



Institute
and Faculty
of Actuaries

EXAMINERS' REPORT

SP7 - General Insurance Reserving and Capital Modelling Specialist Principles

September 2022

Introduction

The Examiners' Report is written by the Chief Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

Sarah Hutchinson
Chair of the Board of Examiners
December 2022

A. General comments on the *aims of this subject and how it is marked*

The aim of this General Insurance Reserving and Capital Modelling Specialist Principles subject is to instil in successful candidates the ability to apply, in simple reserving and capital modelling situations, the mathematical techniques and the principles of actuarial planning and control needed for the sound financial operation of general insurers.

Candidates who pass the exam are expected to analyse hypothetical situations, within the context of general insurance, including using judgement to assess the implications of possible actions and to develop appropriate proposals or recommendations relating to reserving and capital modelling.

Candidates who are well prepared generally appear to perform reasonably well on SP7, although a number of candidates do not appear to be adequately prepared and are unable to generate sufficient distinct points in their answers or show poor exam technique.

Candidates are reminded to carefully read questions to understand the specific scenarios given in the questions and tailor their answers accordingly, rather than relying on pre-prepared lists of generic points, which may not be application in a number of scenarios.

Calculation questions will come up on a regular basis within SP7 papers. Candidates should always be prepared for such staples as balance sheet preparation, triangle manipulations and projections and reinsurance layer calculations (along with being able to carry out any necessary adjustments including inflation, exposure, earning distortion and time period issues). All workings and rationale should be clearly shown to allow credit to be given for workings even where the figures are incorrect.

Candidates should expect the examiners to set questions from all parts of the syllabus with a view to test as wide as possible a range of skills and, in particular, to achieve a fair balance between capital and reserving, including reinsurance. It is important to note that the questions are designed to be able to test how candidates can apply these concepts in a given scenario.

The depth and breadth of an answer needs to be in line with the command verb and marks allocated to the question.

While the marking schedule is discussed extensively to cover as many points as possible, candidates who give well-reasoned points not in the marking schedule are awarded marks for doing so.

B. Comments on *candidate performance in this diet of the examination.*

The paper was generally well attempted, except for question 6 and question 8, where the marks were often lower due to candidates lacking a good understanding of the concepts that were tested. Candidates particularly scored low in question 8 part (ii)(b) which required the reinsurance recoveries to be calculated for a blend of QS and XoL reinsurance covers. Question 6 tested the candidates' ability to interpret and apply the concepts of UPR and URR which are very commonly used concepts. However, the

responses suggested a lack of understanding around these in the context of the scenario provided in the question. Also, some candidates found challenging the question on Silent Cyber – question 3.

Responses to knowledge-based questions were generally good. Questions that tested application and higher order skills proved more challenging, and candidate responses to these questions often lacked the breadth and the detailed understanding needed to score well. A common theme that came through was candidates not being able to apply the concepts to the specific information or situation given in the question.

The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates are advised to include these areas in their revision.

The pass mark for this subject was set at 61, which reflects what the examining team felt a candidate needed to score for them to be considered competent in the skills tested by this subject.

C. Pass Mark

The Pass Mark for this exam was 61
315 presented themselves and 119 passed.

Solutions for Subject SP7 – September 2022

Q1

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Advantages:

If the company uses annual development periods, quarterly origin cohort may not work so well for practical reasons [½]

Because then each column of the triangle will be at a different point in development, making the use of standard actuarial techniques difficult [½]

In any case, since the insurer is reporting quarterly and would like to understand the quarterly developments in the data [½]

For an accident year basis valuation, if there are not enough accidents happening within a quarter, there might not be sufficient data to apply statistical techniques to a quarterly origin cohort [½]

For an underwriting year basis, if sufficient number of policies are not being written each quarter, there might not be sufficient data to apply statistical techniques to [½]

Equally if there is sufficient homogenous data, it may not lead to a more accurate estimation of a reserves for a stable line of business with high volumes of data [½]

Household insurance is likely to be a such a line [½]

using annual cohorts can save time as fewer origin periods to review [½]

Annual cohorts might be in line with other practical considerations such as the System design etc. [½]

Marks available for other sensible comments (*½ mark per point*) [1]

[Marks available 5½, maximum 2]

Disadvantages:

| | |
|---|--------------------------------|
| HH business in the Europe region is likely to be seasonal with, for instance, higher claims frequency during winters | [½] |
| quarterly origin periods will be able to capture the development of such seasonal trends better | [½] |
| Or any other trends which are not necessarily weather related | [½] |
| allowing for a more accurate estimation of IBNR | [½] |
| Might work better to see the impact of underwriting changes if such changes are applied mid-way through the underwriting year | [½] |
| when an UWY basis valuation analysis is performed. | [½] |
| Reflects development of short-tail business better | [½] |
| Since the data is available at a quarterly level and the reporting is taking place at a quarterly level, using annual cohorts is not making full use of the available information | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |
| | [Marks available 5, maximum 2] |

Overall, the question was answered reasonably well. Some candidates misinterpreted the question and provided points related to development periods as opposed to origin cohorts.

Q2

(i)

| | |
|---|---------------------------------|
| Reserving for EL business can be challenging due to its long tail nature | [½] |
| May have been legal changes and/or court rulings increasing the number and size of EL claims | [½] |
| for example class action lawsuits can result in many claims at once which might not be known at the time of acquiring the portfolio | [½] |
| Changes in the litigiousness of society | [½] |
| Claims inflation difficult to estimate for EL business | [½] |
| and different types of inflation can impact claims e.g. wage inflation | [½] |
| possibility of emergence of unforeseen latent claims... | [½] |
| especially for EL risks which due to their nature are difficult to reserve for accurately | [½] |
| May be changes in the way claims are settled going forward e.g. lump sum vs PPOs | [½] |
| Potential for accumulation of risk | [½] |
| Potential for large claims which are difficult to reserve for and may skew development patterns | [½] |
| Recently acquired EL reserves may be more uncertain as Company B has not experience in reserving for commercial risks | [½] |
| Risks may not be very homogeneous such as exposed to different countries and claims environments | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |
| | [Marks available 7½, maximum 4] |

(ii)(a)

| | |
|---|-----|
| The company could use the LPT arrangement to transfer one or more lines of business | [½] |
| as there may be lines of business it views as loss making | [½] |
| The company could transfer those lines of business it does not manage efficiently and resources are better deployed elsewhere | [½] |
| The company will need to inform policyholders and reinsurers of this transfer | [½] |

The company will need to obtain court approval [½]
 Claims handling functions could be removed or redeployed elsewhere [½]
 Marks available for other sensible comments (*½ mark per point*) [1]
 [Marks available 4, maximum 2]

(ii)(b)

The company could purchase an ADC on individual lines or multiple lines [½]
 or its whole business [½]
 The company has a choice of attachment point for the ADC [½]
 depending on how much risk they wish to cede to the reinsurer and cost [½]
 The company could have a participation in the ADC to keep the cost down [½]
 The company could decide to keep or pass on the claims handling function, depending
 upon the arrangement with the reinsurer [½]
 Marks available for other sensible comments (*½ mark per point*) [1]
 (*Note to the marking team: Maximum ½ mark for defining LPT and ADC each. Further
 marks for outlining how to implement in practice*)
 [Marks available 4, maximum 2]

(iii)

Advantages:

Company B can still benefit from favourable reserve movements which could happen
 if the acquired EL business is reserved for prudently [½]
 Assets backing the long tail liabilities might need to be realised potentially at a loss
 under the LPT arrangement. [½]
 Less of a need for buy in from existing reinsurers [½]
 Investment income can be substantial for long tail EL business [½]
 and these reserves stay with the company hence no loss of investment income under
 an ADC arrangement [½]
 No court approval required [½]
 Keep an interest in the performance of the business and maintain data [½]
 Able to structure the cover to tie in with risk appetite [½]
 Marks available for other sensible comments (*½ mark per point*) [1]
 [Marks available 5, maximum 2]

Disadvantages:

Does not allow Company B to exit the EL business and concentrate on remaining
 business [½]
 this may be desired since Company B is a personal lines insurer and has a concern
 with the acquired EL business [½]
 ADC can be expensive depending on the attachment point as EL reserves may be
 uncertain [½]
 especially if there is potential exposure to latent claims [½]
 For an ADC, claims would usually still be handled by Company B and hence there
 are the associated expenses... [½]
 these expenses may be high as Company B is not used to handling commercial EL
 claims [½]
 Credit risk if reinsurer fails/defaults [½]
 Likely more capital needed under the ADC [½]
 Marks available for other sensible comments (*½ mark per point*) [1]
 [Marks available 5, maximum 2]

[Total 12]

This question was generally well answered with candidates scoring well across all parts. Some candidates missed points on part (ii) by not outlining the practical considerations when implementing ADCs and LPTs.

Q3

(i)

Silent cyber claims would arise when the policy coverage and conditions neither explicitly cover nor exclude cyber risks [1/2]
 causing uncertainties in coverage and claim settlement, resulting in potential disputes [1/2]
 for example, a fire caused by a malware attack to a programmable controller of a facility [1/2]
 the property insurance cover may not be clear about coverage for a loss of cause triggered by a cyber event. [1/2]

Maximum 1 mark for defining 'silent cyber'

(Note to the marking team:

The question wording can be read as asking to discuss how premiums are calculated as well as how premium liabilities are calculated. While, as intended, most candidates interpreted it to be premium liabilities, marks were awarded for both interpretations.)

Premium Liabilities:

Could be difficult to identify as these are silent and might not have been recognized or notified yet [1/2]
 Depends if the insurer thinks that they need to hold premium liabilities due to such incidents being reported in the industry. [1/2]

An allowance could be reflected in the best estimate URR estimation within the property class [1/2]
 as a loading on the pricing loss ratio [1/2]
 or based on an industry benchmark [1/2]
 based on a loss ratio from past silent cyber losses [1/2]
 Could be considered to be included in margins for uncertainty held over and above the best estimates, if the company holds such margins [1/2]
 Marks available for other sensible comments (*1/2 mark per point*) [1]

Claim Liabilities:

For claims already reported, the extent to which the insurer could be liable under the current wordings will have to be established [1/2]
 Underwriters' opinions will be required to establish liability and coverage [1/2]
 Legal opinions may be required to establish liability if the insurer/claimant takes the claim to court [1/2]
 expert judgement from cyber risk professionals might be required to make a decision around coverage, if such capacity doesn't exist in-house [1/2]
 Once liability is established, sum assured limits in the policy will have to be looked at to establish amount to be held as case reserves [1/2]

For claims not yet reported, policy level exposure-based approach with input from claims/underwriting experts could be used [1/2]

apply a damage ratio, or probability of loss multiplied by sum insured, to the property policies to get the expected loss for an account. [½]
 consider individual policy wordings and exclusions to identify the possibility of an event being notified [½]
 also consider the probability for the exclusion not holding when in a dispute [½]

Will also depend upon the potential/sophistication for cyber events to trigger property losses in the geography Company C writes policies [½]
 Statistical approaches such as chain ladder are unlikely to work if there isn't sufficient history or homogeneity [½]
 Frequency-severity approach could also be used for estimating the required IBNR [½]
 will likely require some judgement on the expected number and size of claims [½]
 could potentially use available market cyber loss data to estimate frequency and severities and adjust for Company C's property portfolio. [½]
 A top-down portfolio level exposure method for the entire property business using the underwriter and actuarial judgement could also be used to hold a risk margin for claim liabilities [½]

Premiums: (for those candidates who interpreted the question as asking to discuss how to calculate the premiums)
 By definition, the risk is unlikely to be known at the time of writing the risk [½]
 So might not be factored altogether in the premium calculations [½]

However, if the underwriter/actuaries believe there is ambiguity in policy wording which can't be corrected [½]
 for example, due to using the standard wording prevalent in the jurisdiction, or regulatory requirements [½]
 a top-down probabilistic analysis could be performed to calculate the potential losses arising on their property portfolio [½]
 by making assumptions about frequency/severity [½]
 loss experience from past silent cyber claims can be used [½]
 using available rates from other jurisdictions/markets where such risks are explicitly covered, or from market prices of affirmative cyber insurance products [½]
 and a loading in the premium could be added to all the policies on top of the pure risk premium for Property claims [½]
 or implicitly through conservative assumptions on the existing pricing approach [½]

General comments:
 An allowance for claims handling expenses should be factored in the claims liability calculations [½]
 Impact of reinsurance will have to be considered when considering the net insurance liabilities [½]
 Marks available for other sensible comments (*½ mark per point*) [1]
 [Marks available 21, maximum 5]

(ii)
 Reasons for not combining:
 Risk and claims profile are likely to be different between the two policy types [½]
 standalone individual cyber could have shorter tail, whereas the previous loss of data for SMEs is likely to have longer tails [½]

as the latter is likely to give rise to more complex cases [½]
 especially when there are complexities from the loss of reputation and loss of
 valuation of any intangible aspects [½]
 or theft of a large database with personal details where the full extent can take quite
 some time to establish [½]
 Impact of fraud on claims could be more severe for the loss of data product than for
 the standalone individual policies [½]
 There are also likely to be differences in the frequency and severity between the two
 products [½]
 e.g. individuals are less likely to have proper cyber security set up on their devices
 when compared to companies [½]
 Hence better to split out to reflect different claim patterns to enable accurate reserving [½]

Reasons for combining:

The standalone individual products have just launched so need to build up the
 experience [½]
 can be split off to form a separate segment once there is sufficient history [½]
 Volume of the standalone individual cyber claims may not be large and hence can be
 combined within the GL segment without causing any material impact to the reserve
 estimates [½]
 claim run-off patterns might not be too different between the two products [½]
 example these might be mostly third party cyber risks with a liability that has similar
 claims experience to the existing GL claims [½]
 Operationally easier to maintain [½]
 extracting the loss of data losses from the GL policies will require changes to how
 the system currently captures them [½]
 the existing reserves will also have to be split out from the GL policies [½]
 this will take time and potential for errors [½]

Other points:

Splitting can be easier/more difficult to manage reinsurance recoveries [½]
 Different loss adjustment expense assumptions [½]
 any regulatory requirements that might require all cyber related risks to be monitored
 as a standalone reserving class [½]
 Marks available for other sensible comments (*½ mark per point*) [1]

[Marks available 11½, maximum 7]

[Total 12]

Both parts were generally not answered well on this topical question on silent cyber. Candidates who did score well were able to give a good breath of responses for claims and premiums liabilities for part (i), whereas candidates that did not score well were those that did not show an understanding of silent cyber.

Part (ii) was a standard reserving question around how business could be aggregated for reserving when arriving at the IBNR. However, candidates did not score very well, primarily because many candidates did not discuss reasons for both combining and not combining data.

Q4

(i)(a)

| | |
|--|--------------------------------|
| If portfolio is profitable then ceding less QS % may increase net UW result | [½] |
| But there will be lower monetary amount of ceding commissions due | [½] |
| Reinsurer may not give as high commissions on smaller ceded premiums as they will have less overall premium volume to cover their costs | [½] |
| resulting in a reduced net UW result | [½] |
| If reinsurer is supporting other areas of the reinsurance programme they may not provide as favourable terms when lower premiums are ceded | [½] |
| as they may use profits from the QS to offset losses from other areas | [½] |
| resulting in a reduced net UW result | [½] |
| Company A may not be able to write large profitable risks with lower capacity | [½] |
| Liability may be long tail so recent good performance may not be certain for a few years | [½] |
| This may make the net UW result more volatile | [½] |
| Net underwriting result ratio might be the same but the net underwriting result amount would increase | [½] |
| Increase in retained premium could be invested resulting in higher investment income and contribute to an increase in UW result | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |
| | [Marks available 7, maximum 4] |

(b)

Factors driving a increase in CAR:

| | |
|--|-----|
| Credit Risk will reduce | [½] |
| as there would be less reinsurance recoverable from reinsurers | [½] |
| but it may depend upon how quickly the reinsurer settles the claims | [½] |
| this will reduce TCR, hence increasing the CAR | [½] |
| Ceding less profit may result in the retained profits increasing meaning more capital is available | [½] |
| Therefore increasing the TCA and increasing the CAR | [½] |
| Less reliance on reinsurer may reduce operational risk and therefore TCR (and increase CAR) | [½] |

Factors driving a reduction in CAR:

| | |
|--|--------------------------------|
| TCR may increase as insurance liabilities risk should increase, this would decrease the CAR | [½] |
| Due to net liabilities increasing | [½] |
| and possibly results becoming more volatile | [½] |
| However these effects will not be immediate... | [½] |
| Depending on how long tail is the claims are, the effect on TCR calculation may take some time to materialise as the current risk attaching QS with higher cession runs off and claims are settled | [½] |
| Less support from reinsurer may increase operational risk and increase TCR (and reduce CAR) | [½] |
| Sensible comment on market risk not changing or valid argument for change | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |
| | [Marks available 8, maximum 4] |

(ii)

| | |
|--|-----|
| CAR before downgrade: $300/145 = 207\%$ | [½] |
| Bond credit risk charge before downgrade: $120 \times 1\% = 1.2\text{m}$ | [½] |
| Bond credit risk charge after downgrade: $120 \times 4\% = 4.8\text{m}$ | [½] |
| Difference in credit risk charge: $4.8\text{m} - 1.2\text{m} = 3.6\text{m}$ | [½] |
| Company A TCR after downgrade: $145 + 3.6 = 148.6\text{m}$ | [½] |
| Company A CAR after downgrade: $300/148.6 = 202\%$ | [½] |
| The bond issuer may show Company A the remedial actions taken to get their rating back up as soon as possible | [½] |
| Company A may decide 202% is ok as it's above their target and no action needed | [½] |
| However, 202% is only just above target which could be cause for concern | [½] |
| Company A may sell their bond investment and reinvest in higher rated bonds | [½] |
| However this will incur costs as the bond holding may be sold at a discount and more expensive bonds, with better ratings, purchased | [½] |
| A further downgrade to A will result in a CAR of 199%... | [½] |
| which could be a cause for concern to the CRO as it is less than the target | [½] |
| Calculation assumes only credit risk is affected by the downgrade and consideration should be given to other risk charges | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |

[Marks available 8, maximum 6]

[Total 14]

This was a capital question based on formula-based capital requirements. Well prepared candidates scored well in part (i) and were able comment on all the components affecting the underwriting result and CAR.

Most candidates were able to carry out the correct calculations for part (ii) but fewer provided sufficient follow up points to score many more marks. It is important for candidates to be able to contextually interpret the outputs from numerical questions.

Q5

(i)

LAE could either be allocated (ALAE) or unallocated (ULAE)

- (a) ULAE based on some proportional time spent, since the actuary's salary cannot be directly attributed to an individual loss. Actuaries do typically spend time in IBNER setting, which is in a way part of loss adjustment [1]
- (b) Management Expense, not a loss adjustment expense, since this has no direct bearing on the loss adjustment function [1]
- (c) Potentially some ULAE/ALAE if the agent also spends time in handling claims [1]
- (d) ULAE based on some proportional time spent method, but unlikely it will be a loss adjustment expense, more likely to be a Management expense [1]

(Note to marking team: ½ mark for saying whether it is LAE or not, ½ mark for the reason provided. If no reasons are provided for all 4, then maximum 1 mark as it is a 'justify' question)

(ii)

Reduced interest rates could mean immediate reduction in investment income [½]

All of Company K's investments are in government bonds, so the impact will be material [½]

| | |
|--|---------------------------------|
| however, it will also depend upon how much new bond purchase Company K has to make over this period | [½] |
| the bonds backing the PA portfolio might be relatively short tailed and regularly re-invested leading the company to purchase lower interest bonds | [½] |
| whereas for the long-tailed construction business, long-term bonds might be in place, which can continue to earn the interest rates applicable at the time of their purchase | [½] |
| Subject to above considerations, it will translate into reduced profit in the P&L | [½] |
| leading to a lower dividend pay-out | [½] |
| for the existing bonds, a reduction in yield will lead to an increase in their prices | [½] |
| which will lead to higher profits due to increase in asset prices for the company, depending on any accounting practices to recognize such profits | [½] |
| leading to a higher dividend pay-out | [½] |
| However, since Company K discounts its reserves, a lower interest rate will mean a higher present value of the reserves | [½] |
| although discounting will be more relevant for the construction business which is long-tailed | [½] |
| Offsetting the increase in asset prices | [½] |
| the offsetting will depend on extent of matching between the long term assets and long term liabilities | [½] |
| the net impact of the increase in asset prices and increase in liabilities will flow into the P&L, and the dividends will be affected accordingly | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |
| | [Marks available 8½, maximum 4] |

(iii)

| | |
|--|-----|
| A reduced rate could result in higher premiums being booked in the short to medium term | [½] |
| reducing the rate may mean under-pricing compared to the industry rate | [½] |
| although it will depend upon how Company K currently prices its products compared to its competitors | [½] |
| This may lead the company to win competitor's business | [½] |
| Since PA is a retail line of business, so the potential for a scale up of the business is high once the rates are reduced | [½] |
| This may create a pool of premiums in a short span of time which can increase the investment income | [½] |
| as the claims are likely to take some time to come through | [½] |
| resulting in higher profits at the current year-end | [½] |
| which will lead to higher dividends being paid out | [½] |
| however there is only one quarter left between the CDO making the suggestion and the dividends being likely paid out in December | [½] |
| So the impact may be minimal | [½] |

| | |
|--|-----|
| Also, the above may not materialise if a reduction in rates doesn't translate into a higher uptake of policies | [½] |
| As the market might already be saturated | [½] |
| such a strategy may backfire if by reducing the rates the company ends up attracting the wrong profile of insureds | [½] |
| leading to higher immediate losses (e.g. fraudulent claims) and a reduced dividend pay-out | [½] |

| | |
|---|---------------------------------|
| Also, a reduction in rates will impact the profitability of the portfolio which may offset the benefits in the medium to long-term | [½] |
| and lead to reduced dividend pay-out if the Board thinks they need to hold the profits back to manage the future losses arising from this portfolio | [½] |
| Writing more of less profitable business will require more capital, | [½] |
| the profits will need to be retained for this purpose | [½] |
| leading to a lower dividend pay-out | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |
| | [Marks available 11, maximum 7] |
| | [Total 15] |

Part (i) was answered well with many candidates scoring full marks. Those who did not score full marks did not consider why some expenses could be considered as LAE.

Part (ii) was not so well answered. Most candidates focussed on the impact of movements in the revaluation of assets and liabilities and not scoring points for referencing investment income movements. Several candidates discussed the impact to the liabilities but did not mention the offsetting impact to the assets and lost marks.

Most candidates did not give enough breadth to their answer to part (iii) to score high marks. This was a higher order question and required broader thinking.

Q6

(i)

Reflecting a non-linear earning pattern requires judgement and understanding of the risk exposures and claims profile of the portfolio by the actuary and can be subjective [½]

Disadvantages:

The linear pattern may not be appropriate for Insurer R's property portfolio as it ignores the impact of seasonality induced by the windstorm events [1]

For instance, using a linear pattern can cause an early release of profits in the first half of the year, which could potentially impact [½]

dividend payout [½]

rating agency views [½]

investor confidence if these big losses are posted at the year-end [½]

Marks available for other sensible comments (*½ mark per point*) [1]

[Marks available 4, maximum 2]

Advantages:

Simple and easier to implement in a system [½]

Reasonable if the portfolio is small and the need for accuracy is immaterial [½]

When only annual development is required, the seasonality during the year might not be necessary [½]

Easy to communicate and understand [½]

Marks available for other sensible comments (*½ mark per point*) [1]

[Marks available 3, maximum 2]

(ii)

The loss ratio used for the unexpired risk reserves should reflect the best estimate view of the unearned losses, split into an attritional, catastrophe and large loss part [½]

The best estimate underlying the URR is an independent estimate and is not affected by the budgeted plan loss ratio [½]

The budgeted loss ratio could be used as the starting point for the URR which would include the budgeted attritional loss ratio of 20% and the CAT view of 40% [½]

or a different view from the previous quarter end [½]

There might be a different view of the URR based on the most recent claims experience as of 30th June [½]

there might be higher or lower attritional losses to date than budgeted loss ratio [½]

however there has been 30 years of experience so the budgeted loss ratio might be reasonable [½]

Data sufficiency – a lack of data around the timing of the windstorm season would result in increased subjectivity [½]

30 years past history is fairly consistent so the actuary would have a clear trend that the windstorm season starts after June [½]

Use of a most recent view of the pricing/underwriter loss ratio if different from budgeted [½]

There might be specific regulatory loadings or requirements on top of the best estimate URR [½]

There might be accepted market practices to adopt [½]

Factors affecting the attritional view of 20%:

Any recent market developments (excluding CAT/windstorms) can affect the future attritional losses and profitability of the unearned business [½]

e.g. economic downturn leading to higher fraudulent claims or impact of inflation affecting claims [½]

Seasonality could still exist for the non-CAT property losses [½]

for example winter effects on the portfolio [½]

any other emerging trends [½]

Factors affecting the CAT loss view of 40% for Windstorms:

The modelled loss ratio for Windstorms of 40% might not be appropriate since the definition used in the CAT model might be too extreme, and a lower ratio might need to be selected [½]

depends how the modelled 1-in-200 year compares to the actual experience from the past 30 years [½]

however 30 years might still not be long enough to calibrate the CAT model [½]

Might also need to reflect other possible man-made large loss events/clash events which need to be considered [½]

for example allowance for an ENID event loss [½]

Consider climate forecasts on the weather for the rest of the year [½]

Consider the availability of market benchmarks [½]

Marks available for other sensible comments (*½ mark per point*) [1]

[Marks available 13½, maximum 6]

(iii)

Reasons why there is no need to revise UPR/URR:

| | |
|---|-----|
| The CAT event happening a month sooner than it has been in the past could be considered as a one-off anomaly | [½] |
| and not require a revision of the earning pattern and hence UPR | [½] |
| When the UPR is earned linearly with no adjustments for seasonality for the windstorm losses, the early loss would have no impact | [½] |
| The actual impact from the early windstorm is at 20% (200K/1mil) and is within the estimated CAT component of the URR | [½] |
| Hence no revision to the URR required | [½] |
| The requirement to adjust could be impacted on how much extra allowance was in the URR | [½] |
| Reporting delays need to be considered; the loss is still too early | [½] |

Reasons to revise UPR/URR:

| | |
|--|-----|
| Recent studies from the market might indicate seasonality is changing in future, justifying a change in the seasonality patterns assumed | [½] |
| Finance director likely wants the UPR to be revised to reflect seasonality of the windstorms, which could be the right thing to do | [½] |
| The early loss was considered to be material at 20% of the GWP and is higher than the CAT portion of the URR | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |

[Marks available 6, maximum 4]

[Total 14]

Part (i) was generally answered well but parts (ii) and (iii) were poorly answered by a majority of the candidates with only the well prepared candidates exhibiting a well-rounded understanding of UPR and URR.

Good answers worked through all considerations including the impact of climate change and potential issues with catastrophe modelling, while the answers for candidates scoring low marks were generic in nature.

Q7

| | |
|---|-----|
| (i) | |
| Each entity can buy less reinsurance | [1] |
| for example higher attachment for XL reinsurance | [½] |
| or lower ceding % for Quota Share | [½] |
| Entities can purchase reinsurance together with coverage being shared | [1] |
| the coverage may cost less due to the bulk purchase | [½] |
| and diversification benefit across entities if their experience is not highly correlated with one another | [½] |
| Setting up a captive reinsurer to reinsure the group's entities | [1] |
| form of self-insurance | [½] |
| entities could then purchase no or less open market reinsurance | [½] |
| Reciprocal QS arrangement | [1] |
| entities effectively reinsure each other | [½] |
| more effective at retaining higher premium when reinsurance is in a hard market thereby taking advantage of market conditions | [½] |

| | |
|--|---------------------------------|
| Marks available for other sensible suggestions | [2] |
| | [Marks available 10, maximum 6] |
| (ii) | |
| The regulator could impose risk-based capital requirements so that capital is held in accordance with risk assumed, limiting the likelihood of default | [½] |
| They could simply impose higher minimum level of solvency than current requirements | [½] |
| as it is known some hold little capital, this would make it less likely for companies to fail | [½] |
| Restriction on the type or amount of certain capital allowed | [½] |
| this would prevent high risk or illiquid assets being held as capital | [½] |
| Prescribed valuation basis for liabilities and assets | [½] |
| such that capital calculations are more robust | [½] |
| Requirement to use an internal model to calculate required capital | [½] |
| such that required capital from the model caters adequately to the business | [½] |
| Requirement to perform stress or scenario tests | [½] |
| to stress the capital is adequate under extreme circumstances | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |
| | [Marks available 7, maximum 3] |
| | [Total 9] |

Part (i) was generally answered well but some candidates did not give enough distinct strategies and focussed on explaining only one or two strategies.

Part (ii) was answered well by most candidates.

Q8

| | |
|---|--------------------------------|
| (i) | |
| Defining the stability clause – any sensible definition | [½] |
| Where inflation has a significant effect on the cost of claims, a stability clause may be applied to the excess point | [½] |
| So that the reinsurer does not receive a higher proportion of the risk purely because of inflation | [½] |
| It's common for the loss of future earnings to be factored into motor bodily injury claims settlement therefore linking to wage inflation is practical | [½] |
| Plus, the mechanism is an average of the wage inflation weighted by claim payment which attempts to mirror the inflation risk as accurately as possible | [½] |
| Both the QS limit and risk XOL deductible have the same stability clause applied to avoid a gap in cover | [½] |
| Reduce the reinsurance premium due to less inflation risk | [½] |
| To maintain the same level of cover in real terms | [½] |
| Marks available for other sensible comments (<i>½ mark per point</i>) | [1] |
| | [Marks available 5, maximum 2] |

(ii)
Assumptions (for parts (a) and (b)):

- Specify timing of payments and when to inflate to (e.g. start/mid/end of year) [½]
- No defaults or claim disputes [½]
- No change in expected ultimate settled claim amount of \$2.5m [½]
- No other reinsurance relevant to this claim [½]
- No delays in payments [½]
- Marks available for sensible assumptions (*½ mark per point*) [1]

Note to the marking team:

Maximum 3 marks in total across (a) and (b) for assumptions

[Marks available 3½, maximum 3]

Determine payments to be made in each time period:

| Year | 0 | 1 | 2 | 3 | 4 | 5 |
|----------------------------------|---------|---------|-----------|-----------|-----------|-----------|
| Cumulative Payment Pattern (1) | 5% | 10% | 50% | 80% | 90% | 100% |
| Incremental Payment Pattern (2) | 5% | 5% | 40% | 30% | 10% | 10% |
| Claim Payment (3) | 125,000 | 125,000 | 1,000,000 | 750,000 | 250,000 | 250,000 |
| Cumulative Claim Total (4) | 125,000 | 250,000 | 1,250,000 | 2,000,000 | 2,250,000 | 2,500,000 |
| Indexed Deductible (5) | 500,000 | 515,000 | 530,450 | 546,364 | 562,754 | 579,637 |
| Weighted Deductible (6) | 500,000 | 507,500 | 525,860 | 533,549 | 536,794 | 541,078 |
| Incremental loss to risk XOL (7) | - | - | 724,140 | 742,311 | 246,755 | 245,716 |
| Incremental loss to QS (8) | 50,000 | 50,000 | 110,344 | 3,076 | 1,298 | 1,714 |

(ii)(a)

Assumptions

Workings

Determine correct claim payment pattern (3) using pattern given [2]

Determine correct indexed deductible (5)

$500,000 \times (1.03)^{\text{year}}$ [2]

Note to the marking team:

Mark scheme shows year to inflate to is start of year, but credit should be awarded for any consistent time period to inflate to if suitable assumption provided e.g. to mid-year or end of year

Determine correct weighted deductible (6) as per formula given [2]

e.g. for year 2: $(500,000 \times 125,000 + 515,000 \times 250,000 + 530,450 \times 1,000,000) / 1,250,000 = 525,860$

[Marks available 9½, maximum 7]

(ii)(b)

Assumptions

Workings

No XOL payment until indexed deductible is below cumulative claim total [1]

Determine corrected XOL payments (7)

e.g. year 4: $2,250,000 - 536,794 - 724,140 - 742,311$ [2]

Determine correct QS payments (8)
 Years 0 and 1: claim paid x 40%
 Later years: weighted deductibles x 40% [2]
 [Marks available 8½ maximum 5]

(iii)
 There could be substantial reinsurance premium savings if there is a lot of loss activity at the current deductible level [½]
 Especially as there is a 2021 claim above the deductible level which could result in a higher 2022 reinsurance premium... [½]
 however, this claim may be expected and priced into the layer with it being predicted at this deductible level [½]
 Higher deductible will mean more retained losses which Company D should estimate and compare to the reinsurance premiums savings [½]
 May be increased capital requirements with a higher deductible [½]
 Motor book is small and perhaps volatile, increasing the deductible could make results more volatile [½]
 However, Company D is a large company and may be able to absorb the additional volatility [½]
 Loss limit of 2022 QS should also increase in line giving more exposure to the QS reinsurers [½]
 which may impact the QS terms for example lower ceding commissions [½]
 Risk XOL is LOD and if the deductible is increased there may be a gap in coverage if a loss occurs in 2022 on a 2021 policy as the 2021 QS loss limit is lower [1]
 Less premium ceded to risk XOL for reinsurers to cover their fixed costs hence terms may not be as favourable at a higher deductible level [½]
 Company D may have more retained premiums to make use of [½]

Should consider:
 the size of their free reserves [½]
 whether increasing the deductible is in line with their risk appetite [½]
 any regulatory requirements [½]
 views of and relationships with brokers and reinsurers [½]
 current reinsurance market conditions [½]
 Marks available for other sensible comments (*½ mark per point*) [1]
 [Marks available 10, maximum 6]

[Total 20]

Part (i) was answered well by most candidates demonstrating common knowledge of stability clauses.

Part (ii) requires heavy calculation and was a clear differentiating question. Most candidates were able to successfully apply the formula to be awarded marks for Part (a), whereas not as many correctly calculated the XOL and QS recoveries in part (b) to gain full marks. A common mistake was calculating the recoveries on the incremental payments instead of the cumulative payment.

Part (iii) was generally answered poorly with many candidates only scoring a few of the points, perhaps due to this being a higher order question on considerations around purchasing reinsurance.

[Paper Total 100]

END OF EXAMINERS' REPORT



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