

EXAMINERS' REPORT

June 2021 examinations

Subject F103 — *General Insurance* Fellowship Principles

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.

QUESTION 1

i. Relative advantages of A over B:

- Surplus will give Propsure much more flexibility in terms of the size/variability of the risks it retains.
 - This is of particular relevance for commercial property insurance where the sizes of the risks can be quite varied.
- X will provide a more secure reinsurance arrangement than Z.
 - This is because X is well-established.
- X would be able to provide more technical assistance to Propsure (e.g. data, pricing, etc.).
 - Z, being only recently-established, would not be able to provide this.
- X could also provide financial assistance.
 - This would not be available through reciprocity with a recently-established insurer.
- Brokers are likely to have more confidence in Propsure if it reinsures through X.
 - This could help build market share.
- With arrangement A, Propsure will not need to take on exposure to the risks accepted by Z.
 - These may be of lower quality (and profitability) than its own business.
- Arrangement A will not require Propsure to spend time (and thus money) to understand Z's business.
 - E.g. its underwriting, contract terms, financial security, etc.
- Arrangement A will not involve any disclosure of market knowledge to Z.
 - This is relevant as Z is a competitor.

ii. Relative advantages of B over A:

- QS is much simpler, and thus cheaper, than Surplus.
 - E.g. There is no need to record separately for each risk the amount to be ceded.
- The reciprocity will provide Propsure with improved diversification.
 - This comes from having a smaller share in a larger number of risks, as well as through geographic diversification.
 - This should help smooth results.
- The arrangement may lead to additional profits.
 - This would depend on the profitability of the business received from Z.
- It could result in a beneficial longer-term collaboration between the two insurers.
 - E.g. In terms of data sharing, marketing, underwriting procedures, etc.

iii. a. Proportion reinsured = $(100 - 75)/100 = 1/4$
Hence (a) = $1/4 \times R2m = R0.5m$

b. Sum Insured left after X = $0.75 \times R160m = R120m$
Hence (b) = $0.01 \times 80\% (R120m - R95m)$
= R0.2m

- c. As Propsure retains the minimum permitted, all 4 lines will be used.
Thus 80% is reinsured.
Hence (c) = $80\% \times R15m = R12m$
- d. Let S' be the sum insured left after X.
Then $0.01 \times 80\% (S' - R95m) = R0.4m$
 $S' = R40m / 0.8 + R95m = R145m$
Hence (d) = $5 \times R145m = R725m$

Parts (i) and (ii) were reasonably well answered by the better prepared candidates. Often, however, candidates did not give sufficient detail to score the full mark for each item. For example, it was not sufficient to say that Surplus allows the insurer to choose how much of each risk to retain. It was also necessary to say why this was relevant in this case, namely due to the type of business being written.

Part (iii) was also reasonably well answered by many candidates. Some, however, demonstrated a poor understanding.

Overall the better prepared candidates were able to distinguish themselves reasonably well from the less well prepared candidates on this question.

QUESTION 2

i. Key factors affecting data quality and quantity are:

- Size of the company
- Age of the company
- Existence of legacy systems
- Integrity of data systems
- Management and staff
- Nature of the organisation
- Method of sale
- Class of business

ii. Uncertainties relating to the insurer's commercial lines claims experience:

- The variability in the size of claims at any time and from one period to the next.
 - Since this type of business is new to the insurer, the insurer will not know what to expect with much confidence.
- The delays between the incidents, reporting and settlement of claims.
- The cover provided and whether this was as intended (i.e. the interpretation of policy wording).
 - This is especially true for a new product.

- The characteristics of the policyholders, including possible anti-selection.
 - This is a large risk for a new type of business since the rating structure is new and could still be open to anti-selection.
- The attitude of policyholders towards claiming may change over time, e.g. due to increasing consumer awareness and education.
- Crime rates can be difficult to predict and may vary with economic conditions, and are also influenced by varying social attitudes.
- Economic conditions are difficult to predict and directly impact claims from financial loss covers (e.g. trade cover) and may also have indirect effects e.g. lead to higher levels of fraud-related losses.
- Judicial decisions set precedence for claim levels and are difficult to predict – they cause claims outgo to experience occasional jumps.
- Legislation changes can lead to lower or higher claim levels (e.g. minimum quality and safety standards should reduce product liability claims).
- Accumulation of risk- some accumulations may be difficult to identify (e.g. from as yet unknown risks).
- Catastrophes and resulting damages are difficult to predict.
- Latent claims are by nature difficult to predict.
- Reinsurance risks include the risk of reinsurer default, which can be difficult to predict
- Economic and claims inflation is linked to economic conditions and the value of the local currency (for part imports) and this is difficult to predict.
- The insurer is exposed to variability in claims amounts and settlement delays due to claims having to be re-opened.
- The insurer may be exposed to uncertain movements in currency exchange rates if it has to settle claims in a foreign currency.

Overall this question was answered reasonably well by most candidates.

Generally candidates gave an appropriate amount of detail for the “outline” part of the question.

QUESTION 3

i. The steps involved are:

- Collect relevant data, including past exposure data and claims arising from the exposure.
- Adjust the data to make it more relevant e.g. if policy conditions have changed.
- Group data into risk groups (if there are significant differences between groups).
- Select the most appropriate rating model or estimation process for the specific case.
- Analyse the data (e.g. to pick up trends in the ratio of claims to exposure over time).
- Set assumptions required by the model or process.
- Test the assumptions for goodness of fit or likelihood probability.
- Run the model or process to arrive at an estimate of future claims costs.

- Perform sensitivity and scenario testing, or apply other methods, to check the validity of the estimate.

Statistical approaches that can be used to derive a risk premium:

- Simple burning cost.
 - Frequency-severity.
 - Multivariate models e.g. GLMs.
 - Original loss curves.
- ii. Pricing exercises involve using past claims experience related to past exposure to set future premium rates, we need to make sure that the past experience is indicative of what may happen in the future. In what way might the base values not be appropriate as the basis for setting new premium rates.

Standard business interruption insurance traditionally requires an underlying physical damage to or loss of property as a claim event. Most business interruption policies relate to this type of insurance and a pandemic would not cause physical damage to or loss of property and claims under this type of insurance have been rejected.

Some business interruption policies have an extension for infectious or contagious diseases, often referred to as the notifiable disease, within a stipulated radius of the policy holder's business in the policy wording.

Data would need to be collected to identify what exposures included the notifiable disease clause as well as which claims fall into the category.

In terms of adjustments for the data, one needs to consider if there have been any court rulings around business interruption clauses on existing policies. This may impact on the size and eligibility of claims and may set legal precedence for claims going forward. Additional considerations need to be made as to whether there will be a change in policy conditions, perils covered and self-retention limits on new business (especially any exclusions relating to the pandemic). This would need to be factored into the pricing.

If there are changes to policy conditions, one needs to consider the impact on future new business levels and whether there is potential for anti-selection.

One may need to separate out exposures based on whether there is a notifiable disease clause or not. Treatment of the two groups will be different.

After analysing the data, assumptions will need to be set and adjustments made for changes in:

- Economic variables;
- Claim patterns;
- Size and frequency of claims. and
- Length of pandemic and whether this is ongoing or once off.

Assumptions will also need to be tested. Calibration could be done on current levels depending on credibility of claim numbers and amounts. Alternatively, one could look to see if there is any industry or reinsurance support to help with modelling the pandemic and the impact on the business.

Sensitivity and scenario testing will need to be carried out to determine which variables impact the pricing the most and to ensure those assumptions are tested properly.

Questions will need to be asked whether past catastrophe loadings were correct or whether these need to be changed.

In part (i) candidates generally scored well. However, many candidates wasted time providing too much detail for an “outline briefly...and list” question (and scored no marks for the extra information not asked for in the question).

Part (ii) was very poorly answered overall. Generally candidates generated too few points to score well. The biggest mistake made by candidates was discussing factors for the office premium rather than the risk premium.

QUESTION 4

i. Fidelity guarantee insurance:

- It covers the insured against financial losses caused by dishonest actions of its employees (fraud or embezzlement).
- It will include loss of money or goods owned by the insured or for which the insured is responsible, and reasonable fees incurred in establishing the size of the loss (eg paid to auditors or accountants).

Legal expenses cover:

- This indemnifies the insured against legal expenses incurred as a result of:
 - Legal proceedings being initiated against the insured
 - The need for the insured to initiate legal proceedings.
- Legal expenses policies will normally cover the payments to legal representatives.

ii. Rationale:

- Fidelity guarantee may not cover all losses experienced by an employer (e.g. damage to reputation/brand), in which case legal expenses cover may be used to fund legal proceedings initiated by an employer against dishonest employees.
- The process of suspending/firing dishonest employees may be a long and costly legal process if labour laws favour employees, and legal expenses cover may assist to fund these employer costs.

- Employees fired/suspended may feel that they have been treated unfairly, and they may initiate legal proceedings against the employer.
- It should be more efficient (and less costly) to provide both covers under one policy, enabling the insurer to attract more business if competitors only offer stand-alone policies for these covers.

iii. Suitability of assets:

- The characteristics of the liabilities include:
 - Nature:
 - Fidelity guarantee benefits are mostly inflation-linked: the cost of goods stolen will increase in line with inflation until settlement, and money stolen would have earned an inflation-linked return.
 - Fees paid to auditors/accountants will be inflation-linked.
 - Legal expenses cover is also inflation-linked as legal fees increase over time.
 - Term:
 - Both fidelity guarantee and legal expenses covers could take months / years before final settlement.
 - Currency: Likely to be local currency.
 - However, losses for multinational companies may be in other currencies, and settlement may require foreign exchange payments.
 - International expertise may be required for very large and complex cases.
- Local cash:
 - Provides good liquidity for paying claims and expenses.
 - Returns are loosely linked to inflation, which may make them suitable for short dated liabilities, however fidelity guarantee claims and legal expenses may extend for years.
 - Cash returns are unlikely to be high enough to match fidelity guarantee and legal costs, and may even experience negative inflation-linked returns – lowest expected returns of all classes.
 - Cash weighting may be suitable but perhaps also too high.
- Local government bonds:
 - While these provide fixed returns (mismatch for nature of liabilities), they may be suitable if the likelihood of inflation being very different from that expected in the gross redemption yield at time of bond purchase is very small (e.g. over short terms).
 - For a developing country the likelihood may not be small.
 - The longer terms may result in higher returns than cash.
 - The term may be suitable but may be too long for the liabilities. █
 - Liquidity is likely to be good for payment of claims and expenses.
- Local corporate bonds:
 - As for above, fixed returns may be suitable, and corporate bonds provide higher expected returns than government bonds.
 - However, they are subject to higher expected defaults and only the liquidity premium should be expected to be earned if bonds are held to maturity.

- Liquidity is likely to be much less than for government bonds.
- The term might be a suitable match for the liabilities but it might be too long.
- All assets are in local currency, so the extent to which some payments may be required in foreign currency leads to some currency mismatch.
- Some index-linked bonds may provide a better match to the inflation-linked nature of the liabilities.
- The choice of assets will consider a number of other factors, and the given split may be reflecting some of these (in addition to liability matching) e.g. solvency.

iv. Changes to the investment strategy:

- The insurer may need to increase liquidity and reduce asset term.
 - The insurer may have relied on premium income to meet short-dated liabilities.
 - This may explain the term of the bond holdings being longer than might be justified by the liabilities.
- The need for greater liquidity will affect the current corporate bond holdings in particular as these might not be sufficiently liquid.
- Asset switches may be problematic:
 - They will entail trading costs and possible crystallisation of taxes.
 - Bonds may need to be sold at a loss / discount to par value.
 - If the insurer's solvency position is sufficiently strong, it may justify not making any changes to the investment strategy.

Overall this question was reasonably well answered.

Part (i) was bookwork, and was generally answered well.

In part (ii) most candidates gained some credit, but few were able to generate more than one or two points. Most candidates could not elaborate on the circumstances that might require legal expense cover in addition to fidelity guarantee.

Part (iii) was generally well answered, although few candidates generated enough points to do really well. Too many candidates produced lists of points without adequate explanation or justification, e.g. "fidelity guarantee liabilities are real" without further explanation is not adequate.

In part (iv) many candidates realised that in run-off there should be no premium income from new business which may create liquidity problems if the insurer was relying on these.

QUESTION 5

- i. Free capital is the excess of available capital over required capital, on either a regulatory or economic basis.

Available capital is the excess of the insurer's financial resources (assets) over the value of its liabilities (typically measured on a regulatory or economic balance sheet).

Required capital is the amount of capital an insurer needs, and this will depend on the purpose of the exercise.

ii. Reasons for holding more capital than specified by the regulator:

- Regulator: To reduce the risk that available capital falls below the regulatory required capital requirement, which would hamper the insurer's business activities. If the available capital falls below the regulatory required capital requirement, the regulator may step in and restrict the levels of new business sold (possibly forcing the insurer to close to new business entirely) and this is clearly in contrast to InsureX's strategy.
- Policyholders: To give a greater degree of security to the policyholders than implied by the relatively weak regulatory minimum capital requirement. This may aid in boosting consumer confidence, positively impacting on business volumes.
- Management: May believe that the minimum level of capital specified by the regulator is too low.
- Shareholders/Senior Management: To maintain a level of working capital for investment in business development and other opportunities. This is particularly important given InsureX's aggressive growth strategy. This could imply the need to:
 - Fund an aggressive investment strategy.
 - Fund an aggressive pricing strategy.
 - Fund the setup of an additional product/line of business/distribution channel.
 - Fund the takeover of a rival insurer
- Shareholders: To allow a buffer between the actual profitability of the business and the dividend stream paid to shareholders (smoothing dividend). Shareholders generally prefer less volatile returns.
- Shareholders: To reduce the risk of having to call on shareholders for further finance if losses are greater than expected.
- Rating agencies: To boost confidence in the financial strength of the insurer and hence maintain (or improve) its credit rating.
- (Potential) debt providers: To meet the requirements of debt providers whose interests may be subordinated to those of policyholders, or to illustrate to potential debt providers that their capital would be secure.
An insurer may also be able to benefit from cheaper financing terms as a result.
- Investment analysts: To improve its standing in the market in the eyes of investment analysts. This can potentially aid in obtaining additional capital if the company were to resort to the capital markets to raise additional funds.
- To manage liquidity risk or unexpected cashflow mismatches. That is, claim payments that cannot be met by investment and premium income.
- Reinsurance strategy: It may want to assume more risk (i.e. cede less) in future.
- It may be due to its risk appetite.

iii. Key factors include:

- The purpose of capital allocation e.g. to determine cost of capital by line of business for performance measurement, pricing, or business and strategy planning.
- Desirable properties of results e.g. stability over time, understandable.
- Practical considerations e.g. Shapley method may be impractical if there are too many classes (the number of scenarios needed is the factorial of the number of classes).
- There may not be a single method that is suitable for all purposes.
- The final allocation may be based on judgement, for example the results from several methods of allocation would be compared before deciding on the final allocation.
- Consider what was done previously.

iv. The way in which we allocate the free capital may depend on the purpose of the exercise or the particular circumstances a company finds itself in.

We may allocate the free capital between classes of business pro rata to its risk-based capital or certain components of it.

Where the free capital is for a specific purpose then it should be allocated to that purpose.

For example, if the free capital is specifically set aside to fund the aggressive growth strategy of InsureX, then the free capital should be allocated to this product line or area of business.

Consider what allocation methodology was used in the past.

This question was poorly answered by most candidates. This was particularly disappointing seeing that parts (i) and (ii) were bookwork.

Candidates generally gave too few points to do well.

QUESTION 6

i. Fraud risk is the risk associated with intentional misappropriation of funds, undertaken with the objective of personal benefit at the expense of the firm.

ii. Steps to reduce fraud:

- Making the policy wording as tight as possible and reviewing it regularly in light of market and judicial changes.
- Devising contracts which minimise risks, e.g. minimum and indexed sum insured for household contents policy.
- Working together with others such as the police to try and identify and punish the offenders.
- Random spot checks on claims, even smaller ones.

- Use statistical software based on fraudulent claims identified in the past and emerging trends to inform where to focus fraud investigations.
- Given the increase in repair costs, have repairs done by a small number of approved firms (rather than at the choice of the claimant).
- Requiring an affidavit from the local police station prior to the processing of any claim.
- Requiring medical certificates to be obtained in respect of certain types of claims such as whiplash, where the physical effects are difficult to see.
- The insurer can increase excesses to discourage policyholders from making small claims each year to recoup premiums.
- The insurer can introduce a no claims discount/bonus or cashback. This may discourage policyholders from making fraudulent claims to preserve their discount/cashback.
- Publicly advertise against fraud, highlighting that it is a crime and inform the public on what has happened to previous fraudsters.
- Share data with other insurers to identify multi claimants.
- Require a verbal statement to be provided by the claimant and invest in technology that can identify fraudulent claims by analysing vocal patterns.
- As this is a large general insurer, they could benefit from setting up a fraud specialist unit.
- Encourage the public to report insurance fraudsters by setting up anonymous phone lines etc to make reports.
- Educate claims staff on how to identify fraudulent claims.
- Require multiple approvals of claims above certain levels to reduce the risk of internal staff fraud.

In part (i) candidates struggled to define fraud risk, with very few extending the definition to encompass all stakeholders of an insurer and not just policyholders.

In part (ii) candidates who were able to generate a broad range of ideas to reduce the number of fraudulent claims from all sources (not just details regarding reducing the number of fraudulent claims from policyholders) generally performed well.

QUESTION 7

- i. a. Names are the members of Lloyd's who accept the liability for (and profits from) the risks underwritten in their name. Names can be individuals or corporate entities.
- b. A syndicate is a group of Lloyd's Names who collectively coinsure risks. Syndicates often specialise in particular types of insurance.
- c. The Lloyd's central fund is a contingency reserve built up from contributions by Lloyd's Names and held by Lloyd's as a layer of protection for policyholders.

ii. Advantages of taking out reinsurance through Lloyd's:

- Access to specialist expertise – Each Lloyd's syndicate typically specialises in particular types of insurance and writes business across many countries which Smartsure can gain access to.
- Reduced credit risk – Lloyd's central fund provides an extra layer of protection to customers and Lloyd's syndicates have a high credit rating.
- Access to reinsurance – Given that Smartsure writes niche Liability business, it may not easily find reinsurance in traditional reinsurance markets. Lloyd's syndicates may be willing to provide tailored specialist cover.

iii. Reasons as to why a corporate name may prefer to write business via a Lloyd's syndicate

- Cost – Setting up an insurance company can be costly and require significant approvals from local authorities. It may be easier to gain access to the insurance market through a Lloyd's syndicate.
- Expertise – Specialist lead underwriters underwrite the risks which can then be filled by syndicates. Lloyd's managing agents manage the affairs of a syndicate and provide technical and administration services.
- Client base – Existing client base that can be shared in without needing to write business from scratch.
- Diversification – Exposure across many countries and lines of business.
- Capital Requirements – Depending on the solvency regime of the local territory in which the Name is based, it may be more capital efficient to write business through a Lloyd's syndicate

iv. Reinsurance to Close

An agreement under the Lloyd's system of 3 year accounting. Underwriting members (the reinsured members) for one year of account (the closing year) of a syndicate agree with another party (the reinsuring party) that the reinsuring party will assume responsibility for the handling and paying all known and unknown liabilities of the reinsured members arising out of insurance business underwritten by the syndicate and allocated to the closing year.

The reinsuring party would usually be the subsequent open year of the same syndicate but could also be a later open year, an open year of another syndicate or a reinsurer outside Lloyd's.

The term is also sometimes referred to as the premium paid to the reinsuring party by the reinsured members for the above-mentioned transfer.

Disappointingly, candidates performed quite poorly with the bookwork parts of the question (part (i) and (iv)), with many scoring no marks.

Candidates generally performed better on the other two parts of the question.

QUESTION 8

- i. Chain ladder method:

A statistical method of estimating outstanding claims, whereby the weighted average of past claims development is projected into the future. The projection is based on the ratios of cumulative past claims, usually paid or incurred for successive years of development.

- ii. Estimated future direct claims settlement expenses (DCSE) assuming claims are not managed by Head Office (R mill):

Accident Year	Cumulative paid claims	Ultimate claims	Future paid claims	DCSE
2018	100	110	10	4
2019	72.5	90.915	18.415	7.366
2020	37.5	63.954	26.454	10.582
2021	25	64.807	39.807	15.923
Total	235	329.676	94.676	37.870

- iii. First, project the number of claims settled in each future calendar year:

Development year					
Accident Year	1	2	3	4	5
2018					220
2019				256	186
2020			425	340	247
2021		375	469	375	272

Then calculate the claims settlement cost using the information provided (Rm):

Development year						
Accident Year	1	2	3	4	5	DCSE
2018					1.1	1.1
2019				1.28	1.067	2.347
2020			2.125	1.955	1.559	5.639
2021		1.875*	2.695	2.372	1.806	8.748
* <i>Number of claims</i> × <i>adjusted settlement cost</i>					Total	17.834

- iv. The estimated savings on the 2019 to 2021 accident years is:

$$R37.870m - R17.834m = R20.036m$$

- v. Key considerations and how these could be addressed:

Recognise and adjust for the effect on the claims development patterns:

- A key assumption of the chain ladder method is that past claims development is a good guide to future claims development. The proposed permanent change in the claims handling process will invalidate this assumption.

- Given that claims settlement expenses are to be covered by the Head Office, reserves should only cover the pure claims cost (unless the Head Office requires the company to reimburse it for its claims settlement expenses). The impact on the speed of claims development will need to be recognised. This could be done by using actuarial judgement when selecting claims development factors or using a different set of claims development factors for claims arising before and after the implementation of the new claims settlement process.

Successful migration of claims data to the Head Office:

- There could be errors when migrating the data to the Head Office's systems. This could be due to a number of reasons, e.g. incomplete data, duplicates etc.
- A number of checks and reconciliations will need to be performed to ensure that your company's data is successfully migrated to the Head Office's claims management system. This will be time consuming and will need to be adequately planned for in order to meet financial reporting time lines.
- Claim definitions in your company could differ from the Head Office's definitions, e.g. the Head Office may ignore claims that are settled at no cost. It is important to ensure that definitions are consistently applied across the Group.
- Data could be stored in a different format on the Head Office's systems compared to how this is stored on your company's systems.

Other considerations:

- The run-off of the existing claims data will need to be carefully managed.
- You will need to consider how you will obtain claims data needed for claims reserving. Will you need to gain access to the Head Offices system's or will the Head Office provide you with the claims data?
- The direct claim settlement assumptions made by the Head Office will need to be compared against emerging experience.
- As your company will be relying on the Head Office for data to calculate the reserves, it is important that there are effective communication lines in place to ensure a smooth reserving process.
- Additional training may be required for staff in your company to ensure an adequate understanding of the new process.

Part (i) was bookwork, and candidates generally performed well. However, a large number of candidates did not mention that the chain ladder projects future claims experience based on ratios of past cumulative claims which is the essential feature of this method.

Part (ii) was a standard application of the basic chain ladder method in which candidates generally performed well. Some candidates, however, did not apply the tail factor given in the question, and some calculated the claims reserves and not the direct claims settlement expenses as asked for in the question.

Part (iii) was more challenging than part (ii) and required an understanding of the way data appears within claims triangles e.g., that the diagonals represent the same calendar year, and

an understanding of the average cost per claim reserving method. Candidates generally either scored very well or very poorly on this part.

Candidates generally knew how to approach part (iv), and performed reasonably well.

Part (v) was the most poorly answered part of the question. It required a practical understanding of the reserving processes and associated risks when implementing a new claims' handling system. It also required the candidate to understand how changes in data can affect the validity of the claims reserves, based on the chain ladder method, and how possible distortions can be overcome. Candidates ought to have a good understanding of the chain ladder method's strengths and weaknesses and how its shortfalls can be overcome, given its importance within the reserving toolkit.

END OF EXAMINERS' REPORT