

EXAMINERS' REPORT

November 2017 examinations

Subject F103 — *General Insurance* Fellowship Principles

INTRODUCTION

The attached report has been prepared by the subject's Principle Examiner. General comments are provided on the performance of candidates on each question. The solutions provided are an indication of the points sought by the examiners, and should not be taken as model solutions.

QUESTION 1

i. Comments:

- The student is correct regarding the point that had the EML been set higher then, under most circumstances, the reinsurer would have had to pick up a larger proportion of the given risk.
 - E.g. Where the insurer aims to retain as much of the risk as possible up to a specified maximum retention limit.
- The proportional split may, however, be unchanged under certain circumstances, such as:
 - If the increased EML is still below any minimum retention limit (in which case nothing is reinsured); or
 - If the insurer has a strategy to use the same proportion of cover on all policies, and maximum/minimum retentions do not come into play.
- However, the argument that regular underestimation of EMLs will not trouble the reinsurer is invalid because:
 - This could be an indication that the insurer is not able to estimate its risks correctly.
 - Thus the insurance premiums may be too low.
 - Even though the premium is shared proportionally with the reinsurers, if the premium is too low they will receive too little premium.
 - If the insurer and reinsurer have underestimated the risk from outset, the reinsurer may also have agreed to pay too much reinsurance commission.

ii. Minimum retention:

On policy 1 all 9 lines should have been used based on the strategy to cede as much risk as possible, but Co. X was only able to use 3 lines owing to the minimum retention limit.

$$\text{Hence } R = \$8\text{m} / (1+3) = \$2\text{m}$$

- a. $\text{Recovery} = 3/4 \times \$12\text{m} = \$9\text{m}$
- b. To cede as much as possible all 9 lines should be used.
This will leave X with a retention of \$5m ($\$50\text{m}/(1+9)$) which is above the minimum retention restriction.
- c. $\text{Recovery} = 9/10 \times \$60\text{m} = \$54\text{m}$
- d. X cannot use all 9 lines of the cover as this would leave X with a retention of \$1.8m EML ($\$18\text{m}/10$).
Hence the retention will be the minimum of \$2m with \$16m EML reinsured, i.e. 8 lines.
- e. The maximum claim payment will be the sum insured, i.e. \$27m
 $\text{Recovery} = 8/9 \times 27\text{m} = \24m

Part (i) was handled reasonably well by those who understood surplus reinsurance and the relevance of the EML. Many candidates, however, demonstrated a lack of understanding.

Part (ii) was handled well by the better prepared candidates. Marks were lost by not explaining certain answers or by omitting currency/units. Many students ignored the fact that the claim exceeded the sum insured in the last policy.

QUESTION 2

- i. a. Net claims ratio = Net Claims Incurred / Net Premiums Earned

$$X: R950m / R1520m = 62.5\%$$

$$Y: R540m / R600m = 90\%$$

- b. Operating (Combined) ratio = Expense Ratio + Claims Ratio

$$\text{Expense Ratio} = [\text{Commission} + \text{Other Expenses}] / \text{Net premiums written}$$

$$X: R400m / R2000m = 20\%$$

$$Y: R240m / R800m = 30\%$$

or:

$$\text{Expense Ratio} = \text{Expenses Incurred} / \text{Net premiums earned}$$

$$= [\text{Commission} + \text{Other Expenses} - \text{Increase in DAC}] / \text{Net premiums earned}$$

with suitable assumptions for the Increase in DAC.

Therefore, Operating Ratio:

$$X: 20\% + 62.5\% = 82.5\%$$

$$Y: 30\% + 90\% = 120\%$$

- c. Return on Capital Employed (ROCE) = Post-tax profit / Free reserves at start of year
with suitable assumptions for the Increase in DAC. Assuming no increase in DAC:

Post-tax profit:

$$X: R290m (1520 - 950 - 200 - 200 + 170 - 50)$$

$$Y: -R140m (600 - 540 - 160 - 80 + 40)$$

Free reserves at start of year

$$X: R230m (460 - 290 + 60)$$

$$Y: R640m (500 + 140)$$

Therefore, ROCE:

$$X: R290m / R230m = 126\%$$

$$Y: -R140m / R640m = -21.9\%$$

ii. Financial Strength

Company X's solvency is much weaker than Y's:

Solvency Ratio = Free reserves / Net written premiums

X: R460m / R2000m = 23%

Y: R500m / R800m = 62.5%

X and Y are of similar size, however X is writing more than twice the level of business. This might reflect under-pricing (hence the strong growth) and under-reserving (hence the reported profitability) by X.

Free reserves for Y declined sharply in the last year (from R640m to R500m) due to the large loss.

Profitability Performance

Y's loss appears to be due to several factors:

- Relatively high level of commission paid (26.7% of gross premium written vs 10.5% for X) may indicate a combination of:
 - Different sales channels being used by X and Y;
 - Aggressive growth strategy by Y;
 - Brokers performing various (and more) functions for Y compared to X.
- Relatively high claims ratio (90%) compared to the lower 62% for X; this could be due to :
 - Poor underwriting;
 - Poor pricing;
 - Deliberate under-pricing as part of an aggressive growth strategy (which is funded from the strong solvency position);
 - Poor claims control;
 - Poor reinsurance strategy;
 - Default by a creditor (e.g. reinsurer, broker);
 - Strengthening of reserving basis;
 - One or two very large losses during the year.
- A longer-term history is needed to determine the trend and possible causes.
- Investment return (as a % of investible assets) is better for Company X:
 - X: R170m / R2210m = 7.7% (7.3% of total assets)
 - Y: R40m / R2220m = 1.8% (1.7% of total assets)This might be due to a more aggressive investment position by X (higher equity, lower cash holding).
- The reinsurance strategy for X (probably quota share) appears to have been more effective than for Y (perhaps excess of loss with high excess):
 - Net/Gross premiums earned for X = R1520m / R1600m = 95%
 - Net/Gross claims incurred for X = R950m / R1000m = 95%
 - Net/Gross premiums earned for Y = R600m / R.800m = 75%
 - Net/Gross claims incurred for Y = R540m / R600m = 90%

iii.

	Company X	Company Y
Investments (% Assets):		
Equities	18%	0%
Fixed Interest	56%	56%
Cash	22%	38%
Deferred Acquisition Costs	4%	3%
Broker balances	0%	2%
Total Assets	100%	100%

Company X's business appears to be short-tailed, while Y appears to be longer-tailed, as illustrated by the Net outstanding claims / Net earned premium ratio:

X: R1000m / R1520m = 0.66

Y: R1400m / R600m = 2.3

Both X and Y appear to be mismatched relative to liabilities:

- X is short-tailed, with low free assets, hence equity holdings seem too risky.
- Given the short-tailed nature of X, too little cash is being held.
- Appropriateness if fixed interest depends on the duration.
- Y's liabilities are longer tailed, and possibly require some inflation protection via equities or ILB.
- Given the strong solvency position Y can tolerate higher risk assets in pursuing inflation-linked returns.
- Y's cash position appears too high for its longer liabilities.

Overall this question was reasonably well answered. However too many candidates simply stated in words what they had calculated without adding any additional insights or interpretation in parts (ii) and (iii) – for example, if it is clear from the calculations that the solvency margin for Y is higher than X, candidates should not waste time stating this in words as well. To obtain credit beyond the calculations candidates need to offer possible reasons and implications for the results they have calculated. A few candidates commented that Net and Gross premium figures were incorrectly switched around in the question and proceeded to answer on this basis – while marks were awarded for this approach, net premium written can end up being higher than gross if a reinsurance contract that was inceptioned (and annual premium paid) in a prior financial year is cancelled in the current year resulting in a partial premium refund.

Part (i) was reasonably well answered, however a number of candidates did not know the definition of the operating ratio, and many candidates did not state their assumptions regarding DAC b/f.

Part (ii) was reasonably well answered, however many candidates provided very little interpretation of the calculated ratios.

Part (iii) was generally not answered well. Very few candidates calculated the asset split in percentage terms to get a clearer understanding of the asset allocation. Many candidates

assumed that X must have longer-tailed business due to its equity holdings and Y shorter-tailed, when in fact the actual position is the reverse. Very few candidates appreciated that the duration of fixed interest is a critical factor in assessing the suitability of those assets.

QUESTION 3

- i. The most important requirement of a rating factor is that it helps to provide a good definition of the risk.

Good rating factors will satisfy the following requirements:

- Define the risk clearly. In quantitative terms, this means that the rating factor should be correlated with the expected claims.
 - Do not correlate too closely with other rating factors. This ensures that they add value to the underwriting process. We should choose each additional rating factor to remove as much of the residual heterogeneity as possible.
 - Are practical to obtain and record. We would not ask policyholders for their claims history over their entire lifetime as they may be unable to recall all the information.
 - Are objective. This avoids disputes between the insurer and policyholder over the truth of the information provided.
 - Are verifiable and preferably factual. This helps to prevent fraudulent behaviour.
 - Are acceptable to the policyholder. Otherwise, the insurer may lose potential customers or renewals. For example, requiring genetic test results to be disclosed might be unacceptable to policyholders.
 - Are not open to manipulation. For example, we would not ask policyholders how many claims they expected to make!
 - Are acceptable to the market, e.g. brokers may object to a proposed new rating factor.
 - Are allowed by the regulator, e.g. regulation may allow a limited number of rating factors.
- ii. We should not use factors that do not add value to the model. In the extreme, if as many factors as data points were used, the model would provide a perfect fit to the data, but would not be useful for predictions. In general, the principle of parsimony applies. As few parameters as possible should be used to find a satisfactory fit to the data.

One-way and two-analysis may help identify the factors that have an influence on the response variable, although one should be aware of the shortcomings.

Analysis of significance of factors

There are a number of techniques used to analyse the significance of the factors used in GLMs. The deviance, scaled deviance, chi-squared statistics, F statistics, and Akaike

Information Criteria (AIC) are various statistics that can be calculated to assess the improvement of fit when adding additional parameters. These statistics allow tests to be done to test for statistical significance of the added parameters.

Approaches to classification

Another way to make the model more parsimonious is classification. Classification refers to the grouping of levels of factors. GLMs can be used effectively for factors where the number of levels is small (say, 100 or less), or where the level forms a naturally continuous variable that can be fitted as a function (say, a polynomial or a set of polynomial splines).

For a factor such as postcode where there are many levels, it is likely that there will not be enough data in every single one of these levels to enable the grouping to be done based only on an analysis of past experience. An approach to classification for postal code is to use spatial smoothing.

Vehicles might be classified according to a number of categories and then vehicles with similar levels in each of the categories will be grouped. Examples of categories that could be used to establish vehicle groupings include: damage and parts costs, repair times, new car values, body shells, performance and car security.

Appropriate diagnostics (e.g. based on residual analyses) should therefore be used to assess the level of smoothing required. Decision trees and CHAID (Chi-squared Automatic Interaction Detector) provide further ways to determine which splits of factors are the most significant.

Measuring uncertainty in the estimators of the model parameters

Uncertainty in parameters could arise due to low amounts of exposure or simply because the factor in question does not explain the underlying risk very well. A poorly defined parameter will have a large standard error. It is possible to calculate standard errors for each parameter estimator and then to test whether the parameter is significantly different from zero.

Comparisons with time

To test the consistency of parameter estimates over time, we can fit a model that includes the interaction of a single factor with a measure of time, e.g. a calendar year. This allows us to test whether the effect of our factor varies depending on the year (or other specified time period) of the experience.

The time consistency check is important for pricing work, because typically you will be analysing data from two to seven years ago, and then deploying rates for the next year. So if the pattern you select is moving rapidly over time, then the model average selected will be inappropriate for future periods.

Restrictions on the use of factors in the model

There are some situations where legal or commercial considerations may impose rigid restrictions on the way particular factors are used in practice. When the use of certain factors is restricted, if desired, the model may be able to compensate to an extent for this artificial restriction by adjusting the fitted relativities for correlated factors. This is achieved using the offset term in the GLM.

If a factor is removed from a GLM then the remaining factors will try to explain as much as possible of the risk that had previously been explained by the removed factor.

An example of where this may be required is in pricing policies with the NCD feature. The relativities between premiums on policyholders in different discount categories will be fixed, possibly resulting in premiums for policyholders in high discount categories being far too low for the risk that they present to the insurer. The offset term can be used to fix the relativities between NCD categories and then hopefully the model will be able to find other factors that are indicative of the actual claims cost, so that overall the premiums received by the insurer will cover claim costs.

Correlations between predictor variables

Although not used directly in the GLM process, an understanding of the correlations within a portfolio is helpful when interpreting the results of a GLM. In particular, it can explain why the multivariate results for a particular factor differ from the univariate results, and can indicate which factors may be affected by the removal or inclusion of any other factor in the GLM. It is important to assess the GLM output taking all factors into account.

For example, if age and type of car are correlated, then the model may mostly use the age factor to explain the effect on the response variable. If the user simply looks at the parameter for car type they may think that car type has a small influence on the results.

Parameter smoothing

It is desirable for the changes in the response variable for incremental changes in rating factors to be smooth. This applies where rating factors have a natural order of levels. For example, as a policyholder ages, they would expect their premium to change smoothly over time (all else being equal). This would not apply to colours of cars, say, as there is no natural order of levels here.

Smoothing is thus a very important technique to apply to current modelling exercises. The actuary will need to smooth the parameters between different levels of a risk factor and still make sure that the overall risk premium is sufficient for the group.

Part (i) was bookwork and was generally well answered by most candidates.

Part (ii) was reasonably well answered by the better prepared candidates. However, most candidates gave too few points to score highly on the question.

QUESTION 4

- i. Protected NCD is a modification to an NCD system whereby a policyholder who has attained a high level of NCD may elect to pay an extra premium in order to be able to make claims without losing future entitlement to discount.

There may be a specified limit to the number of claims that can be made without affecting the discount, or the insurer may simply reserve the right to withdraw the policyholder's option to continue on protected NCD.

- ii. Advantages:

- Could provide increased new business if offered to other insurers' policyholders (on proof of their claims record).
- May encourage loyalty from existing policyholders.
- Avoids ill-feeling with the insured if they suffered a rare claim and would otherwise have lost NCD.
- Simpler to operate than the existing system
- There may be an improvement in experience prior to policyholders reaching protected NCD status

Disadvantages:

- There may be consumer resistance to the extra premium.
- Possible selection against the company as the policyholders most likely to take up the option are those who think they are likely to benefit from it.
- Morale hazard increases as policyholders can now claim without adverse consequences.
- There is no deterrent against small claims (without higher excesses).
- The extra premium will be difficult to determine owing to likely changes in experience after the introduction of the protected NCD.
- Hence premiums will be incorrect (inadequate or excessive, each with its own problems).
- If the better risks are transferred to this option an increase in premium may be required for the standard option.

- iii. Reasons for higher excesses:

- This can eliminate the small claims – without this there would be no disincentive for policyholders not to claim for every single thing, no matter how small.
- It would reduce the overall cost of the insurance – even the larger claims would be reduced by the excess, helping keep costs down to offset the potential increase in claims.

Part (i) was well answered by most candidates.

Part (ii) was relatively straightforward and reasonably well answered by most candidates. However, most candidates failed to give enough points, or failed to give sufficient detail (in this “outline” question), in order to score well.

Part (iii) was generally poorly answered. Most candidates only gave one reason, and not two as required.

QUESTION 5

i. Key issues you should consider before purchasing any reserving software.

Financial cost of acquiring the software:

You will need to consider the cost of acquiring the software, including any once-off fees and the annual license fee payable.

Benefit of acquiring software:

You will need to carefully consider the added benefit of using the software over the current approach of reserving.

Some benefits that the software may provide compared to the current spreadsheet approach include:

- Faster and more automated reserving calculations.
- Better documentation.
- A clearer audit trail.
- A greater selection of reserving methodologies.
- Less risk of making errors in reserving calculations.
- A better assessment of reserving results.
- Better model governance.
- Stochastic reserving capabilities.
- Easy integration of benchmarks.

Reserving methods included in software:

You will need to understand the methodologies included in the software and whether these are in line with actuarial best practice and relevant to your firm.

Given that your company is newly established there may be insufficient data volumes to appropriately apply the reserving methodologies included in the software, limiting the value of the software.

You will need to consider whether the software can replicate the current reserving methodologies.

Consider the stochastic capabilities of the software.

Level of expertise in your company:

You will need to consider whether you have the right skills in your company to adequately use the software.

Software support provided by consultancy:

The support provided by the consultancy will be important.

This covers fixing bugs, software enhancements and day-to-day support

Compatibility of software:

You will need to consider the compatibility of the software with current software used in your company, and any new software your company may be acquiring, for example capital modelling software.

Documentation available:

Consider whether there is a user manual available detailing the methodologies used and what a user would need to know in order to use the software.

Software reputation:

Consider whether the software is well known in the market and whether it is currently used by other insurers.

Legislation:

Consider whether the software produces the results required by legislation which may simplify the reporting process

Time remaining:

Consider whether there is sufficient time remaining to move over to the software before the next year-end.

- ii. The prediction error is the estimation (parameter) error plus the process error.
The estimation error arises since the estimated parameters are random variables.
The process error reflects the inherent random noise in the process.
- iii. The outputs of a stochastic claims reserving model could be used:
 - To assess the level of prudence in the booked claims reserve.
 - To provide information to investors in order to compare the attractiveness of different investment options.
 - To calculate reserve risk as part of a capital modelling exercise.
 - To compare the variability of different classes of business in order to better understand the relative reserving risk.
 - Inform discussions with the regulator to better understand the impact of any adverse run-off on the solvency position.
 - To assist in setting premium rates in order to achieve a targeted return on capital, where capital would include an element of reserve risk.
 - To aid in the negotiation of a commutation settlement which may depend on the riskiness of the claims run-off.
 - As part of an asset liability matching exercise.
 - For statutory reporting where there is a requirement to calculate a margin above the best estimate or where a cost of capital approach is required.

- As part of a capital allocation exercise in which riskier classes attract more capital.
- To assist in strategic planning where adverse scenarios relating to the run-off of claims provisions are considered.

iv. Key issues to consider:

Selection of the model:

A model will need to be selected, for example a Mack, ODP or Bayesian.

These models can be applied to incurred or paid claims data.

Correlation assumptions, between classes of business, are likely to be required.

Model assumptions:

A key issue to consider is whether the assumptions underlying the model hold. If the model assumptions are not met then this may invalidate the results. For example, the ODP assumes that development factors across the whole development period are greater than one. This is usually more of an issue for incurred claims data, where prudent case estimates imply later releases, compared to paid data where negative development usually does not occur.

Claims not in the data:

Stochastic claims reserving methods only model the variability inherent in the claims data. To the extent that claims are not included in the data, for example latent claims, the variability could be understated.

Data issues:

All data used will need to be reconciled to an independent source, likely the financial statements. Sparse or limited data may imply that the assumptions underlying the stochastic reserving models are not met. For example, when bootstrapping, the assumptions underlying the Chain Ladder method should at least be met, implying that there should be sufficiently credible data available. Errors in the data or incomplete data are all problematic and can also lead to inaccurate results.

The resulting claims distribution can also be very sensitive to individual outliers in the data. A key issue to consider is whether these outliers should be included or excluded when estimating the claims reserve distribution.

Extreme percentiles:

If stochastic reserving is used to estimate extreme percentiles of the claims reserve distribution (e.g. the 99.5th under SAM) this could be problematic as the data on which the claims reserves are parameterised might not be reflective of more extreme percentiles where there is usually limited data available.

Model risk, parameter risk and spurious accuracy:

Will need to consider model risk by fitting a number of different models.

For each model there will be an element of parameter risk which can be assessed by performing sensitivity testing on the selected parameters.

Given the complexity of stochastic models there could be a tendency to assume that the results produced are more accurate than is justified i.e. spurious accuracy.

Time constraints:

Stochastic models can be time-consuming to run or validate, which needs to be taken into account.

Communication:

Given the complexity of stochastic modelling it is important to consider how the results will be communicated, in particular to a non-technical audience.

Documentation:

Given the complexity of stochastic modelling it is important that there is sufficient documentation and that a clear audit trail is provided.

Part (i) was generally well answered with a number of candidates scoring full marks. Candidates generally demonstrated the ability to think broadly covering commercial, operational and actuarial aspects. Some candidates stated that the insurer should consider developing its own software, this was not accepted as a viable option since the insurer is new and is not likely to have sufficient expertise to do this, and there is not likely to be sufficient time to develop and test new software before the next year-end.

Part (ii) was bookwork, so it was disappointing to see several candidates scoring very poorly while others scored full marks. Many candidates clearly do not know the bookwork well enough, which was also evident in later parts of the question. Candidates were penalised if they did not define the prediction error as the sum of the process and parameter errors.

Similar to part (ii) this bookwork question resulted in a wide distribution of marks. Some candidates answered this question assuming that it referred to the use of “best estimate” claims provisions. However, the question referred to a “stochastic claims reserving model” implying that the answer should consider the variance around the mean or focus on percentiles above the mean. A number of candidates stated that the output from a stochastic claims reserving model could be used for statutory reporting. While this may be correct candidates should have motivated the reason that the model would be necessary e.g. to determine, the margin above the best estimate or the cost of capital.

Generally performance on part (iv), which was largely bookwork, was poor. Some candidates provided very generic answers relating to stochastic models in general without focusing on modelling claims distributions.

QUESTION 6

- i. Benefits: The insured is indemnified against the legal liability to compensate third parties as a result of bodily injury, death and damage to property as a result of unintentional pollution for which the insured is deemed responsible. The costs of cleaning up the pollution and regulatory fines may also be covered.

Perils: The insured perils can be regarded as any incident causing gradual or sudden environmental pollution, e.g. waste contaminating ground water or air.

ii. The exposure measure will depend heavily on the nature of the industry. In this case, the exposure could relate to the amount of waste dumped. Something like weight of waste dumped (or payroll which may be related) could suffice. Exposure would increase proportionately to this measure which is practical to obtain and verify.

iii. Possible rating factors include:

- Type of waste: more hazardous waste will cause more risk than garden refuse for example.
- Depth of landfill. Deeper landfills will be more likely to contaminate ground water.
- Location e.g. closer to residential suburbs will open up more room for being sued.
- Level of technology for containing waste. More sophisticated technology should reduce the environmental risk.
- Company/employees years of experience. More experience should reduce the risk of making process errors resulting in leakage/contamination.

iv. Impact of claims made basis:

- Under claims made policies, the insurer faces the risk that the insured only purchased insurance due to events that have already happened or been initiated and then claims for the incidents.
- This could result in unexpected claims for the insurer.
- However, in this case claims will be initiated by the company following law suits from affected third parties, who will not care about the basis on which the insurance was written.
- Thus claims may not be impacted by the basis on which the policy was written.
- The presence of insurance, however, may serve as an incentive to sue the insured for damages, as the company is more likely to be able to pay if it is insured – however it is unlikely that third parties will know the basis on which the policy was written and so this may have little impact.

v. Key challenges in modelling capital requirements:

- Data sparse: environmental pollution claims are of relatively low frequency compared to a class such as motor insurance. Thus data are sparse, making it difficult to parameterise distributions.
- Changing nature of risk: Furthermore, the nature of environmental risk may be changing over time as more activists are pushing for environmental sustainability and hence may be changing the propensity of policyholders to claim. Thus, past data may not be completely relevant in setting loss assumptions.
- Latent claims: Also, for business written previously, the full extent of claims may be unknown due to potential latent claims where the pollution happens slowly over time and the extent of damage is not known until a much later stage. This may cause underestimating of underwriting risk and reserving risk.

- New technology: As the technology is new, the effectiveness is not certain. In particular it is believed that pollution will be less, which would result in a lower capital requirement for the insurer. The insurer risks underestimating capital if the technology turns out to be less effective than expected.
 - Concentration risk: There is a concentration risk if the landfill is close to a number of individuals e.g. a residential area, as more people could be affected by pollution.
- vi. Employers' liability insurance, as employees will be exposed to harmful air etc. from the waste.

Part (i) was bookwork and was generally well answered. However, very few candidates scored full marks.

In part (ii) many candidates suggested a suitable measure, but reasoning usually focussed on the requirement that exposure measures are proportional to risk, neglecting other requirements of an exposure measure.

Part (iii) was straightforward and generally well-answered. A common mistake was to include the exposure measure as one of the rating factors, when this was covered in the previous part.

In part (iv) the obvious aspect of "pent-up" claims was generally identified, though most candidates failed to analyse the situation more deeply – most candidates did not recognise that the company would not be the party initiating the liability claims.

In part (v) many good ideas were generated. However, candidates generally did not make it clear what the actual challenge was for each point raised, which resulted in a loss of marks.

Part (vi) was correctly answered by most candidates.

QUESTION 7

i. Advantages:

- The government will be able to decide on a level of benefits that is necessary, avoiding unnecessary and costly benefits that insurers may offer in order to increase premiums.
- The administration will be simplified and hence costs reduced by having only one insurance company providing all the services.
- The large number of policyholders will help the insurance provider achieve economies of scale and hence lower the average cost of providing the insurance.

- The method of collecting funding through a fuel levy essentially forces every driver to pay premiums, according to the amount they drive (in line with exposure). If enrolment was done through individual insurers, it is unlikely that everyone would purchase insurance, despite being compulsory. This is particularly important as it relates to the primary objective of the scheme – making sure everyone on the road has liability insurance.
- No risk of anti-selection for the insurer as there is a forced cross-subsidy due to the insurance being compulsory and all parties being insured by the same insurer.

Disadvantages:

- Depending on who works for the government and if they have insurance expertise, the product design may not adequately meet the needs of policyholders e.g. the benefit level may be too low.
- There is a risk that the scheme will be underfunded as the tender process is based on price alone, forcing insurers to charge unrealistically low premiums.
- The amount of business may be particularly large for a single insurer to handle, potentially resulting in inefficient service. If the company chooses to expand, they risk having the contract removed at the next 5-year renewal. It may be better to spread the business over a number of insurers who are willing to sell the insurance at the agreed rates.
- Once the insurer has won the business, there will be no competition, potentially resulting in poor service as there is no need to try retain customers.

ii. Risks to tendering insurer:

- Any insurer tendering faces the risk that they put in a lot of effort and time in the tender process and then do not get the business, so can not recover any costs.
- Current policyholders may lapse their existing contracts because they feel they are double paying for insurance.
- Service levels to exiting policyholders may decline, resulting in a loss of reputation and lapses.
- The company may not receive the funding from the government after it has been collected as a fuel levy.
- If the insurer wins the business and increases infrastructure to be able to handle the large volumes, there is a risk that they lose the next tender and then are over capitalised.
- Risk that premium rates are insufficient to meet costs. This could be for a variety of reasons, including:
 - Insurer underestimated the risk.
 - A new target market that was not previously insured, may be riskier than the average insured driver. In particular, many of these cars may belong to low-income earners who were unable to afford insurance, hence the cars may be older and less well maintained.
 - Increase in policyholders propensity to claim e.g. before all had insurance, people may have been happy to drive around with slightly dented cars, whereas now they would claim more.

- Claim costs may go up e.g. parts inflation (possibly linked to exchange rate), with the insurer not having flexibility to increase premium rates in response.
- The driving risks may change over the five year period e.g. if roads aren't maintained or if roads get busier, there may be more accidents.
- With premiums being directly linked to the fuel price, there is a risk that the fuel price decreases and that the fuel levy rate per litre is unchanged, resulting in premiums being too low to cover claim costs.
- The company's reputation may be damaged by actions of the government if it is viewed as a partner of the government.

iii. Claims reserving risk:

- Claims reserving risk refers to the risk that claim payments and claim related expenses arising from expired business will turn out to be higher than reserved for.
- This could be due to adverse developments on open claims, or IBNR claims being higher than expected. Most reserving methods assume that past development patterns will continue into the future, so reserving risk essentially arises when future patterns are not the same as past patterns, resulting in claims being higher than reserved for.
- Claims underwriting risk on the other hand refers to the risk that claims on unexpired business are higher than expected. This includes claim events which have not yet happened, whereas reserving risk is restricted to claim events which have already happened, even if not known about by the insurer.

iv. Reasons include:

- Case estimate methodology common: the case estimate methodology may have changed on all classes, which will not be detected by methods assuming stable development patterns. For example, if case estimates are less prudent in the most recent years, reserves will be underestimated.
- Litigation culture: all liability classes will be affected by an increasing culture of litigation, especially if this results in latent claims arising from court awards. The company is not heavily exposed to liability, but there is a third party liability element in household and motor insurance (especially if the company wins the new liability business).
- Inflation: inflation of goods may affect all property related claims. This is particularly a concern if the company's investments do not keep pace with inflation.

- v. Setting premium rates relies on reserve estimates in order to establish the full extent of claims on past business. If reserves are under-estimated (reserve risk), this in turn can result in premium rates being underestimated, leading to underwriting risk.

In part (i) most candidates generated a good range of ideas, though few got close to full marks. A common mistake was to focus on advantages or disadvantages to insurers, rather than the situation as a whole, bearing in mind the government's objectives. Many candidates

also failed to give enough detail to satisfy the requirement to “outline” points. For example, stating the economies of scale would be achieved, without expanding to suggest that this could result in lower premiums, which would benefit poorer people in the broader population.

In part (ii) most candidates failed to generate enough ideas and/or “outline” points adequately. A common mistake was to not make it clear how something could turn out worse than expected, e.g. stating that systems would need to be expanded – this is not a risk if the insurer has priced this into its quote.

Part (iii) was bookwork, with most candidates getting the gist of the answer. However, most candidates do not seem to know the bookwork well enough.

Part (iv) was generally poorly answered. The most common error was to give reasons for general correlations between claims, rather than focussing on reserve risk – the two are quite different.

In part (v) few candidates identified the main link.

END OF EXAMINERS’ REPORT