EXAMINERS' REPORT

October 2019 examinations

Subject F203 — *General Insurance*

Fellowship Applications

INTRODUCTION

The attached report has been prepared by the subject's Principle Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners and should not be taken as model solutions.

Subject F203 — *General Insurance*

Specialist Applications
October 2019
MEMORANDUM

Overall

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, the marking schedules contains open ended marks for other sensible comments in some sections where they are deemed necessary. Overall, there are significantly more than 100 marks available.

Performance on this paper was consistent to prior examination sessions.

- *Candidates continue to undermine themselves by providing generic or off-topic answers. Specific observations are provided by question throughout this report.*
- *The examiners also want to comment on the poor quality of hand-written scripts where text is barely legible. If you intend on writing the paper next session, please ask a peer to review your handwriting where you have written something under similar conditions.*

Candidates should note that F203 is the key paper at which we test candidates' broader thinking. This is generally the final paper before qualifying as a professional, and we consider a capacity for broader thinking to be one of the best indicators of a candidate's suitability to act as a professional actuary. As such, we aim to design exam papers so that it is difficult to pass without displaying some capacity for independent, broad and commercial thinking.

Markers heavily reward instances where these skills are displayed. When reviewing past papers, candidates should assume that the marks available for generic points are substantially less than those awarded for the more challenging points that would be the mark of high-quality professional insight. Marks available for list items from bookwork are lower still.

As in prior sessions, candidates couldn't convince the examiners that they could apply higher order thinking to solve the problems posed. The majority of candidates answered questions with very generic answers (especially question 2). Question 1 part vi required a bit of thought and reference to the prior question to develop the solution – this question was especially poorly answered.

Candidates that planned their way through the exam did not appear under time pressure.

In conclusion, we would offer candidates two key pieces of advice – read the question properly and take the time to think about what is going on. Time spent making sure that you are answering the question that is asked is therefore more valuable than a panicked rush to put down as many points as possible, regardless of whether they are relevant.

QUESTION 1

This question examined candidates' ability to apply reserving concepts to sales related data. The question considered the appropriateness of a number of techniques and considerations to project the sales data to ultimate.

Candidates were required to perform a calculation where they projected the sales data to ultimate stating any assumptions made and recommend the best performing website. Candidates were also required to consider the limitations of the development factors that they calculated.

Candidates were also provided additional quote data to use to project a new week of sales development and again recommend a preferred website.

Finally, candidates were required to discuss the merits of a fee per quote costing model rather than the current model.

i) *This question required candidates to discuss the Basic chain ladder, Average cost per claim, BF and Exposure-based techniques and their suitability to estimating ultimate sales. This is a theory question with a small amount of application and was generally satisfactorily answered.*

Basic Chain Ladder

- Cumulative sales numbers grouped by placement week to obtain a triangle of data by week delay from placement week
- A corresponding triangle of development factors is obtained by calculating the development ratios from 1 week to the next for each placement week
- Weighted average development factors for each development week are calculated allowing for trends/outliers as appropriate
- Factors applied to the cumulative sales for each placement week to obtain estimated ultimate sales amount for each placement week
- If sales patterns are stable over different weeks this may be a suitable technique
- Size of sales may vary considerably however given that it is contents only there is a possibility that premiums will not differ significantly

Average cost per claim

- Require triangles of sales amounts and sales numbers as in BCL
- Average sales amount triangle is obtained by dividing amounts by numbers and projected to get ultimate average sales amount for each placement week
- Sales numbers are also projected to get ultimate sales numbers
- The product of ultimate sales numbers and ultimate average sales amount gives the projected ultimate sales amount for each placement week
- Any variation in average sales amount may lead to different results e.g. change in mix may result in different profile of sales with different expected sales premium
- Also, will allow for any distortions in sales patterns
- This may be more useful if both numbers and average amounts vary especially if negatively correlated since totals will mask impact
- This may be quite useful to sales data as size of premium and probability of sales are often negatively correlated

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- Determine initial expected a priori ratio by referencing external benchmarks or exercise to determine expected sales amount per ad spend amount
- Apply development factors as determined by BCL method to obtain estimated total sales to date
- Difference BF and BCL to determine sales outstanding
- "A credibility approach which gives greater weight to the prior information (development data) where that information is greatest (the older placement weeks) and greater weight to the external/alternative data for the more recent placement weeks"
- More useful particularly for the more recent underdeveloped weeks
- May produce different results if the external view is markedly different from that generated by standard development factors
- Will be useful for this scenario as decisions need to be based on recent under-developed periods
- May also have external estimates of sales given placements

Exposure-based

- Expected sales estimated from quoted premiums by sales experts
- Useful for estimating large sales or for events where an early estimate is required and little internal data available
- If large sales are projected along with the normal sales, it could lead to over estimation of the sales
- Similar to BF it will be more useful since internal data is limited and external estimates may prove useful

ii) *Section ii required candidates to discuss the suitability of IBNR, tail factors, outlier data points, inflation, trends and risk margin to the projection of ultimate sales. This question is a combination of theory and application to the sales forecast. The question was generally satisfactorily answered.*

Incurred But Not Reported

- Incurred but not reported is for sales made that has not been captured in the data
- There may have been a technical error that caused some sales not to reflect
- It is unlikely that this would be relevant to the sales analysis due to it being digital only
- Thus, no need to consider IBNR in this analysis

For this question, if candidates adequately explained the IBNR with reference to the quoted sales becoming real sales, this was also awarded marks.

Tail Factor

- A Tail factor is required where the data can still develop beyond what has been provided for analysis
- Quotes are often valid for 30 days, so if the client responded at the end of Week 10, there may still be some open quotes in Week 15
- It will therefore be appropriate to allow for some tail factor

Outlier data points

- Outliers can materially skew run-off analysis especially if it is expected to not be repeated in future placement weeks
- It will therefore be important to identify large sales from the data to exclude if these are not expected to be repeated or analyse and predict separately to not affect analysis of smaller "normal" sales
- Large sales may require separate return period type adjustments to consider the expected frequency of large sales
- The first 2 rows of the development triangle, development from periods 0 to 1 look significantly different from the next 5 rows.
- Week 14 of placement week 10 looks very high compared with previous and may be an outlier, although not so clear cut. However, for comparison purposes this is not relevant as this is the only source of development factor for this period

Inflation

- Inflation is important to consider when run-off patterns take long to develop over many months or years
- Given that the run-off is calculated over weeks, it is not considered an important factor for the analysis

Trends

- When performing run-off analysis, it is always important to consider trends in the data - these could be calendar week effects which may reflect process changes e.g. sales process or;
- it could be placement week effects that may reflect changes in buying behaviour
- Since both sales processes and buying behaviour can change constantly, this may be an important consideration when analysing data
- Historic data will have to be adjusted to reflect expected trends in the future to give a representative prediction

Risk Margin

- Normally required to ensure that provisions held are sufficient for at least the x-th percentile
- Depending on the requirements of the CMO, it may be appropriate to consider a margin in your calculation
- For prudency, the margin will be to reduce the central estimate as you rather want to understate the total sales number

iii) *Candidates were required to calculate ultimate sales stating all assumptions made and make a recommendation regarding the best website to use. Most candidates were able to apply the correct basic methodology and assumptions. Almost no candidates applied a tail factor or a BF model. Candidates generally scored satisfactorily for this question.*

Marks were awarded for:

Takesome

- Logical Assumptions
    - Logical tail factor assumption: Assume quotes valid 30 days, quotes made on average in middle of week - thus 2 days left after weeks (30 - 4x7) but just half a week. Assume last week indicative of tail sales

- Calculation stages to perform:
    - Cumulative triangle
    - Tail factor
    - Development Factors
    - Cumulative development factors
    - Ultimate Sales
    - Return on Cost
    - Weighted / Unweighted metric

BuyAlot

- Assumptions
    - Logical assumptions about methodologies used
    - Assume the sales pattern is similar for BuyAlot and Takesome
    - Assume the ultimate return for Takesome and BuyAlot are the same for Week 11 (BF)

- Calculation stages to perform:
    - Cumulative triangle
    - Tail Factor
    - Development Factors
    - Cumulative development factors
    - Ultimate Sales
    - Return on Cost
    - Weighted / Unweighted metric

Conclusion

- Logical and data driven observations
- On weighted average basis it seems like Takesome does better than BuyAlot
- However, only BuyAlot was exposed to Week 14 and also the estimate is very uncertain due to it being very undeveloped so it may be an outlier
- Takesome seems to have a downward trend in return whereas BuyAlot is trending upwards barring Week 14
- Comparing Week 11, 12 and 13 for both on an unweighted basis shows that BuyAlot performs better
- I would recommend BuyAlot *(or your recommendation based on your calculation)*

Calculation *(Other methods were also considered – but no marks were given for methods that did not make use of a triangle)*

Cumulative

Takesome	**0**	**1**	**2**	**3**	**4**	**Tail**	**Ultimate**	**Cost**	**Return**	
Week 10	160	360	560	630	780	801	801	100	8.01	
Week 11	210	460	560	640			814	120	6.78	
Week 12	300	450	600				865	130	6.66	
Week 13	330	470					918	140	6.56	
Week 14										
DF	1.74	1.35	1.13	1.24	1.03		3 399	490	**6.94**	Weighted
DFC	3.40	1.95	1.44	1.27	1.03				**6.67**	Unweighted (same placement weeks)

BuyAlot	**0**	**1**	**2**	**3**	**4**	**Tail**	**Ultimate**	**Cost**	**Return**	**A Priori**
Week 10										
Week 11	310	410	460	560	693	712	712	110	6.48	746
Week 12	420	540	630				976	140	6.97	
Week 13	440	600					1 066	150	7.11	
Week 14	400						942	160	5.88	
DF	1.32	1.15	1.22	1.24	1.03		3 696	560	**6.60**	Weighted
DFC	2.35	1.78	1.55	1.27	1.03				**6.85**	Unweighted (same placement weeks)

iv) *Section iv required candidates to consider the impact that a public holiday could have on website traffic as well as how to allow for this in the development factors. In general, this question was poorly answered.*

- A public holiday could reduce sales numbers at least on the day as customers may not be shopping online
- Could scale up sales by factor of 7/6 but this may be too aggressive as some sales would just have happened next day
- **OR** it may inflate numbers since customers are not at work
- Could smooth sales on holiday to look more like a normal day
- This may be material as it is 1 day of 7 potential days
- It may impact the days following in different ways depending on whether it is close to a weekend or not
- For a placement week it could mean that the whole cohort's pattern is different to other weeks
- It may be best to exclude Week 12 from analysis to not distort other cohorts
- However, data is limited, so may want to try to adjust for the distortion
- It will also affect development patterns - thus placement weeks 10, 11 and 12 will have different run-off sales patterns at different delay periods
- There is no indication of whether more sales are made on workdays or non-workdays – so best not to make any adjustments

v) *Candidates were required to consider the limitations of their development factors for use in predicting the success of future website placements. Candidates generally answered this question satisfactorily.*

- Predictions are very sensitive to what has happened to date especially if only a week has passed
- Most methods assume a stable development pattern which is not always the case - sales could be very volatile
- Predictions could be over/under-estimated if there are underlying trends in the data
- If the underlying mix of business / quotes change, the predictions will not automatically take this into account
- Results are sensitive to exposure e.g. public holidays
- Extrapolations are made from very limited data

vi) *Section vi provided candidates with additional quoting data and required them to project the sales from the latest advertising spend showing their assumptions and make a recommendation regarding the best website. This question was very poorly answered with a number of candidates not using the additional data provided.*

The bulk of quotes are done within the first week following the placement - over 90% for the more developed cohorts

- Can use BF method with Sale to Quote Ratio as aPriori estimate
- Calculation
  - Sales ratio for Takesome and BuyAlot
  - aPriori Ultimate Sales estimate for Takesome and BuyAlot
  - BF Ultimate for Takesome and BuyAlot
  - Expected Return for Takesome and BuyAlot

BuyAlot is still expected to outperform Takesome

Calculation *(Again, alternative methods were also considered by the markers)*

Cumulative Takesome	Quotes	Ult Sales	S Ratio	Costs	BF Ult	Return
Week 10	2 500	801	32.1%	100		
Week 11	2 300	814	35.4%	120		
Week 12	2 600	865	33.3%	130		
Week 13	2 650	918	34.6%	140		
Week 14						
Weighted	10 050	3 399	33.8%	490		
Unweighted			33.8%			
Week 15	2 800	947	33.8%	140	908	6.49
BuyAlot	**Quotes**	**Ult Sales**	**S Ratio**	**Costs**	**BF Ult**	
Week 10		-		-		
Week 11	2 000	712	35.6%	110		
Week 12	3 000	976	32.5%	140		
Week 13	3 600	1 066	29.6%	150		
Week 14	3 500	942	26.9%	160		
Weighted	12 100	3 696	30.5%	560		
Unweighted			31.2%			
Week 15	3 800	1 161	30.5%	160	1 268	7.92

vii) The final part of the question required candidates to discuss the merits of paying the website per quote rather than the current model. Candidates answered this question quite generically rather than using the information at their disposal. The question was answered quite poorly.

- At first sight quotes are increasing which may seem that BuyAlot are more successful at advertising
- However, the sales numbers did not increase in line with the quote volumes
- Evidenced by sales ratio over time
- CMO will start paying more for advertising but not gaining enough sales to make up for the increase
- Might even have negative returns if quoting process requires some intervention and costs e.g. telesales, queries, etc.
- Recommendation is to rather negotiate rate dependent on sales volumes

QUESTION 2

Question 2 examined a range of actuarial topics related to a medium-sized general insurance company (Tiger) in the South African market that had made losses in the last few years. The company writes business via UMAs, brokers, co-insurance and inwards reinsurance.

The first part of the question asked candidates to discuss the investigations a consultancy should perform to conduct a pricing and profitability review focusing on the sources of loss.

The second part of the question considered a follow up project for the consultancy to remediate the pricing issues. Candidates were asked to assess the factors they would consider regarding the consultancy's ability to carry out the exercise as well reasons why a successful remediation exercise would be difficult.

Finally, candidates were informed that Tiger had been declared financially unsound and were asked to discuss the ladder of supervisory intervention as well as options available to Tiger's management. The effect of the options exercised above on capital requirements, technical provisions, reinsurance and pricing were also discussed.

i) *The first part examined the investigations that the consultancy would conduct in order to perform a pricing and profitability review focusing on sources of loss. Most candidates considered a wide range of suitable investigations and in general this question was well answered.*

General

- Analysis of financial statements and management accounts by product lines for the last few periods
- Potentially a profit/loss attribution approach to identify sources of loss. This can be done by assessing the likelihood of observing the actual results and understanding how rare/expected the losses are
- For underwriting losses, consider budget vs actuals and use a similar approach for other risk types
- Benchmarking premium rates against other industry participants
- Understanding whether solely underwriting loss, or other losses as well for example bad investment performance
- Unpacking the underwriting loss further into components - Claims, expenses, commission
- Perform the exercise for Gross and Net (after reinsurance) results separately

Product

- Proportions of the lines of business, and changes to the split over time (potentially before the losses occurred)
- Analyse products by distribution channels, regions, major brokerages, type of products, by UMA, reinsurance (inwards) vs direct business
- Specific categories of policies, large medium small, industry of operation
- Renewal vs new pricing terms
- Policies on which Tiger follows vs lead/directly priced
- Any bulk negotiation pricing deals

- Understanding the pricing basis, scope of broker mandate, aggressiveness of rates, technical vs tactical vs actual rate charged
- If there is a discount mandate for brokers/UMA's, are they sticking to it?
- Remuneration of UMAs and brokers should be assessed for proper incentivisation
- Inflated expenses for the size of the business
- Main risk versus add on risks profitability
- RI inwards by client/source, type of treaty
- Cyclicality of industry (gross + reinsurance separately)
- Large/catastrophic losses
- Losses caused by frequency or severity
- Quality of underwriting - both at inception and at claims stage
- Policy wording - poor policy wording may lead to payment of claims not priced

Reinsurance Arrangements

- Proportional and non-proportional separately
- Reinsurance balance on treaties
- Reinsurance commission vs industry
- General effectiveness of reinsurance strategy/usage of non-proportional treaties
- Differing reinsurance in the industry should also be considered as this will cause differences in competitiveness on coinsurance terms

Other

- Length of time for which brokers have money
- Credit/counterparty default Losses
- Operational losses
- Reserve deterioration
- Level of binder and outsource fees as well as vs the market
- UMA fees and profit share and comparison vs the market

ii) *Part a required candidates to discuss the factors they would consider in assessing whether their consultancy has the ability to carry out a pricing remediation exercise. In general, this part of the question was poorly answered with candidates not considering the experience required to price the products and implement solutions in the environment in which Tiger operates.*

Ability to carry out the exercise

- Typically, an area with a lot of judgement (commercial lines) and hence technical pricing not as familiar and as well used/utilised
- Relationships with the clients will be very important and will affect the way in which pricing can be remediated
- Cyclicality and market pricing especially of reinsurance will be an issue, may not have the expertise in the area currently
- Lots of underwriter judgement may be used in setting terms, will be difficult to communicate the changes and account for all possible outcomes
- Intermediated model will make it complicated to implement and monitor changes
- Methods of quoting at intermediaries and differences in rating may be a further complication
- Credibility of actuaries in the space is not as obvious as personal lines
- Potentially opens up the consultancy to professional indemnity claims

Part b required candidates to suggest reasons why a pricing remediation exercise would be difficult to achieve in Tiger's environment. This part of the question was also not well answered with candidates not adequately considering the pricing intricacies of the products that Tiger underwrites and the difficulty in implementing pricing changes in the channels in which Tiger operates.

Implementation challenges

- Lower policy base may impact negatively on overhead expenses
- Difficulty of charging the correct price due to required volumes of business
- It may be very unfair to charge clients exactly the premium deserved if large enough to be experience rated, hence a consideration of cross subsidy is required between policies
- Technical (actuarial) pricing may not be the norm in the business and hence will need to address the use of rating manuals, potentially will need to digitise these and force brokers to use them
- Loss leaders may be required to bring in business e.g. loss expected on property but profit on motor, liability sections of the same policy
- Similarly, master policy/head office may be loss making with other addresses profitable
- Broker mandate may heavily discount rates
- Following terms will have to be set in line with lead, differential rates may reduce business volumes
- In the case of reinsurance inwards, may need to change types of treaties that are written, normally will participate on a number of treaties per primary insurer. This will not be as easy as simply updating the rate per unprofitable treaty
- This is similar to the lead/follow discussion, but for reinsurance even more difficult as market rates will be prevalent here, affected by global factors
- Additionally, proportional reinsurance follows the fortunes of the primary insurer to a large degree and only have the commission rate as a pricing tool

iii) *Despite the pricing remediation considered above Tiger unfortunately became financially unsound.*

Part a of the question considers the ladder of supervisory intervention under SAM. This is bookwork and was generally answered to a satisfactory degree by candidates.

Regulatory Intervention

- The MCR and SCR are intended to enable a "supervisory ladder of intervention", basically enabling the Prudential Authority (PA) to intervene with measures appropriate to the degree of "insolvency".
- The MCR is the minimum amount of capital below which no insurer will be allowed to operate
- The SCR is a much higher amount and indicates the first "trigger" point at which the regulator would start to intervene in the affairs of an insurer.

- Insolvency may arise in terms of SCR or MCR being breached based on the quality or quantum of capital (tiering of funds) available

- Despite the existence of a lower bound for the solvency level in the form of the MCR, the SCR remains the primary measure of solvency. The SCR is required to be continuously maintained.

- Insurers will be required to inform the PA in the event that there are insufficient own funds to cover the SCR, or in the event that this is a possibility within the near term.

- Tiger would need to submit a plan to restore solvency to the regulator
- Could require an immediate capital injection/capital guarantee in the interim until solvency is regained

- Next step, if capital not provided, is to prevent Tiger from writing new business

Part b required candidates to consider what options management has available to remedy the financially unsound position. Candidates generally identified most of the remedial steps of full or partial sale, closing to new business, reinsurance and a capital injection. Candidates generally scored well on this part of the question.

Options for Tiger Insurance

- Continue operating in the hopes that fortunes turn around, along with a plan submitted to the regulator. May be able to obtain a capital injection to achieve a longer “runway”. Could combine this with scaling down and reducing risk written in higher capital-intensive lines of business.
- Look at components of SCR and mitigate those with highest contribution; e.g. if Cat risk is requiring the most capital – purchase more focused reinsurance; similarly, de-risk the balance sheet in terms of market risk
- Stop selling new policies – run-off of existing policies and then wind up the insurer. This would be valid in the situation where management doesn’t think that the insurer can turn fortunes around. This would normally only be temporary until another solution is found. Difficult to keep running the insurer profitably under these circumstances
- Sell parts of the business (certain lines)– perform a portfolio transfer of the business. Would enable the solvency to improve if certain business segments are particularly capital intensive, however would reduce the size of business. Would need to notify regulator if certain blocks of business are sold.
- Sell entire business - If selling the entire insurer, price may be depressed as it is a forced sale.
- Purchase particular reinsurance - Adverse development cover for particular blocks of business. This could be expensive but could also improve solvency. Also, may reduce size of business and effectively scale down risk taking ability of the insurer

Part c required candidates to state what impact the options outlined in b above would have on Tiger's capital requirements, technical provisions, RI arrangements and pricing. This part of the question was not well answered with a number of candidates not adequately considering the impact of the options that they outlined in part b would have.

A number of candidates also combined their answers for parts b and c which made marking difficult and was considered poor exam technique. In addition, many marks were available for this question, far beyond the memo. Few candidates applied broader thinking to the impact that the steps would have on Tiger.

Candidates without proper planning technique did not give themselves enough time on this (last question) in the paper, despite it being worth 12 marks.

Change in actuarial inputs

Capital Requirements

- Capital requirements would be affected by premium volumes, a forecast reduction would decrease requirements assuming growth was assumed in the past.
- Maximum of premium over the last and next 12 months is used in the formula, so capital requirements would not reduce as fast as the business contraction
- Use of more reinsurance would decrease this further (up to a point) as the requirements are calculated on a net basis
- Less risky asset types would reduce capital requirements due to lower risk profile.
- This would have knock on impacts if the term is reduced as well, reducing the interest rate risk. However, may increase mismatching risk with technical provisions
- Too much reinsurance either on unexpired/expired risk will attract a counterparty default and potentially a concentration risk charge
- Increase in pricing strength will increase the premium and hence capital requirements
- Any impact on technical provisions will also change the exposure under the relevant capital requirement module
- Still will be onerous to calculate the capital requirements even in the instance that business is run-off, will be disproportionate effort

Technical provisions (TP's)

- Technical provisions would still be measured in a similar way.
- May need to consider a change in basis if there has been some deterioration in reserves historically
- Could be impacted for example on salvages and recoveries if there is a fundamental change in business operations due to run-off etc. which will have knock on impact on TP's
- Given the losses experienced it may be expected that an AURR is appropriate.
- The risk adjustment should be appropriate to that required in a sale of business.
- Reduction in capital requirements will have an impact on calculation of Risk Margin and hence TP's
- Allowance for ULAE and risk adjustment is already compulsory on a solvency TP basis. The change in the IFRS basis may then need to move to something more market consistent

- Allowance for a ULAE reserve may become more important if the business decides to stop writing new business
- Transfer of liabilities will reduce the technical provisions/remove them completely for those lines of business transferred
- Sale of the entire business will extinguish all of the liability, hence this will remove capital requirements and technical provisions completely

Pricing

- Increasing in pricing strength to avoid losses would be expected
- This may have a knock on effect as brokers would be less likely to recommend products if they know that they are expensive
- Follow terms and reinsurance inward terms may not change and hence selectiveness will be required in identifying where the pricing level is appropriate
- However, this would only be appropriate up to a point for a business which is a going concern as there are still overhead expenses to worry about
- Could reprice current policies where there is scope for this, for example multi-year contracts or monthly renewable contracts if any

Reinsurance

- Adverse development cover/reinsuring specific blocks of business may be appropriate
- Reinsurers may still expect that some interest is held by Tiger
- Typically for a stressed insurer would expect the use of more reinsurance
- Unfavourable terms may be applicable (commission) for proportional insurance since the business is loss making
- Reinsurers may be able to run off claims more profitably than Tiger

END OF REPORT