

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2021

Subject SP7 – General Insurance Reserving and Capital Modelling Specialist Principles

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.

Paul Nicholas
Chair of the Board of Examiners
July 2021

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

1. 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.
2. 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.
3. Candidates who are well prepared generally appear to perform reasonably on SP7, although a number of candidates do not appear to be adequately prepared, or show poor exam technique. The following points are always worth considering to improve performance:
4. Lists are hugely valuable for breadth of point generation but candidates should always exercise judgement when applying them. In many instances questions will be specifically designed to render a number of the standard points inappropriate and marks (often generous multiple marks) will be available for identifying and articulating these nuances well.
5. 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 & projections and reinsurance layer calculations (along with being able to carry out any necessary adjustments including inflation, exposure, earning distortion and time period issues). Further, if the examiners cannot follow a candidate's logic they cannot give partial credit for incorrect calculations. Therefore a clear audit trail should be left to help secure appropriate method marks where the calculations are incorrect.
6. Capital questions should be expected on every paper and represent a sufficient proportion of the course content that candidates should not expect to be able to pass on their reserving knowledge alone. Those who do not encounter capital work in their professional lives should be particularly careful to ensure that they take time to familiarise themselves with this element of the course.
7. Questions in relation to how data will need to be read, manipulated and understood before and after a reserving or capital analysis are also expected. Candidates should not blindly apply actuarial techniques without understanding the issues with data.
8. Candidates should aim to reword any material from the core reading instead of regurgitating it, because majority of questions are application based and require the candidates to demonstrate a deeper understanding of the topics.
9. It is important to always read the question properly and to answer only what you are asked. There will be no additional marks for writing more than the question has asked

for, and certainly not more than the total available marks for the question or its part thereof.

10. Always assume that question content is there for a reason. If something is pure knowledge based, it should be obvious as such as it will generally go straight to a question with little or no specific context. These are the only sorts of questions where you should expect to provide generic answers. Otherwise you will need to make reference to the situation posed in the question to score well. For example if lines of business, types of insurance entity, a specific set of regulatory requirement or anything else is mentioned they have been chosen as they have an impact on the answer. If numbers are mentioned, they are there because we expect you to look at them, think about them and offer some comment or display some ability to notice unusual features of a table of numbers (a key skill for an actuary). In every exam there will be a significant number of candidates who are clearly extremely well prepared, who write very long answers that clearly display all the basic knowledge one might require to be able to think intelligently about a question, but they score poorly because the answer is purely generic with no obvious attempt to actually address the question scenarios.
11. Candidates who answer the questions with bigger marks first seem to not run out of time. Although this can vary from individual to individual, time keeping is of essence.
12. The depth/details of the answer must be in sync with the command verb used in the question.
13. 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.*

1. Candidates performed reasonably well in this exam diet. With additional guidance around the calculation questions issued by the IFoA, there appeared to be consistency in terms of how much candidates wrote to get the full marks.
2. Given that this paper was slightly more inclined towards reserving, while still maintaining the overall desired mix of topics, it is expected for candidates to score well since candidates usually score better on reserving questions compared to accounting, reinsurance or capital questions.
3. Q7 was the only calculation question in the exam paper and quite a lot of candidates did poorly in the application part associated with this question. Only the best candidates answered the question on reinsurance rate calculation. Calculation questions regularly come up in SP7 and candidates should practise these as part of exam preparation.
4. Q4 and Q8 were higher order questions, and the average score as a percentage of the total marks in these questions was noticeable lower than the knowledge and application questions.

5. Q8 tested the understanding of the impact of discounting of reserves and many candidates failed to show a good understanding of this.

C. Pass Mark

The Pass Mark for this exam was 65.
399 presented themselves and 187 passed.

Solutions for Subject SP7 – April 2021

Q1

(i)

Credit risk is the risk of loss if another party fails to meet its financial obligations [1]

Or fails to perform them in a timely fashion [½]

It can also include downgrade impacts [½]

If the candidate has mentioned relevant examples here, award up to 2 half marks against part (ii). Should not be awarded marks twice.

[Marks available 2, maximum 1]

(ii)

Investment credit risk [½]

For example from holdings of non-government bonds [½]

Corporate Bonds [½]

Counterparty credit risk [½]

For example reinsurance recoverables [½]

And where material, premium debtors, including pipeline premiums [½]

And other balances with intermediaries (brokers, agents) and banks [½]

Any other suitable points [1]

Marks to be awarded for just mentioning the broader heading of Investment and Counterparty Credit Risk. No sub-limit for examples within each category so long as relevant examples

[Marks available 3½, maximum 3]

(iii)

Increased counterparty credit risk [1]

As will be expecting reinsurance recoveries now (assuming no reinsurance program was in place before) [½]

Reduced insurance risk [1]

(same explanation points as below for Reserve/Premium risk)

Claims liability/Reserve Risk can potentially reduce [1]

as net of reinsurance claims severity and volatility should decrease [½]

But it will also depend on the effectiveness of reinsurance programme. [½]

Reduced Premium liability/Underwriting Risk [1]

As some of the underwriting risk will be passed on to the reinsurer [½]

Small insurer is likely to have more volatility of results so depending on the type and amount of RI purchased could have large impact on reduction of volatility of results [½]

Ceding more profit to reinsurer [½]

So secondary effect could be lower market risk as less assets to invest given that RI premium outgo is well in advance of recoveries	[½]
Potential liquidity risk decrease	[1]
as could be getting RI commissions in advance of claims hitting the book	[½]
However, liquidity risk could increase	[1]
if delay in receiving recoveries.	[½]
Operational risk could increase that appropriate reinsurance is not purchased	[½]
or due to the increased administration involved	[½]
If catastrophe exposed, catastrophe risk could be reduced	[1]
if the reinsurance purchased covers CATs	[½]
Increased currency risk	[1]
if RI contracts do not provide settlement in reporting currency	[½]

Any other suitable risk type [1½]

*[1] mark for naming the risk **and** stating the direction of movement, zero marks for only listing the name of the risk*

Max [1½] marks per risk type separate marks should not be awarded for Insurance Risk if Claims/Reserves and Premium/Underwriting have been awarded marks

Marks to be awarded for suggesting, with explanation, no impact to a specific risk type. No marks for Group Risk as too far fetched

[Marks available 16, maximum 6]

[Total 10]

Straightforward question and candidates scored quite well. There was some mixing of answers between parts (i) and (ii) as candidates ended up providing examples as part of the definition.

Q2

(i)

The company must use the model to help manage the business, not simply to produce numbers for regulatory purposes:

Reinsurance: Optimising the purchase of reinsurance [½]

Types of RI and different retention

Investment: Assessing the impact of a change in the investment mix [½]

Investment departments often use model output to match liabilities in terms of amount, timing, currency, etc [½]

Pricing: Assessing return on capital for pricing and performance measurement [½]

Used to form a view on how capital requirements should be allocated between different lines of business [½]

Reserving: Quantifying the uncertainty in claims reserves [½]

For regulatory purposes. [½]

Planning: Comparing different plans [½]

In terms of their risks/expected profits [½]

Strategy: Assessing the risks and benefits of new strategies [½]

Such as consideration for writing new lines of business or assessing the impact of using new distribution channels [½]

Risk management: Identifying key risks [½]

And assessing the impact of mitigation [½]

wider risk assessment

Any other suitable Use with example and explanation [1]

Marks not to be awarded for stating the model will be used to calculate regulatory capital, since it is still in the approval process, unless it is a higher order point in relation to how it can enhance the regulatory capital setting process.

[Marks available 7½, maximum 5]

(ii)

Being a “one size fits all” approach, the Standard Formula will not be specifically tailored to the Company’s business/risk exposures [1]

For example company may be writing non-standard/complex risks [½]

This may result in capital requirements which are either too high or too low [½]

If too low, then the Company may not calculate sufficient capital to protect it against adverse future scenarios [½]

If too high, then the Company may tie up capital that could be used elsewhere, e.g. to expand a line of business [½]

Investing in the development of an internal model may be worthwhile in that it can be used for many other areas [½]

such as for pricing, ALM, risk management, etc. [½]

May be approach taken by Company’s competitors, peers or other Group companies [½]

Standard Formula might be cheaper and less complex to implement [½]

but perhaps the benefits outweigh the cost, e.g. by reducing the capital requirements. [½]

The regulator might have asked the company to set up an Internal Model [½]

Might help with the credit rating for the company if leads to a more appropriate level of capital being held [½]

The company might already be having a model which could readily be used for IMAF process [½]

The company wants to use a stochastic model as against a deterministic approach of the Standard Formula [½]

Any other suitable points [1]

[Marks available 8½, maximum 5]

[Total 10]

Most candidates seemed to understand the Use test well, although a few candidates did appear to think of calculating the capital itself being the main component of the Use Test.

Candidates scored lower on part (ii) and seemed to run out of ideas to score sufficient marks.

Q3

(i)

To allow for potential adverse experience that the Company may suffer [½]

Such that reserves are not exhausted when experience is worse than expected [½]

May be a regulatory requirement [½]

Maintain/improve credit rating [½]

Stay in line with competition [½]

Perhaps because the company has always done so, and to keep it consistent with the past practice [1/2]
 Provide higher level of confidence to the various stakeholders in the company's ability to meet claims to various stakeholders [1/2]
 To allow for sufficient prudence in the reserves as per the accounting principle of prudence [1/2]
 Best estimates might only be the central estimate of the loss distribution, and may not be fully representative of the actual performance which can be more adverse [1/2]
 Historical experience of late reporting of losses/ large losses causing the Best Estimate to being insufficient [1/2]
 Management decision based on their understanding of the business [1/2]
 Smoothing of results year-on-year [1/2]
 Deferring profits or tax management [1/2]
 Changes to the claims handling policies rendering case reserves being booked at the lower end of the spectrum [1/2]

Any other suitable point [1]

[Marks available 8, maximum 3]

(ii)

Percentile-based approach/Stochastic approach

Set Margin for Uncertainty (MfU) to bring reserves up to a certain percentile, e.g. up to 75th percentile [1]
 Involves coming up with a distribution of the reserves [1/2]
 Stochastic approach to setting the MfU. [1/2]
 Mack/ODP [1/2]

Scenario-based approach

Process of setting the MfU based on certain specified real-life scenarios around companies' reserve estimates [1]
 Typically involves considering possible events that could have an adverse impact on companies' reserves [1/2]
 Can derive a scenario in a variety of ways: basing it on an historical event, thinking up a hypothetical event using our judgement, or from the results of a stochastic model [1/2]
 Based on the concept that in extreme conditions, areas of uncertainty may become more correlated [1/2]
 For example, risk of fires and subsidence claims during and following a spell of dry weather [1/2]

Any other suitable examples, including the ones in the Core reading [1/2]

Percentage loading on top of best estimate

Simply involves applying a straight percentage loading on top of companies' best estimate reserve picks [1]
 Percentage arrived at using judgement [1/2]
 Or could be prescribed by the regulator [1/2]

Cost of Capital approach

Involves calculating an explicit MfU as a risk margin calculated using a cost of capital approach, where future projected capital requirements are multiplied by a chosen cost of capital % [1]
 The cost of capital may be prescribed by the regulator, or industry practice [1/2]

and then discounted back to the present day [½]

Ad-hoc loading approach

Involves adding an explicit ad-hoc loading amount on top of the best estimate reserves, [1]

For example, \$Xm on top of best estimate [½]

Typically arrived at using judgment [½]

Could represent a loading for estimates for a 1-in-200 flood event [½]

Alternative set of assumptions

Involves choosing an alternative, more prudent set of assumptions compared to the actuary's best estimate view, [1]

Typically arrived at using judgment. [½]

For example, choosing a slower LDF, higher IELR, more prudent frequency and severity. [½]

If the candidate has provided more than three approaches, mark the best three only since the question specifically asks for three approaches.

Any other approach and appropriate explanation of approach [2]

Max 2 marks per approach

[Marks available 16½, maximum 6]

(iii)

Percentile-based approach

Advantages:

Sophisticated approach that is consistent year-on-year [½]

Specified valuation approach, assists with conversations with Auditors, regulators, etc. [½]

Disadvantages:

Time consuming/Expensive [½]

Complex/difficult to explain [½]

May lead to spurious accuracy, and/or give a false sense of security [½]

Choice of model might not be correct [½]

Impractical if limited past data is available [½]

Scenario-based approach

Advantages:

Takes into account specifics of companies' exposures to certain scenarios [½]

Because it is aimed at the specific question, we can construct a scenario test and produce reliable results much more quickly than for a stochastic model [½]

Encourages engagement with stakeholders from other areas of the business (e.g. Underwriting, Claims, etc.) as scenarios are easy to communicate and understand [½]

Model uncertainty is much less of a problem when we construct scenario tests because we consider the driving factors explicitly [½]

Disadvantages:

Time consuming to arrive at scenarios and select appropriate probability, many different stakeholders may want to get involved in the process [½]

Significant amount of judgement likely to be involved, both in arriving at possible scenario losses, and in the selection of the likelihood of the scenarios [½]

Typically only give information on the extremes of the distribution of eventual outcomes [½]

Percentage loading on top of best estimate

Advantages:

Simple approach that is easy and inexpensive to update each valuation [1/2]

May allow greater Board/stakeholder engagement with MfU due to the simplicity of the technique [1/2]

Disadvantages:

Might be the only option if prescribed by the regulator [1/2]

May be overly simplistic and hence not allow for specifics of the reserve risks companies are actually exposed to [1/2]

Arbitrary approach may cause issues in discussions with stakeholders [1/2]

Difficult to choose a percentage if not prescribed [1/2]

Cost of Capital approach

Advantages:

Sophisticated approach that is consistent year-on-year [1/2]

May be reasonably accurate proxy in terms of what the MfU is intended to allow for [1/2]

Disadvantages:

- Complex/Time consuming [1/2]
- Expensive/Difficult to explain. [1/2]
- May lead to spurious accuracy, and/or give a false sense of security. [1/2]

Alternative Set of Assumptions

Advantages:

Simple to understand [1/2]

Doesn't require any additional modelling as the same model can be re-run using a different set of assumptions [1/2]

Disadvantages:

Choosing the alternative set of assumptions can be tricky [1/2]

Might not be able to communicate what the statistical level of confidence is for the new outcome, as it doesn't produce a full distribution [1/2]

The alternative set of assumptions may require some underlying statistical analysis to arrive at leading to extra effort, and a statistical approach might be better [1/2]

Ad-hoc loading approach

Advantages:

Simple approach not requiring extensive process [1/2]

May be reasonably accurate proxy in terms of what the MfU is intended to allow for in that it makes use of expert judgement to feed into estimate [1/2]

Disadvantages:

Not a structured calculation process, hence incremental process to update each year [1/2]

May attract attention from Auditors/Regulators as to why there isn't a structured calculation process around the loading year-on-year [1/2]

Difficult to choose such a loading [1/2]

[Marks available 17½, maximum 6]

Advantages and Disadvantages of any other relevant approach for which marks have been awarded in the previous question part [2]
If the candidate has provided more than three approaches, mark the same three approaches as marked in part (ii).
Max 2 marks per approach
[Total 15]

The overall performance on this question was satisfactory. Part (ii) and (iii) were interrelated and candidates who scored low on part (ii) scored low on part (iii) as well (and vice versa). Some candidates went on to explain the Mack and ODP methods in detail, which did not carry full marks as a method to estimate uncertainty – they are only examples of stochastic techniques.

Q4

(i)

Mutual insurers for marine risks, not for profit [1/2]

Members may be asked to contribute money if the pool runs out of money. Equally members may be eligible for sharing profits. [1/2]

Originally formed to cover marine risks that could not be covered under commercial marine policies [1/2]

However, owing to their mutual nature and technical expertise, P&I clubs still provide a significant proportion of the world's coverage against marine liability claims [1/2]

P&I clubs also provide shipowners with technical assistance in the marine market and advice on issues relating to the shipping industry [1/2]

Some of the largest P&I clubs themselves mutualise in respect of very large claims [1/2]

Any other suitable points [1]

[Marks available 4, maximum 2]

(ii)

Subrogation is defined as the substitution of one party for another as creditor, with a transfer of rights and responsibilities. [1/2]

It involves recoveries from other parties to whom some liability of claim can be attributed [1/2]

Max 1/2 mark for defining subrogation

P&I Clubs provide liability cover to shipowners, so in the situation the member insured by the P&I club is at fault in an incident, the insurer of the other vessel may pay damages to its insured first, [1/2]

and then seek to recover damages from the P&I club. [1/2]

This will have an adverse impact on the club's profitability, i.e., it is a claim [1/2]

For example, a cargo-owner may claim from its insurer for the damage to its cargo, but if the cargo was damaged due to the shipowner's fault, the cargo's marine insurer will use the subrogation clause to claim against the P&I insurer of the shipowner [1/2]

It is also possible that the P&I Club gets a claim recovery through subrogation clause if it turns out that another party was at fault, [1/2]

this will increase its profitability [1/2]

Recoveries may be made through salvage [½]
 suitable example for salvage [½]
 This will increase the profitability of the P&I Club [½]

Any other suitable point [1]
 [Marks available 6½, maximum 3]

(iii)

The actuary is right in considering an adjustment for the potential recovery due to the relative size of the recovery to the premiums of the mid-sized insurer [½]
 and also because it is given that the loss has been caused by the ship [½]
 It can therefore be argued to be booked as a subrogation recovery [½]
 However it is not known whether the P&I club has admitted liability [½]
 and even if it does, a full recovery is not guaranteed [½]
 There could still be legal dispute resulting in the recovery not coming in [½]
 For example, the P&I club could become insolvent [½]
 The actuary may not be a legal expert to understand the consequences [½]
 It could depend on what the court rules in the end, and a possibility of recovery will not usually be sufficient evidence for auditors [½]
 Need to ensure the possible recovery has not been booked under case reserves by the company [½]
 If the amount of recovery changes in future, this can be a challenge to explain to the management [½]
 Depends upon the regulator as well if such recoveries are allowed be recognised or not [½]
 If the recovery doesn't come in at 100%, the portfolio is technically under-reserved/inadequate [½]
 There is clearly a huge financial risk to the company should the P&I Club dispute the claim at a later stage [½]
 Also there will likely be some defence/legal costs which means a zero incurred may be inaccurate in any case [½]
 Negative IBNRs can be seen as suspicious by the tax authorities [½]
 Equally booking it at 100% value might have an adverse impact on the profitability and capital adequacy of the company, given the size of the claim [½]
 The actuary should also consider the adequacy of the existing reserves [½]
 ...if too much prudence then reserves may still be adequate at the best-estimate level even after the negative IBNR [½]
 Principle of prudence would suggest not to book any recovery [½]
 Perhaps a probability weighted recovery could be booked, which may be a best case estimate of potential recovery, and can be justified as holding adequate IBNR [½]
 May want to consider how such situations were handled in the past [½]
 No matter how it is finally booked, it must be suitably communicated to the stakeholders so that the adequacy of reserves can be interpreted accordingly [½]

Any other suitable comments Max [1] mark

The marks allocated to this question are high due to the time spent on reading the preamble of the question, and it is strictly a higher order question.

[Marks available 12½, maximum 6]

(iv)

Need to consider/assume that the XoL cover has a high enough limit to cover the full \$100m [½]

If there is a reinsurance cover in place, then the actuary is correct in booking a negative IBNR /RI IBNR [½]

This is because there is a legal contract which entitles the company to recover the amount from the reinsurer, subject to the usual terms and conditions [½]

whether or not the subrogation clause is eventually exercised [½]

However, it will still require the same thinking as in part (iii) above for the amount of retention [½]

Since the Company is only entitled to recover the amount in excess of \$20m [½]

However the financial impact to the company will be less in this case [½]

The actuary will still need to think about the potential for reinsurer default [½]

comment around exhaustion of reinsurance/reinstatement premiums [½]

Comment around consideration of the claim not being excluded in the reinsurance [½]

Any other suitable comment with reasons Max 1

In particular, if the candidate has assumed less than \$100m limit, they should still be getting marks if suitable follow up points have been provided

[Marks available 6, maximum 3]

[Total 14]

This question wasn't answered very well, especially parts (iii) and (iv). The last two parts were higher order questions and some candidates actually skipped answering part (iv) altogether.

Q5

(i)

Professional Indemnity cover insures a professional person or a professional firm [½]

They would normally provide insurance for losses arising from negligence, error or omission in provision of service by the insured lawyer [1]

For example, it could cover financial loss incurred by an incorrect legal advice by a solicitor to its client – could be an individual or a company [½]

It will typically also cover the defence costs [½]

Could also cover losses to a third party [½]

Loss of documents [½]

relevant example 1 [½]

relevant example 2 [½]

relevant example 3 [½]

[Marks available 5, maximum 3]

(ii)

Benchmarks from other companies/industry who have been writing PI for lawyers before

Company K [½]

or from the Lawyers' Association's published statistics (if available) [½]

Benchmarks from other companies/industry who have been writing PI for other professions, if it is not available for PI for lawyers [½]

The above could be adjusted for rates and claims inflation [½]

Underwriters opinion [½]

adjusting for future assumptions based on the underwriting guidelines [½]

or for any changes to market conditions upon checking with the National Lawyers' Association	[½]
Pricing Loss Ratio	[½]
combined with the earned loss ratios observed to date	[½]
Any significant court rulings that may have an impact on the future loss ratios.	[½]
Business Plan loss ratios where a robust pricing loss ratio cannot be established	[½]
Any selection should consider the change in claims environment in future, such as increased litigiousness in the Society as a whole	[½]
Loss ratio from the Reinsurer (if they have access to it)	[½]
Any selection should consider the types of policies written by the company and how they may differ from those underlying the selection e.g. different excess points	[½]
<i>Any other suitable sources, Max</i>	<i>[1]</i>
[Marks available 8, maximum 4]	

(iii)

Advantages:

Simple and easy to apply	[½]
Can be used when the historical data is sparse	[½]
unreliable or missing altogether, which is the case for Company K	[½]
Is not distorted by anomalous data	[½]
Or the current claims experience	[½]

Disadvantages:

Ignores the pattern of claims development to date	[½]
However in this instance the policy is only one year into a 5-year policy, so the claim development is not reliable anyway	[½]
Difficult to adjust for one off large claims	[½]
Benchmarks could be wrong, and not suited to the case at hand	[½]
Underwriters may have a biased/incomplete view since Company K has never written PI Insurance altogether	[½]
More generally, it is difficult to validate this method in advance for new lines of business, as is the case with Company K	[½]

Any other suitable comments Max 1 mark

No separate sub-limit for advantages and disadvantages to be applied

[Marks available 6½, maximum 4]

[Total 11]

Candidates answered this question generally well, although they were short of ideas for part (ii), which was poorly answered. Also candidates lost marks in part (i) for not recognising that the PI cover was specific to lawyers.

Q6

(i) Latent claims are those claims that result from those perils which were unforeseen at the time of underwriting	[1]
and for which the potential for claims to be made many years later has not been appreciated.	[½]
In common parlance, latent claims are also those that generally take many years to be reported.	[½]

These are not reflected in the past claims data [½]
 Most of these arise from diseases caused by products or industrial processes [½]
 but faulty construction of buildings is another possibility [½]
 Sometimes court rulings, or late disease diagnosis can trigger these claims, and can lead to
 significant adverse financial impact on the insurer, [½]
 Suitable example with explanation e.g. asbestos, pollution claims, VWF, NIHL, Stress,
 Mobile phone radiation, sexual molestation of children etc. [1]
[½] mark for name, [½] mark for explaining how it is latent
Any other suitable points [1]
 [Marks available 6, maximum 2]

(ii)

Many reserving techniques are based on projecting past claims development into the future [½]
 or use a pricing assumption to come up with an estimate for the expected performance of the
 portfolio [½]
 Neither can generally be used for latent claims since by definition, latent claims are not
 reflected in the historical data, or pricing assumptions [½]
 Latent claims can have a calendar year effect [½]
 Single risk can give rise to multiple claims [½]
 Social trends can also influence the incidence of these claims, which can be difficult to track
 and allow for [½]
 Date of loss may not be uniquely defined, especially for disease related claims [½]
 Any actuarial estimate of reserves can therefore lead to under or over-reserving [½]
 This is particularly a challenge before the latent claim is discovered [½]
 but could still be a challenge post-discovery while the industry practice and exposure is being
 established [½]
 due to which it may be challenged by regulators, auditors and senior management
 more so than, for example, reserving for attritional claims [½]
Any other suitable points [1]
 [Marks available 6½, maximum 2]

(iii)

The BF method is a credibility estimate, based on a weighted average of an expected level of
 claims [½]
 estimated by the loss ratio method [½]
 and of claims based on the experience to date [½]
 assuming a development pattern of claims using the Loss Development Factors as would be
 used in a Chain Ladder method [½]
 We can equally apply the BF method to paid claims or incurred claims [½]
 It combines the advantages of the chain ladder method with the advantages of the loss ratio
 method [½]
 Suitable numerical example, covering the following elements:
 Chain ladder % developed [½]
 ELR and an exposure measure [½]
 $BF\ Ultimate = Incurred + ELR * Exposure * (1 - \% dev)$ [½]
 $IBNR = Ultimate - Incurred$ [½]

Max [2] marks if no example provided
Max [2] marks if only numerical example provided with no explanation
 [Marks available 5, maximum 4]

(iv)

Employers' Liability is generally a long-tailed line of business [½]
 Depending upon what the nature of the employer is [½]
 this can be very long tailed to medium long-tailed [½]
 Due to this, the development patterns will be less reflective of the true ultimate claim cost [½]

Since the book is exposed to Latent claims, by definition, the claim development patterns will not capture the likelihood of such claims [½]

Since it is known the book is exposed to latent claims, it is possible that the loss ratio used in the BF method contains an allowance for the incidence of these claims [½]

Although by definition, latent claims are unknown [½]

although a subjective allowance might have been made for this in the ELR [½]

First origin period is likely to be little developed in 24 months, since it is a liability line [½]

Using BF is slightly better than using Chain Ladder method [½]

But it might be preferable to use an Expected Loss Ratio type of technique, or another exposure based estimate to come up with a loading for the potential latent claims [½]

Any other suitable points [1]

[Marks available 6½, maximum 4]

[Total 12]

This was mostly a knowledge based question, and there wasn't a lot of variation in the answers provided. Some candidates wrote too much to show an example of BF method, and several candidates were not able to produce a coherent explanation of the BF method in part (iii) outside of the example.

Q7

(i)

Expect to apply a Chain Ladder method for the 2017 and 2018 AYs, BF for the 2019 and 2020 years (at least for 2020)

Only [½] to be awarded if CL has been used for 2020, and/or if IELR has been used for 2017

Assumptions for Chain Ladder/BF method [1]

Assume that claims proportion provided is proportion of incurred loss to date to projected ultimate loss as per the Claims Development pattern. [½]

Assume no tail factor, or apply a suitable tail factor [½]

Correct CL Ultimate Loss amount (1 for each year)

ULR for:

2017: $3000/72.9\% = 4,115.2$; ULR = 137.1% [1]

2018: $2000/52.1\% = 3,838.7$; ULR = 63.9% [1]

2019: $2000/28.9\% = 3,460.2$; ULR = 43.2% [1]

2020: $1600/12.6\% = 12,698.4$; ULR = 149.3% [½]

Max [½] mark if CL method has been used for the 2020 AY

Max [½] mark for each AY if only the Ultimate loss has been calculated, and ULR has not been calculated

Correct BF Ult Loss amount (1 for each year)

[4]

BF Ult Formula
$=3000+(100\%-72.9\%)*60\%*3000$
$=2000+(100\%-52.1\%)*60\%*6000$
$=1000+(100\%-28.9\%)*60\%*8000$
$=1600+(100\%-12.6\%)*60\%*8500$

ULR

2017: $3,487.8/3,000 = 116.3\%$

2018: $3,724.4/6,000 = 62.1\%$

2019: $4,412.8/8,000 = 55.2\%$

2020: $6,057/8,500 = 71.2\%$

Max [1/2] mark for each AY if only the Ultimate loss has been calculated and ULR has not been calculated

IELR Method

2017: ULR = 60%

[1/2]

2018: ULR = 60%

[1]

2019: ULR = 60%

[1]

2020: ULR = 60%

[1]

Max [1/2] mark for each AY if only the Ultimate loss has been calculated and ULR has not been calculated

[1] mark per calculation has been awarded instead of [1/2] to account for the time taken in reading the figures, copying pasting the date from Word into Excel
[Marks available 9½, maximum 4]

(ii)

Chain Ladder, ELR or BF can be used for one of the years or for all of the years, but a suitable justification has to be provided

Any reasonable explanation as to why the candidate has chosen BF or ELR for the last and/or penultimate years. [1]

Or that Chain Ladder cannot be used at all since there is likely to be reporting and settlement lags in the third party liability line of business [1]

Marks to be awarded for this part based on the choice of methods even if the numerical calculation is incorrect in part (i).

Any other suitable reasoning [1]

[Marks available 3, maximum 2]

(iii)

Note that the choice of CL or BF for an individual year should have no bearing on this calculation.

Loss Ratio (CL Method for 2017 and 2018, BF Method for 2019 and 2020)

Starting with the GLR% same as calculated in Part (i)

[1/2]

Assume no other reinsurance program is in place

[1/2]

Calculating the Net Inc/Ult Loss Ratio as 1.06 times the Gross Inc/Ult Loss ratio as per the information provided [1/2]

Setting Net ultimate equal to the gross ultimate

[1/2]

Calculating NEP correctly as Net Incurred/NLR%

[1/2]

Calculating the correct expiring proposed rate of reinsurance at 5.66%

[1½]

Note this can also be calculated as $(1 - 1/1.06)$, which should get full marks since the thinking involved is the same, but quite likely candidates go down the detailed step-by-step route above. It should be clear with workings to get full marks (shown below)

$$\begin{aligned}
 REP/GEP &= 1 - NEP/GEP \\
 &= 1 - NEP/NUL * NUL/GUL * GUL/GEP \\
 &= 1 - (1/NULR) * GULR \\
 &= 1 - 1/(NULR/GULR) \\
 &= 1 - 1/1.06 = 5.66\%
 \end{aligned}$$

Calculating the correct proposed rate of reinsurance at 16.67% [½]

Simple difference between the two rates calculated correctly at 11.01%, and percentage difference at 194.52% [1]
[Marks available 5½, maximum 4]

(iv)

Effectiveness of the Reinsurance Programme:

State that so far no recoveries have been made from the Reinsurer therefore at the first glance it appears that reinsurance is just ceding the profits away [½]

This is an Excess of Loss Reinsurance, so not necessary to receive recovery every year [½]

However 2017 is a quite poor performance year when compared to Budgeted loss ratio, still no recovery [½]

This could mean that the attachment is too high for the severity incurred by the insurer [½]

Hence the program can be seen as not being very effective [½]

Or that the company has been 'unlucky' that there have been no large losses, but higher frequency of smaller losses which don't reach the attachment point [½]

The own damage component is unlikely to hit the retention for such a program [½]

However motor third party liability is a liability line of business, so not too odd that big claims haven't happened over a 4 year time horizon [½]

It can be a hit-or-miss line of business [½]

No recovery so far doesn't mean that Reinsurance is not required [½]

There is potential for claims to further develop to above the retention and make a recovery [½]

especially given that motor third-party liability is written on unlimited liability basis in many jurisdictions [½]

Any other suitable comments. [½ each, max 1]

[Marks available 7, maximum 4]

[Total 14]

The question was poorly answered, and was the only numerical question in the paper. Most candidates answered part (i) and (ii) well, but parts (iii) and (iv) were either not answered altogether, or the calculations were incorrect. Reinsurance calculations came across as a weak spot.

Q8

(i)

- The Company will require a paid claims pattern, in order to project out the future claims cashflows to be discounted [1/2]
- Need to consider how to derive the paid pattern [1/2]
- The pattern should not be too volatile from one reporting period to the other [1/2]
- Choosing a suitable yield curve [1/2]
- Regulations/accounting standards may specify the yield curve to be used [1/2]
- Or it could likely be set with reference to the risk-free yield curve as at the valuation date [1/2]
- The illiquidity premium should allow for the difference between the liquidity characteristics of the insurance contracts and the liquidity characteristics of assets used to arrive at the Company's selected yield curve [1/2]
- As well as adjusting due to differences between asset and liability cashflows in terms of amount/timing/mean term/uncertainty [1/2]
- should also take into account the currencies of its claims liabilities [1/2]
- Will need to take into consideration any implicit discounting [1/2]
- What the competitors/peers/Group company is doing [1/2]
- Communicating the change in reserves due to discounting, its impact on profits and taxes [1/2]
- Its impact on the market risk calculations [1/2]
- It is important to consider consistency between the economic inflation assumptions and the discount rate [1/2]
- as well as any assumptions used for yields and asset returns in a corresponding solvency assessment [1/2]
- Need to consider whether the rate of discount is gross or net of tax and disclose this as a part of the reserving basis
- Potential implications on any reinsurance terms and conditions [1/2]

Any other suitable points [1]

[Marks available 9, maximum 4]

(ii)

- Combining/Aggregating the impact of the change in liabilities and assets caused by movements in yield curves, will remove at least some of the volatility compared to if we considered the Company's liabilities in isolation [2]

[2] marks to be awarded only if all aspects from the above point have been conveyed. for instance if the candidate says it will remove all volatility then only 1/2 mark to be awarded

- Assuming that the Company is to some extent matched from an asset-liability matching perspective, then the additional source of movement in the Company's claims reserves (caused by discounting), would be offset by movements in asset values in the opposite direction [1]

- For example, if downward shifts in the Company's chosen yield curves caused liability values to increase, this may be offset (at least to some extent) by an increase in the value of the corresponding assets [1]

- However, it might not be possible to fully eliminate the volatility, due to an imperfect matching of assets and liabilities in real-life scenarios [1]

Any other suitable point [1]

The marks have been awarded as 1 and 2 due to these being the key points. If the candidate has stated these points, they do deserve the full 4 marks.

[Marks available 6, maximum 4]

(iii)

Assuming the level of the Company's reserves is stable from one year-end to the next, and yield curves are positive [1/2]

A downward movement in yield curves will reduce the discounting impact within the Company's claims reserves, and as such its claims liabilities will increase [1/2]

On the assets side, the movement downwards in yield curves is likely to increase the value of the Company's assets [1/2]

This increase in the value of the Company's assets will offset to some extent the increase in the value of the Company's claims liabilities [1/2]

If the Company's assets are on average of shorter duration than its corresponding liabilities, then the downward movement in yield curves will cause the value of the Company's liabilities to increase by more than the corresponding increase in the Company's assets [1]

Therefore, this will have an adverse impact on the Company's Income Statement [1/2]

1 mark to be awarded only if the full meaning is conveyed, award half a mark if the relative movement between duration and change in the interest rates is not clearly articulated

Any other reasonable argument [1]

[Marks available 4 1/2, maximum 3]

(iv)

Assuming the question is in relation to the preventing a negative impact on the income statement due to a greater than expected increase in the yield curves [1/2]

If yield curves rise more than expected, the value of both the Company's claims liabilities and corresponding assets will decrease [1/2]

It could invest in assets of average duration shorter than that of its corresponding claims liabilities [1/2]

This will allow the Company to make a relative gain if yield curves rise by more than expected going forward [1/2]

Alternatively, Management may pursue a strategy where the Company is perfectly matched from an asset-liability perspective, such that regardless of the direction of movement in yield curves, this does not have an impact on the Income Statement, i.e. volatility removed [1]

1 mark to be awarded only if the full meaning is conveyed, award half a mark otherwise

Any other suitable action [1]

[Marks available 4, maximum 3]

[Total 14]

This question was also poorly answered. Quite a few candidates didn't answer parts of this question – and at times it appeared it was due to lack of time. This question had some generous marks available, so candidates who showed some understanding of the concepts scored reasonable marks. Those who scored well understood and described the impact of change in yield curves on both assets and liabilities.

[Paper Total 100]

END OF EXAMINERS' REPORT