

**Subject SA3 — General Insurance
Specialist Applications**

EXAMINERS' REPORT

April 2008

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 A Stocker
Chairman of the Board of Examiners

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Comments

Individual comments are shown after the solutions to each part question that follows.

- 1** (i) A claims made policy is one that covers all claims reported to an insurer within the policy period irrespective of when they occurred.

Comments on Question 1(i): *Bookwork question with most candidates scoring well.*

- (ii)
- + Limits exposure to latent claims –via recent retroactive date
 - + Quicker reporting of claims – to ensure that coverage is triggered
 - + Greater clarity on which insurance period is triggered by a claim
 - + Reduced chance of (expensive) legal action between insurers to assess who is on-risk for a claim
 - + Insurer can determine profit/losses more quickly – less uncertainty
 - + Potentially easier to reserve
 - Notification of greater number of claims/circumstances
 - Risk of moral hazard where an insured takes out a policy being aware that a claim has incurred in order to claim under the claims made policy if the insured has not been on claims made cover before
 - LOD is the norm so out of line with the competition
 - claims emerge from different periods of exposure

Comments on Question 1(ii): *Generally well answered by most candidates. Better candidates recognised that exposure to latent claims could be reduced via a retroactive date. Poorer candidates incorrectly stated that moving from a losses occurring basis to a claims made basis created gaps in cover.*

- (iii) Although all claims have to be reported within the exposure period of the policy, this does not mean that they will be paid within this period so uncertainty remains
- Most annual policies will still have exposure after end of year
- There may be policies for longer than one year
- or binders/lineslips meaning further claims possible after more than one year
- Claims could re-open
- May be options for extension of notification period
- Might expect more notifications to come late in the policy term
- IT delays may cause further delay
- There may be little information available on a claim / notification of circumstance when it is first reported, so it may be difficult to set up an appropriate reserve
- This could be especially true where companies “laundry list” claims attempting to ensure that all potential incidents which could lead to a claim (however unlikely) are reported to the insurer so that they would be covered under the claims made trigger
- The claims made trigger has been in place for some years, and there are increases in incurred claims in years 4 and 5 of development
- Public liability covers damage to 3rd party property and bodily injury claims. The latter can be subject to a high degree of uncertainty and may take a long time to settle

Comments on Question 1(iii): *Reasonable attempts were made by most candidates on this question. Better answers appreciated the potential for new claims on the most*

recent year even though the basis is "claims made", and used the data provided to demonstrate the need for IBNER.

(iv) *Range requirement*

Reserve report likely to be formal in GN12 terms

GN12 states that report should normally indicate the nature, degree and sources of uncertainty surrounding the results and sensitivities to key assumptions

Uncertainty should normally be quantified where practicable

but otherwise should normally be reported using an appropriate descriptive summary

This would suggest that it might be necessary to provide a quantitative range of reserves in order to be compliant with Institute guidance except where impractical when a description might suffice

Consider GN50 which states that uncertainty surrounding advice or opinions formed must be considered and communicated appropriately

The less likely the audience is to appreciate the importance or extent of uncertainty the greater is the need for this to be communicated

In this case the audience may be unlikely to appreciate extent of uncertainty without some quantitative calculation e.g. a range

Comments on Question 1(iv): *Most candidates mentioned GN12 and some of the advice therein. Few candidates demonstrated full knowledge of the relevant parts of GN12 and GN50. Better candidates identified the need to consider communication in the context of the audience of the report.*

- (v)
- + No need for any proprietary software or programming skills
 - + Very flexible to different situations
 - + Easy to involve other stakeholders e.g. underwriters
 - + particularly important for this line of business as limited data may be available due to change to claims made in 2002
 - Highly dependent on the experience of the actuary applying the judgement / not objective
 - + This could be an advantage where actuary has appropriate experience/skill
 - + Should be easier to explain to any audience than more technical methods
 - + Potentially allow for model error as well as parameter and process error
 - Difficult to avoid being “anchored” to estimates provided in different context
 - little data on extreme events so difficult to model catastrophes
 - difficult to model correlations
 - difficult to check / peer review

Comments on Question 1(v): *Many candidates scored well here. Better candidates went beyond general comments such as "easy to do" (which is far from clear!) and gave opinions as to which aspects might require specialised judgement and the associated difficulties.*

(vi) *Bootstrapping – characteristics:*

A method of estimating the parameter uncertainty surrounding an estimate of the reserves

To estimate process uncertainty need to use in conjunction with e.g. Mack or over-dispersed Poisson model

Estimation achieved by repeated re-sampling with replacement from the historic data to produce a large number of alternative pseudo-data sets consistent with the original data.

Each of these alternative data sets is projected using the chosen projection method to give an alternative reserve estimate for each re-sampled set of data
By repeating this process thousands of times we can generate standard deviations, confidence intervals

Can be applied to paid or incurred data, and accident year or underwriting year cohorts

Open to manipulation

Bootstrapping- pros/cons

+ Easy to apply for most datasets

+ customisable

- No allowance for tail factor

- Basic method very restrictive in terms of how development factors are selected

+ however method can be applied to subjectively derived development factors

Mack's Method – characteristics:

An analytical method based on the chain ladder for estimating the uncertainty inherent in the reserve estimate for a given accident or underwriting year

A standard chain ladder method is applied to the cumulative triangle to determine the incremental development factors.

Variability between the actual and expected development at each point in the triangle is calculated.

Then the variability across the rows is aggregated to produce a standard error for each accident/ underwriting year

Can extend to derive a standard error of the overall reserve estimate

However, if percentiles are required, in order to produce a range, a distribution needs to be assumed via a deterministic calculation or bootstrap approach

Based on chain ladder so assume underlying chain ladder assumptions appropriate

Can be applied to paid or incurred data, and accident year or underwriting year cohorts

Mack's method pros/cons

+ No assumption of prior distribution

+ A tail factor can be incorporated as a deterministic multiple

-Limited judgement possible

Both methods pros/cons

+ Require few assumptions

- + Easy to use – can be run in Excel or proprietary software may contain a version of the method
- + Increasing usage of methods in insurance industry
- Dependent on the quality of data used
- Output may reflect variability of data which is a feature of data errors/inconsistency rather than the underlying claim features
- Any variability not included in the data will not be reflected in the derived range
- This is a particular problem where limited data are available which is likely to be the case for this line of business
- Difficult to explain to non-technical audience
- + Objective
- + Can audit and peer review

Comments on Question 1(vi): *Generally poorly answered. Alternative acceptable answers were given equivalent marks for this question, e.g. giving a brief example of bootstrapping in place of an explanation. Many candidates gave a reasonable explanation of bootstrapping; fewer demonstrated knowledge of Mack. Most candidates scored poorly on identifying the advantages and disadvantages of each method. Better candidates identified that Mack's method could be used as part of a bootstrapping exercise. Not many candidates picked up on the marks available for non-technical observations such as the need for sufficient data, failure to reflect variability not in the data etc.*

(vii) *Inconsistent with range*

- Latest ultimate is not inconsistent with range
- Latest ultimate is greater than 90th percentile at year end
- One in ten years, might expect ultimate to be greater than 90th percentile
- Ultimate is below 95th percentile so still within this part of range
- Change in ultimate largely driven by huge (£27.5m) increase in incurred claims in 2005 policy year
- This might be caused by a single unexpected large claim, accumulation of claims, class actions
- Public liability is always exposed to such claims
- 2006 policy year has also seen worse than expected development
- Earlier years have not seen large increases
- so may not be indication of need for heavier tail factor

Impact on ICA

- Unlikely (in itself) to have significant impact on ICA
- Only one line out of several – other lines may have seen better than expected development
- ICA calibrated to 1 in 200 year event
- Increase may not be that significant in comparison to overall reserve size
- Diversification benefits from multiple lines
- Need to consider impact of reinsurance
- In particular if increase caused by single large claim with XOL reinsurance
- Many other elements than risk of reserve deterioration included in ICA:
- Operational risk
- Credit risk

Market risk
Liquidity risk
Group risk
Might impact ICA if change not because of volatility but e.g. legal ruling

Comments on Question 1(vii): *Many candidates failed to answer the question as they did not specify whether they agreed with the comments. Some also did not explain the significance of other influences on the ICA.*

(viii) *Observations*

Loss ratio is volatile over time
Varies from 36% to 260%
Loss ratio for 2006 should be treated with caution however as at an early stage of development
Last 2 years it is significantly above 100% suggesting unprofitable
Consideration of non-claim elements (expenses, investment income highly unlikely to compensate for loss ratio > 100%)
But potentially a large claim in 2005 distorts numbers
Trend in loss ratio appears to be upwards
Since this is associated with increasing premium volume this is a particular concern
Might be growing book by offering lower rates
Or trying to expand book in soft market
Or antiselection / competitor rating

"Claims made" features

Business written in early years might be from clients moving from loss occurrence to claims made
In this case early years might have low exposure to claims (due to slow emergence of claims so few claims reported which do not trigger prior insurance)
As account matures there is a full pool of earlier years generating claims so greater number of claims trigger claims made policy
If these features are not appropriately allowed for in the pricing, a worsening profitability trend might be observed

Further information

Need further information before any strong conclusions
Knowing the reinsurance structure for the class and the reinsurance spend/ recoveries in past is crucial
Net loss ratio could be much lower due to e.g. excess of loss protection
But if this is the case reinsurance premium likely to increase in future
Need benchmark profitability requirement e.g. X% ROE over market cycle
Must estimate the capital required for business
Taking account of diversification
Investment income estimated
 e.g. based on mean term from payment pattern
 and interest rate
Expenses investigation required
At least estimate of expense ratio

Ideally split of expenses into constituent parts
Fixed/variable etc.
Estimate claims handling costs
Commission level unknown (assuming premium is gross of commission)
Rate change information / rate adequacy on new business
Further information on large claims
Need discussion with underwriter of account
and claims handler of account
in particular to understand drivers of poor performance in 2005
Credit terms for premium
Tax rate
Monitor attachment/limit profile
Mix of business change e.g. territory, industry
Consider position in market cycle
More detailed exposure information (e.g. terms and conditions)
Split of business into new/renewal
Undertake full profit testing exercise
Benchmark against competitor loss ratios (if possible)
Any reasons for running a loss leader, e.g. need to offer product to secure
profitable business on other lines
Investigate any changes in legislation
Number of claims triangulation
this would assist in observing separate frequency / severity trends

Comments on Question 1(viii): *Candidates generally scored well on this question, with the better candidates considering the potential impact in performance of changing from claims occurring basis to claims made basis in 2002. Most candidates showed that although results appeared poor for the last two years, more information was needed to put this in context. Some candidates suggested that a reason for the good results in the first two years was because of having a choice of who to claim from, i.e from the current claims made insurance or previous losses occurring. This is highly unlikely as a retroactive date would be used to avoid overinsurance.*

- 2** (i) Some of the classes of insurance will have seen claims experience change in character over the last ten years because of the company's expansion. Others will have only been subject to moderate change.
If there have been no claims, it will be difficult to allow for changes in exposure

Commercial Fire

The number of sites has increased by over 50% over the past ten years, implying that the latest claims experience arising from exposure now may be very different to that of ten years ago.
There may have been a number of site sales and acquisitions over the period, adding further exposure changes and therefore impacts on claims experience.

There may have been changes in other risk factors.
Example of other change in risk factors, e.g. age of buildings different

As the business has expanded, productive use per unit floor space has most likely increased.

Need to consider the number and amount of gross losses per location over period

And sum insured

Review of sum insureds over 10 year period

Consider relevant rating factors

Key aspect in the past claims experience will be whether or not any large single fire losses have occurred during the past ten years.

Unless the company has been unlucky with large losses during period, the claims experience will most likely be very low and not take into consideration the additional premium to charge for expected large losses.

Do any market statistics exist on much greater size portfolios of similar exposure mix with more credible large loss experience?

Is the cost of small claims abnormally low?

If it is then justifies a lower premium rate

Are there particularly good safety procedures in place?

Does the type or age of construction of the buildings warrant a lower or higher premium than a traditional book rate?

Change in socio-economic factors

Business Interruption

A loss of this kind is only likely to occur after a major or total loss as the company may well now be potentially large enough to have business continuity plans in place.

Therefore premium may look high in relation to past claims

Furthermore, if a claim does occur now, it is likely to be much greater now than it would have been ten years ago because of far greater output.

Existing claims experience is unlikely to be adequate to be able to use in isolation for assessing a suitable premium rate.

Specialized machinery requiring a long lead time for replacement *could* increase potential risk.

Exposure measure turnover / profit

which could be volatile

Consider relevant rating factors

Employers Liability

If the exposure available was over a long period, with stability in numbers of employees and working conditions, the company's own experience may well be a good guide for small claims

E.g. payroll may be used as an exposure measure.

Analysis of clerical versus manual payroll

Consider relevant rating factors

However, regard must be made to the chances of unsuspected industrial disease claims such as deafness or vibration white finger.

10 years is insufficient to establish the potential for such latent claims

It may also be necessary to allow for the presence or absence of any abnormal claims or accidents to several employees at the same time.

Changing environment and technological progress may also have an impact on claims experience.

Awareness of health and safety issues might have improved claims experience

Greater productivity per employee may imply a higher real salary than ten years ago, as more responsibility is placed on individuals. This may result in much larger claims now than ten years ago.

Public Liability

Exposure measure turnover

Consider relevant rating factors

This is likely to cover mainly premises risks.

Also external factors such as environmental exposure

The number of premises has doubled over the past ten years and with floor space increasing and potentially a greater number of third parties visiting each premise, the experience now will be very different to that of ten years ago.

Changes in internal environment may impact on claims experience.

Claims experience may have been very light during the ten years particularly for large losses.

It will be important to analyse trends in claims experience compared with the number of premises or other exposure measures such as turnover.

Goods in Transit

Acceptable exposure measure e.g. sum assured

Consider rating factors e.g. distance travelled, frequency of travel, hub in travel, methods of transport...

Lots of new premises might mean more internal shipping rather than external shipping

Past experience should be a reasonable guide unless rating factors have changed significantly

Fleet

Vehicle year as exposure measure

Consider relevant rating factors

The experience over the past ten years should be a good guide as the workforce has been stable and therefore the number of vehicles should be broadly similar.

Key issue will be how the mileage per driver has changed over the past ten years.

Are vehicles travelling much greater distances now as a result of road improvements or has the company been using alternative forms of transport such as rail, shipping or air?

Has changed manufacturing processes impacted on the type of transport used?

Ideally consider losses broken down into vehicle type

Are larger vehicles being used now compared to ten years ago?

Different drivers to previous years

Need to consider losses split into physical damage and bodily injury due to different level of inflation

Large claims will need to be truncated at a certain level to remove abnormally large claims with suitable adjustment for a long term allowance for large loss derived from a number of year's data within the premium rate calculation.

General – consider for all products

Claim frequency
Average severity
Analysis by cause
Analysis by year
Trends on all the above

Comments on Question 2(i): *This question was poorly answered. Few candidates considered the context of the question. Many did not answer the question being asked, instead deciding that this was asking for an explanation of how to conduct a pricing review. Better candidates demonstrated an understanding that each class of business would exhibit differing experience in losses and exposure during a period of rapid expansion with a stable workforce.*

- (ii) A captive is an insurer wholly owned by an industrial or commercial enterprise and set up with the primary purpose of insuring the parent or associated group companies
... and retaining premiums and risk within the enterprise / form of self insurance
Some captives are set up with the primary purpose of selling insurance to the customers of the parent.
... or alternatively they may insure other non Group companies if they have the expertise

Comments on Question 2(ii): *Bookwork question. Better candidates identified that the captive could sell insurance to customers of Rapidco or other non-related companies.*

- (iii) **Advantages**
Rather than passing insurance profits onto external insurers, the company retains these.
This could therefore further improve the profitability of the group's accounts on a consolidated basis
Could also benefit from further profits by selling products to customers of the company e.g. warranty
Promotes greater awareness to senior management of managing risk within the company rather than passing to an insurer.
A captive may pass on good experience and risk management improvement savings through lower premiums quicker than an external insurer
Direct access to reinsurance markets and expertise.
Or obtaining cover that cannot be obtained by a direct insurer.
Assists in negotiating desired cover, terms and conditions with reinsurers
There may be tax advantages if located in certain domiciles, e.g. Bermuda, Channel Islands
Reserves/premiums are built up as pre-tax profits
Reduces insurer credit risk exposure
Could select against insurance market by increasing retention in captive when in hard market

Disadvantages

Ties up the group's capital so potential conflict of opportunity cost of captive versus alternative better returns in group activities

Increased volatility in group results dependent on reinsurance retention levels
i.e. lack of risk-transfer

Costly and complex to set up and subsequent running costs

May pull management time and resource away from main Group activities.

Location may be a factor here.

Might not have the economies of scale of an external insurer so may overall be more expensive even though not giving away profit margin

Accumulation of risk

Comments on Question 2(iii): *Bookwork question, generally well answered by most candidates.*

(iv) ***Capital requirements***

This will depend upon whether the subsidiary is to be restricted to the manufacturer's group business or not.

If it is restricted, the need for capital may be fairly low since this self-insurance arrangement is basically equivalent to internal group accounting.

Although the actual capital requirements will depend on the domicile of the captive

The statutory minimum requirement is required as long as the parent realises that it must subscribe more capital in order to maintain the minimum at least at every year end for the purposes of declaring financial accounts to the regulators and shareholders.

If the company is to be seen as an independent trading entity which is accepting business from elsewhere, then it needs enough capital to show the level of solvency margin expected of other insurers.

This will almost certainly be greater than the statutory minimum requirement.

Capital and solvency levels will be a critical factor in the captive's ability to attract business as a measure of its security to meet claims as they fall due.

The regulators of the country in which the captive will be set up may also demand a far greater level of security for independent policyholders

The parent will need to balance the capital employed against return achieved against the alternative use of capital within the manufacturing company.

Consider changes in future solvency regulation.

Generic capital points e.g.

volumes & growth

initial costs

adequacy of premium rates

use of reinsurance

expected volatility

adequacy of reserves

investment strategy

Reinsurance programme

The reinsurer will require full details of all the group insurances it will write in order that it can rate them.

Setting the level of retention will be important

a lower retention will attract increased claims supervision by reinsurers.

.... as they will want to ensure that adequate risk management procedures are in place to limit claims in size and volume.

The company may wish to purchase reinsurance initially to benefit from technical assistance

and to provide financial support.

The costs in providing reinsurance for this captive may be prohibitive if it is small in relation to other insurance companies who have greater purchasing power.

It might be very difficult to place proportional reinsurance since the company could write business at artificially low premiums in agreement with the holding company

.. with all subsidiaries being then required to pay supplementary premiums if necessary.

If the captive could persuade reinsurers that it was rating risks on standard market rates and underwriting correctly, it might obtain reasonable terms.

Its requirements would then be fairly standard, e.g.

- Surplus treaty for commercial fire and business interruption
- Excess of loss for motor, liability and goods in transit
- Quota share outward/inward with other insurers/captives may also be an option to reduce claims volatility and reduce accumulation of risk
- Catastrophe excess of loss to reduce exposure to concentration of risk in one area (all property and casualty covers)

Generic reinsurance points e.g.

Consider the group's overall risk appetite

Consider what reinsurance is available and the cost including possible profit-sharing arrangements

Consider alternatives to reinsurance available, e.g. more capital from parent.

Consider net impact on capital requirements

Consider security status of available reinsurers.

Fronting could be used by captive if convenient or cost-effective

Comments on Question 2(iv): *Although reasonably well answered, most candidates missed marks for identifying the differences in capital requirements between open and closed captives. A number of candidates discussed in detail the current UK regulations on capital and Solvency II when the question clearly states that the captive will be set up in a non EU country rendering these comments largely redundant. Few candidates discussed the pros and cons of setting the desired reinsurance retention limits. There was a tendency to concentrate on general capital and reinsurance points rather than considering the specific issues for the captive.*

Comments on Question 2: *This question was based on a question from an early 90's exam paper as was coincidentally an ActEd assignment. Very few candidates who may have done the assignment appear to have benefited from this.*

END OF EXAMINERS' REPORT