

# **INSTITUTE AND FACULTY OF ACTUARIES**

## **EXAMINERS' REPORT**

September 2012 examinations

### **Subject SA3 – General Insurance Specialist Applications**

#### **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.

D C Bowie  
Chairman of the Board of Examiners

December 2012

### **General comments on Subject SA3**

Consistent with previous examiners reports, we would encourage candidates to read the question properly and take the time to think about what is going on.

Candidates should always work on the assumption that the question wording has been carefully chosen. It is therefore essential to read the question properly.

In general, the questions have been worded to limit the scope of the answer required so that it is feasible within the time constraints of an examination.

Wording of question sections should also be considered in the context of the position within the overall question. Where new question information is provided between sections, candidates should recognise that this information is specifically relevant to the following section or sections. When answering preceding question sections, candidates should not consider any subsequent information in their answers (although may cover similar ground).

Various examples from this paper of recurrent failure to read the question are below.

On the second issue, candidates should note that SA3 is, as with all SA papers, a key paper at which we test their broader thinking. This is generally the final paper before qualifying as a professional, and we consider a capacity for broader thinking to be one of the best indicators of a candidate's suitability to act in a professional capacity once qualified.

As such we aim to design exam papers so that it is difficult to pass without displaying some capacity for independent and broad thinking, as well as to reward instances where these skills are displayed. When reviewing past papers, candidates should assume that the marks available for the less important generic points are less than those awarded for the most important points and for points that would be the mark of high quality professional insight in a practising actuary. Marks available for list items from bookwork are lower still.

We strongly recommend that candidates step back and take the time to consider thoroughly what is actually going on in question situations proposed rather than simply considering numbers to be analysed with standard techniques. For example, candidates should take into account what the claims are for in a particular class of business, considering factors such as what actually causes the claim, who brings the claim, how it is dealt with once brought, what makes one claim small while another is substantial etc.

This more grounded, real world perspective will help candidates to consider such things as the practicalities, stakeholders involved and their potentially diverging objectives, wider impacts, regulatory or ethical issues, inappropriateness of certain actuarial techniques for the specific situation, current economic or cyclical effects etc. This is likely to lead to significantly broader point generation (and indeed reflects the thought processes of the examiners in drafting the questions and solutions) and a more rounded understanding of the underlying risks and dynamics which should also be of value to candidates when dealing with different stakeholders in their professional life.

Again, some examples of this failure to think more widely on the current paper are below.

More generally, we would also advise candidates to employ basic exam techniques such as well structured answers and effective time management.

### **Comments on the September 2012 paper**

At an overall level, performance on the paper was reasonable, reflected in an above average pass rate (although in line with recent sessions).

Looking at individual sections however, the performance was significantly more mixed. In general, question 1 was better answered than question 2. This is unsurprising, question 2 tested higher order skills and the wider social, political and economic context of insurance which candidates tend to underperform on. Question 1 however tested core reserving skills, most likely playing to the strengths of a number of candidates (with reserving still appearing to be disproportionately represented among the skill sets). In spite of that, a number of sections of Q1 were still answered poorly.

- 1**
- (i)
- (a) **Perceived shortfall**
- The apparent shortfall could be published in an analyst report
  - This could generate concerns as to the true financial position due to fears of a strengthening of reserves
  - Negative market comment and concerns could result in sell recommendations and a fall in the company's share price
  - The negative market comment and concerns could result in a downgrading in the company's credit rating
  - The company's ability to raise debt could be materially impacted with implications for any funding requirements or growth aspirations
  - The company could become a target for a takeover bid
  - Concerns over senior management may lead to demands for an overhaul of senior management
  - The issues may trigger concerns and re-assessments of other insurance companies and hence have a negative impact on the whole of the insurance sector
  - The developments would most likely result in regulatory investigations and formal reviews to assess the viability of the company
  - The shortfall is unlikely in isolation to have a material impact on the company's solvency position. However, if this is combined with market weakness, and forced management actions this could have detrimental capital implications.
- (b) **Recognised shortfall**
- Overstated profits are prematurely distributed, leading to future problems meeting liabilities
  - the insurer pays too much tax in the short term
  - premiums will be reduced below profitable levels
  - profit commission will be overpaid
  - Incorrect reserving will affect reinsurance arrangements, with incorrect estimates of recoveries and inappropriate premiums on renewal.
  - The company may need to issue a profit warning
  - The company may need to restate the 31 December 2011 financial results
  - All of the above impacts
- (ii) **Data**
- Quarterly developing data
  - Incurred data
  - Reported/Settled Claim numbers
  - Reopened claims
  - Market data (e.g. Loss ratios)
  - Average costs

- Motor split by:
  - TPL
  - damage
  - peril (windscreen damage, freeze, flood etc)
  - comprehensive/non-comprehensive
    - motorcycle
- Household split by
  - contents/buildings,
  - peril (theft, escape of water, freeze, flood, subsidence, accidental damage etc.)
- Attritional, large, cat
- Separate gross and reinsurance data
- Distribution channel
- Indemnity and expenses split
- Nil settlements
- Aim is to split the data into appropriately homogenous groups
- Exposure data e.g. vehicle years, sums insured
- Premium data
- Individual claim amounts
- Underwriting data e.g. Initial Expected Loss Ratios

(iii) **Quarterly data**

- allows you to observe and allow for seasonal patterns
- annual factors may absorb or mask these and if there has been a change, it would not be possible to allow for it
- may be useful for the selection of the current year estimates, providing more data points and analysis potential
- more data points, however may also mean greater volatility in introduced in the results

**Incurred claims**

- Contains more information than paid loss alone
- Particularly useful for longer-tail classes
- Preferable if changes in settlement rates have led to distortions in the payment data which could lead to over/under-estimation of provisions
- Allows you to observe and factor in any changes in claims handling processes

**Claim numbers**

- When combined with average costs, allows use of ACPC methods
- Allows additional information on claim numbers to be allowed for
- For example, an increasing trend in nil claims might not be discernible from the paid data. This could mean that provisions are over-stated

- Any changes in settlement or reporting practices can be observed in more detail and allowed for as appropriate.

#### **Market data**

- Market loss ratios could be applied, particularly in segments of the business where the internal data is unreliable
- For any segments of the business not impacted by claims handling changes, market loss ratios may be a useful benchmark particularly for the more recent most under-developed accident years, removing the impact of any distortions or random variations
- Market share may be used to provide a reference point or alternative estimate in relation to a particular event e.g. weather event or change in regulation. This may generate a different estimate to that produced by the data as the particular features or scale of the event may result in inappropriate results if aggregated data triangles are used.
- For those segments that have been impacted by claims handling changes, it may be possible to apply a high level adjustment to loss ratios to reflect the expected impact of the initiative
- Market loss ratios may be used in conjunction with adjustments to allow for rating changes which may be different to the market experience.
- The aggressive rating may result in a change in the mix of business and deteriorating claims experience. Projecting the high level aggregate data may not reflect any such deterioration, whereas benchmark data can provide a way to make this allowance.

#### **Average Costs**

- When combined with claim numbers, allows use of ACPC methods
- Allows you to observe and allow for varying costs of settlement by different segments of business
- A change in mix of business for Motor for example may mean higher average costs.
- Offsetting this may be an expected reduction in average costs as a result in the accelerated settling of claims
- Aggregated data would potentially mask these effects
- Explicit claims inflation assumptions can be applied to the average costs. Impact would depend on the assumption and how different this is to the implicit assumptions contained within the aggregated data.

#### **Motor splits**

- Any change in experience due to a change in mix will be more accurately observed and allowed for by analysing the data in more granular and homogenous risk groups
- Analysis may tend to underestimate these impacts
- To the extent that the claims initiatives have been applied to specific claim types e.g. BI or claims in respect of certain legal entities or distribution channels, the impact will be more accurately observed and allowed for by analysing the data at the same level

### **Household splits**

- Any weather events will be better allowed for by separate analysis e.g. freeze events/cats.
- To the extent that the claims initiatives have been applied to specific claim types e.g. fire or claims in respect of certain legal entities or distribution channels, the impact will be more accurately observed and allowed for by analysing the data at the same level

### **Attritional/large/cats**

- The prevalence of large claims or multiple claims from weather events may lead to over-inflated estimates when using the aggregated data.
- By stripping out cats and large claims, these can be allowed for separately.

### **Gross/reinsurance**

- Any changes in reinsurance will be better allowed for by analysing the gross and reinsurance data separately
- For example the impact of a reduction in retention levels may not be discernible from the aggregated data and may result in over-projections.

### **Distribution channel**

- Different distribution channels may specialise in particular risks with different patterns e.g. older drivers
  - Performance may be known to be markedly different and require for example use of different loss ratios
- More (or less) data may be available for a given distribution channel. More granular analysis will therefore be possible, rather than reverting to the lowest common denominator of available data

### **Indemnity and expenses split**

- Any claims expense drives will be better reflected by separate allowance
- Separate treatment would allow different methodologies and assumptions to be applied e.g. future inflation

### **Nil settlements**

- Any changes impacting the number of nil claims could have a material impact on the provisions.
- A change in claims handling practices may specifically seek to drive out more nil claims (e.g. by tackling fraud).
- May affect older or larger claims
- Beware impact on re-opened claims however

### **Exposure data e.g. vehicle years, sums insured**

- Aggregate data may not show evidence of a change in exposure.
- Changing exposure in different risks could be reflected by using average cost methods and may lead to different results

**Premium data**

- May be used as a proxy for exposure
- Granular premium data applied to loss ratios can give an alternative estimate, particularly where other approaches are not appropriate e.g. current accident period

**Individual claim amounts**

- Can allow for the specifics of the particular claims
- Allows additional information to be reflected
- Complex or larger claims may distort data triangles, so better removed

**Underwriting data e.g. Initial Expected Loss Ratios**

- Allows additional information to be reflected
- May be more insightful than aggregate data<sup>1/4</sup>
- Especially for more recent accident periods or where data is sparse

(iv) **Methodologies**

- Paid chain ladder
  - Cumulative paid losses are grouped by accident year and payment periods (e.g. quarterly) to obtain a triangle of data
  - A corresponding triangle of development factors is obtained by calculating the development ratios from one period to the next for each accident year and development period
  - Weighted average development factors for each development period are calculated allowing for any trends/outliers as appropriate and applied to the cumulative paid loss for each accident year to obtain the estimated ultimate loss for each accident year
  - Adjusting individual development factors (e.g. removing outliers) will also lead to a different result
  - The selected factors can be averaged over different periods – greater weight may be given to more recent periods and a shorter average period assumed which may lead to a different result (e.g. to allow for changes in settlement rates)
  - tail factor will be required for the longer tail classes e.g. Motor BI
  - could be selected using curve fitting techniques, or benchmarking, or through consideration of incurred loss and likely redundancy/sufficiency
  - If performed on more granular data, results may be very different to those based on aggregated data
- Incurred chain ladder
  - Method as above but Incurred claims (paid plus case reserves) data used instead of cumulative payments
  - Use of case estimates means additional information is incorporated
  - Development patterns will be affected by any changes in claims handling practices

- E.g. if cases estimates are increased at a given date following a claims handling review this would lead to higher development factors which would lead to increased projections if left unadjusted
- If performed on more granular data, results may be very different to those based on aggregated data
  
- Inflation Adjusted chain ladder
  - Triangles of incremental payments are converted to current prices by applying historic claims inflation rates to each calendar period (diagonal) of payments – will vary by block of business
  - Appropriate assumptions on future inflation also required. Consider
    - external, economic references
    - internal assessments e.g. for pricing studies/plan projections
  - Requires an assumption about when the payments are made in each development period (e.g. midway)
  - If future claims inflation is expected to be markedly different from implicit past inflation, this approach will lead to different results
  
- Average cost per claim
  - Triangles for claim amounts (e.g. Incurred) and claim numbers (e.g. reported claims) are generated as above
  - Average claims triangle is obtained by dividing one by the other, and projecting to get the ultimate average claims cost for each accident period
  - Claim numbers are also projected to get the ultimate claim numbers
  
  - The product of the ultimate claim numbers and the ultimate average claims cost gives the projected ultimate cost for each accident period
  
  - Subtract the cumulative payments to give the reserves
  - Could also use paid loss and no of claims settled
  - Any variation in average costs may lead to different results e.g. change in mix may result in a different profile of business with a different expected average cost
  - Also will allow for any distortions in reporting patterns
  
- Bornhuetter Ferguson
  - Determine initial expected loss ratios, by reference to external benchmarks or pricing exercises for example
  - Apply development factors determined as per the paid or incurred chain ladder described above, to obtain an estimated incurred to date/paid to date
  - Difference the two to obtain the estimated outstanding
  - A credibility approach which gives greater weight to the prior information (development data) where that information is greatest (the older accident periods) and greater weight to the external/alternative data (loss ratios) for the more recent accident periods
  - Maybe more useful particularly for the more recent underdeveloped years

- May produce different results if the external view is markedly different from that generated by standard development factors
- Exposure based methods
  - Bottom-up: claims assessed by claims experts on a policy by policy basis exposures and extent of any claim having regard to policy limits and excesses
  - Top-down: apply estimated market share to estimated market losses
  - Useful for estimating large losses or for events where an early estimate is required and little internal data available
  - If large losses are projected along with the attritional data, it could lead to over estimation of the costs

(v) **Alternative Methodologies**

- Berquist Sherman
  - Development patterns are adjusted for changes in settlement patterns or case reserve adequacy by restating historical development data to be on the current basis
  - useful where there has been a change in the rate of settlement
- Expected loss ratio method
  - Apply selected loss ratio (claims per unit of exposure) for each accident period to the total exposure
  - Simple approach which may be used if data is scant, for recent accident years or may be used as a check on other approaches
  - Source of loss ratios includes underwriter view, business plan, market benchmarks
  - Subject to bias and takes no account of claims experience to date
- Curve fitting
  - Fit curves to premium or claim data using regression techniques
  - Adopt distributions such as Weibull, lognormal
  - Can also use curves to smooth development patterns or select tail factors
- Cape Cod
  - Similar to the Bornhuetter Ferguson method
  - but, instead of an a priori loss ratio, it uses weights proportional to a measure of exposure and inversely proportional to claims development.
- Stochastic
  - Distributions (e.g. ODP, log-normal, negative binomial) can be fit to the data by reference to the first two moments

- Mack Method is an analytical method that reproduces chain ladder estimates and makes no specific assumption about distributions, only assumptions about the first two moments
- Simulation techniques can be used to produce full distributions of outcomes e.g. bootstrapping
- Bootstrapping involves sampling (with replacement) multiple times from an observed dataset in order to create a number of pseudo datasets. The model can then be refit to each new dataset, to obtain a distribution of the parameters.
- Often applied to the ODP model, but can be applied to other models

(vi) **Expected features**

*Household*

- Depending on when in 2010 the business was disposed, would expect to see a reduction in the level of payments to a lesser or greater extent in 2010 flowing through to the 2011 accident year.
- Impact depends on scale of disposal
- Volume impact vs other impacts
- Impact on development factors difficult to predict
- The residual household business may have a different profile to the previous total business. If the residual business has a better claims experience, reported claims and/or average costs may fall, which may mean lower payments in 2010 and 2011
- Development factors may show a different pattern to previous years
- Impacts would also depend on when the claims handling initiatives commenced during 2010 – later in the year then the less the impact
- Nature of the disposal has not been explained:
  - Could involve ceding all incurred liabilities in relation to the disposed business. If this is reflected in the data triangles, then a number of accident years will be impacted
  - Could be still liable for incurred claims and just passing on future business and therefore a less dramatic impact reflecting the loss of business (and share of any claims) arising after the disposal date.
- 2010 and 2011 payments will also be impacted by the claims handling initiative – extent of impact depends on when the initiative was introduced. If late 2010, then minimum impact on 2010 accident year as claims are generally fairly short tail and a large proportion will have been settled in the first year
- Some segments may be completely unaffected. If the claims handling initiative applies to certain types of claims only, then those areas unaffected by the disposal will be completely untouched by the changes.

*Motor*

- Depending on when in 2010 the rate changes started to apply, some increased payments may start to flow through in 2010, but more likely not until 2011 as the reduced rates are earned out.

- Volume impact of reduced rates and also impact of any change in profile due to change in mix
- Potential that the rate reduction may result in poorer risks being targeted with the result of deteriorating claims experience
- Levels of payments may increase for these two reasons
- Patterns may change to reflect the different profile – could be more bodily injury type claims e.g. if there has been an increase in poorer risks, this may lead to more longer tailed claims if there is a consequent increase in the number of bodily injury or larger claims
- Claims handling initiative would expect to have the effect of accelerating claims settlements
- More payments flowing through in the earlier development periods than historically might mean higher paid development factors in the earlier development periods for the 2010 and 2011 accident years
- The effect may be greater for 2011 than for 2010, therefore larger payments in the first 12 months development
- Quarterly developing triangles would provide more insights
- Claims handling initiative may be confounded by the increased volume of payments that may overstretch the claims team and wipe out the impact of the accelerated settlements
- Some segments may be affected more than others; some may not be affected at all depending on which segments are impacted by rating changes and where the claims handling initiatives have been targeting.

*In both classes:*

- There may be an increase in re-opened claims that may start to emerge if there has been a push to settle more claims more quickly.
- The acceleration of claims settling may also have the effect of reducing the impact of claims inflation
- If any second order benefits of the claims handling impact are anticipated in the case estimates then redundancies may be seen in the incurred development factors

(vii) **Observed effects**

*Motor*

- Big increase in paid loss in 2010 accident year in the first development period (39% higher than the amount in 2009)
- After 24 months development, the 2010 payments are 22% higher than the 2009 accident year
- This could reflect volume increase following increased Motor focus. May also reflect deterioration in the business.
- The increase in payments in 2011 relative to 2010 is much less – 8%. This may indicate that much of the volume increase occurred in 2010 and that the rebalancing may have commenced early on in 2010
- The increases may also reflect an acceleration in claims handling

- At 1.303, the 2010 development factor for 12-24 months is significantly lower than all the other development factors at the same point in development.
- Weighted average over all years is 1.452. Even the 2 year average is considerably higher at 1.379.
- Given the stated accelerated claims handling, the low 1.303 development factor is not what might be expected.
- The impact of the accelerated handling may be more prominent in the very early development months, and so not captured in the given data
- The impact of the accelerated handling may be offset by the increased payments due to volume or deterioration
- The influx of claims may have overwhelmed the claims staff and derailed the claims handling initiative
- Potentially a diagonal/calendar effect observed with lower development factors for 2009, 2008, and to a lesser extent 2007 accident years
- This may reflect concentration of claims staff on the deluge of claims from the most recent accident year
- It could indicate more careful screening of settlements i.e. more claims settled for a lower amount or for nil. Analysis of claim numbers would throw some light on this
- Large number of claims for the 2007 accident year, may indicate a weather or other significant event(s)
- Any other notable comments e.g.
  - factor less than 1
  - tail factor required

#### *Household*

- Historically and substantially high payments for 2007 accident year may indicate a weather or other significant event(s)
- 12-month payments stable for 2008-2010, and then substantially lower for 2011. Low payments in line with the stated disposal. Most of the impact felt in 2011 – suggests disposal may have occurred late in 2010.
- Not clear whether all historic payments related to the disposed business have been removed from the data. Drop in 2011, suggests not.
- 2010 payments are up marginally after 12 months development relative to the 2009 accident years: perhaps counter-intuitive given disposals.
- This could reflect
  - some impact from the disposal (if still retaining past liabilities)
  - disposal occurring late in 2010
  - offset by the accelerated settlements
- Falling development factors in the 12–24 month development period since 2008 accident year.
- Low factor for 2010 reflects probably the increased claims settlement
- May also reflect change in development profile of the business not disposed

- Any other notable comments e.g.
  - Any outliers
  - no tail factor required

### Calculations

*Marks awarded for any calculations showing impact of selected development factors on ultimates or provisions.*

*Part (i) was a relatively high scoring question due to the number of potential points on offer, although candidates still frequently did a poor job of distinguishing between perceived and actual shortfalls. For reference – any points relevant to an actual shortfall only offered in part (a) received no marks.*

*Part (iii) was averagely answered. Candidates appeared to focus disproportionately on the granularity of data, rather than considering the wider range of data points on the scope of their influence on a reserving analysis.*

*Part (iv) was a relatively high scoring question as it allowed candidates to describe core methods. Performance was more questionable on the contributions that those methods might make to a discrepancy in projected outcomes however.*

*Part (v) was relatively low scoring with candidates often failing to generate five distinct methods.*

*Part (vi) was the lowest scoring section, with candidates failing to give enough depth or think through all the impacts that the question changes might have on data. This is disappointing as this is a core skill for a reserving actuary.*

*Part (vii) was averagely answered. The higher number of marks available per point to compensate for the time required to scan and interpret the atypical volume of data provided made up for the limited number of points generated by most candidates. Most candidates were able to pick out the key points however.*

- 2** (i) The risk premium is the amount of premium required to cover claims expected for a risk; that is, average claim amount times average claim frequency.

Insurance premiums need to cover the risk premium, commission, any other expenses, premium taxes, and provide a profit loading.

Most homes (96%) have almost nil flood risk

Insurers would be able to charge little or no additional premium to cover flood on these properties.

Insurers would want to keep flood loading to a minimum so as to attract these risks.

If insurers tried to charge more than the minimum, they would expect to lose business to competitors.

Some homes have high flood risk, so would need to be charged higher premiums.

Insurers would not be allowed to charge “excessive” premiums, although it is unclear what this means.

For the minority of homes, premiums would be very high, and would likely be considered unaffordable.

Numerical example, e.g. premium for top 1% of homes would be more than \$10,000, which is large compared to the average income of \$40,000.

However, insurers would not want to charge less than this amount, or would expect to make a loss.

Insurers may not be able to accurately estimate the risk level for an individual property.

If there is thought to be any level of flood risk, insurers may include margins in their premiums to avoid making a loss.

Some insurers might quote very large premiums (>\$10,000 say) unless they think the flood risk is almost nil, so as to avoid taking flood risk in the portfolio.

However, such pricing approaches may be regarded as “excessive” and so not meet the regulations.

Premiums would need to include a loading for catastrophe claims beyond those in the historical data.

Insurers may need to purchase additional reinsurance in respect of catastrophe events, or hold additional capital. These costs would need to be reflected in the premium charged.

(ii) **Advantages of compulsory insurance**

Following a natural disaster everyone would be covered, helping to cover rebuilding cost and reducing individual hardship.

The government would be under pressure to ensure insurance provided good value (and was perceived to provide good value)

This may require further intervention in the insurance market, for example, providing subsidies

Alternatively, government may be decide to invest more in flood mitigation

Where insurance is compulsory, there is potential to cross-subsidise high and low risk properties.

For example, government could allow a small levy on premiums for low risk homes to fund high risk home premiums.

Since low risk householders have no choice but to insure, this scheme would be able to raise the required revenue.

A possible benefit to insurers is increased revenues, and potentially profits. However, this benefit may be minimal as most people insure (for non-flood perils) already.

### **Disadvantages of compulsory insurance**

Some people may not be able to afford to insure.

For example:

- Because they live in high risk properties (where the risk cost is \$2,500 or more)
- Because they have a low income

People would not be able to insure if flood insurance was not available.

There would need to be some way to check compliance, i.e. that everyone had cover.

This would involve expense and, potentially, inconvenience.

Moral hazard – people may build in unsuitable places, given flood cover is likely to be available.

Insurers may be unable to price flood risk accurately and so make losses. Inaccurate pricing may be due to lack of data, insufficient expertise (or other valid reason)

Government may implement pricing controls, given insurance is compulsory. Insurers may consider this to their disadvantage, for example, if government limits profit margins (or other example).

May impact housing market due to additional undesirability of homes where insurance is prohibitive (depending on success of prime minister's proposal to prevent "excessive" premiums")

- (iii) It is unlikely HADI has any flood data at the moment, as it is a small insurer and does not cover flood

The company has no data of its own to price other home insurance perils, for example, fire

The company would need to know the flood risk of any property requesting cover in order to estimate the premium

Householders may be aware if their properties have high flood risk (e.g. because they have recently flooded)

These policyholders would be most keen to obtain insurance (adverse selection).

If HADI did not charge a premium reflecting the risk it would likely make losses.

In particular, HADI would need to be able to identify the high and very high risk properties, as undercharging on these could result in a very large loss.

Limited flood data are available in Aqua, so it would be difficult to obtain external pricing assistance

Very detailed data are necessary to price flood insurance

This is because the level of risk can vary greatly from property to property, even within a small area.

Obtaining the required flood data would likely involve time and expense

Possible sources of flood data include:

- The limited studies prepared to date, which may include flood maps prepared by industry bodies or the government
- Data for other insurances if these cover flood, for example, motor insurance

Even if HADI has some data, estimation of return periods would be uncertain.

This is because

- data would be limited
- there may have been environmental changes over time
- there may have been man made changes over time (e.g. dams, flood protection, building in areas prone to flooding)

Perhaps HADI could offer cover only to properties that were easily identifiable as low risk, for example, homes on high ground.

When providing quotes, HADI could ask whether the home has ever flooded, and refuse to insure if this is the case, or apply a large loading.

However, home owner may be unaware of previous flooding.

Home owner may choose not to declare flood risk.

Some high risk homes may never have previously flooded.

It is unclear whether there are “enormous amounts” of money to be made in providing flood insurance:

- Most homes (96%) have almost no flood risk, so presumably have limited interest in buying flood insurance
- Some low risk owners may purchase cover if they are very risk averse, or are unaware of the low flood risk
- In any case, for low risk properties, the premium per household is low
- There may be value to HADI in using flood insurance as a marketing point
  
- For the highest risk properties, the number of properties is very small
- Cover for high risk properties is likely to be unaffordable in any case

If this initiative is successful, there are practical issues about coping with a large amount of new business in a short time

- Pricing expertise (they might just be a niche insurer)
- Number of staff
- Capital requirements
- Reinsurance requirements
- Staff issues, both numbers, and expertise

If HADI were able to make enormous profits, other insurers would enter the market.

Competition would be expected to reduce profits to normal levels.

Regulatory/sovereign risk – government consultation is under way.

HADI would need to invest to launch the new cover, and future government proposals may make the business unviable.

(iv) **Which homes to subsidise**

In terms of homes to be included, should capture the highest risk properties, but not too many. Likely to be homes with a return period of at least 1 in 50, or possibly at least 1 in 20.

1

*Marks for any reasonable answer.*

*Reasons*

Premiums where return period is less than 1 in x are clearly unaffordable, being a very large proportion of total earnings.

This is balanced with the need to keep the subsidised group to a minimum, so as to limit the cost of the scheme, and prevent distortion of the commercial market.

**Level of subsidy**

The government's aim is to make premiums affordable, so larger subsidies will be required for very high risk properties than high risk properties.

No subsidies will be required for properties with nil, low or (perhaps) moderate risk, as commercial premiums appear affordable

However, premiums should still increase as flood risk increases, to provide a behavioural signal to householders.

So, for example, the home owner could pay first \$1,000 of premium in full, plus a proportion of any amount above this (*or other sensible example*).

*Marks available for other appropriate comments.*

(v) **Advantages**

Raises the money necessary to fund the subsidies without recourse to general taxation

Because only a small number of properties have significant flood risk, the required levy will probably be modest

### **Disadvantages**

As a general principle, insurance premiums should be risk rated, with limited cross-subsidy

Any level of cross-subsidy may therefore be regarded as unfair.

Example of why this might be considered unfair, for example, people on low incomes in high rise apartments will be subsidising insurance for millionaires' beach houses

Because the cross-subsidy increases the price of home insurance, some people may decide they no longer wish to insure

There are practical difficulties in calculating the levy.

This is because it is impossible to know in advance the total amount of subsidies that will be paid, or the number of people who will be required to pay the levy.

Passing the cost of subsidies back to people buying insurance reduces the incentive for government to mitigate flood risk, for example, by investing in flood risk

Direct government funding also gives government an incentive to take difficult decisions, for example, to prevent building homes in areas that flood often, or purchase existing homes in these areas.

*Part (i) was relatively poorly answered. Candidates were generally able to pick up the impacts on technical rate but struggled to think through wider market and commercial dynamics as to how the technical impacts might actually feed through to consumers.*

*Part (ii) was poorly answered. The majority of candidates recognised cross subsidies, inability to afford insurance and breadth of cover. Most however failed to consider the goals of a regulatory regime and the incentives (or flawed incentives) that might be created depending on the implementation*

*Part (iii) was poorly answered. Candidates did not generate the depth of consideration necessary for a "discuss" question. For example, many candidates flagged data as an issue but did not give any depth as to how material an issue it is for flood cover or what the options might be to source data.*

*Parts (iv) and (v) were poorly answered, with an ongoing tendency for candidates to not think about broader issues, incentives, market conditions or objectives of a health insurance & regulatory industry.*

**END OF EXAMINERS' REPORT**