INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2011 examinations

Subject SA3 — General Insurance Specialist Applications

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

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Chairman of the Board of Examiners

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1 (i) *Financial Performance of Agency A*

The loss ratio statistics may have been prepared on a different basis.

It is not clear whether the figures are gross or net of reinsurance.

The figures might be discounted or undiscounted.

The other loss ratios (Agency B and Non-Agency Business) might not include IBNR.

Agency A may tend to include margins in its reported loss ratios (or other example).

If the loss ratios exclude IBNR, Agency A's higher loss ratio could simply reflect the fact that the business written is significantly shorter tail.

If this is the case, it would most likely be accompanied by lower capital requirements which would further affect the profit relativities.

The figures might be calculated incorrectly.

The 2010 loss ratios may not be reflective of the underlying, long term profitability of the business. Taking an average over several years, Agency A might be more profitable (or equivalently, other business less profitable).

For example, Agency A might have been impacted by a single exceptional loss during the year.
The rating cycle might also be at a lower point for the business written by Agency A than it is for business written by other agencies

Agency A might support the financial performance by providing business that is uncorrelated with the Syndicate's other activities.

Agency A's business could be more stable than Agency B's, which might be a catastrophe account.

The expense ratios may not be comparable.

A large proportion of the profits on Agency B might have to be paid out in profit commission.

Agency A might carry out more of the administration than Agency B, or require less oversight from Syndicate staff (or other valid example).

Agency A produces 40% of total syndicate premium income. Agency A may make a significant contribution to covering the syndicates fixed costs.

This $40m premium income may help support the Syndicate's market standing.

The greater volumes of business may also help with data volumes/expertise.

Based on the table the business written by Agency A appears to be profitable (albeit less profitable than the other business).

Total syndicate profits would be lower if Agency A had not been underwritten.

The business written by Agency A may have lower capital requirements than the other Syndicate business.

It may in any case serve to reduce capital requirements for other business (especially if relatively uncorrelated).

It is possible that Agency A might have generated the highest return on capital.

Even if Agency A generates a lower return on capital than other activities, it may still be considered a good use of capital if no superior opportunities are available.

The relationship with Agency A might be important to the syndicate's overall financial result.

For example, CHUM may be allowed to underwrite Agency B if it agrees to underwrite agency A (or other example).

Agency A may write longer tailed business on which greater investment income can be earned.

Agency A might have different investment strategy/experience.

Agency A might have growth plans that improve the financial forecasts of the Syndicate.

Agency A may boost the liquidity of the Syndicate.

Miscellaneous points that could explain differences: reinsurance programme, accommodation business, tax

(ii) *Main Features of Binding Authorities*

Binding authorities are contractual agreements setting out the scope of delegated authority, allowing cover holders to enter into contracts of insurance and to issue insurance documents on behalf of Lloyd's managing agents.

Underwriting agencies represent a very large source of London Market business.

The contract will specify the period for which insurance can be placed…
…the classes of business covered…
…and the policy wordings that are to be used.

Many agencies are paid a percentage of premiums as commission.

This causes a potential conflict of interest for the agency because it has an incentive to increase premiums without sufficient regard for the profitability of business.

Many of these agencies were formed by brokers.

In some cases, a company may establish a specialist agency to underwrite risks on behalf of an insurer.

Some agencies have been formed with specialist risk management functions in-house to write specialist business on behalf of an insurer.

Miscellaneous points: how they are authorised, whether the agency handles claims and to what extent, reporting of summarised premium and claims information.

(iii) *Agency C investigations*

Investigate Agency C's historical performance.

Investigate historical premium volumes.

Consider both the total premium written each year, and how business has varied from period to period.

It may not be worthwhile for CHUM to consider an underwriting agreement if the amount of business written is too small.

Alternatively, the amount of business written may exceed CHUM's available capacity.

High growth rates may show that the agency is a successful business, and so a good agent for CHUM.

However, operational risk issues may be of more concern for a high growth company than one with a stable portfolio.

Investigate historical claims costs.

Generic points about projecting to ultimate

These should be adjusted for any rating movements over the period

Consider the degree of variation in historical claims results

Consider the potential for worse financial performance than has been seen in the data historically

Large losses are likely to be a particular feature of this type of business as fire claims for large hotels could make up a significant proportion of the overall exposure

PML reports, frequency severity modelling, and discussions with agency staff could be useful here.

Nature of business / business mix

What classes of business do they/are they going to underwrite?

Consider whether the nature of the risk changed over time.

This could mean that the historical data is not an appropriate indicator of future claims experience.

Consider the location of insured risks.

This may indicate the potential for large losses due to accumulation of risk.

Consider the number of individual insureds covered by the agency

This will indicate whether premium income and claims experience is dependent on a few large accounts, or there is a good level of diversification of risk.

This would impact the volatility of claims and premium income.

Conduct some general market research to understand features of the business written e.g. by interviewing Agency C:

e.g. consideration should be given to local building standards for the territories covered as this may significantly impact potential risks
e.g. employment practice/court awards for injuries/sensible alternative point.

Agency C expenses, including any profit contingent commissions.

Ideally the expense structure should better align the interests of agency and underwriter, on both the downside and the upside.

Review Agency's C future plans

Could new business help defray syndicate overheads?

Agency C growth and strategy

Review Agency's C future plans.

Consider the point in the rating cycle for this type of business.

Areas of focus include forecast growth, profitability and portfolio composition.

It would be necessary to understand the assumptions underlying any forecast and how they have been derived.

Agency C's market share should be considered when analysing any growth forecast

As should the potential growth in overall market volumes (with Africa being an emerging market with significant growth potential).

Consider whether the agency plans to significantly change its business model.

Agency reputation

Consider the reputation of the agency in the insurance market.

For example, consider whether the agency is known to CHUM staff.

Consider whether the agency is involved in any legal disputes.

Company background – how long established, where are offices located, etc.

Reason for agency leaving current underwriter or being interested in the deal.

Consider the qualifications and experience of Agency C staff.

Consider whether the staff currently involved been responsible for historical results.

Qualitative factors will play a part in CHUM's overall assessment of Agency C.

Consider the reputation of the agency amongst hotels.

Underwriting results may be better if the agency has long established relationships and is a dominant player in the market.

A relatively new agency may need to offer competitive rates to establish client relationships.

Operational risks

Investigate the agency's risk management and assessment capabilities.

Where these are well developed, this would add comfort that the business is well run and that risks are properly considered

However if these are less well developed there is greater scope for enhancing underwriting quality, further improving any historical performance

Depending on scale and resources, there may also be value to be added by working with coverholders to improve safety features

Processes and procedures – consider whether the operating procedures of the agency are consistent with CHUM's own policies.

Examples of policies to consider include quality control, safe custody of the insurers money, issuing contracts on time, settlement of ex gratia claims.

Investigate how Agency C sets premiums.

Consider how CHUM will assess the adequacy of rates offered.

Consider claim settlement procedures.

Consider the claim authorities currently offered to Agency C, for example, what is C's authority to settle claims be, and what claims need to be referred to the underwriter.

Monitoring and reporting issues

Investigate whether Agency C is set up to provide sufficient information to meet Lloyd's reporting requirements.

Extra half mark for mentioning the PMD.

Consider whether the agency will be able to provide the information needed by the syndicate for monitoring and reporting and in good time.

The required information would include:

Claims data for various purposes, for example, to allow monitoring of loss settlement, provide reports to reinsurers, monitoring of profitability, year-end reserving.

Exposure data, for example, to assess aggregations and use in catastrophe modelling.

Does the syndicate have enough expertise to effectively monitor the underwriting agent? Extra staff may be required.

Overseas location could cause potential issues with effective monitoring, or at least add to the resource costs involved

How much management time will be required to oversee the business?

Syndicate strategy

Consider whether the business has a unique distribution model which allows it to access business not otherwise available to the syndicate.

Consider whether there are other forms of insurance not currently written by Agency C that could be sold to their existing client base (particularly insurance written by other agencies of CHUM).

Consider whether underwriting through Agency C is consistent with the Syndicate's business strategy.

Does CHUM want exposure to African hotels?

Does the business provide diversification from or aggregation issues with the Syndicates other activities?

What currency is the business written in and how does this fit with CHUM's business model?
Would writing the business be consistent with the syndicates risk appetite?

Does the syndicate have sufficient reinsurance?

Capital issues

Estimates of historical capital requirements, and therefore historical return on capital.

Historical variation in profitability should be considered in the context of the return on capital.

Does the syndicate have sufficient capital (regulatory and economic capital requirements would need to be considered)

If existing capital is insufficient, can capital be raised at an appropriate rate to finance this venture

Does the business meet syndicate targets for return on capital?

Opportunity cost of capital – is this the best use of syndicate resources?

Other issues

Regulatory/legal issues, for example, consider whether Lloyd's is authorised to write in all the countries that Agency C writes in.

Local regulatory risks – for example, could the claims environment change significantly due to developments in local legal systems.
Political risks

What are the premium payment terms and consequent credit risk?

Other valid points (½ mark per point, max of 1)

(iv) *Underestimation by Model*

All models are uncertain. The results rely on judgements which may not turn out to be correct.

In particular, little or no data will be available to guide the most extreme loss scenarios (1 in 1000).

Underestimation of the tail is very common
both in terms of severity and frequency.

Sensible comment about the numbers, such as there is surprisingly little difference between the modelled claims costs for a 1 in 40 year loss and a 1 in 200 year loss.
Historical data for Africa is also likely to be of significantly lower quality than the equivalent data for e.g. the US or Europe

The model may not simulate losses for all the perils that the portfolio is exposed to.

For example, the model may only cover certain natural catastrophes. Other natural catastrophes such as bush fire may not be included.

Even where perils are included in the model, assumptions might not be appropriate for the risks insured by Agency C.

Most modelling expertise is focussed on areas with greatest insured risks (rather than African hotels).

Mapping software is also of significantly greater granularity for developed world risks and the CAT model may not accurately reflect the specific risk profile.

This is a natural catastrophe model and does not cover manmade losses, for example a large fire could be expensive to cover.

CHUM should check that the results were produced using the latest versions of the catastrophe models.
Models are updated following cats to allow for new data, and this can change the model estimates.

Climate change effects may also be significantly altering the underlying CAT risks

Data issues – There may have been parts of the portfolio that could not be modelled due to missing data.

The portfolio may have changed significantly since it was modelled.

For example, new or lapsed policies, changes in limits, deductibles or terms and conditions.

Hotel risks can also demonstrate significant variations in underlying exposure in short timescales (e.g. following major refurbishment works)

Currency fluctuations may significantly alter the weighting of values between different countries and CAT zones.

Some problems identified with cat models include:

Unmodelled elements of a modelled loss, e.g. storm surge.

Unmodelled parts of modelled policy, for example, any business interruption offered to the hotel, marine policies for hotel pleasure craft.
Modelling errors.

Model may not adequately allowed for any frequency trends.

Model may not have allowed for severity issues such as demand surge following a catastrophe.

(v) *Alternative Estimate of Loss Potential*

Interview underwriters and other experts at agency C. Produce a loss scenario that reflects the judgement of the staff.

Contact the provider of the current proprietary CAT model to understand how their model works and what data it is based on.

Most importantly, identify whether there are specific loss types that are excluded from the model so that models for these risk types can be added to the existing model projections.

Identify whether there are alternative proprietary models that cover these additional risk types.

Discuss development of bespoke models for these additional risk types with experts – e.g. underwriters, geologists, meteorologists etc.

Review historical loss experience, for example, the worst loss that Agency C has ever had.
E.g. using Extreme Value Theory.

Consider whether this loss is exceptional, for example, the Agency C may no longer write risks like the one that produced the loss.

Alternatively, the historical experience may only provide a lower bound on possible future losses.

Review indicators of possible losses for significant insured risks.

For example, review any surveyors reports and consider PMLs and other indications of possible losses.

Use this data to perform scenario analysis.

Alternatively a simple simulation model could be produced.

It would be important to consider the location of hotels in the analysis. For example, if several hotels are part of the same complex they could all be impacted by a claim.

Repeat the analysis with other proprietary catastrophe models, and consider the range of results produced.
This comparison should adjust for any differences in loss types covered

Apply a top down approach.

Apply a bottom up approach.

Other third party sources of possible expertise include – reinsurer, Lloyds, brokers, other experts with relevant knowledge

This question was generally reasonably well answered by candidates. Most were able to think rationally about the numbers presented in part (i) and consider the wider context that might surround high level numbers of this kind. In part (ii) candidates broadly understood the key features of binding arrangements, although many appeared to think that the binding authority was the coverholder rather than the agreement itself.

Part (iii) was well answered by the standards of open ended questions of this manner, with many candidates displaying the ability to think on their feet and make sensible comments about potential issues with African business. Overall, this was still one of the lower scoring sections however, with many candidates simply not generating a sufficiently wide range of points particularly on strategic points and around wider operational issues with this kind of deal. For questions of this type, candidates may find it helpful to take a step back to consider both what companies are looking to accomplish with any business deal and how any deal might actually be practically implemented. This ability to think in a wider business context is something we aim to test in SA3, with a view to producing better rounded qualified actuaries who are capable of adding commercial as well as technical value to their employers.

Part (iv) was again relatively well answered given the open ended nature of the question, with most candidates identifying the general uncertainty issues with catastrophe modelling as well as some more specific challenges with African CAT modelling given lower data volumes. References to the numbers provided were rare however.

Part (v) was less well answered, with many candidates outlining investigations to clarify attritional losses rather than focusing their attention on large and catastrophe losses.

2 (i) (a) Scheme provider:

- Theft – stolen bikes will need to be replaced
- Damage – repair and/or replacement of damaged bikes
- CAT cover – e.g. damage following flood or storm
- Docking stations
  - Property damage
    Public Liability resulting in injury to third parties or damage to third party property caused by the docking stations
- Loss of or damage to keys – to cover the cost of replacing/repairing them
- Employers Liability - to cover the employees of the scheme provider
- Insurance against a delayed launch – to cover the expenses associated with the over-run (e.g. launch event, additional marketing), any claims from potential participants
- Compensation for loss of confidential information e.g. payment details

(b) Suppliers:

- Product Liability – in the event of third party damage or injury resulting from faulty bikes
- Functionality failure of bikes/docking stations/keys
- Fleet insurance cover for lorries transporting the bikes between locations
- Commercial property insurance
- Goods in transit cover
- Delay or failure of registration website
- or overcharging errors and related administrative and compensation costs.
- Employers Liability - to cover the employees of the suppliers
- Fraud insurance? If key system is hacked and bikes can be used for free could be a number of potential costs
- Delayed delivery of bikes/docking stations/keys

(c) Scheme participants:
- Theft – to cover the cost of any payment required towards the cost of replacement of the bike or key
- Damage – to cover the cost of any payment required towards the cost of repair/replacement of the bike or key
- Public liability/third party liability – to cover against third-party claims for injury to other persons or damage to other people's property following an accident caused by the participant

- Personal accident – covering the cyclist for a fixed amount in the event of death or disablement to themselves.
- Breakdown cover – may also incorporate cover for any delay in returning the bike back to the docking stations and compensation for any fees incurred
- Compensation for charges e.g. if unable to find a free docking station, if liable for faulty docking station etc.

(ii) In both cases the insurance cost will be determined by reference to the estimated number of participants and anticipated frequency/duration of usage.

To identify users and track their experience, good information systems are required and users need to be identified through online details (for registered users) or payment details (for casual users).

(a) Differential pricing – key considerations

Substantial data requirements covering exposure, claims and other costs, including:

- age/sex
- cycling experience/proficiency
- intended use: commute/pleasure/peak-time/route
- casual vs registered users
- seasonal use
- use of helmet
- holds UK drivers' license
- number of bikes on risk
- duration of each journey
- distance travelled

Claims history of the cyclist would be important.
NCD could be an incentive to register.

As this is a new scheme and new insurer, there will be no data
...beyond any data obtained from advance registrants or market research
Market data from other cities or countries will be used
This may not be directly comparable
Consultants may provide some assistance
It may be worth starting to collect data online while applying flat fee approach ready for differential pricing later.

Inadequate data may lead to deficient rates, resulting in:

- Underwriting losses
- Poor take-up, leading to unsustainable running costs
- Attracting undesirable risks, resulting in poor experience and costs
- Insufficient funds to meet running costs
- Scheme may need to be subsidised by other means

To offset data limitations, conservative assumptions or additional loadings could be applied.

But care needs to be taken to ensure that the charges are not so excessive as to impact take-up.

To analyse and collate the information, the scheme will need to have in place appropriate systems.
This will add to the administration and cost of the scheme.

Consideration will need to be given to casual users who effectively need to be underwritten at the docking station. Practicality of seeking information at point of access?

Refusal of significant number of potential casual users at point of access may lead to bad press.

(b) Flat-rate fee – additional considerations

Above data requirements are relevant plus the additional assessment of the appropriate mix of each factor in order to determine an appropriate average or flat rate.

Assumption of number of participants will be critical

Flat fee could sit alongside a schedule of post-claim penalties for damage to bike, for example

The cost can be split between the upfront access fee the hourly hire cost.

In both cases the insurance costs of the scheme provider will need to be factored in.

(iii) Differential

- More equitable
- Avoids subsidising of poorer risks
- Reduces the risk of anti-selection
- More responsive to underlying risks
- More complicated to administer

- Not viable for the casual users
- Data not immediately available

Flat rate

- Simple and cheaper to administer
- More straightforward and easier to market
- Risk of greater proportion of poorer risks
- Can be enhanced with explicit schedule of post-claim charges

(iv) A key aim would be to ensure that participants are responsible for a portion of the cost in the event of loss/damage to minimise moral hazard.

A fee could be charged before the key is issued, and for additional keys issued. In the event of loss or damage to the bike/key, this fee when combined with the net insurance proceeds would cover the cost of repairing or replacing the bike/key.

Casual users (i.e. those that are not registered on-line) could be required to provide card details before hiring bikes. The amount of the charges for loss/theft/damage must be available on the payment card, and deductible if the bike is not returned in good condition

Alternatively casual users could be asked to put a full deposit up, with scope to have this being more substantial than the flat fees charged for insurance.

In the event of a public liability claim, the insurance taken out by the regional authority would pay out, but participants could be required to pay the first part of any such claim, so minimising moral hazard risk.

Participants could be asked to sign terms and conditions requiring them to observe basic road and bike safety principles e.g. wearing a helmet, observing traffic regulations
. . . . and in the event that they didn't any personal accident element would be invalid.

The scheme provider could reserve the right to decline an individual request to hire due to previous claims/poor track record in maintaining the property

Opt in/opt out choice / sign a waiver.

(v) An insurer wholly owned by an industrial or commercial enterprise and set up with the primary purpose of insuring the parent or associated group companies

and retaining premiums and risk within the enterprise.

Reasons for establishing:

- To fill gaps in insurance cover that may not be available from the traditional insurance market.

- To allow the transport authority to better manage its total insurance spend.
- To enable the enterprise to buy cover directly from the reinsurance market.
- To focus effort on risk management.
- To gain tax and other legislative or regulatory advantages.
- Although tends not to be the primary reason anymore.
- In addition to accepting the risks of their parent companies, captives may also accept external risks on a commercial basis e.g. insuring the third party suppliers.
- Although regulatory benefits would not be possible in this case.

(vi) The captive would need to follow the local regulator's (e.g. the FSA's) authorisation process.

This could involve a process similar to the FSA's:

- Submitting a regulatory business plan outlining the business which the captive intends to underwrite.
- Scope of permission required, i.e. the regulated activities which the captive will carry on, the client types etc.
- The financial resources of the captive, including financial projections over at least a 3 year period, the type of assets to be held, and the amount of capital the captive believes is appropriate given the regulatory business plan proposed.
- List of personnel in terms of controlled functions.
- Compliance arrangements
- Estimate of FSA fees and other levies
- Other reasonable points e.g. demonstration that captive at arms length (half each to max of 1)

(vii) Quota Share

- May be desirable to spread risk for this new class of business
- In return for expertise from reinsurer
- Allows writing of more risks for the same capital
- can retain a smaller share of a larger number of risks
- useful if expecting the portfolio to grow significantly
- and hence increase the diversification within its portfolio, reducing the volatility of the overall result
- this would reduce the capital requirement of the captive/improve solvency ratio
- most useful for more predictable risks e.g. damage/theft
- administratively simple
- commission may help with cash flow

Surplus is only relevant for non-liability non-cycle hire risks

Excess of loss
- Caps exposure to larger risks
- Risk xl may be useful for specific larger risks e.g. related to launch date delivery or website failure
- Aggregate xl may be appropriate to cover a collection of bodily injury claims e.g. if thefts/accidents spiral to unprecedented levels
- Cat xl provides cover in the event of flood or windstorm

Stop Loss
- Will protect against loss ratio higher than expected
- But unlikely to be available at reasonable price

Financial reinsurance – may improve liquidity/cashflow and apparent solvency position.

There would be capital implications regarding credit risk with any reinsurance.

No reinsurance is an option – all profit is kept but will require more capital.

(viii) Figures shown indicate the business is loss making
However reserve figures seem inconsistent with LRs as UEP is 600 and claims reserve is 700.
We need more information on what these figures represent e.g. definition of "net".
COR of 115% (85% LR plus 30% Expense Ratio)
This compares with planned COR of 95% after 12 months and 90% after 2 years
The year-end position will reflect the development of premiums, expenses and claims
[assume limited impact of investment income]

Premium and uncertainties
- The major increase in take-up has resulted in significant increase in insurance premium income for the captive
- Nearly 70% of the full year premium income has been achieved in the first 6 months
- YE profit will be impacted by NEP for the year
- Earning of the premium will depend on the underlying mix of exposures (annual fee payers vs casual users for example)
- Assumption needed for any further growth in premium in the last quarter

    - discuss plans and forecasts with the regional authority
    - seasonality considerations; take-up may fall away as weather declines
    - any increases anticipated to scheme charges may directly or indirectly captive premium income
    - sensitive to any negative press, infrastructure developments

- Net premium subject to any changes in reinsurance e.g. increase in non-proportional coverage, if there are an increased number of larger risks presenting

Expenses and uncertainties

- Expense ratio is running at 30% compared to the year 1 plan of 25%
- This is despite the increase in premium volume
- May indicate
  - higher than expected set-up costs
  - or set up costs biasing the expense ratio for the first 6 months
  - re-negotiated commission rates
  - inexperienced claims staff
  - more complicated claims than expected
- May take some time for expenses to stabilise/reduce.

Claims and uncertainties

- Experience of first 6 months has been worse than planned: 85% COR cf 70%
- Claims experience is likely to be seasonal.
- Profile of participants may be different to expected:
  - Age
  - Gender
  - Cycling proficiency
  - Casual vs registered
- More BI claims than anticipated
- Road infrastructure unable to cope with influx of cyclists leading to greater hazard than anticipated
- May reflect larger claims in relation to website failure or launch failure, equipment failure (although would expect to receive recoveries from suppliers)
- Theft/accidents greater than anticipated
- Major cat event/weather event
- For YE projection, will need to anticipate the extent to which the poor claims experience is likely to continue or can be considered to be one-off
- Also need to assess the possibility of the claims already incurred deteriorating e.g. poor case estimation, adverse court settlements, adverse claims inflation
- Generic point about investments.
- Generic point about tax.

Performance on this question was mixed, although overall candidates tended to provide reasonable answers. Most candidates produced a reasonable range of points, although as with Q1(iii) candidates would benefit from taking a step back to really envision how the business would work; for example almost no candidates considered fleet insurance for the transport of bikes between stations (something that London candidates at least should have thought of).

Parts (ii) and (iii) were reasonably well answered, although many candidates offered relatively generic points with limited effort to tailor it to the question specifics. In part (iv) *many candidates spent time discussing forms of differential charging such as linking premiums to past experience, in spite of this being specifically excluded.*

Questions (v) and (vi) were standard bookwork and were answered well. In part (vii), a number of candidates went into detail on the nature of the reinsurance contracts written. As the question only required candidates to list options before detailing the specific benefits and implications in the situation posed, this additional detail gained no marks. Part (viii) was one of the lowest scoring parts, although this appeared to be more due to an abnormal number of candidates simply running out of time. Few candidates made any specific comments on the numbers provided either.

END OF EXAMINERS' REPORT