

EXAMINERS' REPORT

June 2023 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. An industry loss warranty:

- This is a type of reinsurance cover.
- Cover is triggered based on the total loss arising to the particular insurance industry rather than the insurer's own losses.
- A specified fixed amount is paid to the insured if:
 - there has been an insured loss relating to hurricanes to the insurance industry of a particular size, and
 - a second indemnity-based trigger is breached, based on the value of the losses incurred by the insured.
- The basis of cover is not indemnity.
- The "industry loss" size referred to in the first bullet point is usually determined using a recognised independent standard of some sort.
 - E.g. PCS (Property Claim Services) for hurricane catastrophe losses in the US.
- The second condition is necessary to ensure that the insured has an insurable interest in the cover.

Advantages:

- This cover could help protect against catastrophes, which could result from hurricanes.
- Recoveries should be made quickly following a claim.
- The simplicity of the contract, and the fact that industry losses may be easier to model than losses on a particular portfolio, may result in relatively attractive pricing compared to standard reinsurance.
- The indemnity mismatch may work in favour of the insured.

Disadvantages:

- Cover is not indemnity, and so the insurer is exposed to its experience being worse than the industry norm.
- If the index used to measure total industry losses is not appropriate (e.g. relating to a different geographical location) the cover may not be triggered when needed.

ii. The maximum proportion of the premium will be paid to the Surplus reinsurer when the maximum permissible number of lines of cover is used.

a. If all 4 lines are used the insurer will retain:

$$(0.8 \times \$200\text{m})/5 = \$32\text{m of the Sum Insured}$$

As this is between the maximum and minimum retention limits it is acceptable.

Hence the maximum proportion of the premium paid to the Surplus reinsurer is:

$$(0.8 \times \$200\text{m} - \$32\text{m})/\$200\text{m} = 0.64$$

viz. 4/5 of the 80% left after the Quota Share, since all 4 lines are used.

- b. If all 4 lines are used the insurer will retain:
 $(0.8 \times \$50\text{m})/5 = \$8\text{m}$ of the Sum Insured
 As this is below the minimum retention, \$10m must be retained.
 Hence the maximum proportion of the premium paid to the Surplus reinsurer is:
 $(0.8 \times \$50\text{m} - \$10\text{m})/\$50\text{m} = 0.6$

- iii. For global losses to exceed \$1bn there must have been at least 3 failed launches.

Based on the binomial distribution the probability of this is:
 $= 1 - \text{Pr}(0 \text{ losses}) - \text{Pr}(1 \text{ loss}) - \text{Pr}(2 \text{ losses})$
 $= 1 - 0.98^{125} - 125 \times 0.98^{124} \times 0.02 - (125 \times 124 \div 2) \times 0.98^{123} \times 0.02^2$
 $= 1 - 0.08003122 - 0.20416129 - 0.25832653$
 $= 0.45748096$

Hence, the Risk Premium is:
 $= \$100\text{m} \times 0.45748096$
 $= \$45\,748\,096$

Overall this question was poorly answered.

In part (i), while most candidates had a basic idea of what an industry loss warranty was, many provided too few details.

Part (ii) was a fairly straightforward surplus proportion calculation, with most candidates performing reasonably well. Several, however, did not apply the Quota Share correctly with some even ignoring it in the calculations. Some candidates suggested that no premium would need to be paid in (b) as there was no claim. Some candidates referred to “EML”, when this was not even referred to in the question.

Part (iii) was poorly handled by most candidates, many of whom seem to have forgotten how a binomial distribution works. Some candidates even made reference to a non-integral number of failures of satellite launches.

QUESTION 2

- i. Data items on a claim record are likely to include:
- Unique claim identifier.
 - Policy identification number linking the claim to a policy.
 - Type/cause of a claim (peril).
 - A description of the claim event.
 - Rating factor details.
 - Status of the record/claim (open, closed, re-opened).
 - Dates and amounts of payment and reinsurance recoveries.
 - Currency of payments and outstanding amounts.

- Payment type (indemnity cost, legal fees, loss adjusters' fees).
- Estimated outstanding claim amount and dates of settlement.
- Control dates (incident, reporting).

ii. Types of data checks:

- Data reconciliation checks: reconciling changes in number of policies in force with movements, e.g.
 - Policies in force at end = Policies in force at start + new business – lapses – cancellations /non-renewals.
- Spot checks of details on policy and claim records, e.g.
 - Check policy details against original proposal/application for incorrect policy number, risk details, and check claim details against linked policy.
- Large and anomalous values. e.g.
 - Unusual dates of birth, large one-off increases in sums assured or large claim values.
- Trends in policy movement analysis, e.g.
 - Lapse rates consistent with prior year and can changes be explained.
- Consistency checks using accounting data, e.g.
 - Number of policies sold by dealership is consistent with commissions paid to each dealership.

iii. Quality and quantity of data:

- The quantity of data depends on the size of the insurer and number of dealerships selling policies – in this case a small insurer so data might be limited.
- The quantity of data will also depend on whether dealerships have been delegated administrative and claim tasks e.g.
 - if they collect premiums, hold detailed policyholder information and pay most claims, the insurer may only have summarised data.
- Data quality/accuracy may vary by dealership based on:
 - The care taken by individuals assigned to the task.
 - Checks and controls put in place by the dealership or the insurer.
- Data received from dealerships may be outdated, especially if the dealerships are tasked with administrative functions.
- Dealerships selling same/similar model cars to similar target market should result in more homogenous and useful/credible data than dealerships selling all types of models to all types of target markets.
- Overall data quantity and quality also depends on past mix of business by distribution channel – direct sales may have been used in the past supplementing current limited data.

Part (i) was bookwork and was well answered by the majority of candidates.

Part (ii) was a bookwork application which was also generally well answered by most candidates.

In part (iii), candidates who linked quantity and quality of data to selling policies through a motor dealership generally did well. Some candidates discussed the method of distribution in general and did not link answers to the question by explaining how selling policies through a motor dealership will impact the quality and quantity of data. Some candidates didn't generate enough distinct points to score well.

QUESTION 3

- i. Underwriting is the process of consideration of insurance risk on individual policies. This includes assessing whether the risk is acceptable and, if so, the appropriate premium, together with terms and conditions of the cover.

In addition to deciding on premium rates to charge, underwriters will specify excesses or exclusions to cover or possibly required improvements to the risk before cover is provided.

- ii. Data that could be used for underwriting:

- Internal Data
 - The initial application form and initial underwriting can be used to determine primary rating factors e.g. age, gender, type of vehicle and model and regular driver
 - The company could provide a telematics device as part of the insurance cover which will provide real time data in terms of location of the vehicle, distance driven, how fast you drive and how fast you brake.
 - The company could develop an app and collect additional data from the app e.g. change in drivers, additional monthly questions, servicing of the car, alterations made to the car, etc.
 - The company may sell other products and could obtain data from these products to further help underwrite.
- Reinsurers Data
 - Reinsurers can provide additional data to help update rating tables / loadings-based experience.
 - Provide statistics and data from other countries where continuous underwriting has been implemented to help with test data or to help build the initial machine learning models.
- Industry Data
 - The insurer could see if it can obtain data from government organizations regarding traffic fines and infringements related to the insured.
- Publicly available data
 - The insurer can see if they can use technology to collect and analyze data from social media accounts, credit data or any other loyalty programs that they might be part of.
 - Crime statistics can be used to update loadings based on different areas travelled.

iii. Factors to consider:

- An important factor to consider is how the continuous underwriting will be implemented.
 - Will changes in premiums rates be done directly or through other means such as rewards or discounts for future periods?
 - What would happen to changes in cover or exclusions if these are implemented?
 - One will also need to ensure that customers are treated fairly and if changes in cover or exclusions are implemented, what recourse do customers have and are all customers treated equally.
- The company needs to make sure there is no risk of anti-selection or moral hazard given that underwriting will happen continuously. Therefore, how is data collected verified and ensured to be correct.
- Can the company collect and store meaningful data from a variety of sources before, during, and after the risk evaluation timeframe. Given that continuous underwriting leverages technology such as automation, artificial intelligence and sophisticated algorithms to extract insights from the vast amount of unstructured data available in real-time. The question then is whether it has the expertise and capability to implement this. The use of specific personal information will also need to comply with POPIA and all rating factors used to update pricing will need to comply with any regulations.
- Market considerations also need to be accounted for.
 - Have competitors implemented a similar product.
 - Is there a need for a product like this and how will brokers and sales agents adjust to the new product.
 - How will terms and conditions and other coverage changes be communicated to clients?
 - How does the company ensure any of the changes made are legally binding?
- The sophistication of the billing system and whether this can easily be updated based on changes made to underwriting needs to be considered.

For a book work question part (i) was poorly answered. Most candidates got some marks but few scored full marks.

Part (ii) was generally poorly answered. Candidates who mentioned different data sources without outlining what data could be used in underwriting did not do well. Another mistake made by candidates was focusing just on initial underwriting or data used to determine the risk premium and not data that could be used for continuous underwriting. The majority of candidates did not generate enough points to score well.

Performance in part (iii) was generally better than on parts (i) and (ii). However, candidates generally didn't generate enough relevant points or provided too much detail on the same point.

QUESTION 4

i. Methods for allocating capital:

- Percentile method
 - Used when capital requirements are derived from simulations. The simulation that provides the capital requirement is examined and assessed for what the loss in the simulation was made up of...
 - For example, if 10 000 simulations are run then the one that results in a 1-in-200 loss (I.e. the 50th worse result) is assessed to see how the capital requirement is derived from the various business units...
 - In practice, the insurer may use a range of the scenarios around the capital requirement scenario to inform the ultimate capital allocation so as to reduce the volatility that may arise from selecting a single scenario. Other practical considerations include the need for sufficient data in order to build distributions to be used in a stochastic model.
- Marginal capital method
 - AKA the “last in” method. Capital is allocated with reference to the marginal capital requirement that each business unit adds. I.e. this is the resultant capital requirement that the business unit would produce were it to be added to the business.
 - A downside of this method in practice is that the marginal capital requirement would depend on the order in which the business unit was “added in”. Diversification benefits allocated to a business unit would depend on what other business units has been considered prior to it.
- Shapley method
 - An extension of the marginal capital method which allocates capital based on the average of its marginal capital requirements. I.e. the average of the marginal capital requirements that arise from adding the business unit first, second, third etc.
 - The practical advantage of this method is that the capital allocation is not dependent on the order the business unit is considered. However, it may not be feasible for a large amount of business units, as the number of scenarios to be considered is the factorial of the number of business units considered.
- Proportions method
 - Capital is allocated to each business unit in proportion to its contribution to the risk metric on a standalone basis. These standalone amounts are then divided by the sum of the amounts and these proportions are applied to the total capital amount allowing for diversification.
 - Practically, this can provide a simple and transparent expression of how risk translates to capital required. Given that the total sum of the individual risks should be larger than the diversified capital amount, this credits each unit with a diversification benefit

ii. Suitability:

- Given the large number of business units, the Shapley method will likely be too computationally intensive to be feasible.
- The marginal method will not fairly distribute diversification benefits (which there is a large potential for due to the large number of lines of business).
- Given that the capital models are deterministic, simulating scenarios for the percentile method becomes difficult. A percentile method may be used if the diversification and correlation between different businesses is explicitly modelled in the deterministic models.
- The proportions method will provide an easier way of allocating the capital based off each business units' contribution to risk and could be suggested.
- However, several methods may be tested and the results assessed. Ultimately the method which provides stable capital charges, is objective, easy to understand and explain, representative of the risk posed to the insurer, and is capable of independent verification would be selected.

A significant number of candidates misread part (i). The question required candidates to apply bookwork methodologies.

Some candidates showed a lack of understanding of the proportions method and how to arrive at the proportion to be used. Many gave methodologies such as taking the proportion of the total capital per business unit and applying that to the total capital. Without additional explanation of how such figures would be calculated – this methodology is essentially a percentile method and not the point of the proportions method.

To score well candidates needed to display an understanding of how diversification plays a role in capital allocation. This was often missed when candidates wrote on the marginal and Shapley methods. The idea being that the Shapley is more computationally intensive but more fairly allocates diversification benefits where the marginal, less fairly, provides this benefit to business units added later.

Poor marks in (ii) showed some candidates' lack of understanding of what each of these methods actually entail. Many candidates appeared to forget the whole reason that capital is held in the first place.

QUESTION 5

i. Product characteristics:

- Benefit: Indemnity cover to fully reinstate a property (including the cost of clearing away debris, repairing and rebuilding) to the same condition it was in prior to the earthquake. This property value will be less than the market value of the property as it excludes the value of the land on which the building sits as that is unlikely to

be damaged during an earthquake. Benefit is likely to be real in nature allowing for labour and material cost inflation.

- Basis for cover: Likely a losses-occurring policy to prevent people from only taking up insurance after they have had property damage. The insurer will only want to pay claims for those that took up insurance prior to an earthquake to prevent anti-selection, additionally the allowable claims will be related to a peril related to the earthquake itself or the damages following afterwards (e.g, a fire or explosion resulting from damage during the earthquake).
- Claim characteristics:
 - In terms of severity: there will be a large concentration of exposure (as this is a catastrophe product) with an accumulation of large payments where there will likely be larger payouts for more severe earthquakes.
 - Frequency: Earthquakes will happen largely randomly. However, given that the country is in an earthquake region, this will happen more frequently than global averages.
 - Delays: Claims are going to be accumulated around earthquakes and as such notification of claims may be delayed as people are dealing with the aftermath of an earthquake. However, reporting delays should be relatively short as people would want to be able to live in a house and have a place of work. There may be settlement delays as there will be a large administrative burden on the insurer to process and verify claims. These delays may lengthen the otherwise short-tailed experience that would be expected with property insurance.
- Other terms:
 - The principle of average may be applied to contracts (particularly residential contracts) to prevent underinsurance or enable insurance premiums to remain affordable in the event where an individual cannot afford the premiums associated with covering the building fully.
 - First loss contracts may be applicable for the commercial contracts if it's believed that an earthquake may not affect the entirety of a building (e.g. a large warehouse).
 - Exclusions are likely to apply around damages that are created by individuals following an earthquake (e.g. riots and looting, or fraudulent damage instigated by the insured).
 - An excess or deductible may be applicable to prevent smaller claims which could otherwise increase the administration burden of claims following an earthquake.
 - An 'hours clause' may be instated in contracts which results in the insurance only paying for damage that occurs for a certain amount of time after an earthquake happens (e.g. 72 hours) and allowing for aftershocks of an earthquake.
 - Limits on cover may be applicable. Where the policy only covers a portion of losses for both residential and commercial policies
 - There may be limits on the types of earthquakes that could be claimed for. There may be conditions that an earthquake, for example, must be greater than a certain number on the Richter scale. This would help reduce small claims and reduce the claims coming from poorly built buildings which would be more likely to be damaged than up-to-code buildings during smaller earthquakes.

ii. Possible rating factors:

- Location of building – this would influence how likely the building is to be affected by an earthquake (certain regions are at higher risk). Policies could be priced relative to earthquake zones.
- Property value – this would influence the severity of the risk. This value would exclude the value of the underlying land as this is unlikely to be damaged by an earthquake. Additionally, this insurance is aimed at repairing buildings and would therefore not want to include land value as it would make the insurance unnecessarily more expensive.
- Type of building – different buildings are at different risks. A residential house vs. a skyscraper vs. an industrial warehouse storing chemicals.
- Building construction – different materials used in the building's frames and foundations would impact the severity of claims as better built buildings are less likely to be affected by an earthquake.
- Building size – the number of floors will have an impact on how severe the impact of an earthquake might be.
- Age of building – the older the building the more likely it is to be at risk of being damaged from an earthquake.
- Building condition – this would look at the structural soundness of a building as well as if it adheres to all relevant building codes and standards. A less effective but potential rating factor could be segmentation by engineer used. Some rating system for ranking engineers would need to be considered and this may outweigh the alternative cost of underwriting and quality checking the building, but it may be considered
- Deductible/excess – the higher the deductible or excess, the lower the premium.

iii. Possible reasons:

- Shift costs and risk from government: When an earthquake does occur, the government currently has to step in to provide relief to affected individuals. By creating an insurance company, it could move this burden to the insurance market. In doing so, the insurer will provide support to the economy and the government will only have to step in if reserves are too low. As such, it reduces its exposure to earthquake catastrophes.
- Improved protection and take-up rate: Assistance provided by government to uninsured parties has been limited. The government has identified that the private market is not providing adequate products (hence the low take-up rate). In creating an insurance company dedicated to providing this type of cover, it hopes to be able to provide more people with cover.
- More data and fair premiums: The government may have more granular information on the past timing of earthquake events along with the cost of these events across the country. As such, it may be able to price for the risk better than private insurers and provide policyholders with fairer premiums.
- Economies of scale: Given that the government would be able to provide this insurance product to the entire country, it may be able to better diversify the risk as compared with the ability of a single insurer. This would make insurance more

affordable and could improve take-up rates. Additionally, if the insurer becomes large enough it could negotiate more favourable reinsurance terms than could an individual insurer.

- Access to reinsurance: Private insurers may have limited access to reinsurers, while the government may be in a better position to obtain adequate and cost-effective reinsurance.
- Affordability: Given that the insurance company is set up under the government and its sole purpose is to provide insurance to the populus. Given this decreased profit motive and the ability to leverage the economies of scale (and the ability to better price based on the solidarity principle) mentioned above, the premium rates may be more affordable than were the private market to provide it.

Part (i) was a surprisingly poorly answered question with candidates giving vague, generic answers where they needed to relate bookwork elements to the scenario at hand. Strong candidates were able to provide a breadth of characteristics particularly around specific contract items that may relate to this type of catastrophe insurance.

Common mistakes included::

- *Stating that the value to be insured would include the value of the land itself. This is unlikely since the land is unlikely to be damaged by an earthquake and its inclusion would make pricing more complicated and unnecessarily increase the premium;*
- *Not relating the answer to the given scenario when referring to severity and frequency (While earthquakes may be relatively infrequent globally, is that the case here? Additionally, the idea that there is an accumulation of risk is specifically relevant here since the insurer will be insuring the citizens from a single country).*
- *Failing to make answers scenario-specific relating to reporting and settlement delays. After a catastrophe people may be injured or there may be no electricity due to infrastructure being affected – extending reporting delays. Additionally, if there is too great a volume of claims that can be effectively managed by the insured then settlement delays may also be lengthened substantially.*

Part (ii) was generally answered well. Several candidates, however, did not adhere to the correct command verb and proceeded to list and not outline items.

Part (iii) was generally poorly answered. Candidates who scored best thought logically through various reasons for the establishment of such an insurer and how this was preferable to the alternative.

Many candidates made the argument that the government may be doing this out of care or for political gain. This, however, is irrelevant if candidates do not first argue that creating an insurer would still be cheaper than them providing the current level of financial assistance. Some candidates based much of their answer on assumptions, such as there being political instability or the insurance being compulsory, which were not provided in the question.

QUESTION 6

- i. An event, peril or cause defined within the policy document as being beyond the scope of the insurance cover.

Examples include exclusions around: pet damage, fraudulent claims, damage resulting from illegal activity.

- ii. a. Claims experience risk:

- Variability in size and frequency of claims: the blackouts pose the risk that the size of claims change when compared with those priced for. For example, there may be additional arson claims under building insurance as there may be increased fires due to appliance faults and heaters that were left turned on. There may be increased risk of road accidents as power outages at traffic lights cause traffic problems.
- Delays: power outages may increase delays in notification and settlement of claims. Policyholders may be unable to claim immediately if they do not have access to digital claim systems while the power is off, there may also be administration delays on the part of the insurer if they do not have the ability to process claims while the electricity is off).
- Types of policy and cover provided: policyholders may be purchasing various items to assist them through the blackouts (invertors, universal power supplies, and solar panels) and adding these to their building and contents cover. This may change the underlying claim characteristics.
- Characteristics of policyholders: Given rising household costs, policyholders that believe they would get value from the insurance are more likely to keep their insurance policies. This would worsen anti-selection effects.
- Attitudes of policyholders to claiming: As economic pressures worsen in a depressed economy (resulting from the blackouts), people may be more likely to try to claim fraudulently.
- Crime rates: With blackouts affecting security systems, and potential economic pressures, crime is likely to increase resulting in increasing claims on motor and contents insurance.
- Accumulation of risk: If the insurer has a geographically diversified portfolio then the risk of potential accumulations may be reduced as blackouts may not affect the entire country simultaneously. However, there is a chance of an accumulation of claims where there is a nation wide power outage or if the book is concentrated in a region. Power outages may accumulate risk as crime in an area without power increases and there is an increased risk of motor accidents.
- May be a change in reinsurer behaviour, premiums and cover available for this type of risk.

b. Expense risk:

- A risk of higher expenses than allowed for in the premium due to:
 - Unexpected costs to the insurer due to the need for mitigation measures (e.g. costs associated with buying a generator or installing solar panels for the insurer to continue to operate during the blackouts).
 - Restricted electricity will likely result in supply side inflation which will increase the costs of claims as building costs, vehicle parts and the value to replace moveable contents increases.
 - it will also increase the costs of the insurer as inflation will affect it as well.

c. Investment risk:

- Due to increased uncertainty in the local market, market conditions may worsen significantly for local assets.
- There may be mismatching between the insurer's assets and liabilities as increased claim volatility shifts the timing of its liabilities out of line with the timing of assets. This could result in increased liquidity risk.
- International capital markets may see the recent developments unfavourably for the local insurance market, making raising debt more expensive.
- Investment returns may decrease due to increased credit risk in the market. With increased level of defaults to be seen as counterparties are likely to experience financial strain due to the blackouts.

d. Business risk:

- Failure of third parties: With decreased economic activities, there will be financial pressures on external suppliers, and third parties. As such, there will be increased counterparty credit risk
- Timing risk: delays in claim settlement and administration issues resulting from the blackout will result in timing differences when compared with the past.
- Competition: There may be other insurers that go insolvent due to the economic pressures resulting in higher new business for this insurer, placing new business processes and staff under pressure and increased risk of errors.
- Operational risk: There could be increased operational risk as the risk of administrative failure will increase if systems fail to work as the blackouts occur (e.g. inability to access systems, or systems failing to sync).

iii. Considerations:

- Consideration needs to be given to what competitors are doing in the market. If this is not market practice, then it may result in reduced new business, fewer renewals and lapses.
- Consider how any increase in lapses or reduced new business may change the mix of the book (e.g., any anti-selection effects).

- Consider whether this could lead to reputational risk as the insurer may then lose market share – not just on their household policies but potentially across all lines of business.
- Consider whether the exclusion is legally permitted and whether there is any legal precedent around courts overruling similar policy exclusions.
- Consider whether the associated reduction in claims following the exclusion outweighs the potential loss of business. Or alternatively if it outweighs the cost of having to assess the claims.
- Consider the effect of not being able to apply the exclusion to the in-force business.
- Consider how long the rolling blackouts are expected to continue – if they are temporary and conditions are expected to normalise in a short while, then the exclusion may not be worth implementing owing to the increased administrative burden and potential loss of business.

Part (i) was generally well answered. However, some candidates could not give a general exclusion that would be considered standard. Some candidates made their exclusion South Africa specific (e.g. referencing loadshedding). The question asks for a standard policy, therefore, answers should be location agnostic.

Candidates did surprisingly poorly in part (ii). Many were unable to generate a sufficiently diverse range of points along with the fact that few were able to effectively apply bookwork lists to the scenario at hand. Many candidates failed to grasp the concept of what a risk is. Risks arise due to the fact that experience may be worse than expected for the insurer – if something is expected then the risk can be managed (hopefully) away. Candidates that scored best were able to critically assess the idea of what experience is expected and how the scenario pose risks due to it resulting in unexpected or worse than expected outcomes. For example, depressed economic growth due to the blackouts leading to depressed asset values is not in itself a risk if it were managed – the risk arises that the insurer will have to sell its assets at values less than expected.

Candidates generally scored well in part (iii). However, many wasted time by giving more than the 4 factors asked for in the question – when 4 factors are asked for, only the first 4 provided by the candidate are marked.

QUESTION 7

i. Key strengths:

- The method can be applied to a wide variety of sets of data.
- Provided the data can be arranged into a development triangle, the chain ladder method can be used to project it to ultimate.
- The basic method can easily be modified to allow for data distortions.
- The method is conceptually straightforward and it is easy to relate results back to the pattern of development.
- The method can be developed to serve as a starting point for a number of other methods, for example the Bornhuetter-Ferguson method.

- There is no need to make an explicit adjustment for inflation, as the BCL makes an implicit allowance for inflation by assuming that the inflation observed in the past will continue in the future.

Key weaknesses:

- If past inflation is not a reliable guide to future inflation e.g. if there was a step change in courts' awards inflation affecting liability claims, then reserves will be inaccurate.
- Limited use for recent cohorts, particularly for long tailed classes, for example liability, where a large proportion of the claims cohort is not developed.
- Results can be distorted by unusual claims experience. This includes large claims, catastrophes, changes in claims handling procedures, business mix, policy terms and conditions etc.
- If the claims triangles used are net of reinsurance, then the results can be distorted by changes in reinsurance arrangements.

ii. Factors:

- Inflation assumptions made:
 - The extent to which past and future reserving inflation assumptions used in the inflation-adjusted Chain Ladder are impacted by higher consumer price inflation.
- Insurance class:
 - The extent to which reserving inflation assumptions are impacted by an increase in consumer price inflation depends on the insurance class.
 - Property claims will tend to increase in line with consumer price inflation, while the repair of property or vehicles will be linked to earnings inflation which may differ from consumer price inflation.
 - Liability claims are generally subject to higher levels of inflation, especially for personal injury claims. These claims tend to increase in steps following court awards and are also linked to medical expense inflation for medical care and nursing benefits. Liability claims are also linked to earnings inflation, due to loss in earnings.
- Duration of liabilities:
 - The longer the reporting and settlement delays the more impacted the claims will be following an increase in consumer price inflation.
- Discounting:
 - If discounting is used to calculate the claims reserves then the impact of higher inflation assumptions will be reduced.
- Expense Inflation:
 - Claims reserves will include an allowance for direct and indirect claims handling costs which will be subject to inflation.
 - The impact of inflation on the claims reserves will thus also depend on the impact that inflation has on the projected claims handling costs, and the proportion these represent of the total claims reserves.

- Other:
 - High inflation may lead to an increase in fraud which will increase claims and hence the level of claims reserves.
 - The impact on claims depends on the structure of products for example fixed benefit products won't be impacted by an increase in inflation.
 - The overall impact on claims will depend on the proportionate mix of property and liability claims since these classes will react differently to an increase in consumer price inflation.

iii. Points which could be included:

- The claims reserves are calculated at least at the 75th percentile, thus there is an explicit margin to allow for claims to be higher than those expected in the best estimate claims reserves.
- The claims reserves are reviewed by external auditors, and our internal peer review system provides additional comfort.
- Any recent changes in inflation should be incorporated into the claims reserves, as these are calculated quarterly, and draw on the company's internal expertise via quarterly meetings with the claims and underwriting Teams.
- The analysis of experience performed, where assumed claims experience is compared to actual experience, acts as a safeguard to ensure that actual claims experience doesn't deviate materially from assumed experience on which the reserves are based.
- The company, being large, will have large amounts of data which improves the accuracy of the selected actuarial reserving methodologies.
- The inflation-adjusted chain ladder method makes explicit inflation assumptions which should reflect the latest available inflation expectations, and so the claims should make full provision for any changes in inflation expectations.

iv. Claims reserve:

Accident Year	2019	2020	2021	2022	Total
Ultimate Loss Ratio	70%	71%	73%	77%	
Claims reserves	25	96	140	198	458

Part (ii) was bookwork and candidates performed well. Marks were not awarded twice for repeating the same point in different ways. For example, stating that the chain ladder method works well with large volumes of data (strength) and that the chain ladder requires large volumes of data (weakness).

Candidates generally did not perform well on part (ii), which required application.. Candidates who performed well generally identified that claims are subject to different types of inflation, and considered how the inflation assumptions used in the inflation adjusted chain ladder method may be affected by an increase in consumer price inflation.

Some candidates ignored the fact that the inflation adjusted chain ladder method was used and answered the question based on the basic chain ladder method, which did not score marks. Candidates also did not gain any marks for discussing the impact of inflation on interest rates and asset values, unless this related to the discount rate used to calculate claims reserves. Some candidates discussed the impact of inflation on premium rates, which did not directly relate to the claims reserves and so did not score any marks.

Candidates' performance on part (iii) was mixed. Candidates who scored best used the information about the reserving process and methodology, i.e. inflation adjusted chain ladder, provided in the question to generate marks.

Performance in part (iv) was varied. Several candidates failed to follow the general instruction to show all calculations. This resulted in marks being lost (even where a final answer may have been correct).

QUESTION 8

i. Accounting concepts:

- Going concern: The enterprise will continue in operational existence for the foreseeable future.
- Accruals basis: Revenue and costs are recognised as they are earned or incurred, not as money is received or paid.
- Consistency: There is consistency of accounting treatment of like items within each accounting period and from one period to the next.
- Prudence and realisation: Revenue and profits are not anticipated (that is, must be realised), and provision is made for all known liabilities, whether the amount of these is known with certainty or is a best estimate in the light of the information available.
- Separate valuation of assets and liabilities: When determining the aggregate amount of any item the enterprise must determine separately the amount of each individual asset or liability that makes up that item.

ii. Ratios:

Profitability (any two):

- Loss ratio = Claims incurred / Premiums earned
 $= 450 / 500 = 0.9$
- Profit margin = Post-tax profit / Premiums earned
 $= 20 / 500 = 0.04$
- Return on capital = Post-tax profit / Shareholder funds at start of year
 $= 20 / 200 = 0.1$

Financial strength:

- Assets to Liabilities
$$= 450 / (450 - 250) = 2.25$$
- Solvency ratio = Total shareholder funds / Premiums written
$$= 250 / 500 = 0.5$$

Assume premiums written = premiums earned (i.e. no change in UPR)

iii. Possible reasons include:

- Other insurers have made the switch and the insurer wishes to be in line with the market.
- The insurer may wish to reduce uncertainty of future claims, particularly exposure to latent claims.
 - Reporting delays may be reduced, as policyholders will need to report claims before the end of the cover year.
 - Reduced uncertainty should lead to reduced solvency requirements.
 - Setting up claim reserves should be easier.
- Profits can be calculated quicker.
- There should be less scope for costly legal action between insurers to determine who is liable for any particular claim.
- Reinsurance may only be available for cover sold on a claims-made basis, so the insurer is aligning to reinsurers' requirements.

iv. Impact on investment strategy:

- The impact of changing the basis of cover for new business is a reduction in the tail of liabilities, confirmed by the accounting disclosures:
 - Outstanding claims / Claims incurred = $80/400 = 0.2$ (2021)
 $= 50/450 = 0.11$ (2022)
- This suggests that claims-made contracts probably exclude claims arising prior to 2022.
- Assets backing liabilities for new business will therefore be invested for a shorter period.
 - Assets will need to be more liquid than before with more stable prices.
- Liabilities remain linked to various forms of inflation (e.g. legal and medical).
 - Suitable matching assets include index-linked bonds and possibly equities, however the shorter investment horizon will require more defensive shares.
- The insurer will still have a substantial proportion of liabilities on a claims-incurred basis, which will have a longer tail, so the insurer will need to monitor the mix and adjust investments accordingly .
 - Matching assets for claims-incurred liabilities will be similar to above, however the longer tail enables the insurer to invest in more volatile assets (i.e. less need for defensive type shares).
- Insurer expenses remain linked to inflation and are best matched by real-return assets.
- Overall strategy is influenced by a number of other factors ,for example:.

- The level of free reserves determines the extent of mismatching that can be adopted.
- Regulations may stipulate prescribed assets that force a mismatched position.

Overall performance was disappointing on this question.

Part (i) was basic bookwork, and a surprising number of candidates did not do well.

Part (ii) was a very basic bookwork and application question, and again many candidates did poorly. Many thought ROCE is a financial strength ratio.

Part (iii) was poorly done due to candidates not answering the question asked. Many candidates explained the claims-made basis, but failed to explain the reasons or benefits for the insurer choosing to make the switch to this basis.

As with part (iii), part (iv) was poorly done by many candidates providing features of a claims-made basis without making the link to investments, and making points not related to the question asked. Many suggested an immediate switch to short dated assets, with various implications for selling long-dated assets, but ignored the point that existing outstanding claims may still have a long run-off and long-term assets are needed to match those liabilities.

END OF EXAMINERS' REPORT