benefits should be calculated using a survival factor starting with 1 at the beginning of policy duration 1. The survival factor should be based on mortality given in the table in the Excel spreadsheet. The calculation starts with 1 times 1 less the mortality rate given in the table for age 70 duration 1. Then the next duration is this value above times 1 less the mortality rate in the table for age 71 duration 2 and so on each duration until duration 20. Projected benefits are calculated as 200,000 times the survival factor for duration 11 through duration 20 (at which point the given mortality in the table is 1 so the calculation stops).

2. Continued

The reserve at the end of year 7 is the net present value of the projected benefits from duration 8 to 20 at 5% interest times 1.05 which is the interest for the year 7.

Model Solution to part a(ii): To calculate the Deferred Profit Liability (DPL) at the end of duration 7, use the reserves calculated above from the beginning of time 1 through the beginning of time 20 (this could also be considered time 0 to time 19) Discount the reserves at 5% for each year duration 0 to 19 to get the present value of future reserves. An amortization percentage is then calculated as the starting amortization amount of premium less reserve at the beginning of year 1 ($100,000 - 80,582.37$) divided by the sum of the present value of future reserves calculated above. This amortization percentage is applied starting in year 1 to the starting reserve at time 0 to get the amortization amount. The starting DPL amount is premium less reserves ($100,000 - 80,582.37 = 19,416.63$). Interest on the DPL is calculated as the starting DPL less the amortization amount times 5%. Deduct the amortization amount from the starting DPL and add the interest to get the second year (or amortized) DPL. For the next year's amortization amount, apply the DPL amortization percentage to that year's reserves. Then deduct this amortization amount from the DPL and apply 5% to calculate the interest on DPL. Take the DPL amount less the amortization amount plus the interest to get the new DPL balance. This should decrease year over year. Continue these calculations until the end of duration 7. This will give the DPL amount at the end of year 7.

Model Solution to part a(iii): To calculate the Deferred Acquisition Cost (DAC) balance at the end of duration 7, first calculate commission to be deferred or capitalized which is the premium times the commission rate ($100,000$ times 3%) or 3,000. Then calculate the life expectancy at each period from 1 to 7. The life expectancy is the sum of future the survival factors, calculated in a(i) (from the mortality given in the Excel table) divided by the prior year survival factor. Divide the DAC capitalization amount by the life expectancy to get the amortization amount for year 1. Deduct that amount from the DAC capitalization amount to get the DAC balance for the end of year 1. The next year take the DAC balance and divide it by the life expectancy amount for that year to get the amortization amount. Deduct this from the prior year DAC balance to get the current year DAC balance. Continue these calculations until year 7 to get the DAC balance at the end of year 7. There is no interest on DAC so there should be no interest included in the calculation of the DAC balance.

2. Continued

- (b) At the end of the eighth year, the upper-medium grade fixed-income investment yield changes to 4.8%.

Explain the impacts to the following items. No calculations are required.

- (i) GAAP reserve
- (ii) Deferred profit liability
- (iii) DAC
- (vi) Net income

Commentary on Question:

Commentary for b(i): Many candidates answered this question by saying that the GAAP reserve increases because of the change in interest rate but that the change is recorded in Other Comprehensive Income (OCI) or Accumulated Other Comprehensive Income (AOCI) and not net income. Some specifically said there was no impact on net income but that the change goes into OCI. Some candidates said the GAAP reserve increased because of the change in interest rate but said nothing about OCI or net income. The above explanations were given full credit. Other explanations such as the following received partial credit. Some candidates said there was no impact but then explained changes reflected in the OCI. They likely meant there was no impact on net income. Some candidates mentioned changes at the new rate and no change at the locked in rate but didn't mention net income and OCI. It was not clear in the question that candidates had to mention OCI. A few candidates said there was an increase but gave no other details. A few candidates said there would be no impact on reserves but did not mention OCI and one said the change would specifically not go into OCI.

Commentary for b(ii): Many candidates said the Deferred Profit Liability (DPL) would increase or decrease given a change in yield which is not correct. Some said there would be no change in DPL because interest is not used in the calculation or that it is only based on mortality which is not correct. Some said there was no impact but that the change went into OCI, which isn't correct. A few candidates said there was no impact because the discount rate is locked in or that the rate does not have to be updated, which is correct. A few said there is no impact to DPL because DPL is not affected by interest but didn't really say why.

2. Continued

Commentary for b(iii): Many candidates said that there would be no impact on Deferred Acquisition Cost (DAC) because amortization of DAC is dependent on survival and not interest rates or because DAC is amortized on a straight-line basis and interest isn't used. Some said there would be no impact because the amortization is based on decrements or experience. These are correct answers. Some said there was no impact on DAC because DAC was amortized straight line but didn't mention anything about interest and why the straight-line amortization wouldn't change. Some just said there would be no impact but didn't give a reason. A few candidates said there would be an increase or decrease in DAC because of the change in yield or discount rate which is incorrect. A few said the DAC would be unchanged but the amortization percentage would change, which isn't correct.

Commentary for b(iv): Many candidates said there would be no change or impact to net income but that the change would be recorded in Other Comprehensive Income (OCI) which is correct. Very few candidates gave the reason that the discount rate is locked in even if they said no change for their answer. Some said there was no impact to reserve, DPL or DAC but didn't mention anything about OCI or mentioned OCI but didn't really explain it or added some incorrect information as well. Some candidates said the net income would increase or decrease which is incorrect. A few candidates mentioned that the change would go into OCI but then said the net income would be impacted as well. A few attributed the fact that net income would not change to offsets and a few gave no reason that net income would not change. Some referred to Deferred Profit Liability (DPL) and said a DPL change would change the net income.

Model Solution for part b(i): The GAAP reserve is calculated at the locked in rate (5%) and the lower current rate (4.8%). The reserves increase when using the lower 4.8% rate and that increase is recorded in Other Comprehensive Income (OCI) not net income.

Model Solution for part b(ii): The deferred profit liability (DPL) uses the locked-in discount rate, so it will continue using the 5% at issue rate. There is no impact to the DPL for a change in yield. The DPL is amortized by original present value of future benefits schedule so the DPL amortization percentage is locked in at issue.

Model Solution for part b(iii): There is no impact on deferred acquisition cost (DAC) from a change in yield or discount rate. Interest is not used in the amortization of DAC. DAC is amortized on a straight-line basis and is based on life expectancy without interest.

2. Continued

Model Solution for part b(iv): There are no changes to net income because the original discount rate is used in the calculation of net income. The effects on the change in interest are recognized in Other Comprehensive Income (OCI) or Accumulated Other Comprehensive Income (AOCI) not net income.

3. Learning Objectives:

1. The candidate will understand and apply U.S. valuation principles and methods applicable to individual life insurance and annuity products issued by U.S. life insurance companies.

Learning Outcomes:

- (1a) Describe, apply and evaluate the appropriate valuation methods, requirements, and techniques and related under the US statutory framework, including the calculation of principles-based reserves and formulaic reserves.

Sources:

Statutory Valuation of Individual Life and Annuity Contracts: Chapters 23 (VM-20: PBR for Life Products) and 14 (Universal Life)

Commentary on Question:

This question tested candidates' knowledge of statutory valuation of universal life contracts, before and after VM-20.

Solution:

- (a) Contrast the methodologies for calculating the following between VM-20 and the Universal Life Insurance Model Regulation:
 - (i) (1 point) Guaranteed Maturity Premium
 - (ii) (1 point) Expense Allowance

Commentary on Question:

Candidates showed mixed performance on both parts. Although similarities between the regulations are listed below, they were not required for full credit due to the question wording used ("Contrast").

For (i), many candidates were able to identify the primary difference between the regulations (what value the GMF is set to at maturity to calculate the GMP). Those candidates earned full credit. Common mistakes included mixing up the regulations or referencing other unrelated regulations.

For (ii), a fair number of candidates explained the differences correctly. Few candidates referenced FPT methodology by name, but many instead described the calculation under FPT correctly, which was granted full credit. Common mistakes included mixing up the regulations or referencing other unrelated regulations.

3. Continued

(i) The guaranteed maturity premium for ULSG under VM-20 is calculated such that the contract expires on the maturity date without value. The guaranteed maturity premium under the Universal Life Insurance Model Regulation is calculated such that the contract matures at face value on the maturity date. Under both methodologies the guaranteed maturity premium is calculated using policy guarantees for expense charges, COIs, and interest credited.

(ii) The expense allowance for ULSG under VM-20 is calculated as: $GMP + .25\%$ Face at $t=0$, 10% of GMP in years 1-5, and 0 thereafter. Under the Universal Life Insurance Model Regulation, the expense allowance is determined using the FPT methodology. In both cases the calculations rely on policy guaranteed COIs expenses, and interest credited.

- (b) Calculate the VM-20 Guaranteed Maturity Premium for the given policy, using information provided in Excel.

Commentary on Question:

Candidates struggled on this question overall. Candidates who made significant mistakes, such as assuming the GMP was paid only at time 0 or that the GMF should equal the face amount at maturity, were awarded less partial credit than candidates that showed an understanding of the regulation but made minor mistakes on timing or made simplifications in calculating COIs.

See Excel file

- (c) You are given information needed to perform the stochastic exclusion ratio test on this block of business in Excel.
- (i) Calculate the stochastic exclusion ratio.
- (ii) Identify the formula for the minimum reserve for this block based on the results of the stochastic exclusion test.

Commentary on Question:

Candidate performance was mixed on (i) but very strong on (ii).

For (i), common mistakes included pointing to the incorrect assumption basis or scenario, as well as improperly handling policy loans. The latter incurred a smaller point penalty than the former.

For (ii), candidates performed well. No double penalty was applied based on the candidate's answer to part (i).

3. Continued

(i) See Excel file

(ii)

If candidate's answer to c.i < 6% then

$$\text{Reserve} = \text{NPR} + \max(0, \text{DR} - \text{NPR})$$

If candidate's answer to c.i > 6% then

$$\text{Reserve} = \text{NPR} + \max(0, \max(\text{DR}, \text{SR}) - \text{NPR})$$

(d) Calculate the Deterministic Reserve.

Commentary on Question:

Candidate performance was strong. The most common mistake was mishandling policy loans. A smaller subset of candidates used the incorrect scenario and/or assumption basis.

See Excel file

4. Learning Objectives:

1. The candidate will understand and apply U.S. valuation principles and methods applicable to individual life insurance and annuity products issued by U.S. life insurance companies.

Learning Outcomes:

- (1b) Describe, apply and evaluate the appropriate valuation methods, requirements, and techniques and related under the US GAAP framework, including the calculation of reserves and related items (e.g., DAC).

Sources:

Chapter 24: VM 21: PBR for Variable Annuities · Statutory Valuation of Individual Life and Annuity Contracts, Claire, D., Lombardi, L. and Summers, S., 5th Edition, 2018.

Commentary on Question:

The question tested the candidates' knowledge on VM-21.

Solution:

- (a) Calculate the following:

Show all work.

- (i) Stochastic reserve
- (ii) The additional standard projection amount
- (iii) VM-21 minimum reserve

Commentary on Question:

- (i)
 - a. Most students performed well on this question.
 - b. Some candidates treated each column as a scenario rather than each row. This alternative interpretation was acceptable, and no points were deducted.
 - c. Some candidates treated positive values as deficiencies and used the "maximum" function to obtain GPVAD. This approach was also acceptable, and no points were deducted.
 - d. Some candidates included the CSV floor in the scenario reserves. No points were deducted for this inclusion.

4. Continued

(ii)

- a. Most candidates did not answer Part A(ii) fully correctly. Many did not achieve a passing mark on this question.
- b. Most candidates used prudent assumptions for at least one of the CTE calculations. However, all calculations related to ASPA should be performed using prescribed assumptions.
- c. Some candidates correctly stated the formula but applied incorrect references or computed incorrect results.
- d. Multiple approaches to calculating CTE65 were accepted, e.g., top 30%, top 40% or top 35%. No points were deducted for any of the three acceptable methods used to calculate CTE65.
- e. Most candidates did not fully understand the calculation of PPA, which is defined as the CTE70 amount under prescribed assumption scenarios including the CSV floor.

(iii)

- a. Most candidates performed well on this question.
- b. Credit was awarded even if candidates did not make mention of Reserve for contracts determined using the Alternative Methodology.
- c. Credit was deducted for failing to apply the CSV floor or for not correctly deducting PIMR (i.e., not correctly deducting the negative 5 million).

See Excel file for model solution

- (b) The company implemented a hedging program to help manage the risks associated with GMIB. You are given the following CTE 70 amounts:

Hedge assets included in projection	CTE 70 amount
Only hedge assets currently held at the valuation date	160 million
Currently held hedge assets and future hedge assets projected based on the hedging strategy	140 million

- The hedging strategy is a clearly defined hedging strategy, and the error factor is 20%

Calculate the stochastic reserve. Show all work.

4. Continued

Commentary on Question:

- 1. Approximately half of the candidates performed well on this question.*
- 2. No points were deducted for using an alternative error factor, as only the Word file specified the error factor of 20% while the Excel file did not.*
- 3. Points were deducted for failing to apply a floor to the excess of CTE(adjusted) over CTE(best efforts). The final result should never be lower than the best-effort reserve, as the error factor is applied to a floored value and therefore cannot reduce the best-effort reserve.*
- 4. Some candidates did not recognize that CTE70(adjusted) of 160M provided in this part of the question, rather, they used the result from Part A(i) No points were deducted for this alternative interpretation.*
- 5. Some candidates confused the concepts of best-effort and best-estimate reserves; points were deducted for this misunderstanding.*

See Excel file for model solution

5. Learning Objectives:

2. The candidate will understand how to explain and apply the methods, approaches and tools of financial capital management for life insurance company under a US regulatory framework.

Learning Outcomes:

- (2a) Explain and calculate required capital under a US regulatory framework.
- (2b) Describe the purpose and application of economic capital.
- (2c) Explain and evaluate the respective perspectives of regulators, investors, policyholders and insurance company management regarding the role and determination of capital.
- (2d) Explain and apply methods in capital management.

Sources:

LO2 o Ch. 29: Risk-Based Capital· Statutory Valuation of Individual Life and Annuity Contracts, Claire, D., Lombardi, L. and Summers, S., 5th Edition, 2018

LO2 A Multi-Stakeholder Approach to Capital Adequacy, Conning Research, Actuarial Practice Forum

Commentary on Question:

The question tested the candidates' ability to perform RBC calculations, compare different stakeholders' perspectives on capital, and explain the purposes and consequences of various metrics used in capital management.

Solution:

- (a) Calculate the RBC ratio for XYZ Life Insurance Company using the following information.

XYZ Life Insurance Company	
Statutory Surplus	3,400,000,000
Asset Valuation Reserve (AVR)	600,000,000
Policyholder Dividend Liability	375,000,000
Total Risk-Based Capital before Covariance Adjustment	3,000,000,000
Covariance Adjustment	450,000,000

Commentary on Question:

Candidates did well on part (a), although nearly all failed to multiply the Total Risk-Based Capital by 0.5. Otherwise, the most common error was to incorrectly apply the Policyholder Dividend Liability⁵.

5. Continued

Step 1: Calculate Total Adjusted Capital

$$\begin{aligned} \text{Total Adjusted Capital} &= \\ \text{Statutory Surplus} + \text{AVR} + .50 * \text{Policyholder Dividend Liability} \\ &= \$4,187,500,000 \end{aligned}$$

Step 2: Calculate Authorized Control Level Risk-Based Capital

$$\begin{aligned} \text{Authorized Control Level Risk-Based Capital} &= \\ .50 * (\text{Total Risk-Based Capital Before Covariance Adjustment} - \text{Covariance} \\ \text{Adjustment}) \\ &= \$1,275,000,000 \end{aligned}$$

Step 3: Calculate RBC Ratio

$$\begin{aligned} \text{RBC Ratio} &= \\ \text{Total Adjusted Capital} / \text{Authorized Control Level Risk-Based Capital} \\ &= 328\% \end{aligned}$$

- (b) Compare and contrast the policyholder, shareholder and regulator perspectives related to capitalization levels.

Commentary on Question:

Candidates generally performed well on part (b). Many candidates provided details of each stakeholder's perspective on capital without articulating how they align and differ, in which case partial credit was awarded.

Policyholders, shareholders, & regulators want capital levels to be set such that the insurance company can continue to meet obligations, which is supported by higher level of capital.

Shareholders, unlike policyholders & regulators, are also concerned with efficient use of capital and return on capital, which is reduced when an insurance company is overcapitalized or holds too much capital. Policyholders & Regulators are less concerned about overcapitalization.

- (c) Describe the potential consequence of falling below capital thresholds for each of the following measures:
- (i) RBC
 - (ii) Best's Capital Adequacy Ratio (BCAR)
 - (iii) Economic capital

5. Continued

Commentary on Question:

Candidates generally performed well on subpart (i), while responses to subparts (ii) and (iii) were mixed, often with very limited detail provided. For subpart (ii), many candidates described BCAR without articulating the consequences of falling below thresholds. For subpart (iii), many candidates conflated consequences of regulatory or rating agency thresholds with economic capital. Several responses stated that there are no consequences of falling below economic capital thresholds without specifying that company internal management may be influenced.

- (i) There are multiple RBC thresholds. When the RBC ratio falls below each threshold different regulatory actions will be triggered.
 - Trend Test Corridor [200% - 300%]: The company must perform a trend test.
 - Company Action Level [150% - 200%]: The company must prepare and submit an RBC plan to the commissioner of the state of domicile.
 - Regulatory Action Level [100% - 150%]: The company must submit an RBC plan to the commissioner and take any corrective actions specified.
 - Authorized Control Level [70% - 100%]: The commissioner is authorized to take any actions deemed necessary to protect the best interest of policyholders and creditors.
 - Mandatory Control Level [< 70%]: The commissioner is required to place the company under regulatory control.
- (ii) Falling below BCAR thresholds can lead to a ratings downgrade, which can make it harder to sell products to new policyholders and to attract agents or agent sales who prefer to only place business with higher rated companies.
- (iii) Falling below economic capital thresholds currently has no external consequences but may potentially trigger management actions within the company. Different companies may have different criteria or formulas for the Economic Capital calculation, so they are unique to each company.

6. Learning Objectives:

4. The candidate will understand the fundamentals of value creation and enforce management techniques for life and annuity products.

Learning Outcomes:

- (4b) Recommend and justify changes to non-guaranteed elements and policyholder dividends.

Sources:

Mechanics of Dividends, SOA Research Institute, Mar 2022

Commentary on Question:

This question tested the candidates' knowledge of considerations when adjusting dividend scales, as well as dividend calculations using the Contribution Method.

Solution:

- (a) Critique each of these statements as they relate to the dividend framework described in "Mechanics of Dividends, SOA Research Institute, Mar 2022":
 - (i) *When a segment of products experiences significantly elevated lapse, it permanently changes the dividend scale uniformly for all products to reflect the change in aggregate experience.*
 - (ii) *The effect of COVID-19 on mortality is an example of a temporary event where no change in dividend scale is necessary.*
 - (iii) *When a dividend scale reduction occurs immediately after a policy is issued, the insurer must use the reduced dividend scale and is not allowed to use the illustrated dividend scale for that policy.*

Commentary on Question:

Candidates generally did well on statements (i) and (iii), but some candidates struggled with critiquing statement (ii). Partial credit is given to candidates who provided a mix of correct and incorrect critiques.

For statement (i), maximum credit was received by candidates who provided a comprehensive response that considers the evaluation, credibility, magnitude, and future impacts of the elevated lapse, as well as the resulting impact on the dividend scale. Candidates that only stated that the change should not be uniformly applied to all products received partial credit.

For statement (ii), maximum credit was received by candidates who concluded that temporary events can impact the dividend scale given sufficient magnitude. Credit is also given to candidates that focus on the long-term impact of COVID-19 and provide a detailed explanation of the possible effects on dividend scale. For statement (iii), maximum credit was received by candidates who fully explain how substitution/pegging works. Candidates that only mention substitution or pegging without defining those methods received partial credit.

6. Continued

- (i) False. Allocate any change in experience as much as possible to the policies experiencing the change. It may not be appropriate to reflect for all policyholders or to spread a limited change among all policyholders. The elevated lapse should also be evaluated to determine if it is a temporary change, in which case the resulting dividend scale change should not be permanent. If the lapses causes experience factors to change to new levels which seem likely to continue, then the dividend scale change may be permanent. .
 - (ii) False. Covid-19 or any other temporary event could cause a temporary dividend scale change, however the dividend scale should generally change for a temporary event of sufficient magnitude.
 - (iii) False. Substitution may be used to pay the illustrated scale for several policy years even if the dividend scale is reduced. This is a sub-type of "Pegging" where a dividend scale reduction is mitigated by continuing the same dividend amount until the reduced scale exceeds that amount.
- (b) You are given an Asset Share Report in the provided Excel spreadsheet.

Calculate the three-factor dividend using the Contribution Method for policy year 15. Show all work.

Commentary on Question:

Candidates generally did well on part b. Most candidates received full or partial credit.

See detailed Model Solution in Excel.

- (c) Due to much higher portfolio rates, the excess of interest rate used to distribute surplus over reserve valuation interest rate is updated to be 130bps greater than what is shown in the Asset Share Report beginning in policy year 15.

Calculate the revised three-factor dividend using the Contribution Method for policy year 15.

Commentary on Question:

Candidates generally did well on part c. Many candidates received full credit. Candidates that used incorrect formulas from part b were still given full credit for part c as long as the interest component was correctly adjusted based on the provided information.

See detailed Model Solution in Excel.