EXAMINATION

September 2008

Subject SA3RSA — General Insurance Specialist Applications

EXAMINERS' REPORT

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

Comments

The solutions contained in this document are more detailed than what would typically be required for a clear pass. Any relevant points made by candidates were given full marks, even if they are not contained in the solutions presented below.

Further comments are given in the solutions presented below.

Question 1

i)

Comments:
This question was poorly answered. Candidates did not explain exactly how to determine an earnings curve. Many candidates also explained how to determine the IBNR by using triangles. With a UPR you need an underwriting triangle – the rows should reflect the inception period of the policy, not the date of loss of the claims. The question states that all policies are renewable annually. It is therefore unnecessary to talk about monthly policies. Monthly business does not need UPR.

Answer:
a) Determine the <u>earnings curve</u> by <u>analyzing the development of claims since policy inception.</u>
    You will need the following:
    - inception date of the policy,
    - the incident date for each claim,
    - the incurred claim amount.
    - The number of policies in-force in each month. This is to take early cancellations into account

    <u>Option 1</u>
    Only mature data, meaning expired policies, must be used for the analysis.
    Claims data must be organized in terms of the lag between the inception month of the policy and the incident date of the claim.
    An exposure measure needs to be established e.g. the number of policies in-force in each month since inception. This is only necessary if policies can cancel mid-term.
    The claims data must be divided by the policy count data to obtain an average claim cost.
    This is necessary because policies cancel and the exposure do not stay constant.
    From the average claim cost per policy data the actuary will be able to determine the percentage of claims per policy that are incurred in each month from inception to policy expiration.
    This is referred to as an earnings curve.
    Multiply the percentage of claims earned in each period by the initial premium (excluding commission) to determine the UPR.

    <u>Option 2</u>
    All data are used.
    Data are organized in 2 triangles:
    - Claims data where row is inception month and column represent the lag between inception month and incident month.
    - Exposure triangle where the row represents the inception date of policy and the column the number of policies in-force for each cohort in month since inception.

Development factors (link ratios) must be determined for both triangles representing the ratio between columns, similar to chain ladder method.
The empty bottom right hand corner must be completed using development factors (link ratios). Two full rectangles have now been determined.
The claims rectangle is divided by policy rectangle to get an average cost per policy.
An average is calculated for column, representing the percentage of claims in each month since inception.
This is called the earnings curve.
Multiply the percentage of claims earned in each period by the initial premium (excluding commission) to determine the UPR.

If it is a new line of business and no claims information is available, information should be obtained with experts in this line of business re the expected earnings curve.

ii)

Comments:
In general the candidates did not do well on pure bookwork questions. Both sections a and b in this question come directly from the notes. Few candidates mentioned that expenses should be included when you determine whether an AURR is required.

Answer:
a) An additional Reserve for Unexpired Risks is a reserve held in excess of the unearned premium,
   to allow for any expectation that the unearned premium reserve will be insufficient to cover the
   - cost of claims
   - and expenses incurred during the period of unexpired risk.

b) An unexpired risk provision will only be allowed
   - if the insurer has incurred an underwriting loss and
   - in consultation with the auditor, the provision is deemed necessary.

c) Determine the ultimate expected losses for each cohort of business written.
   This can be done by organizing the data into a triangle and by using link ratios.
   Calculate the expected loss ratio for each cohort by dividing the ultimate expected loss by the premiums earned.
   If this loss ratio exceeds a break-even loss ratio then an AURR is required.
   Add the expected operating expenses to the ultimate expected losses.
   The size of the AURR is the difference between the
   - Sum of the ultimate expected loss and operating expenses minus the losses and expenses incurred to date
   - and the UPR.
   If the policy can cancel mid-term you need to take exposure into account by creating an exposure triangle and dividing the claims triangle by the exposure triangle.

iii)

Comments:
This question was poorly answered. Although most candidates could list the operational risks associated with the strategy, many candidates failed to notice from the balance sheet that the company will be insolvent if they take on the new book of business. The impression is that students in general struggle to interpret a balance sheet or income statement. There is also no accumulation risk between the 2 products. Motor mechanical breakdown covers the policyholder against mechanical failure, while motor comprehensive cover, cover perils such as accident, theft, hail, etc.
It was disappointing that many candidates ignored the income statement and balance sheet provided. The information is given for a specific reason.

Answer:
Capital:
The minimum solvency requirement is 15% of the greater of the net written premium for the 12 months immediately preceding the calculation date, or the 12 months of the previous financial year.
The solvency before acquiring the book is 19.3/90 = 21.4%. The solvency drops to 17.3/137.5 = 12.6%. The company is therefore technically insolvent.
The lack of capital will hinder the growth of the company.
There is an asset liability mismatch for the motor book. All the assets are in cash and the longer duration of passenger and third party liability claims will require a longer investment strategy.
Shareholders might be reluctant to inject further capital into the business.
Mitigating Actions
The company will have to add a contingency reserve equal to 10% of the net written premium of the new line of business.
The company will have to add a minimum amount of capital equal to R3.325 million to get to minimum solvency requirements.

Profitability:
The loss ratio before acquiring the motor book is 41.7 / 72.5 = 57.5%. The loss ratio deteriorates to 76.7 / 118 = 65%
The net underwriting result before tax drops from R8.3 million to R6.3 million.
The loss ratio of the motor book is a lot worse than the loss ratio of the mechanical breakdown product.
The expense ratio has increased form 25% to 26.3% but economies of scale might reduce the expense ratio over time.
The current reinsurance program might not give adequate cover for catastrophes and expose the company to possible large losses arising from a single event.
Company Small might not be able to purchase the reinsurance at the same rates as the current underwriter.
The investment strategy for Company Small will be different and the investment returns that support the underwriting results might be less than assumed in the current pricing.

Company Small might not be able to administer the book at the same expense ratio as the previous underwriter.

There is a risk that the outstanding claims and IBNR reserves are insufficient.

The return on capital will deteriorate because of the underwriting loss on the motor comprehensive business.

Mitigating Actions

Get in contact with reinsurers to

- discuss the appropriateness of the reinsurance programm
- and get initial rates from them to determine whether the reinsurance premiums will go up.

Increase the rates of the motor book immediately but this may lose business and increase the expense ratio because of fixed expenses.

Do a proper audit on the adequacy of reserves.

The company might get dispensation from the FSB to reduce the IBNR reserve below 7%

Operational Issues:

Company Small has no data to judge appropriateness of rates.

There are no experienced claims or underwriting staff to deal with a new line of business.

The policy and claims administration system might not be able to handle comprehensive motor policies and claims.

The policy contract might expose the insurer to unanticipated losses, e.g. additional perils, very low excesses or high liability limits.

Management lacks experience in this line of business.

Poor administration (because of lack of experienced staff) may harm the image of the company and impact on sales.

There might be high loss ratios because the policyholders do not want to insure with company Small.

Mitigating Actions

Need to employ staff with extensive previous experience in comprehensive motor insurance.

Update the administration system or acquire new system that can handle this type of business.

Company Small will need to set up agreements with salvage contractors, investigators, claims assessors, panel beaters, loss adjusters, etc

Compliance with policyholder protection rules and disclosure must be adhered to.

A quoting system has to be developed and updated monthly with new vehicle prices.

The company might get help from reinsurers with the pricing of the new product.

Establish relationships with the brokers that sell the product.

iv)

Comments:
The question was reasonably answered. They did recognize that it is a silly strategy to take on loss making business to save tax.

Answer:
This statement is false.
The South African Revenue Service allows previous losses incurred by the company to be set off against future profits.
This is only applicable if a company makes a total net operating loss. The principal does not apply by line of business.
Although the acquisition of the comprehensive motor book will reduce the net operating profit, Company Small is still making a profit and will have to pay the normal tax.
Different Approach:
This statement is false.
South African Insurers are taxed on profit. While profit may be a little lower I would hope that the company decides to take on business to increase profits and not to lower tax.

v)

Comments:
The question was reasonably answered. Some students mentioned issues such as dividend policies and investment strategy that relates to the company performance as a whole, and not the performance of this acquired book of business.

Answer:
Determine a monthly claims ratio / loss ratio. This is incurred claims / earned premium.
Count the number of exposures – this is vehicle-years
Determine a unit premium rate and a unit claims rate. This will show whether there has been any variation in the period in the unit claim rates that has been disguised by changes in unit premium rates.
Split the unit claim rate down into its component parts
- Number of claims per policy (frequency)
- Claim amount per policy (severity)
- Exposure per policy

The unit claim rate should also be repeated for different risk factors (e.g. age, gender) and specific perils.
Lapse rates and persistency should be calculated because loss ratios usually improve as a book of business matures.
Both direct and indirect expenses should be monitored to insure that the expense loading in the rates are sufficient.
Risk Profiles (number of policies per risk factor) must be calculated for both in-force and new business. This will help the insurer to detect anti-selection.
Growth in volumes (both number of policies and premium income) must be monitored.

Test the adequacy of both <u>IBNR and case reserves</u>.

All these ratios and trends should be monitored for <u>trends</u> as well as against <u>budgets or targeted values.</u>

Identify all claims exceeding a certain size to

- Remove them from the claims analysis and avoid distortion.
- Determine whether the book should be protected by an excess of loss reinsurance treaty.

<u>Conversion ratios</u> (number of policies incepted versus number of quotes) should be monitored by rating factor, e.g. gender, age group, sum-insured group, etc. <u>This will also identify anti-selection.</u>

Monitor

- claims inflation
- repudiations rates
- multiple claimants
- Details of claims recoveries
- Profitability by source
- Concentration of risks in certain geographical areas to determine cat purchase
- Staff turnover
- Quality of underwriting
- Effectiveness of the system.

Question 2:

i)

Comments:
Candidates are confused about the current requirements for liabilities and the proposed requirements under FCR. They also talked about the capital requirements while the question specifically referred to the technical reserves only.

Answer:
The technical reserves form part of the overall capital requirement.
Technical reserves include both premium and claims reserves
Reserves are to be calculated on a best estimate basis and the additional margins needed to ensure 75% sufficiency should be shown explicitly.
The reserves are calculated separately for each class of business.
The Prescribed model includes prescribed ways of determining both the liabilities and the additional margins.
Companies may apply their own personalized calculation methods, but require dispensation from the FSB.
The company will need to submit an FCR report annually, describing the salient features of the reserves and the key risks.
Although formal guidelines around the calculation of the capital and technical reserve components have not yet been published by the FSB, this will become applicable in the future.
GN50 (General Insurance Principles and Practice) is currently the most relevant guidance note and will need to be considered during the construction and application of the DFA.
GN12 (General Insurance Business: Actuarial Reports) will need to be borne in mind for the FCR report and any other formal documentation produced during the course of the process.

ii)

Comments:
Although most students had no problem listing four major sources of risk, most students did not address the possible limitations that a company faces in quantifying the risks. In general not enough attention was given to the quantification of these risks as well. If a question asks to discuss four or five issues, candidates should not follow a shot-gun approach and list as many as possible, but rather discuss four or five strategies in detail.

Answer:
Claims & Underwriting risk
- Claims severity variability.
- Claims frequency variability.
- Settlement delays.
- The existence of large or catastrophic claims.
- Concentration/accumulation of risk.

- Claims Inflation, both price as well as judicial inflation
- Claims fraud.

Quantification
- Claims should be modeled explicitly. Preferably separately by attritional, large and catastrophic sizes.
- Attritional & large claims model separately for each class. Catastrophic events could be generated on a global basis and the impact on each line be investigated.
- Stochastic models are preferred since they give more insight into the volatility of the claims.
- Consider correlation between classes.
- Investigate separate models for frequency & severity.
- Loss ratio distributions should reflect actual underwriting experience i.e. average levels of claims as well as variance of results.
- Build in allowance explicit for claims inflation, in order to investigate explicit scenarios.

Limitations
- Complexity of models and ability of software/systems to cope as well as time & cost involved.
- Data to populate and parameterize complex models.
- Assumption that past is indicative of the future.
- Uncertainty of results especially around the tails of the distributions.

Expenses & commission
- Salaries & staff costs
- Commission levels and associated regulations
- Claims handling expenses
- Expense inflation
- The allocation of overhead/fixed expenses and direct expenses to various sub-components of the business.
- Loadings for expenses

Quantification
- Model direct & indirect expenses separately.
- Identify drivers of expenses and build this into the modeling process.
- Functional costing analysis may help to define the relationships.
- Claims handling expense allowance may be incorporated in to claims modeling process or be done separately. If done separately, it should bear resemblance to the level of claims modeled.
- Overheads should be reflective of overall strategic vision of the firm.

Limitations
- Uncertainty:
  o Expense drivers are not always clear and identifiable.

- External factors may play a role e.g. Labour Unions may influence wages & hence staff & salary costs
- Attribution of overheads to business components and classes of business may be subjective.
- Commissions may be influenced by changes in regulations – this makes it hard to model/predict.
- Quality & quantity of data to parameterize models

Exposure
- Changes in membership may lead to changes in risk profiles
- Membership movements
- Penetration
- Retention/persistency
- Churn/cancellation
- Premium volumes

Quantification
- Modeled membership movements should reflect overall strategic goals/targets
- Modeling should be done separately by major risk factors (eg. Age, gender)
- Models should allow for levels of new business, cancellations, renewals, and movement between various exposure groups.
- Modeling should reflect the various "life stages" of policyholders.
- Models should be linked to actual rates tables being charge in order to ensure accuracy of results.

Limitations
- Ensuring consistency between modeled claims and exposure can be complex. Models will need to be linked to ensure consistency.
- Membership movements may be hard to predict due to the influence of various external influences e.g. inflation, competition, affordability of insurance, market culture and demand for insurance
- Accurate exposure/membership data may be hard to obtain if the business is sold through brokers.
- Effect of anti-selection may be hard to anticipate/model.

Reinsurance
- The credit risk of reinsurance counterparties.
- The availability of reinsurance (especially facultative cover).
- The price of reinsurance.
- The adequacy of protection offered by treaties.
- The terms available on treaties (specifically with respect to profit commissions)

Quantification
- Model should be able to accept the various actual reinsurance treaties that exist.

- Simulated gross claims should be fed through reinsurance structures to model simulated net claims and recoveries.
- "Reactionary" events such as profit commissions and reinstatements premiums should be built into model workings.
- Reinsurer creditworthiness could be incorporated through use of published credit ratings from agencies like Standard & Poors or Moody's.
- Parameters should be based on actual quotes from brokers & reinsurers.

Limitations
- Certain arrangements are hard to predict eg. Facultative cover
- Availability and cost of reinsurance is hard to predict and may depend on various external factors e.g. economic conditions, underwriting cycle etc.
- Complex reinsurance workings and multiple treaties may be complex to model.
- Lack of data around tails of claims distributions may make it difficult to assess high levels of cover such as catastrophe cover.

Reserving risk
- The adequacy of reserve estimates:
    o Under-reserving: cannot meet liabilities as they fall due
    o Over-reserving: inefficient lock-up of funds & overstatement of liabilities i.e. through inaccurate reporting
- Reserving risk include IBNRs, UPRs and outstanding claims reserves

Quantification
- Assess reserving adequacy by comparing reserves set up to actual run-off of claims i.e. through "reserving ratios".
- Statistical variability of reserving ratios should be incorporated stochastically into model.
- Claims reporting & run-off patterns should therefore be incorporated here.
- Analysis should be done separately for each class, due to different characteristics (e.g. long/short tails)

Limitations
- Detailed reserve development data may not be available to conduct the exercise.
- Low claims volumes on certain classes may reduce the credibility of the results.
- Short historical period of data on newer classes may mean that full run-off picture is not yet visible.
- Inflation may play a role on longer tailed classes.

Regulation
- Unexpected changes in regulation may have an impact on the insurer's business.
- Cost of compliance (both direct & indirect) may be prohibitive.
- May inhibit business operations and ability to innovate.
- May affect level of competition in the market.
- E.g. statutory reporting requirements

Quantification
- Known regulatory changes can be built-in in advance
- Uncertain regulatory influences should be investigated through stress and scenario testing.
- Cost of compliance can be estimated by adjusting fixed and/or variable expenses components of the model.

Limitations
- Extent of impact is not always clear until regulations are finalised.
- Changes are sometimes hard to predict or anticipate.
- Regulatory requirements may have "knock-on" effects on the insurers operations, which are hard to predict.
- Large measure of subjectivity e.g. impact on competition.

Investments
- Market risk from market conditions.
- Matching of liabilities by nature, term, currency remains important.
- Liquidity, marketability and security of investments.
- Types of investment allowed/approved
- Investment & Asset management.
- Level of return on investments.

Quantification
- DFA should contain a component which specifically models assets.
- DFA should allow for at least the major classes of investments: property, equity, bonds, cash & near-cash.
- Should include ability to model market levels, interest rates, yield curves, prices of financial instruments, indices.
- Could make use of established models & techniques e.g. Wilkie model, TSM etc.
- Model must be able to reflect expected fall in asset values and should be consistent with modelling done on liability side.
- Model should be regularly calibrated to market data

Limitations
- Asset models are often very complex to build & calibrate
- Difficult to allow for risk of different asset managers

Business & Operational risks
- Failure of third parties such as service providers
- Systems & ability to accept, manage and operate with the complexity of the underlying business.
- The insurance cycle. The hardening & softening of the market is certain, but it is not always possible to know one's position in the cycle.
- Competition: May affect business volumes, market rates & hence profitability.

- Staff & workforce: e.g. absenteeism, HIV, fraud etc…
- Political risk: changes in political regimes, unrest/instability, political restrictions.
- Legal/Judicial risks: e.g. legal precedents

Quantification
- Operational risks can be assessed through risk matrices. List risk on one axis and potential areas of impact on the other. Knowledgeable individuals then estimate extent of impact under various scenarios.
- Could fit stochastic models to data if sufficient data exists – unlikely.
- Workforce modelling, with allowance for various decrements due to absenteeism, HIV can be conducted.
- The insurance cycle can be explicitly built into the DFA – typically requires an autoregressive model.
- Scenario & stress testing would be important to assess political, legal, judicial etc. risks.

Limitations
- Models rely more on qualitative than quantitative input.
- No fixed or prescribed basis which to model/assess operation risks.
- Historical data is scarce.
- Risks and hence models are unique to each insurer.

iii)

Comments:
This question was reasonably well answered. All candidates understood the implications for exposure and claims, but not all students mentioned the impact that re-opened claims will have on IBNR calculations.

Answer:
Separate systems – might lead to inconsistencies in the data and problems reconciling with each other as well as with financials.
Compatibility issues between the two systems might hamper analysis.
Other implications:
- Costly to maintain two systems (staff costs, software, hardware etc.)
- More time consuming to manage two separate platforms
Endorsements:
- When endorsements are recorded, it overwrites the existing information. Serious problem, as data will only reflect most recent endorsement information. However, not a problem where no endorsements were made.
- One cannot determine the true exposure characteristics of policies over their lifetime. Claims experience will be attributed to incorrect demographic/risk groups and incorrect analysis (eg. Lapse rates, claims rates, exposure movements etc.) will follow.

- This could, in turn, lead to inappropriate follow-up action such as pricing changes, policy revisions etc.
- Incorrect policy data could lead to incorrect premium reserve calculations.

Claims:

- Re-opened claims will overwrite previous claims information.
- It will appear as one claim instead of a series of opened, closed and re-opened claims.
- This will distort run-off and settlement patterns derived from the data
- This could, in turn affect the claims reserves modeled and may lead to either over- or under-reserving.

If incorrect claims data and exposure data are combined, one might find cases where claims cannot be matched up to exposure records. This could lead to incorrect application of reinsurance treaties during the modeling process and may lead to incorrect reinsurance recoveries being modeled.

When data are overwritten, the ability to produce accurate audit-trails is reduced. This may make it very difficult to assess the integrity of results and could hamper statutory audits. In addition, it makes it very difficult to draw sensible conclusions from any experience investigations.

The two systems should be corrected so that new information is appended to existing information, rather than overwritten.
Ideally, we would want exposure and claims data on the same system, although it is not uncommon (due to practical constraints) to have them separate. At least the two separate systems should work off the same IT platform to ensure compatibility of the two data sets.
Where the desired data cannot be recreated or re-extracted, the actuary will need to make approximations and assumptions in order to carry out his/her experience investigation.
If key policy dates are lost (e.g. inception or expiry dates), the actuary will need to investigate and estimate the average lifetime of policies and apply this as an assumption to approximate these dates.
It may be possible to obtain historic data extracts used for previous experience investigations and piece together the lost information.
The actuary will still need to make assumptions such as

- Average endorsement dates
- Average risk factors and the historic changes/developments in these e.g.
  - Average age
  - Average value of insured items
  - Average premiums
- Average claims statistics e.g.
  - Average settlement delays

Average claims handling expenses (as proportion of claims paid)

iv)

Comments:
This question was answered well.

Answer:
The data shortcomings could seriously jeopardize the accuracy of the investigation.
Applicable guidance notes:
GN50:

- The actuary should consider and communicate the imperfections in the data
- The actuary should consider what allowance to make for imperfections and may need to modify advice, or modify the scope of advice to allow for these
- The actuary must exercise care that advice is based on data which are sufficiently up to date
- Key assumptions and methodologies should be appropriate for the purpose and should be disclosed
- Key assumptions should be justified, tested and compared with actual emerging experience
- The actuary should consider and communicate uncertainty around his/her advice and conclusions.
- The assumptions and documentations should be peer reviewed.

GN12:

- The actuary must disclose the sources of information and the responsibility taken for data completeness.
- Material data limitations and the effect of this should be highlighted.
- Adjustments to the data should be stated (nature, amount & rationale)
- Key assumptions and judgments should be stated and discussed
- The nature, degree and sources of uncertainty should be stated and quantified where practical to do so.

v)

Comments:
This question was answered well. Most candidates could mention 5 examples of financial engineering products. Candidates often did not get high marks because they did not give enough detail.

Answer:
Financial Engineering is also known as alternative risk transfer (ART) or Financial reinsurance.
Typically involves small degree of transfer of risk and often only enhances appearance of balance sheet.
Often aim to achieve regulatory arbitrage.
Look similar to typical insurance, but have tailored details such as:

- Sliding scale profit commissions
- Experience account balances

Contracts are often designed so that premiums are adjusted later on to compensate for experience early on.

Exchange uncertain cash flows for pre-determined payments, hence can smooth results over a number of years.

Financial Engineering is often used to:
- Access alternative sources of capital
- Restructure and manage risks
- Reduce capital requirements

Financial Engineering is often created in the form on bonds/derivatives rather than insurance contracts.

Examples include:
- Finite risk reinsurance
  - These contracts smooth earnings and so reduce the cost of capital
  - Has a small component of risk transfer
  - Has a component of risk finance
  - Transfer volatility for predictability
  - Cost of capital reduction could address his concerns
- Adverse development cover
  - Protects against the risk of adverse run-off of old business reserves
  - Reinsurer covers an ultimate claims settled amount above a certain limit
  - Caps the liability and protects the balance sheet
  - Could involve a small participation percentage by insurer
  - Addresses concerns to a limited extent
- Spread loss covers
  - The reinsurer will cover specific claims in return for upfront/regular premiums.
  - Premiums accumulate with interest in an experience account
  - The balance of the account is settled at the end of the contract term
  - Limited risk transfer
  - Could address his concerns
- Financial quota share
  - The contracts facilitate the exchange of cash flows to simulate a loan and deposit arrangements
  - This is done through significant commission agreements built into the contract
  - The contract can take the form of traditional QS or XOL agreement
  - Not likely to address his concerns
- Run-off solutions
  - Reserve development risk is transferred
  - A portfolio is transferred to a reinsurer in exchange for a premium or premiums. The reinsurer assumes all risks, premiums and reserves
  - Often sought during corporate restructuring, M&A, closing of lines, legal or regulatory changes
  - Addresses concerns to a limited extent
- Multi-line, multi-year, multi-trigger
  - Provide an alternative to traditional reinsurance

- These products allow the insurer to benefit from consolidating their risks in their portfolio
- Risk can be combined into insured "portfolios" and more efficient risk transfer achieved.
- Multi-trigger: only payout on n^{th} event – suite high risk appetites
- Addresses concerns to a limited extent
- Committed capital/contingent capital
  - Provide a way of managing capital requirements
  - A contractual commitment is made to provide capital to the insurer after a specific event.
  - Contractually allowed to sell equity at a specified minimum price
  - Could address his concerns
- Insurance linked securities
  - Often sold as Cat bonds.
  - Issue bonds in bond market. Bondholders forfeit capital & interest in the event of a specified cat event.
  - Increase insurance capacity
  - Could address his concerns
- Structured finance
  - Lower cost of finance by enhancing the creditworthiness of the borrower
  - Reinsurer provides a credit guarantee or credit insurance
  - Not likely to address his concerns

vi)

Comments:
The question on the reinsurance arrangements were answered well. A few candidates mentioned that a surplus treaty gives you the opportunity to decide which risks you cede to the reinsurer. This is not true. All policies exceeding a certain sum insured will be ceded. The attachment point can vary by class of risk if a table of limits is used. However, the ceding must still happen strictly according to the agreement between the insurer and reinsurer as specified in the wording.

Answer:
Motor:
- QS with large retention. Thus simply "following the fortunes" with no real transfer of risk.
- High level of retention doesn't really free up capacity
- Consider ceding a larger proportion in order to free up more capacity and reduce strain on capital.
- Alternatively consider more non-proportional reinsurance such as a working layer of XOL or surplus in order to obtain a more comprehensive protection again volatility and large claims.

Fire & property
- Only one layer with 3m of cover above 10m. Tail losses are likely to be quite volatile and so the protection offered by this single layer may not be sufficient or wide enough.
- Consider breaking down into multiple smaller layers in order to diversify cover over different reinsurers and reduce reinsurance credit risk.
- Heterogeneity of property risks means that the treaty might not provide appropriate cover for all the various types of risk.
- Consider introducing lower, working layers or the use of a surplus treaty to ensure that the retention per risk is more in line with the company risk profile.

Engineering:
- As for Motor, QS retention is high and does not provide much protection against volatility or free up capacity.
- CatXL is very high and will provide very little protection other than against the most extreme scenarios.
- CatXL is an inappropriate contract for this class given that:
    o There is liquidity strain – this treaty is only exacerbating this.
    o This is a new, fast growing class thus limited experience exists. Should probably retain a lot less and make use of reinsurer's assistance and expertise.

Given the heterogeneity of risk of this class, the claims experience might be volatile. Insurance should be structured so as to reduce this and thus protect liquidity and solvency.

vii)

Comments:
This was answered well.

Answer:
The DFA is an appropriate tool to investigate the effects of proposed reinsurance against the strategic desirables identified by management.

Monte-Carlo simulation would allow the distribution of net result to be investigated for a range of different reinsurance structures. Various percentiles can be generated from the simulations and will indication of the tail distributions of the results.

Management should specify their risk-appetite: e.g. the probability of technical insolvency over a y year period should not exceed x% at any point in time. The attachment points, retention levels and other treaty variables can then be tailored to meet this appetite.

A range of scenarios can be investigated and risk and reward measures be calculated e.g. rate of return versus probability of default. When plotted, this should form an efficient

frontier curve and an optimal point can be chosen such that the risk is minimized for a given level of return, or the return is maximized for a given level of risk.

The cost of reinsurance can be investigated and "feedback" allowance can be built in e.g. reinstatements can be programmed in the event of cover being exhausted.

The value-for-money proposition of catastrophe layer can be investigated. The expected recoveries can be assessed against the premium to investigate the reasonability of the rates.

The benefits of diversification gained by using different reinsurers and the reduction in the reinsurance credit risk can be modeled running simulations through the DFA where the likelihood of reinsurer default is parameterized by info from credit rating agencies such as Moody's or Standard & Poors.

The DFA will also allow the company to assess the capital implications of altering their reinsurance arrangements. Capital strain can be minimized by selecting an optimal reinsurance structure.

END OF EXAMINERS REPORT