INSTITUTE AND FACULTY OF ACTUARIES

EXAMINERS' REPORT

April 2013 examinations

Subject ST8 – General Insurance: Pricing Specialist Technical

Introduction

The Examiners' Report is written by the Principal Examiner with the aim of helping candidates, both those who are sitting the examination for the first time and using past papers as a revision aid and also those who have previously failed the subject.

The Examiners are charged by Council with examining the published syllabus. The Examiners have access to the Core Reading, which is designed to interpret the syllabus, and will generally base questions around it but are not required to examine the content of Core Reading specifically or exclusively.

For numerical questions the Examiners' preferred approach to the solution is reproduced in this report; other valid approaches are given appropriate credit. For essay-style questions, particularly the open-ended questions in the later subjects, the report may contain more points than the Examiners will expect from a solution that scores full marks.

The report is written based on the legislative and regulatory context pertaining to the date that the examination was set. Candidates should take into account the possibility that circumstances may have changed if using these reports for revision.

D C Bowie
Chairman of the Board of Examiners

July 2013

General comments on Subject ST8

Subject ST8 deals with applications of general insurance pricing techniques across many different types of product. Candidates should expect the examiners to draw these applications from all parts of the syllabus in order to test as wide as possible a range of skills and, in particular, to achieve a fair balance between personal and commercial lines.

Examiners will sometimes require the use of standard general insurance actuarial and statistical techniques that are covered in earlier subjects. Candidates should ensure that they are familiar with these when preparing for the ST8 examination.

As well as pricing techniques, ST8 also covers the workings and use of reinsurance products, so candidates should also expect the examiners to set questions on these aspects.

In questions with an element of calculation, different numerical answers may be obtained from those shown in these solutions depending on whether figures obtained from tables or from calculators are used in the calculations. Candidates are not penalised for this. However, candidates may be penalised where excessive rounding has been used or where insufficient working is shown. Where questions require looking up values in tables, candidates are expected to interpolate between two values if reasonable to do so, even when this is not stated in the question.

Where examples are given in the solution to illustrate the points made, marks were awarded to candidates who gave these particular examples or an equally valid alternative.

Comments on the April 2013 paper

The level of difficulty of the paper and the general performance of candidates were similar to recent sittings. There was some evidence of time pressure amongst candidates around the pass-mark area. Of those candidates who failed narrowly, a significant number appeared to have spent too long on the questions that they attempted at the start of the examination, which meant that their later answers were rushed and failed to score well.

At least eight candidates displayed poor handwriting at this sitting, which made it difficult for the examiners to be sure that they had awarded full credit for the answers. Candidates who struggle with the legibility of their handwriting are asked to contact the Examinations Team well in advance of the sitting for advice on what support may be available.

Question 2 asked candidates to describe the process of determining the level of discount to give customers for renewing early. Most candidates struggled with this question, showing a lack of commercial awareness. Scores were generally very low as a result. Question 9 also produced generally low scores because candidates often had difficulties with the numerical content, and few gave enough valid assumptions.

The comments that follow the questions concentrate on areas where candidates could have improved their performance. Candidates approaching the subject for the first time are advised to concentrate their revision in these areas.

1

FV	1,000,000	
Layer 1 – $475k xs $25k		
	Amount	%
Lower	25,000	2.5%
Upper	500,000	50.0%
G(Layer 1)	84.0%–7.0%	77.0%
Layer 2 – $700k xs $50k		
	Amount	%
Lower	50,000	5.0%
Upper	750,000	75.0%
G(Layer 2)	97.0%–14.0%	83.0%
EL(Layer 1)		10,000.00
EL(Full Value)	10000/77%	12,987.01
EL(Layer 2)	12,987*83%	10,779.22

Full credit was given for combining parts of the above into fewer steps, provided that workings were clear and correct. Very few candidates had any problems with this question, except for a few numerical slips.

2

Overall approach

- To propose the theoretical level of discount, it should compare the expected profit streams of the business with and without the discount…
- … and then set the level of discount to achieve the profit hurdle.
- Several options and scenarios might be presented.
- As well as the theoretical model, the company should consider practical matters, such as:
    - how best to present the discount so that it appears sensible (e.g. applying rounding)
    - whether the discount will be appealing enough to the customer to justify the promotion

- consider whether a sliding scale, dependent upon how early they renew, would be appropriate
- whether there are any regulatory, legal or customer treatment issues with the terms or level of the discount
- in particular, whether the company can change the "normal" price from its current level at the same time as starting the offer
- documentation should be produced

Modelling the discount

- Segment by class of business, distribution channel, etc.
- Investigate the following factors to assess how much they are likely to be affected by the introduction of a discount…
- …and how much they would vary as a result of different levels of discount:
  - Probability of early renewal (or volume of renewals)
  - Profitability of policies that renew
  - Profitability could be influenced by:
    - Types of policy renewing (ie, change in mix and policy size)
    - Claims experience
    - Mid-term cancellation rate
    - Administrative expenses incurred at renewal
    - How to treat claims occurring between time of invite and policy anniversary, in cases where the date of invite is earlier than usual
    - impact upon new business - save money on marketing and commission?
- Quantify the cost of any additional system changes
- Allow for competitor reaction/levels of discount
- Decide on the pricing strategy for future years after the discount is given
- …because this will affect the customer lifetime value.
- E.g., will the discount persist or be removed?

- Ensure that the loadings for other items in the rates (e.g. cost of capital, reinsurance, investment income) are updated.

- The above elements are likely to be difficult to judge because the company has no previous experience

- …so it is important to assess the sensitivity of the modelled discount to the key assumptions.

- and may want to include additional prudence for uncertainty

- Some market research or consultation with experts may be helpful here.

Note that a stochastic model is not appropriate – this would be an over-elaborate approach for the circumstances, and it would be likely that there would be a lack of data.

This question was very poorly answered. Most gave generic answers on how to set up a profit testing model. Many candidates dived straight into data collection or constructing a GLM without setting out the structure of the exercise, and consequently failed to score well.

Attempting to use external data was a common theme in answers, but this showed a lack of understanding of the type of data that is likely to be available in a competitive market.

Many candidates suggested a pilot exercise, which is a perfectly valid method of model validation and evolution, but this was slightly outside the scope of the question.

It was disappointing that hardly any candidates considered the more practical aspects of introducing a discount.

3 (i) $E(S) = E(N)E(X)$
$\text{Var}(S) = E(N)\text{Var}(X) + \text{Var}(N)[E(X)]^2$
$E(N) = \mu$
$\text{Var}(N) = \mu$
$E(X) = \alpha/\lambda$
$\text{Var}(X) = \alpha/\lambda^2$

Therefore:

$E(S) = \alpha\mu/\lambda$
$\text{Var}(S) = \alpha\mu/\lambda^2 + \mu\alpha^2/\lambda^2 = \alpha\mu(1 + \alpha)/\lambda^2$

(ii) (a) Can be used as a check on the distributional (theoretical approach).

It can be used to estimate probabilities without making distributional (Normal/Gamma) approximations.

Can by simpler to apply than an analytical approach

Deals more easily with complex policy features, such as individual and aggregate deductibles and limits.

Can accommodate reinsurance recoveries more easily

(b) Simulate the number of claims n from the distribution describing the number of claims (e.g. Poisson)

Sample n times from the claim size distribution (e.g. Gamma) to obtain values for $X_1, \ldots X_n$

It may be necessary to apply individual limits and deductibles to the X_i

Sum the X_i

It may be necessary to apply aggregate limits and deductibles

Repeat the above a large number of times (e.g. over 100,000)

Part (i) – this was straightforward and caused few problems.

Part (ii) - most candidates misinterpreted (a) as a question about the advantages of a probabilistic model over a deterministic one, which rendered nearly all of their points invalid. For example, most candidates commented that the output of a simulation is a distribution of possible results, which is correct but did not score, because this is also the output of an analytical approach. For (b), the examiners were looking for a clear, precise, step-by-step description, which most candidates were able to provide. The most common problem was forgetting to apply deductibles and limits.

4 (a) Frequency/severity is likely to be more appropriate.

Even though there is no past data for the new policy, the frequency & severity distributions can be modelled from similar books.

Some adjustments would probably be needed to make the data suitable for the new book, but this should not be a major problem.

If substantial data is available, it will be more accurate to use frequency/severity models.

Reasons:

They reflect more accurately the underlying process of generating losses, each with an independent ultimate value.

It is easier to isolate the drivers of differences in aggregate losses.

They help to identify trends in loss experience over time.

If expenses are attributable to frequency or severity, they can be loaded into prices more accurately.

(b) Burning cost is likely to be most appropriate.

The aggregated nature of the data will probably make a frequency/severity approach inappropriately complex.

The book is quite specialist and large, so is likely to be heavily experience-rated, which makes it difficult to build a frequency/severity model from similar books.

(c) Frequency/severity likely to be more appropriate if there is sufficiently detailed data

The aggregate deductibles and complex structures in the treaty are very difficult to handle analytically…

…therefore a stochastic simulation approach should be used.

Risk-level deductibles and limits are easiest to handle if the severity distribution is modelled separately.

It may be necessary to model attritional and large losses separately, which is easier in a frequency/severity model.

An advantage of fitting/simulating a distribution is that it will produce some variance of results in order to trigger payment of the profit commission, which would not be possible with the burning cost approach.

Burning cost would be an alternative if there is insufficient historical data for frequency/severity…

… and provided that the past experience is stable enough to give a good indicator of the future

Candidates in general made a good attempt at this question; however, several candidates did not give a definitive choice, instead giving the pros and cons of each, thereby failing to pick up some of the available marks.

For part (a) many failed to express why the frequency/severity approach is useful. Candidates tended to say that frequency/severity was advisable due to the available data, but did not say why.

In (b), many candidates stated that frequency/severity was impossible, which is not strictly true. It would simply need more assumptions to be made that are not supported by the available data.

In (c), many candidates stated that frequency/severity with stochastic simulation was the best approach, but failed to justify each aspect properly. Very few gave a coherent consideration

of modelling the profit share. Candidates frequently spent time discussing poor data quality because it is a reinsurance contact, but failed to address the special features of the contract stated in the question.

5 (i) Initial estimate, or gut feel, of claim handler at time of notification
…then updated subsequently…
…either when a payment is made, or periodically, or when additional information is received

Standard, or default, estimate…

…set by reference to the type of claim

Algorithm, using statistical methods to estimate the value based upon certain risk and/or claim characteristics

As advised by the lead insurer, in the case of co-insurance…

…(This would not be common for a motor insurer)

Using estimates/invoices from repairers

Estimates from loss adjusters or specialist claim assessors

Bulk estimates for a group of claims, where claims handling is delegated to an external company and aggregated amounts are input to the system

Aggregating estimates across multiple heads of damage (e.g. own damage, third party property damage, third party injury, etc.) and entering this onto the system, perhaps where only one claim amount field is available

(ii) A further payment comes to light for costs incurred by the insurer in investigating and settling the claim

The insurer has made a recovery against a third party involved

Further development of the existing claim

An error was made in closing the claim originally, or was closed by an automatic process

The insurer may receive a further claim from a third party for which the insured was liable

There is a dispute or complaint from the policyholder.

The insurer enters into litigation concerning the claim.

A retrospective requirement to reopen claims, e.g. as a result of a legal or regulatory ruling

(iii) Cost of risk may be distorted, due to errors in the apparent claims experience and its trends

The proportion of nil claims could be misstated

It may be the case that certain claim types have larger discrepancies than others…
…e.g. bodily injury or other liability

This could lead to distortion of the true distribution of claim costs between risk groups…
…e.g. young drivers appearing lower risk than they actually are

This could lead to incorrect differentials between prices across risk groups

It might also affect marketing strategies if certain risk groups appeared to have different claims costs from actuals

If the insurer adopts a deficient set of rates as a result of faulty data, it might:
suffer underwriting losses if rates are too low
suffer loss of market share if rates are too high
attract undesirable risks, causing deterioration in underwriting experience, if rates for such risks are too low
impact reinsurance or capital loadings
trigger a rate review, when one is not required (or vice versa)
affect development patterns

Part (i) – Some candidates went into the detail of BF/Chain Ladder methods without just considering the basic approaches that are practically applied. It was very common for candidates to misunderstand the term case reserves and give an answer more appropriate to a bulk reserving exercise. Many candidates suggested asking the underwriter, but the question relates to personal lines motor insurance and this suggestion was not considered valid.

Part (ii) – This was well answered in general, but many just gave two or three points and, therefore, failed to pick up the full marks.

Part (iii) – Most candidates failed to discuss the issue of incorrect differentials across risk groups. Hardly any candidates mentioned that some types of claims could be more subject to distortion than others.

6 (i) Hurricane/windstorm/Cyclone/typhoon
Earthquake
Tsunami
Flood

Hail
Volcanic eruption
Terrorism (often excluded, depending upon territory)
Riot

Industrial accident
Fire/conflagration
Freeze

Subsidence
Lightning
Explosion
Tornado
Snow

(ii) The coverage is for an accumulation of losses, not for individual losses

The underwriter's portfolio will most likely have multiple properties that may be affected by the same catastrophe event

Even if the underwriter's portfolio is so diverse that the same event cannot affect more than one property, then there will still most likely be a clash with one of the other divisions.

Claims from the same event but different divisions will still be grouped together for reinsurance recoveries, so their portfolios should still make a contribution to the cost of reinsurance.

(iii) The exercise is effectively to price the outwards layer, and calculate the contribution from each of the 3 classes.

Starting point is using a catastrophe model for the company's exposures

The financial analysis module will allow us to model the cat layer. This will give the expected recoveries under the policy.

Summing all of the expected recoveries will give the expected recoveries for each division

Then allocate cost in proportion to the expected recoveries

A more sophisticated approach may involve looking at the volatility of recoveries e.g. looking at return periods

For instance a division that makes a volatile use of the layer would have a larger charge than a less volatile one even if it had the same expected recoveries.

In addition we could look at how the 3 classes correlate together in the outwards layer

If two classes correlate together more than the other they should have a higher reinsurance charge

May also want to consider uncertainties in the exposure data. May be greater for some divisions than for others

There are other simpler approaches which may not involve catastrophe modelling e.g.:

Pro rata costs by sum insured or by premium

Pro rata costs by total PML

Stress testing the portfolio on individual loss events

These could be used in particular for non-natural catastrophes, such as terrorism

Part (i) – This section was well attempted by almost all candidates.

Part (ii) – This was quite well attempted by most. However, many failed to consider that the accumulation could occur between the commercial division and the other divisions in the company. The better candidates spotted that accumulations could apply across divisions from the same event.

Part (iii) – This was quite poorly answered, with most candidates only getting a few basic points. The better candidates considered situations in which a simple allocation in proportion to expected recoveries might be appropriate – e.g. correlation between divisions, and volatility within each division.

7 (i) Under the Classical model,

$$Z_C = \begin{cases} (n / n_F)^{½} & 0 \le n < n_F \\ 1 & n \ge n_F \end{cases}$$

We can ignore the case $Z_C = 1$ because this would require $k = 0$.

The two definitions of credibility are equal when:

$$n / (n + k) = (n/n_F)^{½}$$

so:

$$k = n * (n/n_F)^{-½} - n$$

Multiply both terms on RHS by n_F / n_F:

$$k = n_F * (n/n_F) * (n/n_F)^{-½} - n_F * (n/n_F)$$

$$k = n_F * (n/n_F)^{½} - n_F * (n/n_F)^{½} * (n/n_F)^{½}$$

$$k = n_F (n/n_F)^{½}[1 - (n/n_F)^{½}]$$

(ii) Since $Z_C = Z_B = Z$

and $Z_C = (n/n_F)^{½}$

we can write $k = n_F.Z(1 - Z)$

Z must lie between 0 and 1 so the middle of the range is where $Z = 0.5$.

Substituting $Z = 0.5$ into the equation gives:

$K = n_F (0.5 * 0.5)$

So $n_F = 4k$

(iii) **Practical Issues:**

The statistic must be easily available,
and up to date

The statistic must be easy to compute
and therefore easier to explain to management and customers
and less likely to result in errors
and cheap to produce

Competitive Market Issues:

The statistic should help make the overall rate:

As unbiased as possible
(not too high or too low over a large number of loss cost estimates)

As accurate as possible
(with as low an error variance as possible around the future losses being estimated)

Regulatory Issues:

- The statistic should have a logical relationship to the loss costs of the class or individual being rated
  in order to help mitigate regulatory concerns and/or to make it easier to explain a high rate in light of the related costs.

Statistical Issues:

- The statistic should be statistically independent from the base statistic so that the resulting rate is more accurate.

Part (i) – This was, in general, well answered by most. Very few candidates considered the case Z=1.

Part (ii) – Many candidates did not attempt this part, and those who did often failed to give clear reasoning for their answer.

Part (iii) – With it being a bookwork-type question, some candidates did very well on this section. However, many went down the wrong path and failed to give the detail required.

8 (i) Liability insurance provides indemnity where the insured, owing to some form of tort (private or civil wrong, such as negligence), is legally liable to pay compensation to a third party.

Cover can be on a claims-made or losses-occurring basis (or equivalently, a limit on the time period during which a claim may be accepted).

Any legal expenses relating to such liability are usually also covered.

There may be exclusions to cover for certain causes (e.g. an illegal act of negligence).

The extent of any legal liability may depend on the prevailing legislation.

There may be a limit to the amount of cover available.

And will usually involve an excess.

(ii) **Employers' liability**
The construction process is likely to involve hazardous materials or working conditions.
EL cover indemnifies the company against legal liability to compensate an employee or his or her estate
for bodily injury, disease or death
and loss of, or damage to, employees' property
owing to negligence of the employer, or fellow employees, in the course of employment.
In many countries it is also a legal requirement.

Directors' and officers' liability
The company is likely to purchase D&O insurance on behalf of its Directors to indemnify them against legal liability to compensate third parties owing to any wrongful act
e.g. allowing false financial statements to be published
allowing the company to continue operating when it should have been declared insolvent
any act resulting in the insured being declared unfit for his or her role.

Motor third-party liability
The company will own various motor vehicles, e.g. for transporting materials
MTPL covers the driver's legal liability to pay compensation to a third party for personal injury
or damage to their property
In many countries the cover is compulsory.
Marine or aviation liability cover might also be required for a large company if it owns these types of vessel.

Public liability
The company will want to be indemnified against legal liability to pay compensation to a third party
such as visitors to the site and owners of neighbouring properties
other than those liabilities covered by other liability insurance.
May be a compulsory cover in some territories

Environmental liability
The company should indemnify itself against the legal liability to compensate third parties
as a result of unintentional pollution for which they are deemed responsible.
This would also cover the costs of cleaning up the pollution
and may also cover any regulatory fines.

Professional indemnity
The company may employ surveyors and architects and will want to indemnify itself against legal liability for losses resulting from incorrect advice, an error in plans (or other suitable example).
It may also want to buy insurance against faulty or unsatisfactory workmanship in the construction.

(iii) (a) The sum insured increases as the project nears completion – tending to the rebuild value.

Or the sum insured may vary if parts of the build become occupied and no longer covered under the construction company's insurance.

The risk to each peril covered varies differently over the duration of the build….
… e.g., for storm, losses would be relatively low at the start of the project

… whilst for theft of raw materials, the risk will rise and fall at different stages (or other suitable examples).

Inflation over the length of the contract is likely to affect the cost of claims.

Seasonality or economic cycles may affect the intensity of risk over the period.

The sum insured may also change following revised plans from the architect…
… or alterations to the build may be required to meet changing buildings regulations.

(b) If a flat exposure measure is used over the whole period, we would apply a percentage load to it that varies over time according to the risk profile.

Or use an exposure measure that varies over the term of the contract.

This would allow a deposit premium to be determined.

Over the duration of the contract, the assumptions could be updated and an adjustment premium derived.

It may be useful to split the premium by the different types of cover, to allow for the variation in different types of risk more accurately.

Part (i) – Many gave the correct definition of what liability insurance is, but many failed to gain the other marks for extra detail in terms of limits/excesses/exclusions etc. At the same time, many were unable to give a precise definition – for example, implying that insurance indemnifies or covers third parties. Candidates tended to concentrate on the legal liability for compensation, but missed several other points relating to the cover. Given the 3 marks available, this was surprising. Many candidates mentioned claims characteristics, sometimes at length, which was not required.

Part (ii) – Most candidates gave a good broad range of likely liability insurance requirements for this company. However, many candidates failed to define what exactly each individual type of liability insurance covers – who the insured party is and what they are covered for. Candidates talked about bodily injury, disease and death, but fewer mentioned other types of loss sustained by third parties, such as property damage. Few said that the pollution should be unintentional to be covered.

Part (iii) – In (a) most candidates explained that the risk will increase over time, but did not consider the other possibilities – change in risk to each peril etc. Most candidates described increases in the value of the partially-completed property. However, those who described the origins of variation of risk in terms of materials and perils scored much higher. Many talked about the risk to the staff, but this part of the question related to property cover for the insured. Part (b) was particularly poorly answered, despite being quite simple.

9 Project number of solicitors in calendar year 2014

No clear trend in growth over time (perhaps slight recent increase).

Sensible estimate based on historic numbers (i.e. between 211 and 215)

213 is selected below.

Convert number of solicitors from calendar years to policy years

Assume linear interpolation is appropriate
…from calendar year midpoint to policy year midpoint
i.e. 1 Jul to 1 Jan

Policy Year	*Number of Solicitors*
2008	209.0
2009	211.5
2010	214.5
2011	212.0
2012	211.5
2013	213.0

Adjust claims for level of cover (limits and excesses)

Policy Year	*Upper*	*ILF (xs)*	*ILF (upper)*	*ILF*
2008	200	0.70	1.40	0.70
2009	200	0.70	1.40	0.70
2010	125	0.50	1.15	0.65
2011	125	0.50	1.15	0.65
2012	125	0.50	1.15	0.65
2013	150	0.70	1.25	0.55

Policy Year	*Adjusted Incurred*	
2008	600	764*0.55/0.7
2009	501	638*0.55/0.7
2010	269	318*0.55/0.65
2011	340	402*0.55/0.65
2012	118	140*0.55/0.65

Additional assumptions for ILFs:

- The ground up loss frequency is independent of the (limit) purchased.
- The ground up severity is independent of the number of losses and the limit purchased.

Adjust claims for inflation

	Severity Trend	5%
	Frequency Trend	2%

Policy Year	*Exposure*	*Adjusted Claims*	*Trend*	*Trended Claims*
2008	209.0	600	1.4091	846
2009	211.5	501	1.3157	660
2010	214.5	269	1.2285	331
2011	212.0	340	1.1470	390
2012	211.5	118	1.0710	127
2013	213.0		1.0000	

- Assume claims in each policy year are paid/incurred on average at the same time relative to the start of that policy year (50% credit for assumption of claim incurred at midpoint of policy year).

Develop claims

Policy Year	*% Dev*	*Ultimate*
2008	90%	940
2009	80%	824
2010	65%	509
2011	45%	867
2012	15%	846

Project 2013 burning cost

2008	4.5 = 940 / 209
2009	3.9
2010	2.4
2011	4.1
2012	4.0

Explanation of rationale for selection:

- Older years more developed but less relevant
- Recent years more relevant but development uncertain
- No clear trend in burning costs for policy years
- 2010 looks anomalous
- Exposure is quite consistent

Calculation of overall burning cost rate as (total cost) / (total exposure)
(e.g. 3.77 if using all years or 3.71 if using all but 2012)
[Alternatively, simple selection using burning cost for each year, e.g. 4]

Loss cost for 2013 = projected exposure * projected burning cost
(e.g. 3.71 * 213 = 790)

Some candidates did very well on this question, but some appeared to leave it unanswered when they got stuck on a particular aspect.

Because the question did not describe precisely how the policy limit operated, full credit was given for an alternative interpretation, where the limit was used as the "upper" point for the ILFs (instead of adding the limit to the policy excess). Partial credit was given for the inflation adjustment if the candidate used 7% instead of compounding. Full credit was given for executing the steps in a different order from that shown above.

Many candidates missed out on marks by not stating the correct assumptions. Several candidates stated as an assumption that no claims reach the limit per claim. Similarly, hardly any candidates gave more than one or two points of justification for the method used to arrive at the burning cost.

A disappointing number of candidates inflated the exposure by the rate of frequency inflation, but failed to realise that this would actually reduce the rate per unit exposure. Many also encountered difficulties with the time period over which the inflation was applicable.

10 Premium rating basis (fundamental uncertainty)

A motor insurer will try to set a premium based on past experience of similar business and then adjust these figures to reflect current and future market conditions.

This policyholder has no previous history as a qualified driver, so there is considerable uncertainty about her future claims experience.

The level of uncertainty is greater than for more experienced drivers.

Data Errors and Differences (one company has better data than another)

Some insurers may have no data at all on this type of risk

e.g. if it's a new product or the company is entering the motor market for the first time (or other similar example)

Or data may be scarce
i.e. not enough claims data to provide a reliable model of risk.
e.g. low-frequency claims types, not enough history, sector bias, or similar example

Data may be inaccurate
e.g. incorrectly entered, or calculated

Missing data *(i.e. referring to missing columns, not to rows)*
e.g. MI system doesn't record some of the rating factors, especially if some of them are new (or other similar example)

Wrong level of detail or integrity problems
e.g. can't link claims to policies correctly, or amounts paid for each claim are not split by head of damage (or other similar example)

Data may be inadequately developed.
e.g. insufficient period left between the end of the exposure period and the analysis date so there are lots of missing IBNR claims (or other similar example).

Claims experience unusually good or bad (due to random fluctuations)

Treatment of PPOs and other large claims (which may not have occurred during modelling period)

Modelling Errors and Differences (one company models better than another)

Different data may be selected or omitted prior to modelling
e.g. Different base periods used for the analysis, exclusion of open claims from analysis (or other similar example)

Differences in the type of modelling done, or level of sophistication. *[Note: this refers to type of modelling only, and not to the grouping of levels of factors (which is credited in the "smoothing" section, below)]*
e.g. sophisticated GLM for the risk premium v one-way tables (or other similar example)
e.g. customer demand analysis done or not done (or other similar example)

Differences in rating factor selection or model basis

Some factors may not be available to all insurers, or appear insignificant in explaining risk
e.g. new technology, such as telematics

Differences in parameter selection, smoothing & constraints
e.g. large BI claims modelled differently or different allowance for catastrophes (or other similar example)
e.g. smoothing of rates over variables like car age or policyholder age are subjective so one may be more accurate than another (or other similar example).

There may be a different approach to cross-subsidy within the model
e.g. NCD scales (or other similar example)

There may be a different level of modelling skill

Differences in Choice of Adjustment Factors

Different views of the inflation of claim amounts …
… and of trends in claim frequencies.
e.g. change in theft claims due to the economic environment, or legal expenses claims due to activities of claims management firms (or other similar example)

Different levels of expenses and commission applied to the risk premium.
e.g. because of the sales channel, or process efficiency (or other similar example)

Different allowance for investment income in the premium rate.
e.g. different length of period assumed for payment of bodily injury claims (or other similar example)

Different reinsurance costs
e.g. different levels and types of reinsurance used

Different assessment of (or appetite for) volatility of risks and therefore a different assessment of the contingency margin / extra profit margin required.

Different profit loadings or required return on capital
e.g. different capital requirements due to diversification (or similar cause)
e.g. or different appetite for high returns on that capital base (or similar cause)

Differences in other elements of the expense basis, such as taxation (or similar cause).

Market and Competition Differences

Two companies may have different target markets
e.g. through having different views of the lifetime value of different segments.

Two companies may have different risk appetites
e.g. one wants young drivers on the books and targets them by giving lower premiums, whilst trying to upsell or cross-sell other business to replace the income stream.

Some companies may have a more well-known brand and can attract customers despite higher prices.

The quotes could have come through different sales channels…
…with different competitive forces

Different companies may have a different idea of where they are in the insurance cycle, so pitch rates at a different level.

There may be changes in legislation, such as banning the use of gender in insurance pricing, and different companies will deal with the changed legislation differently

Although the cover is the same, other aspects of the customer experience may be different, which affects the premium.
e.g. level of service quality, fringe benefits (or other similar example).

Accumulations

An accumulation of the above factors likely to be necessary in order to produce the large discrepancy.

Candidates often made valid points, but under a different heading. Where this was done, full credit was given.

Candidates often gave a general point without an example, or an example without generalising, hence missing marks. For instance, many gave "reinsurance" as an answer, but did not explain that different companies will have different levels and types of cover and, therefore, different reinsurance costs.

There was a wide variety in approaches to "fundamental uncertainty". The core reading refers here to the insurable risk that is transferred by the policyholder.

Lots of candidates made comments saying the insurer could be deliberately pricing itself out of a segment, or targeting certain customers, without giving any logic for this.

Many mentioned the use of external data, but this would probably tend to make premiums more similar, rather than different.

Candidates tended to talk about weather catastrophes, but very few mentioned large bodily injury claims and accumulations.

END OF EXAMINERS' REPORT