EXAMINATION

September 2005

Subject SA3 — 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.

M Flaherty
Chairman of the Board of Examiners

29 November 2005

1 *The examiners were generally disappointed with the answers to this question. Although most candidates managed to answer part (i) reasonably well there were generally very poor solutions given regarding how to deal with large claims in parts (ii) and (iii). Part (v) was also badly answered with many candidates blindly using the Chain Ladder method without consideration of the data available. A few candidates could not even use the Chain Ladder correctly which is very basic methodology for GI reserving. Ignoring the data given in part (v) and inventing own data did not gain any marks.*

The use of abbreviations without definitions does not help the examiners in assessing if the candidate understands the issues being considered. Using non-standard abbreviations even if definitions are given is not welcomed. The increase usage of text speak is also most unwelcome as such speak would not be tolerated in the business environment.

(i) **Personal and commercial motor**

- Might expect a reasonable proportion of total claims cost to arise from large individual claims greater than £100,000
- Large individual claims are likely to arise due to bodily injury rather than due to property damage (unless very high value or large commercial vehicles)
- Likelihood of large claim usually higher for commercial owing to mileage driven, although will depend upon experience of driver
- Likelihood of large claim higher for young drivers which may generally have non-comp rather than comp insurance
- Likelihood of large claims is increasing owing to Court Awards and general litigiousness
- Catastrophes may arise from, say, a motorway pile up
- or weather events such as floods
- Potential accumulation of risk is greater for Commercial Motor
- …although these are likely to have less impact on overall claims costs than large individual claims

Household buildings and contents

- Most household contents claims are small…
- …as mostly property damage claims
- More household buildings claims are large…
- …e.g. total destruction due to fire, or total rebuild for subsidence
- But generally the proportion of large individual claims is smaller than for motor (or some other valid comment about relativity to other classes)
- Catastrophes are a significant feature for household insurance, being a key driver of profitability for a particular accident year
- These generally arise due to weather conditions…
- …such as flood, storm, freeze
- Subsidence claims are not generally particularly large (on average about £10,000)….

- …although they tend to aggregate regionally (due to type of soil)….
- …and their occurrence is strongly linked to weather conditions…
- …and therefore a bad year for subsidence may be considered a catastrophe year
- Possibility, although very unlikely to have a large PL claim

Commercial property

- Large individual commercial property claims are common
- As a proportion of total claims cost large individual claims are more significant for this class than for motor or household (or some other valid comment about relativity to other classes)
- Potential for very large claims depends on nature of portfolio (e.g. retail, industrial, small/medium/large assureds)
- Large claims can arise when there is significant property damage
- E.g. fire resulting in destruction of whole building
- But also from business interruption claims if this cover is included within the contract
- Catastrophes generally arise due to weather conditions
- Potential for accumulation of losses owing to proximity of risks

Employers liability

- Employers liability gives rise to bodily injury claims of various sizes, including some very large ones
- Large individual claims can arise where bodily injury is such that cost of medical care is very high e.g. back injuries
- or employee's salary is high…
- or employee is young…
- …and therefore loss of future earnings when unable to work is high
- The most serious asbestos-exposure claims (e.g. mesothelioma) can give rise to individual claims in excess of £100k
- The likelihood of some large claims (e.g. asbestos) will depend upon size of past exposure and trades covered
- Occasionally catastrophes can affect this class, although this is less of a feature than for household business (or some other valid comment about relativity to other classes)
- E.g. Piper Alpha oil rig disaster in 1988 did find its way into employers liability accounts / other suitable example
- Catastrophes will depend upon trades covered

Public liability

- Public liability gives rise to property damage and bodily injury claims of various sizes, including some very large ones
- Likelihood will depend upon business covered, e.g. major sporting event
- Claim size distribution is generally more skew for public liability than for employers liability

- Sometimes public liability includes product liability cover; this can lead to aggregation of claims (e.g. product recall)…
- …or large individual claims (e.g. pharmaceutical products)

Professional indemnity

- Claim sizes generally depends on professions covered within account
- Likelihood of a large claim depends upon policy terms and conditions and generally frequency is more variable than for other classes
- A professional negligence claim against a large firm of accountants may result in a very large claim if a company became insolvent as a result of negligent advice
- Market-wide issues such as pensions misselling claims on professional indemnity for IFA's, may be considered as catastrophe claims

(ii) **Outstanding Claims Reserves calculations**

- If left unadjusted in aggregate data, individual large claims might distort the projection of the OCR
- This is the case if individual large claims have a different claims development pattern than non-large claims….
- …and the mix of non-large and large claims varies from year to year (due to random large loss experience i.e. if frequency of large claims is low)
- ...then leaving large claims in the aggregate data could result in unstable chain ladder development factors
- and average development factors for each development year might be distorted by unusually high or low large loss experience in recent years
- and even when the averages are not distorted, applying an average chain ladder development factor might be inappropriate for those years of account with unusually high or low large loss experience.
- Catastrophes can cause a similar problem to individual large claims…
- …although the various individual claims arising from a catastrophe may develop at a similar speed to non-catastrophe claims…
- …they may bias the average date of occurrence
- …e.g. storm occurring at the end of an accident year for the household account might result in year being less mature than normal
- claims resulting from storm and flood catastrophes tend to be reported very quickly and therefore distort reporting pattern, whereas claims from subsidence catastrophe tend to be reported quite slowly – splitting of such claims leads to greater accuracy within modelling
- Catastrophes may lead to greater claims leakage owing to pressure of making payments this distorting the true payments pattern
- The inflationary effect on a large claim is likely to be different to that on smaller claims

Rating factor relativities

- If left unadjusted in aggregate data, individual large claims would unduly dominate the experience of the risk group.
- and might lead to inequitable pricing
- which in turn might lead to antiselection
- This is particularly relevant for rating cells/risk groups with lower volumes of data
- e.g. 80 year old drivers for private motor insurance
- where the presence of a large claim is more due to random occurrence rather than systematically bad experience
- Could create non-competitive premiums

Reinsurance calculations

- It might be necessary to assess current and future recoveries on excess of loss and catastrophe reinsurances
- And this may be easier to do by removing the elements of large claims that are recoverable and projecting them separately

(iii)

- There are various different ways that large losses can be extracted from the claims triangulations and…
- …there are different definitions for a large individual claim
- Different extraction approaches include:

1. Do not extract large claims from data

    + Simple and quick
    + Fairly robust if large claims experience has been fairly stable from year to year
    + Ensures reasonable allowance for unreported large claims
    – May result in over/underestimation of IBNR if large loss experience has not been stable
    – Does not recognise trends in large claim experience

2. Extract whole of each large claim and associated history if its incurred claim amount exceeds a certain threshold e.g. £100,000

    + Non-large claims triangulation is not distorted by part-history of large claims
    – Will need to restate history of non-large triangulation each year as non-large claims become large
    – So difficult to reconcile with last year's data
    – Difficult to allow for claims currently classified as non-large to become large

3. "Once large always large" => even if incurred claims for a loss falls back below threshold, still treat as "large"

    + Reduces need to amend history of non-large triangulation each year
    + Recognises the potential for large claims to become non-large and therefore avoids over-estimation of reserves for large losses
    – May distort any large claim average cost analysis

4. Only extract claim from the point that it become large i.e. history of claim before large remains in the aggregate data

    + No need to amend history of non-large triangulation each year
    – May be sharp reductions in claims in non-large triangle from one development year to next
    – Development factors that rely too heavily on such an instance would result in optimistic non-large IBNR estimate

5. Apply indexing to the large claim definition e.g. £100,000 for losses occurring in 2000, £105,000 for losses in 2001 etc.

    + Ensures that large loss definition maintains real value over time
    + If there were no indexation, there would be very few claims extracted from early years of account compared to later years and this would reliability of development analysis
    + Can make definition coincide with excess point for excess of loss reinsurance
    – Indexation introduces complexity
    – Inflation hard to measure

6. Only extract the part of each large individual claim that is in excess of the threshold

    + The non-large aggregate claims history does not then change over time
    + If threshold is in line with excess point for excess of loss reinsurance, then reinsurance IBNR can be identified more easily
    – Might be harder for systems to extract the excess over the threshold

(iv)

- Depending on exactly how the large claims have been extracted, there may be no explicit allowance for non-large claims to become large
- There is no allowance for unreported large claims…
- …and the large claims listing clearly shows that some large claims do not become so until 2 or 3 years after the accident date
- There is no allowance for development of existing large claims

- Although the case reserving may be stronger since the arrival of the new claims handler, there is still potential for case reserves to increase
- eg due to unforeseen deterioration in medical condition
- but there is also evidence of case reserve reduction in later years as some claims are settled favourably
- Chain ladder methodologies on the non-large claims may not be appropriate for the more recent years of account
- As development factors applied may be quite large
- And no use is made of exposure information such as premiums or vehicle years
- There is no indexation of large losses
- General comments about the disadvantages of the Standard Chain Ladder method

(v)

- Chain ladder methods less likely to be as reliable as claims handling practices, and hence shape of development curve, have changed
- Reasonable to take ultimates on 1998–2001 as current incurred…
- …as little evidence to suggest that there is development after year 4
- ….=> 5505 total ultimate for 1998–2001
- For the 2000 and 2001 accident years, calculate the % developed at development year 3 over current incurred: (935+2665)/(963+2740) = 97%
- Apply this to the 2002 total developed at year 3 to estimate unltimate incurred as 1204/0.97 = 1241

Pure IBNR

- Need to allow for pure IBNR i.e. large losses not on the list but which have occurred prior to 31 December 2004
- Use an average frequency average cost approach
- No details about premium volumes/size of account over time so assume stable
- Calculate current average claim numbers and average cost each accident year correct numbers below give
- From table, large losses appear to be notified within 3 years of start of accident year
- Therefore establish average number of claims in 1998–2002 years as fully developed in terms of number of claims
- = 3.6
- But allow for fact that large loss definition has not been inflation adjusted => round up to 4
- 2003 and 2004 notifications to date do not appear out of line with this total annual number of claims
- From table, large losses appear to be mostly developed within 4 years of start of accident year
- Therefore establish average cost of claims in each of 1998–2001 years as fairly fully developed in terms of cost of claims correct numbers below give

- Large claim definition has not been inflation-adjusted so need to allow for effect of inflation
- E.g. at 7% for motor (or something similar)
- correct numbers below give
- Gives average of 599 in 2004 terms
- Multiply by 4 claims to get est for 2003 and 2004
- correct numbers below give

Reserve calculation

- Total ultimates of 11538. Total paid of 3339. Reserve of £8,199,000

Acc Yr	*No.*	*Av Cost*	*Future no.*	*7% Inflation adj Avg Cost*	*Ult*	
1998	4	183.3		275.0	733	Current incurred
1999	2	534.5		749.7	1069	Current incurred
2000	5	192.6		252.5	963	Current incurred
2001	3	913.3		1118.9	2740	Current incurred
2002	4	301.0		344.6	1241	Incurred / 0.97
2003	2	165.0	1.6	176.6	2396	4×599
2004	1	400.0	2.6	400.0	2396	4×599
					11538	
Avg	3.6	455.9		599.0		
Sel	4			599		

2 *This question was also generally not well answered. The level od detail given by most candidates in the main part of their solutions fell well short of what was expected to gain sufficient marks to pass.*

(i) Quite possible that the data does not yet exist to do this accurately
Should examine the data available and identify gaps for further review
Impact split between change in value of treaty, and change in value of underlying
There is a requirement to allow for year on year changes in expense allocation
There is a requirement to allow for year on year changes in cost of capital
Change in value made up of price and T&C

For treaty itself T&C changes could include:

For non-proportional

Per claim limit
Feed from pricing model — or apply increased limit factors from external data
Per claim excess
Feed from pricing model — or apply increased limit factors from external data
Aggregate limit
Needs explicit pricing — stochastic model ideal — stress test if not priced stochastically
Aggregate deductible
Needs explicit pricing — stochastic model ideal — stress test if not priced stochastically
Per event limit
Approximate adjustment based on historical catastrophe experience
Types of claim covered
Market data — apply external benchmarks for new/discarded heads of claim
Territory covered
Market data — apply external benchmarks for new/old territories
Term of policy
Longer inflation adjustment
Inflation clauses (e.g. severe inflation clause)
Can adjust value compared to inflation assumptions actually made
Profit commission
Calculate explicitly based upon expected results + stress test
Brokerage
Calculate explicitly as discount/load to price
Risks attaching/Losses occurring nature
Calculate approximate change in earnings profile to assess change
Reinstatement terms
Calculate explicitly using pricing model assumptions

For Proportional

Profit commission
Calculate explicitly as discount/load to price
Over-ride commission
Calculate explicitly as discount/load to price
Brokerage
Calculate explicitly as discount/load to price
Classes covered
Market data — external benchmarks — review expected profitability of added/lost underlying business.

For the underlying business, changes could include

Underlying exposure volumes
Assuming price per exposure, apply multiplicative factor
Pricing of underlying direct business

Depends on how it feeds through — if treaty price is % of underlying then multiplicative, if fixed amount then no change. If combination of both then submission needs to be examined
Types of business underlying
Market data — apply external benchmarks to adjust for new/discarded business
Policy wordings / exclusions underlying
Approximate adjustment — qualitative view based on change in terms — if removing head of claim (e.g. asbestos exclusion) this may be possible to do more accurately
Territories
Market data — apply external benchmarks to adjust for new/old territories
Deductibles
Feed from pricing model — using increased limit factors to reflect change in risk
Exposure measure (e.g. payroll/turnover switch)
Approximate adjustment — qualitative view of change in underlying price

Other issues will include:
Look at price as rate per exposure rather than just premium amount
Consider expected changes in frequency and severity (claims inflation)
Allowance for year on year tax changes
Adjustment for investment income depending upon how the product is priced

Method

Group contracts into broadly homogeneous categories
Need to consider materiality — want usefully large groups, not every contract
Consistency with reserving groups — feedback from actuarial control cycle
For each contract need to quantify overall change in value to company
Use solutions suggested above, or other similar appropriate to calculate impact of T&C changes
Request that underwriters record their own estimate of changes at point of underwriting
Can calculate alternative index of these changes as a comparison
Importance of high level common sense checks
Consider changes in total 1st loss rate on line for non-proportional book, for instance
Check versus business plan for degree of consistency or otherwise
A full statistical model may not be practical given the monthly reporting requirement

Data

Details of all the above for own treaty from underwriting system
Ensure that underwriting system is capturing underlying changes from broker submissions in future
Market data may assist in calculating simple impacts
e.g. RAA data
e.g. Increased Limit Factor tables

e.g. Relative performance of direct business in different territories
e.g. Market pricing indices for direct business — brokers, ABI, Lloyd's etc

Assumptions

In the absence of information about the underlying business on individual treaties
then the market T&C changes are a good guide to average movements.
Changes in claim severity (inflation +)
Changes in claim frequency (possibly inflation driven on excess of loss)

Limitations

Indicative answers only because:

Data collection may be inadequate
Insurance business is volatile — price increase is no guarantee of profit increase
Assumptions may not hold, especially inflation
Heavily reliant on information provided by insureds
Indicies by line of business will not reflect client profitability (if there are cross subsidies)
Danger of spurious accuracy

(ii) Other types of underwriting/claims MI could include:

Premium written per month
Number of policies written per month
Deviations on income v expected by contract
Large claims advised
Large claim movements in the month
Any claim notified against large exposures
Top exposures written during month
Actual v expected claims development by class
Impact on reserving of monthly movements in claims
Concentration of risk exposure by territory/class etc
Total claims notified by class, territory etc.
External market information – updates
Quotation conversion rate
Business by source

(iii) **Advantages of RPP approach**

Keeps a client happy — strengthens relationship
Additional income for company (as policy not previously written)
Artificially inflates premium further — still book reinstatement premiums as well as additional premium
this is because a reinstatement premium protection recovery is a claim on a policy and not a premium refund — so there are equal increases in claims and premium produced

Profit (net of any additional attritional costs) remains the same with either approach

Disadvantages of RPP approach

Increases exposure to the same risks for the company which may lead to reinsurance exhaustion
May not be authorised — strictly not reinsurance — no direct insurance contract to protect
Second contract — cost of issuing lots of contracts where one would do
May not be covered under company's outwards reinsurance programme (as not reinsurance)
Reinsurance cost may actually increase
Company may not have the choice of share of RPP as the policies may be broked separately

(iv) RPP cover responds to the same losses as the original policy.
Cover also responds in same proportion — a half limit loss triggers a half reinstatement.
Structure of RPP contract mirrors original too — therefore risk cost should follow same proportions.
Limit of policy is £250,000 (¼ of original).
Theoretical risk premium would be 250000/1000000*250000*0.8=50000

END OF EXAMINERS' REPORT