REPORT OF THE BOARD OF EXAMINERS ON THE EXAMINATIONS HELD IN

April 2002

Subject 403 — UK Fellowship General Insurance

Paper Two

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The examiners are mindful that a number of interpretations may be drawn from the syllabus and Core Reading. 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.

The report does not attempt to offer a specimen solution for each question — that is, a solution that a well prepared candidate might have produced in the time allowed. For most questions substantially more detail is given than would normally be necessary to obtain a clear pass. There can also be valid alternatives which would gain equal marks.

K Forman
Chairman of the Board of Examiners

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1 *There were many possible approaches that a candidate could take in order to answer this question and many points that could have been made. The points below were the main points that the examiners were looking for but marks were also awarded for many additional points given which the examiners thought were relevant.*

The solution offered by many candidates consisted of a technical description of how to apply standard reserving techniques. This was often not sufficient to demonstrate to the examiners that the candidate had the appropriate application and higher skills required to pass this exam. The better candidates used all the information provided as a basis to structure their solution. Unfortunately even though the examiners had structured the question to guide the candidate into answering the question in a particular way many solutions were very disjointed and hard to follow. The examiners would like to repeat how important it is to use the reading time to think and plan answers and not to start writing immediately. It should be quite easy to make sufficient points in such a question in the time allowed that time is available for producing a concise well structured answer that demonstrates to the examiners that the candidate understands the subject.

One particular common error is that many candidates mentioned spreading large losses over a number of years which is not applicable in such a situation but would be for pricing.

Technical Gross Triangle Issues

- 6, 18, 30 triangle will project full year 2001 not half year 2001. Need to adjust standard methods to allow for this. Chain ladder methods could simply divide by two. BF methods require more complex approach.

- Need to adjust pattern from 12, 24, 36 triangle to be applicable to mid-year data. Could interpolate pattern but care needed as linear interpolation may be too simplistic — could use benchmarks if available.

    - Care needed if using the development factor to mid year (would expect to be less than usual — but not necessarily so).

    - Alternatively could do actual vs expected analysis.

- France — incurred triangles likely to be distorted. Paid triangles should be OK and should be given more weighting than usual in determining ultimate claims. May be possible to get some use out of incurred triangles by using a method that "fixes" the incurred triangle such as the Berquist Sherman method.

Normal Reserving Type Issues

- Company has failed to achieve critical mass so triangles likely to be small and erratic. Consider use of benchmarks.

- Could aggregate data to reduce volatility but care needed to ensure sufficient homogeneity. Adding GTPL in UK and Germany may not be sensible due to differing legal systems, claims handling philosophies etc.

- Claims handling costs if not already included.

- UPR to be taken into account for sale price.

Technical Premium Earning issues

- Premium information is given as written premium so need to earn this out to apply to accident year loss data.

- Need to split written premium into earned and unearned element to assess requirement for URR or because the UPR may be higher than the unearned amount of future losses.

- No information given so assume written evenly over the year (this is insurance not reinsurance). Care needed when estimating earned premium for the first six months of 2001. Correct formula is 3/8*2000 ultimate written premium + 1/8*2001 (full year) ultimate written premium. Projecting written premium may yield full year or partial year premium — care is needed.

Large Losses

- Care needed not to exclude too many large losses. If too many are excluded then need to consider large loss IBNR.

- Would seem sensible to exclude only those large losses whose size is on a par with the retention.

- The definition of large losses is not ideal, 100,000 in real terms would be better. What if a loss was above 100,000 but settled for less that 100,000? It would not be on the list. This would distort the non-large loss triangle as the basis for removing large losses is not consistent year on year. (For 2001 all large losses above 100,000 after 6 months are excluded. For 2000 all large losses that are above 100,000 after 18 months are excluded etc.)

- May have benchmark development data on some large losses. Unlikely though as this is a heavy commercial book. Large losses are more likely to be the smaller man made ones rather than the typically larger natural peril large losses.

- Taking out the large losses is more important to avoid distorting the remainder than for any additional loss estimate the actuary will be able to put on individual large losses.

Net Data

- Where full net data is available then can project as for gross losses but need to ensure the two sets of projections are consistent.

- We are not told about any potential vertical or horizontal exhaustion of the reinsurance protections. This is a key omission and the report will have to be caveated appropriately. Assume there is no exhaustion and press on.

- Where we have only the last net paid and net incurred diagonal we could use the gross development patterns to estimate net IBNR. This assumes that the reinsurance behaves similarly to proportional reinsurance. This is less likely to be the case the greater use is made of non-proportional reinsurance. We could also use the net/gross method described below. A comparison of the two different methods will yield useful information as to the reliability of either the methods. We could use benchmarks but these are not likely to be very reliable unless Company A's reinsurance programme is typical of the marketplace as a whole.

- Where we have only current net outstanding split by accident year we can approximate net IBNR by the following formula

    - Net IBNR = Gross IBNR * Net OS/Gross OS

- This also assumes the programmes behave in a proportional manner.
- Need to assess quality of reinsurers to see if a bad debt loading is required. Assume bad debts are not reflected in the net paid data and hence an explicit load is required (or other assumption that makes sense).

Data Quality Issues

- Would want conformation from the company and the auditors that the data was accurate.

- There is still a requirement to check the data for overall reasonableness and internal consistency. The two main ways of doing this are:

    - Ensuring the reserves tie in to the accounts.

    - Using multiple reserving approaches to highlight areas where they differ markedly. These indicate areas where either the assumptions behind one or more of the projection methods are not valid or the data is incorrect. In places where the data supplied allows only a limited number of approached to be taken it is much more difficult to spot even major errors. For instance if only current net OS data was supplied and it was materially wrong how could the actuary spot this?

2 *This question was generally answered well by most candidates. In the second part of the question there was sometimes too much detail on the rating factors to be used and no mention of the other components of the premium other than claims costs. In addition, some candidates described how they would adjust the data even though the question stated that any necessary adjustments had already been made. Describing such detailed adjustments therefore meant that less time was available for other points or structuring the answer in a way to demonstrate to the examiners that the candidate had the required skills to progress to become a qualified actuary.*

(i)

Threats

Rating:

Selection against
Increased competition from new entrants who may be more efficient, have more sophisticated rating methods or may be cheaper because they got it wrong, resulting in potentially reduced margins
Loss of market share and associated difficulties e.g. infrastructure
Potential increased costs associated with increased rating sophistication, data collection etc.
Many policyholders may face substantially increased premiums — may go elsewhere / Complaints

Need to consider very carefully the granularity of geographic rating — too high a level gives other companies the opportunity to cherry-pick and too detailed a level means scarcity of data to base rating on.

Distribution:

New entrants may be able to set up more cost effective distribution channels
e.g. direct, internet etc.

Opportunities

Rating:
Increased profitability from charging correct rate for each risk
Difficult for new entrants because market domination means Company A and Company B have all the data (if they have collected it)

Distribution:

New distribution opportunities — telephone, internet, employed sales staff

(ii)
Model the claims experience

Need to produce separate models for buildings and contents.
Need to investigate each peril separately.

There are three broad approaches available:
- model claim frequency and average claim amount separately, using a stochastic approach for each
- model claim frequency stochastically and apply the expected claim amounts which have been obtained deterministically
- model aggregate claim amounts deterministically

Additive / multiplicative modelling will be investigated.

Suitable probability distributions might be Poisson for frequency and lognormal or Pareto for claim amounts.

Parameters required by the distributions are estimated, and statistical methods are used to test their goodness of fit.
The stochastic models would be run a number of times to show the distribution of the modelled results. These will then form the basis of the risk premiums.
A generalised linear model can be used to investigate the potential rating factors.

When looking at possible rating factors, the current market factors should be considered together with other factors which it is felt could be used in practice in the market place.
The number of factors which can be investigated is very dependent on the amount and reliability of the base data.

Some factors which are important for buildings may be unimportant for contents, and vice versa.

Calculate the theoretical office premium

Make adjustments to allow for:
- expenses & commission,
- investment return (i.e. income and capital growth where relevant) allowing for how the business is sold and whether it is paid on an annual or a monthly premium),
- profit, and
- cost of reinsurance (this should cover the net cost of purchasing reinsurance).

This can be done by either:
- a fixed percentage to the risk premium rate, or
- a more detailed adjustment allowing for fixed and variable expenses which
- allow for the size and nature of the business.

The fixed expenses could be allowed for by margins in the premium calculations.

Initial expenses are generally incorporated into the overall level of expenses based on the assumed level of new business and its expected duration.
If discounts are given for certain groups of policyholders then you need to ensure that the policy expense loadings are still met.
This can be achieved either by increasing the fixed loading in the formula to allow for the average level of discount, or by charging a separate policy fee to cover fixed expenses with no discount applying to the fee.
Generally the policy fee approach is not taken in practice as it seems unacceptably high to policyholders compared with the cost of the risk.

Consider minimum premium — cost of some risks may be very small and you want to charge a little bit extra to at least cover a small contribution to fixed expenses.
This can be done by applying a minimum sum insured (also helps to prevent under-insurance by policyholders).
Consider whether there are any other rating factors which you want to be taken forward into the rates, but for which you don't currently have data on the factors.
If they are to provide a discount then an adjustment would be required to the base rate if the discount is to be funding neutral.

Allowance for any applicable sales tax, e.g. IPT.

Consider any loading to be applied if policyholders choose to pay by instalments.

Finally, having calculated a theoretical premium for each risk, a market competitiveness analysis should be done, and premiums are likely to need to be adjusted.

(iii)

Rating structure was inappropriate, Chance
Lack of claims data to produce reliable conclusions — may be analysing at a too detailed level.
May have allowed for some risks which occur less frequently than annually e.g. subsidence, storms, floods and there have been no adverse weather conditions — perhaps should consider a claims equalisation reserve
Change to risk during period
May have attracted policyholders more / less likely to claim e.g. older for buildings, younger for contents — older policyholders less likely to claim.
Have there been legislative changes which have affected the level of claims?

Claims inflation may have been different to expected
Theft risk may have been underestimated — what are economic conditions, security requirements
May have been selected against for contents if other companies have produced more accurate rating

(iv)

Keep the current rating structure for a longer period to see if the original assumptions prove to be correct.
Risks: Could be wrong rates and will lose more money
Selection against on contents
Buildings profit because rates are too high therefore amount of buildings business sold may be less than expected, resulting in over-staffing, expense overruns etc.

Change rates for all business to reflect the claims experience since the introduction of the new rates

Risks: Experience may not be as expected in the short term, but may prove correct in the longer term, especially if there have been no periods of adverse weather conditions

Risk of losing business on renewal if large increases are imposed.
Similar effects can occur for large reductions in premium, but the overall effect will be to lose much of the business which receives the largest rate increases.

Amalgamate all of the claims data, giving more weight to recent years and produce a new rating structure for all business based on this data.

Risks: May be a compromise rating structure which may not reflect changes in the risk profile in recent years.
Renewal risks as above

Change to a new rating structure for new business but for renewal business change to the new rating over a number of years to avoid one-off large changes.

Risks: Still likely to lose more business which has the largest increases imposed, although will be a more gradual process.
If rates for renewal business are significantly more than for new business in some cases, may be running a major PR risk.
May continue to underprice some business for a number of years.