EXAMINERS' REPORT

June 2018 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
May 2018
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. There are significantly more than 100 marks available

Performance on this paper was mixed. In line with previous F203 exams, a considerable number of candidates undermined themselves by providing generic or off-topic answers. Specific observations are provided by question throughout this report.

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 and broad thinking, as well as to 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 in a practising actuary. Marks available for list items from bookwork are lower still.

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' understanding of the implications of not setting reserves accurately as well as factors to consider when eliminating a line of business and the alternatives to such a course of action. The question also examined the risks of entering a new line of business and the impacts that could have on Solvency and changes to the ORSA. A simple question on the statistical calculation of a risk premium for the line of business as well as other factors that could affect the adequacy of the premium was also included.

(i) *Examiners' notes:*

This was a straight forward application question. Better candidates were able to generate a number of reasons why the CFO's proportional approach would not be feasible. The question was not badly answered.

Changes to underlying characteristics might have occurred in the year:

- Reinsurance Structure
- Deliberate changes to Claim Settlement/Payment policies/procedures
- System changes resulting in changes to reporting/settlement or payment procedures
- Changes to underwriting procedures leading to changes in claims reporting e.g. Cash Back
- Changes in the amount of large claims experienced, this could affect the settlement pattern
- Catastrophe claims experienced close to valuation period - will affect the claims pattern
- AFS are audited, audit will ensure that there are no material misstatements to the financial statements. Unlikely that audit team will allow proportional methodology
- SAM requires Head of Actuarial Function to sign off on technical provisions, unlikely that the HAC will sign off on the proposed methodology

Additional marks available for:

- Conclusion about OCR being large with resulting proportional method resulting in large IBNR
- Consistency in Methodology being important

(ii) *Examiners' notes: Most candidates were able to identify a number of potential implications of understating the provisions. The question was quite well answered.*

- The understated provision will only change the emergence / timing of the recognition of profits, and the issue is the second order impact of decisions made on this apparent increase in profitability
- Essentially understating the provisions will overstate the profits of the company
  Could lead to inappropriate decisions being made:
- Paying too much in company tax
- Distributing dividends based on profitability of the company
- Dividend payments could be exacerbated by lower capital requirements because of factor multiplied by lower provision

- Could lead to management believing that pricing is too prudent (i.e. based on good loss ratio) and lead to more aggressive pricing
- If reserving practice is not updated - this will lead to more unprofitable business being taken on due to favourable pricing and anti-selection
- Eventually as losses start to emerge, this will cause pressure on pricing/profits as well as further capital strain
- This in turn could lead to further inappropriate decisions, e.g. broad based premium increases, cutting staff and costs etc.
- If shareholders not willing/unable to increase the shareholder capital could lead to regulatory interventions
- There could be a potential negative impact on Asset Liability matching
- As an actuary need to consider the implications of not adhering to best practice i.e. APN 401

(iii) *Examiners' notes: Candidates were generally able to generate quite a few advantages and disadvantages of cancelling the fleet lines of business. Other potential focus areas to improve profitability was not badly answered.*

Disadvantages:

- Relationships with intermediaries will be affected
- Administratively difficult process to exit from a line of business
- Market conditions could make it difficult to find appropriate buyer for the line of business
- Capital requirements only likely to reduce in year 2 based on SAM standard formula
- Cancel all policies - will depend on the terms and conditions of each policy e.g. cancel on 31 days' notice
- Administratively intensive/expensive to deal with the Outstanding claims on the portfolio - would need to keep staff to handle these claims. ULAE costs would form bigger proportion of total provision
- The portfolio could have experienced a bad year and the decision could be based on incomplete information. E.g. the portfolio could possibly have performed better in prior years
- Company could suffer significant reputational and brand risk from exiting the line of business. Especially from policies that have Motor Fleet and Personal lines components
- Fleet carried part of fixed expenses. If this LoB is removed, more expenses will have to be allocated to the other lines of business which will in turn affect their profitability negatively
- Possible staff and systems redundancies, Reduced perceived offering in the market
- Company would need to consider fair treatment of customers in closing down a line of business

Advantages:

- Exiting from this line of business will free up capital to pursue other ventures.
- Exiting from a bad performing portfolio could lead to greater profits and return on equity

Could lead to other efficiencies being created:

- e.g. Better reinsurance terms if pricing was based on combined portfolio
- If business is bad performing and administratively intensive this will free up resources to focus on good performing portfolios
- Further increasing customer satisfaction
- Reinsurance advantages in terms of favourable pricing on overall portfolio perspective - also with consideration to the financial records

Focus Areas

- Salvage and Recovery Ratios
- Investigate the Total losses vs attritional losses - could be that we are suffering high amounts of write offs with inadequate recoveries or too many small claims without proper excess structure

- Need to investigate the reinsurance structure: Significant pay-away on RI contracts for this class
- Specifically analyse the differences between Proportional and Non-Proportional contracts
- Other operating and administrative expenses for fleet needs to be analysed as this is also proportionally higher
- Fees and commission income - commission will be standard, why are the fees for this line of business so high
- Assessing accuracy of initial estimates - these could be too low leading to significant IBNER/too high to ensure savings towards the end of the year
- Investigate the procurement processes in the fleet line of business. It might be that the panel shop/salvages/recovery process used are not market standard and is costing us a lot of money
- Investigate the Allocated Loss adjustment expenses - there could be a disproportionate amount of charges allocated to the Fleet line of business
- Analyse why the investment income is lower for fleet business. (From the income statement)

Max 1 mark available for conclusions about Guarantee business *(iv)* *Examiners' notes: The risks and mitigations of moving into the space insurance market was generally well answered by most candidates.*

Risks:

- Lack of knowledge of the market/requires specific expertise
- Underwriting terms and conditions
- Pricing the product
- Setting provisions
- Investigating the conditions for valid claims
- Could be difficult to finding the correct reinsurance structure/reinsurance support
- License may not permit writing of new line of business
- There is a risk that our co-insurer defaults on obligations - this could lead to reputational damage
- Need to confirm who pays for claim investigations and business acquisition costs…
- Other valid administrative quotes (Not system related - simple product)
- Potentially unprofitable as market could be expecting a lot of new entrants
- Unknown business - could lead to relatively high variability of claims/profit
- Small market, so may be difficult to attract business.
- Could be difficult to find reinsurance support at suitable price
- Could expose the company to currency risk ~ likely to be in Dollar
- Capital requirements could be excessive - leading to lower return on equity

No Marks for latency - not a liability product

Mitigation:

- Partner with reputable co-insurer. Leverage off their expertise in the market.
- Have in place the necessary legal contracts to support the partnership
- Buy in expertise: either employ specialist underwriters or buy an existing company/UMA with expertise
- Do not follow market rates, but underwrite for profit - but may not get much business
- Purchase significant reinsurance / coinsurance
- In addition purchase reinsurance from reputable reinsurers - so as to limit the counterparty default/concentration risk charges
- Use policy exclusions or restrictive policy language - again this would require expertise
- Limit the income written and so limit the downside risk and capital requirements

(v) *Examiners' notes: The regulatory implications from both a SAM and ORSA perspective of moving in to a new line of business was generally poorly answered by candidates. A lot of theoretical answers were given without a link being made to the specific new class under consideration.*

CPR Return:

- Students answered from Formula perspective (marks available):
- Conclusion on premium and reserve
- Conclusion on market risk
- Conclusion on currency risk
- Overall impacts on formula (i.e. Operational Risk & Diversification)

(No Marks for latency discussion or massive liabilities and long-term investments)

- Allocating the new class to the applicable line of business
- Most likely be allocated to Miscellaneous/Aviation
- Need to determine best way to determine the provisions for this class
- Will be most significant for Premium Earning as well as Incurred but not reported provisions
- Will also need to determine the ULAE provision
- Need to ensure that we have reinsurers in equivalent jurisdictions (Otherwise Capital requirements will be excessive)
- Allowance for currency risk where this was not previously necessary

ORSA:

- Need to determine whether an out of cycle ORSA will be required - most likely as it is significant change to business
- Need to incorporate the class into the processes of the business
- Impact on the Risk management processes (including Risk Register)
- Discuss initial risk mitigation performed when entering the class:
- Market conditions, reasons for entering, reinsurance market, partnerships etc.
- Business planning and capital management over the business planning period (At least 3 years)
- Discussion of risk appetite measures - whether still in bounds
- Discuss capital requirements of class
- Both on the Standard Formula basis as well as company's own belief of capital requirements for the class
- Discuss how the company is planning to hold capital for this class and whether the methodology used is correct: Should we keep more own funds to rectify the issue or are there management actions that could be taken that will provide a better solution

(vi) *Examiners' notes: The calculation of the risk premium was performed quite badly by the majority of candidates. This was disappointing as the calculation was not particularly difficult.*

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Losses are normally distributed
Mean R160m
Probability X > 200M i.e. > 1.6 standard deviations from the mean
N(200,160,25) = 94.5201%
1-0.945201 = 0.054799
Risk Premium = 50,000,000 x 0.054799 = 2,739,965

(vii) *Examiners' notes: The majority of candidates did not list sufficient other factors that could affect the adequacy of the premium charged. This question was poorly answered.*

Risk premium will not be equal to office premium for various reasons:

- Loading for costs
- Loading for retrocession
- Profit component

- Data used to calibrate the model
- Reinsurance and other direct costs to take into consideration
- Risk premium to office premium considerations (Max 1)
- Consider the probability of failure… If the probability of failure is slightly higher the contract will almost definitely pay out the R50m
- Not all rockets have the same value - the past may not be a good indication of the future
- Project overspend may increase the value of launches and possible loss cost.
- Exchange rate fluctuation could influence pricing
- Inflation could have increased the loss cost as the average was used with no adjustment - this could influence the payment trigger
- The method assumes that the probability of failure is constant from trial to trial there are a number of reasons why this may not be the case: e.g. failure rate dependant on components used and size of project budget
- What happens if OutThere decides to launch more than 5 rockets… We will have to specify the number of launches covered
- Technology advances may decrease the cost of future launches
- How does salvages and other recoveries affect the loss cost, is this already factored in?
- Also need to consider what the insurance actually covers. If it includes collateral damage from a launch destroying a large area/population insurance is will be very substantial

QUESTION 2

This question examined a range of actuarial topics related to the launch of a new insurance product. The pricing, reserving and cost implications of launching On Demand Insurance (ODI) were examined. The cost component of the question also included a simple calculation. The question also examined the currency risk that paying claims in BitCoin would pose to reserving and profitability. Candidates in general performed poorly in question 2 compared to question 1.

(i) *The first part examined the pricing differences between traditional personal lines insurance and ODI. Candidates generally didn't score too well in this question.*

Traditional personal lines insurance in SA is priced and on a monthly renewable basis with the minority of policies being on an annual basis

The following items are explicitly priced into the premium:

- Expected cost of claims
- Acquisition expenses
- Office costs - including claims
- Any binders or outsource fees
- Allowance for any reinsurance
- Profit margin

- ODI insurance has a specified start date but policies may run for hours, days or months depending on the period of cover selected
- If cover is typically provided for a month, what premium should be charged for a day?
- Should it be 1/30 of the monthly premium or if a certain item is only used once a month e.g. a mountain bike should the premium for a day be 90 or even 100%%
- How can usage of an item be predicted?
- Will average usage be assumed for all customers? Leading to a higher price for customers utilising more ODI?
- This would mean that we end up penalising customers that are loyal users of ODI?
- How can the items priced into the premium above be allowed for in a policy with variable duration while still presenting a profitable offering to a potential customer?
- May have more frequent premium collections for ODI that will add to additional office expenses
- Will your reinsurance treaties allow for ODI and / will RI for this product be available?
- Expanding on the changes in the expected cost of claims:
- How will anti-selection and moral hazard be priced into the product?
- Client can insure an item after an event has taken place and delay the reporting of the insured event to the period in which there is coverage
- Possibility of ex-gratia claims - i.e. trying to insure your bicycle but you are in a no coverage zone?

- Other relevant points considering changes to terms and conditions
- ODI underwriting needs to be simpler and quicker than TPLI

(ii) *Question ii was a straight-forward theory question examining the Bornhuetter-Ferguson method. The majority of candidates answered the question adequately.*

Bornhuetter Ferguson Method

- Aims to estimate the IBNR claims amounts
- Generally considered a blend between the chain ladder and expected claims loss reserving methods
- A credibility approach between 2 ways of estimating the ultimate value i.e. a priori loss ratio approach and chain-ladder approach with the credibility given to the chain ladder approach being the current/expected ultimate ratio.
- Most useful for latest reporting periods with less claims development

(iii) *This question examined the collection and analysis of ODI data for reserving purposes and the potential problems associated with this. This question was generally adequately answered.*

- Reserving would currently be done on an accident basis on either a month basis with monthly development or on a quarterly basis with quarterly development
- Exposure would now need to be collected on a daily basis and reported losses linked back to day of exposure, thus with daily development
- Different personal lines products may exhibit different exposure patterns - mountain bikes or cameras for a few hours and cars for may days during the same period of ODI
- Will these products have to be reserved for in different homogenous groups to what the insurer is currently doing?
- Will these homogenous groups have sufficient data to allow for a sensible reserving exercise?
- Alternative frequency and severity reserving methods may need to be considered to better link exposure periods to incidence of claims
- Earned premium will need to be calculated on a daily basis in order to facilitate BF methods and show the seasonality introduced by ODI
- Will there be delays between inception of ODI risk and receipt of premium
- Significant time may be required to convert data into a format suitable for use
- Significant volumes of data will be collected

(iv) *The affect that ODI would have on your contract boundaries and reserves was satisfactorily answered by most candidates.*

- The measurement of insurance contracts should include all cash flows relating to the contract should they fall within the contract boundary
- For an ordinary monthly portfolio of personal lines products the contract boundary would be the point at which the insurer or reinsurer would have a unilateral right to terminate the contract, reject premiums payable or amend the policy. This would generally be at least 30 - 60 days into the future
- For ODI insurance a policy is either on risk in which case the same contract boundary as above applies or it is not currently active in which case there is no contract boundary
- The fact that all ODI policies will not be active means that the best estimate liability of the discounted projected cashflows should be lower for ODI policies
- The policy wording will have to include reference to the point at which the insurer would have a unilateral right to terminate the contract, reject premiums payable or amend the policy. Failing that, the contract boundary will always be the full term of the ODI policies
- Contract boundaries will have to be calculated at an individual policy level
- Will introduce more volatility between valuation dates
- An appropriate conclusion was also required

(v) *This part of the question required candidates to explain whether they believed that a similar volume of ODI insurance would require a lower IBNR reserve compared to traditional insurance. Most candidates did not generate enough valid factors and as a consequence scored poorly.*

- IBNR reporting should broadly follow the incidence of risk of the underlying policies
- The periods for which policies are at risk will now be known far more accurately
- Data will be collected at a more granular level
- Reserving will probably be performed on a more homogenous product level data permitting
- So, will incidence of risk be different for ODI policies and will reporting patterns be quicker than for the standard personal lines portfolio?
- Will policyholders be able to report their claims via an app or something similar? Will this be faster than the standard claims reporting platforms in your business
- SI amounts will be more accurate for ODI and hence IBNER claims development should be much lower
- ODI clients may be more aware of a potential claim which could speed up claims reporting
- ODI will probably be more affected by 'seasonality' than the standard portfolio. For example, we may see demand increase for insurance at certain times of the week - e.g. use of recreational assets over weekend or holiday periods. This should push the reserves for the period up. Conversely, at times of low demand, the reserves should decrease

- Your current personal lines business is made up of an equal mix of intermediated and direct business. These two business types will show different reporting patterns with the delays on intermediated business generally being longer than those on direct business
- The IBNR will therefore probably be less for ODI business than your current portfolio as reporting delays should on average be shorter. There will however be demand changes in reserves related to 'seasonal' variations that could either increase or decrease your reserves at a point in time

(vi) *Part vi required a simple calculation to determine a level of cost savings required as well as discussing other relevant areas of cost savings and business improvement. The vast majority of candidates did not attempt the calculation and failed to generate relevant costs saving and business improvement ideas. Answers were far too generic with little thought applied. Candidates scored poorly in this question.*

- Personal lines makes up 50% of portfolio and direct channel makes up about 50% of that. So, the cost saving relates to 25% of GWP
- The ODI insurance covers motor and assets all risks so let's assume this is about 70% of GWP. The saving will thus have to be borne by 17.5% of GWP (marks were also allocated for performing the calculation for the whole direct channel)
- Let us assume that the ODI product replaces the current personal lines products via new business and attrition at a rate of 33% per annum:

	Year 1	**Year 2**	**Year 3**	**Sum**
Percentage Premium	33.3%	66.7%	100.0%	
Percentage of GWP	17.5%	17.5%	17.5%	
GWP contribution	5.8%	11.7%	17.5%	35.0%
Cost of ODI	5%	1%	1%	7.0%
Savings per annum	**85.7%**	**8.6%**	**5.7%**	
Overall after 3 years				**20.0%**

- The above assumes no growth and a similar demand for ODI as for the current personal lines products. The quicker the appropriate product conversions are to ODI, the lower the overall percentage of GWP the costs will be

- The above shows that after 3 years of steady growth ODI needs to achieve 20% cost savings of their GWP in order for company to be back in a similar financial position

The following areas of cost savings will need to be considered to achieve this extent of cost saving:

Acquisition costs:

- If sales are done via an app can there be a saving of direct staff selling the product via a call center?
- Will marketing costs be more or less for the ODI product than your current direct products?

GWP:

- Will the ODI be more or less popular than the current direct products? The quicker GWP grows the smaller the cost becomes as a percentage of GWP

- Are there technology synergies that can be used with the current direct channel products - Homeowners and Householders? Can sales and claims take place on a similar / same platform? This will spread the cost over another 7.%, 7.5% of GWP and lead to an overall savings requirement of 14% all other things being equal
- Can the intermediated personal lines model benefit from the use of this technology? Sales or claims interfaces? Can this increase GWP and further spread cost?
- It will be difficult to increase premium per client else a standard personal lines rather than ODI product will be more appealing at an individual client level
- Can ODI entice clients to insure products that they otherwise would not - e.g. mountain bikes or cameras
- Can current direct personal lines clients be converted to the ODI product at either anniversary or via a sales campaign? This will reduce cost as a percentage of GWP

Claims Costs:

- Can claims be reported more accurately via the technology thereby requiring less claims staff to manage claims?
- Will the technology adequately protect the insurer against moral hazard and fraud? Or introduce more technology to combat this
- Can the pricing of ODI products result in a lower loss ratio or will ODI struggle to outperform normal direct products and hence result in a higher loss ratio?

Office Expenses:

- Will the technology lead to less manual intervention in systems and reporting? Are there savings in staff headcount?
- Is the CEO willing to reduce the headcount if the technology leads to redundancy? If not, the cost savings will not manifest

Other considerations:

- Some clients will not be interested in this use of technology and will prefer traditional direct insurance
- What is the age breakdown of your direct channel personal lines business and will they want to use this technology?
- Where are you currently marketing and will that attract the ODI type customer? If you need to change your marketing strategy, will this result in increased cost or a cost savings

(vii) *Candidates failed to realise that the majority of considerations of setting reserves and financial performance of paying claims in Bitcoin would be related to currency risk and volatility. The question was not well answered.*

The insurer follows a policy of matching assets and liabilities very closely.

- BitCoin is very volatile and the value is determined by the bitcoin exchange
- As soon as they become aware of a claim that is payable in Bitcoin they will have to purchase the equivalent amount in order to settle their liabilities
- Once they are in possession of the appropriate settlement amount they should be largely immunized against the price changes in Bitcoin unless they become aware of additional amounts that are payable under a claim. This will leave them exposed to further fluctuations in value

- If premiums are payable for these policies in Rands, there could be significant strain at a policy level if the benefit payout amount has suddenly been very adversely affected by an increase in BitCoin value. The converse to this may also be true
- A portion of the IBNR reserves will also need to be held in Bitcoin - specifically related to the portion of policies that elect to have their benefits paid out in BitCoin
- The reserves held at the end of a reserving period in Bitcoin will need to be reported in Rands. This will add significantly to balance sheet volatility at a reporting period
- Sudden surges in the cost of Bitcoin will therefore lead to a decrease in profitability and decreases in the value of Bitcoin will lead to increases in profitability
- Bitcoin also lends itself to fraud and could open the company to fraud and money laundering from both its staff and the market in general

(viii) The impact on profitability and capital requirements under Interim Measures and SAM of paying claims in BitCoin was again very generically answered with candidates not considering the specific drivers of capital caused by the currency and market risks.

- Profitability of the company will be linked to the value of Bitcoin benefits paid by the policy. If Bitcoin increases in value the insurer loses money and if bitcoin decreases in value the insurer makes more money. This adds an extra degree of volatility to the insurer
- Under Interim Measures the capital requirements will depend on whether any technical or current liabilities need to be matched in Bitcoin.
- If Bitcoin needs to be used to match these labilities there will be a market Risk Capital Charge factor of 38% which is the same as for equities
- If Bitcoin needs to match these liabilities they will also incur a substantial credit risk capital charge. As ODI will probably have a mean term of less than a year the charge will be 11.2% of the value of the asset
- These assets may also be inadmissible from a solvency perspective
- From a feasibility perspective under Interim measures it will therefore depend on whether any Bitcoin will need to be used to match technical or current liabilities as to whether the capital requirement of the insurer will increase. The overall solvency may then also be impacted by the inadmissibility of the asset
- Under SAM, these assets will be subject to substantial currency shocks
- Depending on the amount of Bitcoin held there could also be a concentration risk charge that is applicable
- They will be seen as unrated equity and receive a substantial equity shock of 49%
- Capital requirements will thus be higher under SAM by offering sum insureds and payment in Bitcoin
- The higher capital requirements would require greater profits to achieve the same ROE - this would need to be priced in
- These assets will be admissible for the SAM balance sheet as they can be valued on an exchange. Their value is however very volatile
- The higher capital requirement under SAM together with the probably higher capital requirement under Interim measures and the volatility of profitability means that this suggestion is probably not feasible

END OF REPORT