ILA LFMU Model Solutions
Spring 2024

1. Learning Objectives:

1. The candidate will understand and apply U.S. GAAP 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 and techniques and related accounting treatments for reserves and related items (e.g., DAC), and other assets and liabilities for specific insurance products under U.S. GAAP. Further, describe and recommend assumptions and margins appropriate to these GAAP reserves.

(1b) Describe and apply the requirements, calculations, and disclosures related to GAAP "Targeted Improvements".

Sources:

LO#1 LFM-856-23: US GAAP for Life Insurers, 2022 - Chapter 11: US GAAP - Deferred Annuities

Commentary on Question:

This question tested the candidates' knowledge of U.S. GAAP valuation principles and methods, particularly around accounting classification of annuity contracts and the calculation of Market Risk Benefits (MRBs) that were introduced as part of the Long Duration Targeted Improvements (LDTI). Overall, candidates generally demonstrated an understanding of the concepts. It was more common for candidates to have challenges with part (a) than on parts (b) and (c).

Solution:

(a) Describe the test that XYZ Life needs to perform to determine the new VA product classification under US GAAP.

1. Continued

Commentary on Question:
Few candidates were able to demonstrate a full understanding of the product classification. A common error was focusing on the market risk component and describing the MRB, rather than the test for VA product classification and the insurance risks associated with it. The key concepts for candidates were describing how deferred annuities may be classified as either investment contracts or as universal life-type contracts and that the key differentiator between the two types was the presence of significant insurance risk. Candidates that performed well explained the determination ratio and threshold.

- Deferred annuities may be classified as either investment contracts or as universal life-type contracts. The key differentiator is the presence of significant mortality or morbidity risks.
- The determination of significance of mortality or morbidity risk shall be based on a comparison of the following amounts:
  - Excess payments. The present value of expected excess payments to be made under insurance benefit features—that is, insurance benefit amounts and related incremental claim adjustment expenses in excess of the account balances.
  - Revenue. The present value of all amounts expected to be assessed against the contract holder and the expected investment margin.
- Based on the applicable guidance, the insurer determines the significance of mortality or morbidity risk only on features and provisions exclusive of the option to annuitize.
- Typically, the insurer establishes an accounting policy where mortality or morbidity risk is determined to be significant if the ratio of excess payments to revenue, as defined above, exceeds a defined threshold.

(b) Calculate the GMDB Market Risk Benefit (MRB) liability at the valuation date. Show all work.

Commentary on Question:
Most candidates were able to demonstrate at least a partial understanding of this part of the question. Common mistakes include calculating a different survivorship than the given persistency (net of decrements), missing one or both of mortality and persistency for decremented excess benefit, not flooring excess benefits at zero, not discounting fees to the beginning of year, and not using the right discount rate in at issue and/or valuation date. Also, candidates often did not provide both calculations at issue to determine the attributed fee percentage and at the valuation date to determine the MRB.

The solution for this part of the question is provided in an Excel spreadsheet.

1. Continued

(c) Calculate the Accumulated Other Comprehensive Income (AOCI) at the valuation date. Show all work.

Commentary on Question:
In general, candidates did well on this part of the question in understanding that the AOCI was a comparison of MRB with respect to the change in own credit from issue to the valuation date. A common mistake was not using the right discount rate at valuation date keeping the risk-free portion the same but with at-issue own credit.

The solution for this part of the question is provided in an Excel spreadsheet.

2. Learning Objectives:

1. The candidate will understand and apply U.S. GAAP 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 and techniques and related accounting treatments for reserves and related items (e.g., DAC), and other assets and liabilities for specific insurance products under U.S. GAAP. Further, describe and recommend assumptions and margins appropriate to these GAAP reserves.

Sources:

LFM-856-23: US GAAP for Life Insurers, 2022 - Chapter 4: US GAAP - Expenses and Capitalization

LFM-856-23: US GAAP for Life Insurers, 2022 - Chapter 8: US GAAP - Long Duration Health (only sections 1, 2.8.2, 3-5)

LFM-858-24: US GAAP for Life Insurers, 2022 - Chapter 15: US GAAP – Reinsurance

Commentary on Question:

This part of the question tested the candidates' understanding of U.S. GAAP valuation principles and methods.

Solution:

(a) For the new LTC product, you are given:

Claim projections

	Projection Year				
Incurral Year	**1**	**2**	**3**	**4**	**5**
1	2,500	2,250	-	-	-
2		6,063	5,456	-	-
Total	**2,500**	**8,313**	**5,456**	**-**	**-**

Corporate Bond Yield Curve

Moody's rating	**Curve**	**1**	**2**	**3**	**4**	**5**
Prime	Spot	5.00%	5.50%	5.25%	4.50%	4.00%
High Grade	Spot	5.25%	5.25%	5.00%	4.75%	4.50%
Upper Medium	Spot	5.50%	6.00%	5.50%	5.00%	4.75%
Prime	Forward	5.00%	6.00%	4.75%	2.25%	2.00%
High Grade	Forward	5.25%	5.25%	4.50%	4.00%	3.50%
Upper Medium	Forward	5.50%	6.50%	4.50%	3.50%	3.75%

2. Continued

(i) Calculate the claim reserve under US GAAP for year 1 and 2 using the spot rate locked in at issue. Show all work.

(ii) Calculate the claim reserve under US GAAP for year 1 and 2 using the forward rate locked in at issue. Show all work.

Commentary on Question:
For this part of the question, candidates were required to determine GAAP claim reserves for a new long-term care product by discounting claims in their year of incurred to the beginning of the first two claim projection years using given spot and forward interest rates.
Candidates generally calculated the GAAP claim reserves accurately. However, candidates had difficulty with distinguishing the projection year from year of incurred or that claims incurred in a particular projection year may be associated with additional claim payments in a later projection year and would be included in the calculation of the GAAP claim reserve for the earlier projection year.
Many candidates only calculated GAAP claim reserves as of the beginning of projection year 1 and did not calculate the GAAP claim reserve at the beginning of projection year 2. Another common error was the derivation of the discounted interest rates. In most cases, candidates derived the projection year 1 values correctly, but when calculating the projection year 2 values candidates used the same discount rates used in their projection year 1 calculations.
The solution is based on the spot and forward rates provided in the question. Typically, spot and forward rates are directly related. It is this relationship which should result in identical results. However, that relationship does not exist in the spot and forward rates for this question. Candidates who realized and demonstrated this concept received full credit.

Claim reserves under US GAAP are equal to the present value of future projected claims discounted back to the beginning of the desired claim projection year using the upper medium interest rates.

CV(x,y) = Claim Reserve at the beginning of projection year x for claims incurred in year y associated with claim payments being made in year y and later. Claims are assumed to be paid at the end of the year.

(i) To calculate the claim reserve under US GAAP for year 1 and 2 using the spot rate locked in at issue:

2. Continued

Total Claim Reserve at Beginning of Projection Year 1 = CV(1,1) + CV(1,2)
CV(1,1) = 2,500 / (1+.055)^1 + 2,250 / (1+.06)^2
= 2,369.67 + 2,002.49 = 4,372.16
CV(1,2) = 6,063 / (1+.06)^2 + 5,456 / (1+.055)^3
= 5,396.05 + 4,646.40 = 10,042.45
Total Claim Reserve at Beginning of Projection Year 1 = 4,372.16 + 10,042.45 = 14,414.61

Total Claim Reserve at Beginning of Projection Year 2 = CV(2,1) + CV(2,2)
CV(2,1) = 2,250 / (1+.06)^1 = 2,122.64
CV(2,2) = 6,063 / (1+.06)^1 + 5,456 / (1+.055)^2
= 5,719.81 + 4,901.96 = 10,621.77
Total Claim Reserve at Beginning of Projection Year 2 = 2,122.64 + 10,621.77 = 12,744.41

(ii) To calculate the claim reserve under US GAAP for year 1 and 2 using the forward rate locked in at issue:

Total Claim Reserve at Beginning of Projection Year 1 = CV(1,1) + CV(1,2)
CV(1,1) = 2500 / (1+.055) + 2250 / (1+.065) /(1+.055)
= 2,369.67 + 2,002.54 = 4,372.21
CV(1,2) = 6,063 / (1+.065) / (1+.055) + 5,456 / (1+.045) / (1+.065) / (1+.055)
= 5,396.17 + 4,646.82 = 10,042.99
Total Claim Reserve at Beginning of Projection Year 1 = 4,372.21 + 10,042.99 = 14,415.20

Total Claim Reserve at Beginning of Projection Year 2 = CV(2,1) + CV(2,2)
CV(2,1) = 2,250 /(1+.065) = 2,112.68
CV(2,2) = 6,063 / (1+.065) + 5,456 / (1+.045) / (1+.065)
= 5,692.96 + 4,902.40 = 10,595.36
Total Claim Reserve at Beginning of Projection Year 2 = 2,112.68 + 10,595.36 = 12,708.04

(b) QWE would like to use reinsurance to mitigate GAAP income volatility from the risk of entering the LTC market.

Assess whether each proposal below meets the objective of QWE.

(i) Proposal 1: Cede 80% of morbidity risk with a large ceding commission to boost surplus at inception. QWE will pay a morbidity premium set at 500% of best estimate morbidity, and will receive an experience rating refund on ceded premium paid over 0.05% of statutory reserves at the end of each year.

2. Continued

(ii) Proposal 2: QWE will pay a quarterly premium at 107% of the industry morbidity rate, with the first-year reinsurance premium being waived for all policies. The reinsurer will reimburse all LTC claims after the second year a policy has been on claim.

Commentary on Question:
For this part of the question, candidates were required to evaluate the appropriateness of two reinsurance proposals with respect to mitigating GAAP income volatility from the risk of entering the LTC market.
Some candidates failed to state if either proposal meets QWE's objective. Some candidates argued that portions of each proposal satisfy QWE's objective and other portions of the same proposal did not satisfy QWE's objective. Many candidates failed to explain why deposit accounting would be applied to Proposal 1 and that such accounting has no impact to GAAP income volatility, or that reinsurance accounting treatment would be applied to Proposal 2 and that such accounting lessens GAAP income volatility. Repeating the proposal was not sufficient for a candidate to earn full credit for this part of the question.

(i) Proposal 1 does not meet the objective of QWE to mitigate GAAP income volatility from the risk of entering the LTC market. QWE paying a morbidity premium equal to 500% of best estimate morbidity is excessive. For QWE to receive an experience rating refund on ceded premium paid over 0.05% of statutory reserves at the end of each year limits the reinsurance risk and raises risk transfer concerns such that it may be more difficult to assert that substantially all the insurance risk has been assumed by the reinsurer. Thus, this proposal does not have sufficient risk transfer. Long-duration reinsurance contracts that do not indemnify the ceding insurer or subject the assuming reinsurer to significant mortality or morbidity risk are treated as deposits. In this case, deposit accounting applies which has no impact on income volatility due to new risks.

(ii) Proposal 2 does meet the objective of QWE to mitigate GAAP income volatility from the risk of entering the LTC market. QWE paying a quarterly premium at 107% of the industry morbidity rate with the first-year premium being waived seems reasonable and in line with the reinsurer reimbursing all LTC claims after the second year a policy has been on claim. Thus, it appears that QWE is indeed transferring substantially all the insurance risk on the reinsured portions of the underlying contracts to the reinsurer and therefore, qualifies as a reinsurance contract. This reinsurance treaty meets the requirements of reinsurance accounting. Such accounting treatment lessens the income volatility induced by the morbidity risk.

2. Continued

(c) To boost competitiveness for the LTC product, QWE's chief marketing officer has decided to increase the commission on the LTC products. The agents selling the policies have proposed the following commission schedules:

- **Schedule A**: 10% commission on first year premium only
- **Schedule B**: 1% commission on all premium collected
- **Schedule C**: fixed cost per year regardless of sales. Cost is approximately 8% of projected first year premium

The expected life of the policy is 30 years.

Identify the commission schedule that:

(i) Results in the least statutory surplus strain at issue.

(ii) Results in the highest GAAP net income.

(iii) Results in the least mismatch between statutory income and GAAP income.

Justify your answer.

Commentary on Question:
For this part of the question, candidates were required to evaluate the impact of three proposed commission scales to GAAP and statutory income statements. Candidates generally did well on this part of the question. Many candidates demonstrated their knowledge of which commission schedule had expenses which were eligible for deferral into a DAC asset and available for amortization. Candidates also demonstrated their understanding how deferability of an expense or lack of deferability impacts statutory surplus, GAAP net income, and the relationship between statutory and GAAP income statements. For part (iii) candidates received full credit if they answered Schedule B, Schedule C, or Schedules B and C.

(i) The commission schedule which results in the least statutory surplus strain at issue is the commission schedule which produces the least amount of expenses in the first year. Expenses are expensed as incurred in a statutory income statement. Thus, Schedule B with its 1% of commission on all premium collected will produce the least amount of expenses among the three schedules in the first year.

2. Continued

(ii) The commission schedule which results in the highest GAAP income is Schedule A because its commissions are deferrable and amortized over 30 years since its commissions are in excess of 0% ultimate commissions. Annually such expenses would be amortized (expensed) in a GAAP income statement as 1/3% of premiums in each year on a straight-line basis for 30 years. The commissions for both Schedules B and C are not deferrable and would be expensed as incurred. The amortized expenses for Schedule A are lower than the expenses incurred by Schedules B and C and results in the least expense reduction of the three schedules.

(iii) The commission schedules that result in the least mismatch between statutory income and GAAP income are Schedules B and C. Schedule B's commissions are not deferrable since its commission schedule are a level percent of premium without a lower ultimate commission and thus, its expenses are identically expensed as incurred in both Statutory and GAAP income statements. Schedule C's commissions are classified as fixed expenses since they do not directly vary with sales and as a result, are not deferrable and thus, as similar to Schedule B, its expenses are identically expensed as incurred in both Statutory and GAAP income statements. This is not true for Schedule A since its commissions are deferrable and therefore, its expenses in a GAAP income statement will not match the expenses in a Statutory income statement.

3. Learning Objectives:

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

Learning Outcomes:

(2a) Describe, apply and evaluate the appropriate valuation methods and techniques and related accounting treatments for reserves and related items, and other assets and liabilities for specific insurance products under the U.S. Statutory rules. Further, describe and recommend assumptions and margins appropriate to these statutory reserves.

Sources:

Practitioner Considerations for Guideline Excess Spread Attribution Methodology under Actuarial Guideline LIII (AG53)

Commentary on Question:

This question tested the candidates' knowledge U.S. Statutory valuation principles and methods, particularly AG53. Part a) asked for a description of Projected High Net Yield assets. Part b) asked for a critique of several statements. Part c) asked for a simplified attribution.

Solution:

(a) Describe Projected High Net Yield assets that are the focus of AG53.

Commentary on Question:

Most candidates received partial credit on this part of the question. Some candidates mentioned "equity-like" and "other than equity-like" assets, the two main asset categories mentioned in AG53, and the main point of each. Some candidates mentioned a higher return assumed later in the projection. Almost no candidates mentioned any portion of the points related to weighted average life, exclusion of investment expenses, or aggregation consistent with grouping of assets.

- Equity-like investments assumed to have a higher value at projection year 10 or later where before deduction for investment expenses:
  - Return is at least 4% for the first 10 projection years and at least 5% for later years,
- Assets other than Equity-like instruments where assumed Guideline Excess Spread is greater than zero. In addition:
  - Appointed Actuary shall disclose method used to determine WAL for comparing to the Investment Grade New Spread Benchmark for assets without an explicit WAL or term to maturity.

3. Continued

- Exclude investment expenses for purposes of the comparison between the assumed Net Market Spread from each asset and the Investment Grade New Spread Benchmark.
- Aggregation is consistent with how assets are grouped. *(Credit only once whether mentioned in first main point, second or both)*

(b) Critique the following statements about AG53:

(i) *AG53 will help ensure spread attributions will be consistent across companies.*

(ii) *For the purpose of determining net market spreads, best estimate cashflows with margin should be used. However, investment expenses and defaults should not be considered when determining the net market spreads.*

(iii) *Guideline excess spread attribution is only required for existing asset holdings.*

(iv) *Guideline excess spread attribution should be performed for fixed rate corporate bonds with no or immaterial callability.*

Commentary on Question:
Most candidates received partial credit on this part of the question. The expectation was that candidates would indicate the statement was true or false first and explain why the statement was false. Some candidates did not clearly indicate whether the statement was true or false and partial credit then depended on the rationale.

(i) False. AG53 will not ensure that spread attributions are consistent across companies. There may be a wide range of views. Asset holdings may differ by companies. Certain companies may have less liquid assets which would impact data used for spreads.

(ii) False. Best estimate cashflows should be used without margins. When determining net market spreads defaults should be deducted while investment expenses should not be considered.

(iii) False. Guideline excess spread attribution is required for both existing assets and assumed reinvestment asset purchases.

(iv) False. It depends on whether the bonds are public or private. If public, then the Guideline Excess Spread attribution is <u>not</u> required. If private, then it will be required.

3. Continued

(c) Complete Table B given the data in Table A. Show all work.

Table A: Spread Components Related to Each Risk

		Spread Components Related to Each Risk				
Asset Type	Net Market Spread	Factor A	Factor B	Factor C	Factor D	Other Factors/ Unallocated
Investment Grade Net Spread Benchmark	1.5%	1.0%	0.5%	0.0%	0.0%	0.0%
Asset Class 1	2.5%	0.3%	0.7%	0.5%	0.8%	0.2%
Asset Class 2	3.5%	1.8%	0.3%	1.0%	0.0%	0.4%

Table B: Excess Spread Components Related to Each Risk

				Excess Spread Components Related to Each Risk				
Asset Type	Net Market Spread	Investment Grade Net Spread Benchmark	Guideline Excess Spread	Factor A	Factor B	Factor C	Factor D	Other Factors/ Unallocated
Asset Class 1								
Asset Class 2								

Commentary on Question:
Some candidates received full credit while many candidates received partial credit on this part of the question. Some candidates correctly completed the first two or three columns of the table while the rest was incorrect. Some candidates showed a correct Guideline Excess Spread but incorrectly proportionated the factors or otherwise floored each factor at zero even though these can be negative. Although not required for full credit, a few candidates showed the check where the Guideline Excess Spread equals the sum of the excess spread components including A-D and other factors/unallocated.

IG Net Spread Benchmark = 1.50% = Original IG Net Spread Benchmark

Net Market Spread = Original Market Spread
Asset Class 1 Net Market Spread = 2.50%
Asset Class 2 Net Market Spread = 3.50%

3. Continued

Guideline Excess Spread = Asset Class N Net Market Spread – IG Net Market Spread
Asset Class 1 Guideline Excess Spread = 1.00% = 2.50% - 1.50%
Asset Class 2 Guideline Excess Spread = 2.00% = 3.50% - 1.50%

Each Factor = Asset Class Factor – IG Factor

Completed Table B:

Asset Type	Net Market Spread	IG Net Spread Benchmark	Guideline Excess Spread	Factor A	Factor B	Factor C	Factor D	Other
Asset Class 1	2.50%	1.50%	1.00%	-0.70%	0.20%	0.50%	0.80%	0.20%
Asset Class 2	3.50%	1.50%	2.00%	0.80%	-0.20%	1.00%	0.00%	0.40%

Check Guideline Excess Spread = Sum of the Factor Spreads.
Asset Class 1: 1.00% = -0.70% + 0.20% +0.50% +0.80% +0.20% ✓
Asset Class 2: 2.00% = 0.80% - 0.20% + 1.00% + 0.00% + 0.40% ✓

4. Learning Objectives:

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

Learning Outcomes:

(2a) Describe, apply and evaluate the appropriate valuation methods and techniques and related accounting treatments for reserves and related items, and other assets and liabilities for specific insurance products under the U.S. Statutory rules. Further, describe and recommend assumptions and margins appropriate to these statutory reserves.

(2b) Describe, apply and evaluate the Principle-Based Reserves valuation methods and techniques for specific insurance products under U.S. Statutory rules.

(2c) Describe and evaluate the fundamental features and design of the U.S. Statutory regulatory system.

Sources:

LFM-143-20: Fundamentals of the Principle Based Approach to Statutory Reserves for Life Insurance

Valuation of Life Insurance Liabilities, Lombardi, Louis J., 5th Edition, 2018, Chapter 23 – PBR for Life Products (exclude 23.1)

Reflection of COVID-19 in Life Insurance Mortality Improvement: A Discussion Brief, American Academy of Actuaries, May 2022

Commentary on Question:

This question tested the candidates' knowledge of U.S. Statutory valuation principles and methods.

Solution:

(a) Critique the following statements:

A. The starting assets in the cash flow projection model should be 105% of the modeled reserve.

B. The Deterministic Exclusion Test is not required as it is designed to identify policies that are insensitive to interest rate and asset return volatility risks.

C. The Stochastic Reserve is calculated as the sum of the starting assets and the greatest present value of accumulated deficiency.

4. Continued

Commentary on Question:

A. Most candidates correctly identified the fallacy of this statement.
B. This is a composite statement and is best analyzed as such. In discussing the application of the DET, the best-prepared candidates recognized the special nature of ULSG; however, this was not required to answer the question correctly.
C. Candidates generally did not do well critiquing this statement.

A. False. The starting assets should be in the range between 98% and 102% of the reported reserve.
B. False. The DET is not required; however, it is designed to determine whether premiums are sufficient to fund the policy's guarantees, not determine whether the policy is insensitive to interest rate and asset return volatility risks.
C. False. The sum of starting assets and the greatest present value of accumulated deficiencies defines a scenario reserve, not the Stochastic Reserve.

(b) Calculate the Scenario Reserve given the projected scenario below. Show all work.

Projection period	0	1	2	3	4	5	6	7	8	9	10
Statement Value of Assets (000s)	20	11	2	(7)	(3)	1	5	9	13	17	21
One-Year Treasury Rate (%)		1.34	0.65	0.14	1.03	1.08	0.74	0.59	1.05	0.57	0.48

Commentary on Question:
Given that the calculation was described in words in the text, the majority of candidates did well on this part of the question.
Common mistakes were:
(a) failing to multiply the Treasury rates by 105%; and
(b) errors in developing the Accumulative Discount Factors.

See spreadsheet for model solution

(c) Describe the steps to determine the prudent estimate mortality assumption given that ABC's mortality experience is only partially credible.

Commentary on Question:
This part of the question might be a bit challenging for candidates who never experienced this process. Most candidates failed to mention the requirement to add margins.

4. Continued

The actuary must select
(a) a set of mortality rates (Set 1) representing the company's mortality experience; and
(b) a corresponding set of mortality rates (Set 2) representing industry mortality experience.
A margin for conservatism is added to each of Set 1 and Set 2, to produce MSet 1 and MSet 2, respectively. The credibility score of the company's experience data is a factor in selecting the respective margins.

Using the detailed process defined in VM-20, MSet 1 and MSet 2 are blended together to produce the final prudent estimate assumption for mortality.

The process of grading the company experience rates (with margin) to the industry experience rates (with margin) uses a prescribed grading table that varies by the credibility level of the company data as well as the "sufficient data period". This period is defined as the last policy duration which has 50 or more claims. Generally, the lower the credibility of the company mortality data, the more quickly the company experience rates must grade into the industry mortality rates after sufficient data no longer exists, as determined by the sufficient data period.

If the actuary does not have sufficient mortality data on which to base the selection of Set 1, then Set 2 alone is used for the entire process.

(d) Describe the factors that can impact ABC Life's mortality improvement assumptions under a significant pandemic, such as COVID-19.

Commentary on Question:
Most candidates treated this as a question about COVID-19. Rather, this a question about the lessons learned from COVID-19. Common errors were:
(a) discussing the mortality assumption rather than the mortality improvement assumption; and
(b) discussing <u>whether</u> to set a mortality improvement assumption. The question presumes that a mortality improvement assumption <u>is</u> being set.

General: Like COVID-19, the future direction of mortality improvement might be unknown; so conservatism must be considered.

Factors that might sustain future mortality improvement:
1. The pandemic might have ended unhealthy lives, leaving behind a population that is healthier than pre-pandemic.
2. COVID-19 encouraged the use of telemedicine. For a future pandemic, this approach may lead to better health outcomes and longer survival.

4. Continued

Factors that might reduce future mortality improvement:
3. Latent effects may emerge later and cause unanticipated deaths.
4. The impact of the pandemic on mental health may have a negative impact on mortality improvement by way of increased suicides.

5. Learning Objectives:

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

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

6. The candidate will understand the fundamental features of the U.S. and International regulatory framework.

Learning Outcomes:

(1a) Describe, apply and evaluate the appropriate valuation methods and techniques and related accounting treatments for reserves and related items (e.g., DAC), and other assets and liabilities for specific insurance products under U.S. GAAP. Further, describe and recommend assumptions and margins appropriate to these GAAP reserves.

(2b) Describe, apply and evaluate the Principle-Based Reserves valuation methods and techniques for specific insurance products under U.S. Statutory rules.

(6c) The valuation methodology specified in IFRS 17.

Sources:

Valuation of Life Insurance Liabilities, Lombardi, Louis J., 5th Edition, 2018, Chapter 23 – PBR for Life Products (exclude 23.1)

LFM-143-20: Fundamentals of the Principle Based Approach to Statutory Reserves for Life Insurance, Rudolph

LFM-856-23: US GAAP for Life Insurers, 2022 - Chapter 5: US GAAP - Non-participating Traditional Life Insurance

Bridging the GAAP: IFRS 17 and LDTI Differences Explored, Financial Reporter, July 2022

Commentary on Question:

This question tested the candidates' ability to compare a variety of standards. The question covers aspects VM-20, US GAAP, and IFRS17. Candidates with knowledge of all the standards generally did well on this question.

Solution:

(a) Due to the impact of COVID-19, PGY Group has been reviewing and revising some of its best estimate assumptions for a block of term business.
You are given:

5. Continued

Assumption	Before	After
Mortality	100% of past experience	10% increase
Maintenance expense	2,000 per policy	2,000 per policy with 3% inflation
Claim expense	1,000 per claim	1,000 per claim, decreasing by 5% each year, floored at 500
PGY's experience is considered fully credible		

Assess the current year directional impact of the assumption update (while holding all other assumptions constant) for each of the above assumptions with regard to each of the following:

(i) Deterministic US Statutory Reserve under VM-20

(ii) US GAAP Reserve

Justify your answers.

Commentary on Question:
Candidates generally did well on this part of the question in identifying the impact due to mortality but struggled on maintenance expenses and claim expenses. For a candidate to receive full credit, they had to ensure to relate their answer back to the standard. Candidates were able to answer the question when it related to mortality but were not able to tie the concepts back when asked about Maintenance Expenses and Claim expenses. This refers to future improvements not being included for VM20, or how maintenance expenses not being considered a part of US GAAP reserves. To receive full credit candidates had to provide the directional impact and the justification, which many candidates failed to do.

(i) Deterministic US Statutory Reserve under VM-20

Mortality – The 10% increase in mortality will **increase** the reserve. As PGY's experience is fully credible, they are allowed to reflect the company experience as part of the assumption.

Maintenance Expenses – Including inflation in the expenses will **increase** the reserve. As the Deterministic Reserve under VM20 is a Gross Premium Valuation, all inflows and outflows are considered.

Claim expense – There will be **no impact** to the reserve. Under VM-20, future improvement is not allowed to be reflected as part of the result until it actually realized.

5. Continued

(ii) US GAAP Reserve

Mortality – The 10% increase in mortality will **increase** the reserve. US GAAP Reserves uses best estimate assumption and allows the unlocking of assumptions at each valuation date.

Maintenance Expenses – There will be **no impact** to the reserve. US GAAP Reserves do not include maintenance expenses,

Claim expense – There will be a decrease to the US GAAP Reserves. GAAP Reserves include claim costs which includes claim expenses. This are allowed to be reflected in the projected cash flows.

(b) Critique the following statements for ULSG under VM-20:

A. The VM-20 Minimum Reserves for a group of individual life insurance policies that pass both the deterministic and stochastic exclusion tests is NPR+Max[0, DR-NPR].

B. The process for calculating the NPR assumes that at issue, all policies are level premium permanent plans that will expire on the maturity date with a minimum guaranteed benefit.

C. When calculating the NPR floor, the COI would be determined to the next paid-to-date using credibility weighted company experience.

Commentary on Question:
Candidates generally did well critiquing statement A, and generally did not do well critiquing statements B and C. Due to the ambiguity about the type of ULSG product stated, when critiquing statement A full credit was received if the candidate stated the the Reserve would just be the NPR, or that a ULSG will always needed to perform the DET. When critiquing statement B many candidates were unable identify that under NPR the fund value had to mature at a 0 value. When critiquing statement C, most candidates failed to identify that the COI should be based on the prescribed mortality rate and focused more on the weighting. No credit was received if a candidate just provided a True or False without any justification.

A. True, under VM-20, a a ULSG will always need to calculate the DR regardless of whether both the DET and SET have been passed.

5. Continued

B. False, when calculating the NPR, the assumption is that the policy will expire at a 0 maturity value.

C. False, when calculating the NPR, the COI would be determined to the next paid-to-date using the applicable prescribed mortality rate based on the issue date of the policy.

(c) PGY Group's management will strategically assign a legal entity for each block of business to be reported through, with the goal of optimizing profit and capital.

You are given the following information on a block of whole life business at issue:

Plan	PV premium (millions)	PV claims (millions)	IFRS 17 Risk Adjustment (millions)	PV expenses (millions)
A	10	5	0.5	0
B	12	13	1	0

(i) Calculate the GAAP liability for each plan. Show all work.

(ii) Calculate the IFRS 17 fulfillment cashflow for each plan. Show all work.

(iii) Calculate the IFRS 17 contractual service margin for each plan. Show all work.

(iv) Recommend which entity below should be used for this block:

- Entity 1: follows IFRS 17 reporting
- Entity 2: follows U.S GAAP reporting

Justify your response.

Commentary on Question:
Candidates generally did not do well on part (i). Most candidates did not appropriately calculate Net Premium Ratio (NPR) and simply set the GAAP Liability to the PV of Claims – PV of Premiums. No credit was received for calculating this formula as it missed out a critical component of calculating the NPR.
Candidates generally did do well on part (ii) and (iii). Most candidates calculated these correctly and those who did not performed mostly careless mistakes.

5. Continued

Candidates performed well on part (iv). Most candidates were able to identify several appropriate reasons to show that US GAAP would be preferable for this entity. Candidates who suggested IFRS17 and provided reasonable justification received partial credit. For a candidate to receive full credit, they had to make reference to the calculations performed within parts (i), (ii) and (iii).

(i) *GAAP Liability*

NPR = min(1, PV Future Benefits/PV future Premiums)

GAAP Liability = PV Future Benefits – NPR x PV Future Premiums

Product A:

NPR = min(1,5/10) = 0.5

GAAP Liability = 5 – 0.5 * 10 = 0

Product B:

NPR = min(1,13/12) = 1

GAAP Liability = 13 – 1* 12 = 1

Total GAAP Liability = 0 + 1 = 1

(ii) *Fulfillment cash flow*

Fulfillment Cashflow = PV Claims + PV Expenses + Risk Adjustment – PV Premiums

Product A = 5 + 0 + 0.5 – 10 = -4.5

Product B = 13 + 0 + 1 – 12 = 2

(iii) *Contractual Service Margin*

CSM = Max(-Fulfillment Cashflow,0)

Product A = Max(-(-4.5),0) = 4.5

Product B = Max(-1,0) = 0

5. Continued

(iv) Entity 2 would be preferred for this block. Under US GAAP, products A and B can be aggregated together. Under IFRS17, as product B is Onerous they have to be reported separately. Under US GAAP as they can be aggregated gains and be used to subsided losses within the different product – under IFRS17 there is no subsiding allowed. As there is a lower GAAP Liability at issue, there will be higher capital compared to IFRS17 due to the initial loss.

6. Learning Objectives:

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

3. The candidate will:
   - Understand the significant impact on individual life insurance and annuity product design and management of U.S. insurance product taxation rules.
   - Understand and apply the significant rules of U.S. insurance company taxation as they apply to U.S. life insurers.

Learning Outcomes:

(2a) Describe, apply and evaluate the appropriate valuation methods and techniques and related accounting treatments for reserves and related items, and other assets and liabilities for specific insurance products under the U.S. Statutory rules. Further, describe and recommend assumptions and margins appropriate to these statutory reserves.

(3a) Describe and apply the significant US tax regulations relating to the taxation of individual life and annuity insurance products.

(3b) Describe, apply and evaluate the valuation methods and techniques for specific insurance products under U.S. taxation rules. Further, evaluate and calculate deferred tax items.

Sources:

Valuation of Life Insurance Liabilities, Lombardi, Louis J., 5th Edition, 2018, Chapter 11 – Valuation Methodologies (exclude 11.3.9 to 11.3.11)

LFM-845-20 – Chapters 1 and 2 of Life Insurance & Modified Endowments under Internal Revenue Code Sections 7702 and 7702A, DesRochers, Adney, King, & Springfield, Second Edition

LFM-850-22 – Changes to Section 7702 (IRC) and Nonforfeiture Interest Rates

The Tax Cuts and Jobs Act of 2017— Effects on Life Insurers, American Academy of Actuaries, Oct 2020

Commentary on Question:

This question tested the candidate's knowledge of U.S. Statutory valuation principles and methods and the impact of taxation rules on products and life insurers. Candidates generally did well on this question. Most candidates received at least partial credit on each part of the question.

6. Continued

Solution:

(a) You are given the following information on an individual whole life policy as of 12/31/2023.

Issue date	April 10, 2016
Mean reserve (includes deficiency reserves)	5,000
Valuation premium	1,000
Deficiency reserve	1,000
Supplemental benefit reserve	100
Cash surrender value	3,500
Policy Mean Reserve	Semi Continuous Reserve Method assuming an Annual Valuation Mode
Policy premium mode	monthly

Calculate the tax reserve for the policy as of 12/31/2023. Show all work.

Commentary on Question:
Very few candidates received full credit on this part of the question. Most candidates were able to identify that the tax reserve is 92.81% of the stat reserve, and that the tax reserve is floored at the cash surrender value. Few candidates applied either correctly. Few candidates identified that the final tax reserve, including the rider reserve, is capped at the statutory reserve. When calculating the deferred premium asset, credit was given to assuming either 3/12 or 4/12 premium left in the policy year.

Tax Reserve = max(Mean Reserve – Deferred Premium – Deficiency Reserve)*0.9281, Cash surrender value)

Deferred premium = (4/12)*Valuation Premium = 333.33
Tax Reserve = max(5,000 – 333.33 – 1000)*0.9281, 3,500) = 3,500
Waiver Reserve = 100*0.9281 = 92.81
Total Tax Reserve is capped at statutory reserve

Total Reserve = min(3,500 + 92.81, 5,000 + 100) = 3,592.81

6. Continued

(b) You are given the following information for a universal life policy:

Face amount	234,000
Minimum guarantee rate	2.0%
Issue age	46
Premium expense load	3.0%

	2%	4%	6%
Present value of death benefits	86,073.58	48,556.15	29,244.58
Present value of expenses	131.98	95.02	72.35
$\ddot{a}_{46}$	27.40	20.00	15.47
$\ddot{a}_{46:7}$	6.57	6.22	5.89

Calculate the following:

(i) Initial Cash Value Accumulation Test Net Single Premium

(ii) Guideline Level Premium

(iii) Guideline Single Premium

(iv) 7-Pay Premium

Show all work.

Commentary on Question:
Most candidates did well on this part of the question and received full credit. Not enough information was given on the issue date of the given contract to determine if it was issued pre- or post-2021, which would have determined if the revised rates under the Consolidated Appropriations Act of 2021 applied. Full credit was given to either approach. Additionally, some candidates included the premium expense load as part of the expenses for the GLP and GSP calculations, and other candidate did not. Full credit was received for either approach.

If issued pre-2021:
(i) CVAT NSP = PVDB @ 4% = 48,556
(ii) GLP = (PVDB + PVExp) / a46 @ 4% = 2,433
(iii) GSP = (PVDB + PVExp) @ 6% = 29,317
(iv) 7-pay premium = PVDB / a46:7 @ 4% = 7,806

6. Continued

If issued post-2021:
(i) CVAT NSP = PVDB @ 2% = 86,074
(ii) GLP = (PVDB + PVExp) / a46 @ 2% = 3,146
(iii) GSP = (PVDB + PVExp) @ 4% = 48,651
(iv) 7-pay premium = PVDB / a46:7 @ 2% = 13,101

(c) Using information from (b), you are given additional information about actual premium payments:

Policy Year	Premium Paid
1	10,000
2	5,000
3	25,000
4	3,000
5	2,500
6	2,000
7	0

(i) Determine whether the policy qualifies as life insurance using the guideline premium test. Show all work.

(ii) Determine whether the policy is a modified endowment contract. Show all work.

(iii) Describe how policyholder taxes change when the policy is a modified endowment contract.

Commentary on Question:
Most candidates were able to receive partial credit on this part of the question. If candidates did not arrive at the correct values in part (b)but used those values correctly in this part of the question to determine whether or not the contract qualifies as life insurance and is a MEC, full credit was received. In order to receive full credit on part (iii), candidates had to state two similarities and two differences between the tax treatment of MECs and non-MECs. Most candidates received at least partial credit on part (iii).

6. Continued

Parts (i) and (ii)

Year	Paid	Accum Prem Paid	GLP	Accum GLP	GSP	Max GSP or Accum GLP	GPT	7-Pay	Accum 7-Pay	7-Pay Test
1	$10,000	$10,000	$3,146	$3,146	$48,651	$48,651	Pass	$13,101	$13,101	Pass
2	$5,000	$15,000	$3,146	$6,292	$48,651	$48,651	Pass	$13,101	$26,202	Pass
3	$25,000	$40,000	$3,146	$9,439	$48,651	$48,651	Pass	$13,101	$39,303	Fail
4	$3,000	$43,000	$3,146	$12,585	$48,651	$48,651	Pass	$13,101	$52,404	Pass
5	$2,500	$45,500	$3,146	$15,731	$48,651	$48,651	Pass	$13,101	$65,505	Pass
6	$2,000	$47,500	$3,146	$18,877	$48,651	$48,651	Pass	$13,101	$78,606	Pass
7	$0	$47,500	$3,146	$22,023	$48,651	$48,651	Pass	$13,101	$91,707	Pass

(iii)

Similarities

- The death benefit received by the beneficiaries is not taxable for both MECs and non-MECs
- The inside build-up of cash value within the policy is tax-deferred for both
- After age 59 ½, full surrenders are treated the same in that any gain is treated as taxable income

Differences

- For non-MECs, contributions are withdrawn from the policy first. For MECs, the gain is withdrawn first.
- If gain is removed from the contract prior to age 59 1/2 , an additional 10% penalty tax applies.
- Policy loans taken two years prior to the MEC effective date are subject to MEC rules and could become taxable events.

7. Learning Objectives:

4. The candidate will understand the fundamental purpose of capital, and its determination and stakeholders.

Learning Outcomes:

(4a) The Candidate will be able to describe and evaluate the theory of capital (including economic capital), and evaluate its applicability for various purposes and its value to different stakeholders.

Sources:

Lombardi, Chapter 29 – Risk-Based Capital, Valuation of Insurance Liabilities, 5th Ed.

LFM-854-22:NAIC Own Risk and Solvency Assessment (ORSA) Guidance Manual, National Association of Insurance Commissioners, Dec 2017

Commentary on Question:

This question tested the candidates' understanding of Risk-Based Capital and ORSA in the context of understanding various viewpoints on risk evaluation.

Solution:

(a) The following is an excerpt from SPW Life's ORSA report:

- *SPW Life has identified its key risk to be disintermediation risk in the rising interest rate environment, where SPW Life will incur a large loss when selling assets to fund its high amount of lapses.*
- *SPW Life's experience in mortality underwriting has been more favorable than the industry, and it does not view mortality as a key risk.*

You have been provided the following information about SPW Life's RBC components:

RBC Component	Capital Amount (before diversification)
C0	0
C1	4,000,000
C2	100,000,000
C3	5,000,000
C4	0

Explain why the biggest risk identified from the RBC above may be different from the ORSA excerpt.

7. Continued

Commentary on Question:
Candidates who identified that ORSA is company specific and RBC is an industry-wide and factor-based approach received did well on this part of the question. Candidates generally did well on this part of the question.

- RBC is a factor-based calculation set by regulatory standards and application does not vary company to company.
- RBC components above are based solely on how regulators perceive risk.
- C2, representing insurance risk, is a factor applied to NAR to get the capital amount, so higher NAR on business issued will naturally make this capital component higher.
- ORSA is an own risk and solvency assessment and is the company's own view of risk; it is company specific and describes what is seen as a perceived risk and how to mitigate and monitor it. This positions SPW Life to acknowledge their mortality underwriting being more favorable than the industry.
- Therefore, there's no requirement the RBC and ORSA would identify the same risk.
- RBC likely should be a considered input when working through ORSA.

(b) Evaluate whether each of the following statements from SPW Life's ORSA report is consistent with the ORSA guidance.

A. *SPW Life has performed all its quantitative risk assessments, using stochastic analysis and actuarial judgement. All assessments were done on a quantitative basis.*

B. *The stress tests used in ORSA calculations were based on historic worst cases experienced by SPW Life in the last 5 years.*

C. *SPW Life defines solvency as having enough liquid assets, limited to cash and US Treasury bonds, to ensure all obligations will be able to be met within the next 3 years.*

Commentary on Question:
Candidates generally did well evaluating statements A and B. Many candidates did not evaluate statement C correctly.

For statement A credit was received for identifying the qualitative analysis.

For statement B credit was received for identifying that the time horizon is likely too short and that testing beyond history is likely needed. Credit was also received for discussing the benefits of varying the stresses by risk category.

7. Continued

For statement C it was a common mistake to address what assets should be included in solvency. Identifying that the question is addressing a life insurance company and the timeline is likely longer received credit.

A.
- ORSA guidance proposes that both qualitative and quantitative analysis be performed.
- Using stochastic analysis can be appropriate for certain risks.

B.
- ORSA doesn't specifically require sensitivity or testing levels.
- Stresses can vary by risk category.
- Judgment will be used to determine what is appropriate to test.
- Stresses based solely on history may not be adequate, especially only the past 5 years.

C.
- This can be viewed as consistent as the statement includes a definition of solvency and a time horizon.
- Solvency should be considered over the expected coverage of the block of business, until one can deem there is no more material risk.
- The projected horizon is likely too short for a life insurance product.

(c) Determine the C-3 Risk Category appropriate for each product below using the NAIC RBC rules at the inception of the product. Justify your reasoning.

(i) Fixed deferred annuity with a 3-year surrender charge period and no Market Value Adjustment (MVA). The first-year surrender charge is 6%.

(ii) Single premium deferred payout annuity. The single premium cannot be withdrawn for 5 years. Starting in year 6, payments are guaranteed for life.

(iii) Fixed indexed annuity with a 2% surrender charge for only the first 5 years.

Commentary on Question:
To received full credit, candidates had to identify the correct risk level of the product (low, medium, high) and provide justification. A common mistake was to only identify the risk level.

7. Continued

(i) Product 1 - Medium risk due to surrender charge >5% threshold.

(ii) Product 2 - Low risk as it does not allow withdrawals.

(iii) Product 3 -High risk as surrender charge is <5% threshold.

8. Learning Objectives:

5. The candidate will understand important insurance company issues, concerns and financial management tools.

Learning Outcomes:

(5a) The candidate will be able to describe, apply and evaluate considerations and matters related to:

- Insurance company mergers and acquisitions
- Management of variable deferred annuities
- Embedded Value determinations
- VM-20 financial impacts
- Rating agency considerations
- Model Audit Rule and Sarbanes-Oxley Section 404 considerations
- Source of Earnings analysis

Sources:

LFM-106-07: Insurance Industry Mergers and Acquisitions, Chapter 4 (Sections 4.1-4.6)

Embedded Value: Practice and Theory, SOA, Actuarial Practice Forum, March 2009

Commentary on Question:

The question tested the candidates' knowledge of embedded value and AAV.

Solution:

(a) CWY hired an investment bank to use the Comparable Company Analysis technique to generate a range of appraisal values for ELF.
You are given:

- price-to-book value multiples ranging from 1.1 to 1.8
- a change of control premium of 15%
- ELF's current book value is 1000

(i) Describe the general guidelines that are useful for peer group selection in the Comparable Company Analysis.

(ii) Calculate the range of appraisal value of ELF Insurance. Show all work.

Commentary on Question:

Few candidates received full credit for this part of the question.

8. Continued

(i) Some guidelines to consider when selecting peer companies:

- The peer group must be large enough to be statistically significant
- Select companies with the same or similar regulatory, accounting and tax rules.
- The peer group should sell in the company's core or dominant segments
- Analyze companies that are similar performers in the same LOB

(ii) Range of appraisal value

- Lower end of range 1000 X 1.1 X (1 + 0.15) = 1,265
- Upper end of range 1000 X 1.8 X (1 + 0.15) = 2,070

(b) You are given the following statutory projection:

	12/2023	12/2024	12/2025	12/2026	12/2027	12/2028
Premium		500	450	400	350	300
Investment Income (all assets)		138	131	125	118	112
Benefits		200	210	220	230	240
Commissions		10	9	8	7	6
Expenses		100	90	80	70	60
Statutory Reserves	2000	1900	1800	1700	1600	0
Total Required Capital	300	290	280	270	260	0

Assuming:

Pre-tax earned rate	6%
Tax rate	21%
Free surplus	0
Risk discount rate	10%

Taxable incomes equal to pre-tax earnings.

8. Continued

Calculate the following information for all projection years:

(i) Book profit

(ii) Cost of Capital

(iii) Inforce Business Value

(iv) Embedded Value

Show all work.

Commentary on Question:
Many candidates did not properly handle the change in the statutory reserve in the presentation of income or take into account federal income taxes. Most candidates also missed the adjustment for interest on required capital in the book profit calculation.

(i) Book Profit
Revenue = premiums + investment income
Benefits / expenses = Benefits + Commissions + Expenses – Change in Reserve
Pre tax Stat Income = Revenue – Benefits
After tax Stat Income = Pre-tax – Taxes
Book Profit = After Tax Stat Income – int on required capital on after tax basis

Yearly Values

Revenue	638	581	525	468	412
Benefits/Exp	210	209	208	207	(1,294)
Pre tax Stat	428	372	317	261	1,706
Tax	90	78	67	55	358
After tax Stat	338	294	250	206	1,347

Req Capital Charge = Required Capital X Earned Rate X (1-Tax Rate)

=	14	14	13	13	12
Book Profit	324	280	237	194	1,335

8. Continued

(ii) Cost of Capital
Cost of Capital Rate = 10% - 6% X (1 – 0.21) = 5.26%
Cost of Capital = Required Capital (t-1) X COC Rate

=	15.78	15.25	14.73	14.20	13.68

(iii) Inforce Business Value
IBV = PV Book Profit – PV Cost Of Capital using 10% rate

PV Book Profit =	1,665	1,508	1,378	1,279	1,214
PV COC =	56	46	35	24	12
IBV =	1,609	1,462	1,343	1,255	1,201

(iv) Embedded Value
EV = AMW + IBV
ANW = Req Capital + Free Surplus

ANW = Required Capital in all years as Free Surplus is always zero.

ANW =	300	290	280	270	260
EV =	1,909	1,752	1,623	1,525	1,461

(c) Critique the following statements. Justify your answers.

A. A going concern valuation captures only the value of all the tangible assets that are reflected on the seller's balance sheet.

B. For public companies, the actuarial appraisals developed by the seller are usually done on a US GAAP accounting basis.

C. The assumptions underlying the seller's actuarial appraisal analysis are intended to be moderately adverse to be conservative.

D. If embedded value assumptions are the same as actuarial appraisal assumptions and the same discount rates are used for both, then the actuarial appraisal value is the sum of embedded value and the value of future business.

Commentary on Question:
Candidates did generally did well on this part of the question.

8. Continued

A. False. A going concerning valuation captures the value of certain intangible assets that are not reflected on the seller's balance sheet.

B. False. Actuarial appraisals are typically done on a statutory accounting basis rather than GAAP (although the GAAP impact of the transaction may be studied as part of the due diligence work).

C. False. The assumption underlying the actuarial appraisal analysis are intended to be best estimate (i.e., without margin for conservatism).

D. True. EV and AAV usually differs in three ways: (1) actuarial appraisals typically assign a value to the contribution of future new business whereas EV does not, (2) actuarial appraisals are typically calculated using higher discount rates than EV, and (3) expense assumptions used in calculating EV are typically more company specific than those used in actuarial appraisals, where the assumptions tend to be more reflective of the prevailing sentiment of the market.

9. Learning Objectives:

6. The candidate will understand the fundamental features of the U.S. and International regulatory framework.

Learning Outcomes:

(6a) The features of the U.S. regulatory regime and the forces which are shaping the evolution of the regime.

(6c) The valuation methodology specified in IFRS 17.

Sources:

LFM-857-24: Insurance Contracts First Impressions: 2020 Edition IFRS 17, KPMG, July 2020 (only Sections 1.1-1.2, 3.1, 5.1-5.3, 6.1-6.4, 14.1-14.2, 15.1-15.2, 17.1-17.3, 20.1)

Bridging the GAAP: IFRS 17 and LDTI Differences Explored, Financial Reporter, July 2022

Commentary on Question:

This question tested the candidates' understanding of the IFRS17 general measurement model (GMM).

Solution:

(a) You are given the following information on a block of 5-year term life insurance policies:

Annual premium	5
Interest rates	0%
Decrements	0
Policies sold	10
Total maintenance expenses per year	25
Total claims per year	10
Total risk adjustment per year	5

Calculate the IFRS 17 liability components on initial recognition. Show all work.

9. Continued

Commentary on Question:
This part of the question tested the candidates' understanding of each liability component under the GMM. Candidates had to demonstrate the mechanism of CSM that is used to defer profits over the life of the contract and understand that no profit will be recognized on initial recognition while losses will be recognized immediately. All calculations were required to receive full credit. Some candidates failed to recognize that the premium provided is an annual premium per policy and that the claims, expenses and risk adjustment provided are annual amounts for all policies, which ended up in an onerous contract. Some candidates only included the risk adjustment for the first year. Also, some candidates failed to calculate the total liability of zero on initial recognition for the profitable contract.

- The contract is a 5-year contract and hence will need to show 5-year cashflow stream.
- The annual premium is per policy and should multiply by 10 to get to the total annual premium of 50.
- Since there is no decrement with 0% interest rate, the PV calculation at time 0 is simply the total of 5-year cashflows.

	Inflow	Outflow	Outflow	
Year	Premium	Maint Exp	Claims	Risk Adjustment
1	50	25	10	5
2	50	25	10	5
3	50	25	10	5
4	50	25	10	5
5	50	25	10	5

- Best Estimate Liability (BEL) = PV of Outflow – PV of Inflow
  - PV of Outflow = 25*5 + 10*5 = 175
  - PV of Inflow = 50*5 = 250
  - BEL = 175 – 250 = -75
- Fulfillment Cashflow (FCF) = BEL + Risk Adjustment (RA)
  - RA = 5*5 = 25
  - FCF = -75 + 25 = -50

9. Continued

- Contractual Service Margin (CSM) = max(0, -FCF)
  - CSM = max(0, -(-50)) = 50
    - Optional explanations:
      - If a contract is profitable (ie. FCF < 0), CSM is meant to offset the FCF so that no profit is recognized at time 0.
      - If a contract is onerous (ie. FCF > 0), CSM will be 0 and a loss component will be established as the amount of FCF, which will be immediately recognized as a loss at time 0.
- Insurance Contract Liability (ICL) = BEL + RA + CSM
  - ICL on initial recognition = -75 + 25 + 50 = 0

(b) Compare and contrast IFRS 17 and LDTI in each of the following areas:

(i) level of aggregation

(ii) financial statements presentation

(iii) earnings emergence for profitable and unprofitable business

Commentary on Question:
Most candidates demonstrated a good understanding on the level of aggregation and the differences in financial statements presentations between the two standards. However, most candidates failed to identify the similarity on financial statements presentations. Some candidates were able to identify similar or uniform earnings emergence on profitable contracts, but failed to comment on the differences in earnings emergence for unprofitable contracts (particularly first-year versus renewal years). Instead, they commented on the grouping of profitable vs unprofitable contracts, which should have been part of the level of aggregation differences.

(i) <u>Level of aggregation</u>

Similarities:
- Under both IFRS 17 and LDTI, contracts are grouped (or cohorted) with like contracts and business that is managed together.
- Both standards do not allow the grouping of contracts issued more than one year apart.

9. Continued

Differences:

- Under IFRS 17, groups are required to be further divided based on the potential to become onerous (i.e., unprofitable); whereas under LDTI, the groupings are not required to be split based on onerousness or likelihood to become onerous.
- Grouping based on onerousness could have a significant impact on financials. Unlike IFRS17, LDTI allows the profitable block to "subsidize" the unprofitable block. IFRS 17 requirement to split onerous contracts from other contracts is more punitive to earnings.

(ii) Financial statements presentation

Similarities:

- A key focus of both the standards is to increase transparency for users of financial statements. Under both LDTI and IFRS 17, additional disclosures have been introduced.
- Both standards allow reporting of the change in discount rates under Other Comprehensive Income (OCI). However, under IFRS17, companies have the option to elect OCI or to flow through P&L.

Difference:

- IFRS 17 income statement aims to improve transparency on sources of earnings by splitting profit and losses into two categories, amounts driven by "insurance service" or underwriting results (i.e., premiums, claims, and directly attributable expenses) and amounts driven by "financial" or investment/overhead results (i.e., investment income and non-directly attributable expenses), not something easily achievable under LDTI.

OR

Under IFRS 17, the financial statements presentation is following:

- Insurance Service Result = Insurance Service Revenue – Insurance Service Expense
- Net Financial Result = Investment Income – Insurance Finance Expense
- Net Income = Insurance Service Result + Net Financial Result
- Comprehensive Income = Net Income + Other Comprehensive Income

9. Continued

Premium is not a component of Insurance service revenue. The amortization of CSM and RA is the component of Insurance service revenue in IFSR17

Under LDTI, the financial statements presentation is following:

- Revenues = Premiums + Investment Income
- Expenses = Benefits + Expenses + other
- Net Income = Revenues – Expenses
- Comprehensive Income = Net Income + Other Comprehensive Income

(iii) Earnings emergence for profitable and unprofitable business

Similarity:

- For a **profitable** group of contracts, the net liability run-off and profit emergence for IFRS 17 and LDTI are very similar. Both accounting models set up a reserve for future policyholder benefits and recognize upfront costs over the life of the policy as insurance services are rendered, leading to largely uniform profit emergence.

Differences:

- Under IFRS 17, profit is attributable to the release of the Risk adjustment and CSM as well as investment income earned . Under LDTI, profit from insurance cash flows is a function of premiums (given the net premium reserve approach) and the amortization of DAC .
- For **unprofitable** business, earnings emergence diverges between the two accounting models.
    - All else equal, the initial reserve increase will be more punitive under IFRS 17 than that under LDTI, due to the inclusion of the RA as well as (presumably) additional expenses in the liability calculation under IFRS 17.
    - The higher initial reserve increase for IFRS 17 leads to a larger negative impact to income upfront, with future profits slightly higher under IFRS 17 as the additional liability is released over time.

9. Continued

(c) Critique the following statements under IFRS 17:

A. *A contract is considered as an insurance contract only if it exposes the insurers to both insurance and financial risks.*

B. *An insurance risk is not considered significant if the insured event is extremely unlikely to occur and if there is minimal probability of significant losses for a group of contracts.*

C. *Insurance risks are risks that are related to an insurance contract, such as death, illness, or lapsation.*

D. *Contractual service margin (CSM) from a profitable direct contract can be used to offset the losses from another contract that is determined to be onerous at initial recognition and in subsequent measurements.*

Commentary on Question:
Candidates have to state whether the statement is correct, incorrect, or partially correct to receive full credit.

Candidates generally did well critiquing statements A and D. For statement B, most candidates failed to comment on the risk significance and instead commented on how a risk will be considered as insurance risk based on the risk likelihood. For statement C, most candidates were able to identify that lapsation is not an insurance risk but failed to justify.

A. The statement is **incorrect**. A contract is considered as insurance contract if it exposes the issuer to significant insurance risks without financial risk, or to both financial risk and significant insurance risks. Contracts that expose the issuer only to financial risk but not to significant insurance risk are not considered as insurance contracts.

B. The statement is **incorrect**. Insurance risk can be significant even if the insured event is extremely unlikely to occur, or if the expected probability-weighted present value of the contingent cash flows is a small proportion of the expected probability-weighted present value of all of the remaining contractual cash flows.

9. Continued

OR

The significance of insurance risk is assessed on a contract-by-contract basis. Even if there is a minimal probability of significant losses for a portfolio or group of contracts, insurance risk can be significant for an individual contract.

C. The statement is **incorrect**. Unexpected death or illness are valid insurance risks, as they pose adverse effects on the policyholders. However, 'lapse or persistency risk' is not considered an insurance risk because the payment to the policyholder is not contingent on an uncertain future event that adversely affects the policyholder.

D. The statement is **incorrect**. At initial recognition, the grouping of individual contracts under IFRS 17 is performed in a way that limits the offsetting of profitable contracts against onerous ones. Since profitable and onerous contracts won't be grouped together, no offsetting of profits and losses is allowed. The groups are established on initial recognition and are not reassessed subsequently.

However, if the two contracts were determined to be profitable at initial recognition and hence grouped together, the CSM established at initial recognition can be used to offset any losses from the same group that arise from unfavorable change in assumptions or estimates related to future service in subsequent measurements, until the CSM is depleted and the excess will be recorded as loss component.