Faculty of Actuaries **Institute of Actuaries**

EXAMINATION

April 2006

Subject SA3 — General Insurance Specialist Applications

EXAMINERS' REPORT

Introduction

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

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Chairman of the Board of Examiners

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Comments

Individual comments are shown after each part question.

1 (i) Underwriting losses and profits are regarded as arising from mutual trading and hence are exempt from tax.

The investment return is taxed independently.

The return from loan relationships will be taxed as income on a mark-to-market basis, unless accounts used amortised cost.

However, with respect to equities, realised investment gains are subject to capital gains rules and hence indexation relief applies.

No relief is given for expenses, which are assumed to be part of the mutual trade.

VAT is not payable on insurance premiums

Insurance for commercial ships and aircraft, commercial goods in international transit and risks located outside the UK are exempt from IPT.

Comments on question 1(i): *Generally well answered although many candidates did not realise it is the mutual trading which is the reason for no taxes on profit and also many got IPT wrong.*

(ii) The rules may define what happens in these circumstances and therefore leave little scope for flexibility. The rules of the mutual must be followed.

There may be a request for a special premium (effectively a capital injection) or an explicit capital injection.

This may require that any special premium be calculated in proportion to the capital provided, or to the insurance premiums paid in the last year.

If the loss is recovered by higher premiums in future then this may be by adding a larger profit margin (percentage) to the premiums charged.

Or by explicitly adding an amount in respect of the loss.

The insurance premiums charged should take account of the post loss commercial premiums. The mutual may have the opportunity to recover its losses through higher premiums whilst still offering good value to the members.

If the mutual were to charge much more than commercially available then member companies would have a good incentive to purchase elsewhere although financial obligations to the losses would remain.

In the long run this may result in the mutual being wound up.

Some of the goods may be salvaged

- This is the only realistic way of mitigating the loss

Clothing can be washed, ironed and re-packed.

None of the electrical or electronic goods will have been powered when the water damage occurred and so some may be recoverable.

Water damaged goods could be moved quickly and dried quickly to avoid additional damage being caused.

Retail packaging and instructions would be seriously damaged and would need replacing.

These steps may be quite costly and require using specialist companies but could significantly reduce the size of the gross loss.

As the loss has exhausted the RI programme any reduction in gross loss will be beneficial to the mutual.

Once the gross loss is within the RI programme then the benefit to the mutual will be a percentage of the gross saving.

The mutual will save on its payment of reinstatement premiums
or, if it retained some of the programme then it will save on this portion.

The remaining benefit will be taken by the reinsurers.

Even so the mutual should benefit in the cost of future reinsurance, as the current loss will be reduced, and therefore have a smaller impact on future pricing calculations.

This salvage is likely to be part of the reinsurance terms and conditions and therefore something that the reinsurer insists upon.

Secondary ways of mitigating the loss size include being tough on claims. However, as a mutual the aims of the insurer are slightly different and this may be more difficult to do than with a proprietary insurer.

E.g. if a member company had not paid its premiums, it may be difficult to void the coverage. (Non-payment of premium is not a valid reason for voiding a claim under English law.)

Policies may be voided if specified policy warranties have been breached or policy exclusions may reduce the insured loss.

Investigate precise cause of incident — seek to offset costs — initiate proceedings against culpable parties (candidates should be clear that this is not Packit's property policies but warehouse owners whose policies may pay)

Investigate T&C of existing reinsurance coverage and ensure that all possible recoveries under all policy sections are made.

A claim may be reduced due to under-declaration of values (similar to averaging; although this is unlikely)

The claim may be recovered out of capital or other assets set aside for this purpose.

Investigate potential Govt/State disaster compensation.

Comments on question 1(ii):

Many candidates did not mention that there would be rules governing the operation of the mutual. These rules must be followed. Many candidates however suggested sensible approaches.

Salvage was mentioned in passing but given the line of business and the nature of the loss far more should have been said. A couple of different examples would have shown that the candidate understood the problem and was tailoring his solution. This was especially important given the number of marks for this part of the question.

Little mention was made of the fact that the claim had exhausted the reinsurance, and the financial impact this would have on the mutual if the gross loss could be reduced.

(iii) (a) Rating factors should define the risk, i.e. be a proxy for the risk factor
not correlate too closely with other rating factors
and that they are practical (simple)
Objective
Easily measurable.
Acceptable to the policyholder
Verifiable (desirable but not essential)

Each additional rating factor should, therefore, be chosen to remove as much of the residual heterogeneity as possible.

This approach should also help to avoid having too many rating factors and so cause practical problems due to lack of data for analysis of each cell.

(b) & (c)

With respect to the importers the loss frequency and severity will be affected by the type of goods: clothing, electronic or white goods.

These may even be subdivided into smaller sub-categories.

All these goods are subject to the same major perils: fire, water damage, theft and physical damage due to impact or crushing.

Different goods behave differently to these different perils and so the severity of loss by type and peril will be different.

Commodity / Peril example 1 — mobile phones will be more likely to be stolen than washing machines or Clothing will be much less susceptible to impact and crushing damage.

Commodity / Peril example 2 — TVs may be more combustible than cotton jeans or Dried foodstuffs will be very susceptible to water damage.

Country of origin.

Whether the transport is primarily by air or sea.

Rating factor example 1 — Air crashes are much less common than ships sinking so the frequency of loss will be lower for air freight. Or Airports tend to be subject to higher levels of security than sea ports and so theft risk will be lower.

Rating factor example 2 — But, given a loss an aircraft will be more likely to suffer total loss so severity higher.

The Shipping Company may be used as a risk/ rating factor if this is known.

The total value of goods at risk in the year.

This is a measure of the exposure to the policy and is a proxy for the number of transits which take place.

The maximum single sum at risk is another exposure measure and defines the largest loss which could occur.

A larger sum at risk has the possibility of a larger loss than a smaller sum at risk.

The amount of policy deductible.

For a given set of circumstances a higher policy deductible will give rise to a smaller claim size than a smaller deductible.

The points of largest risk will probably be during loading and unloading. Once an item is on a ship or aircraft the theft and damage risks are small, so distance travelled is likely to have a smallish effect. (Distance could be a rating factor as it has an impact on risk and may be a proxy for the number of trans-shipments).

The number of times a cargo is moved between storage and a method of transport will be an important risk factor but is not a practical rating factor. It is almost impossible to determine in advance.

The Shipping Company may not be used as a risk / rating factor if this is unknown.

The security of the transit locations could be important but very difficult to measure as the goods owners will have little say in the transit route, that being controlled by the shippers. So not a practical rating factor.

Comments on question 1(iii): *The bookwork part of this section was well answered but the application and higher skills parts were poor.*

(iv) Policy limits and deductibles will be best dealt with by either an exposure measure or a frequency / severity model.

Exposure based methods would be either an exposure curve or increased limit factors.

Exposure curves describe the claim severity distribution:

- this could be a loss size distribution
- or may express the deductible as a percentage of the sum insured (i.e. first loss curves)

This claim size or percentage can then be read from the curve to give the proportion of claims cost which is retained within the deductible.

Increased limit factors work in a similar way but the limit and deductible are looked up as factors. The factors at these amounts are then used to calculate the proportion of claim cost retained by the deductible. (Mention of Limited Expected Values score here.)

There may be more than one claim distribution needed to fully describe the observed claims and therefore to calculate the equitable portion of claims within the deductible.

Experience methods on observed historic claims for the cedant can be used but are unlikely to give equitable answers as the observed claims are unlikely to be a good representation of all the possible claims outcomes. (Burning cost methods do not score as being equitable.)

Comments on question 1(iv): *This question was exploring the higher skills and wider reading of candidates. Candidates generally scored low marks on this section with very few referring to exposure based methods (either exposure curves or increased limit factors) or frequency/severity models.*

(v) Considerations:

Cost of cover
following a large cat loss the cost of RI is likely to go up
following the exhaustion of the RI programme the cost will go up even for high layers which were not purchased previously
can the mutual afford to buy the RI it would like to?
can the mutual afford not to buy and run the risk net?
Expected recoveries
linked to the cost, the mutual will want value for money
these will be evaluated by amount using both frequency and severity

May need to reparameterise frequency severity distributions following the experienced losses — for accurate analysis.

Alternatives to traditional reinsurance — ART, financial assistance, loss development covers etc.

Availability of cover
what cover is available following the cat
in terms of capacity (amount)
capacity may be severely restricted following a large cat
and in terms of coverage

Likelihood of a similar event
if the last event was seen as a remote event e.g. 1/10,000 years then the mutual may not want to buy the cover
this will be location and peril specific

Exhaustion of the current programme
Vertical exhaustion — by how much?
wanting to ensure that a future loss does not exhaust the programme

Sideways cover
The number of reinstatements needed for multiple events in the same policy period.

Level of exposure for the following year — sums insured

Maximum accumulations of value next year
per location and
geographically
although this may be hard to determine when the mutual has little knowledge of the shipping details

Risk appetites of the member companies
more risk averse will want to buy more protection or vice versa

Rating agencies security status/rating of available reinsurers

Diversification of reinsurers (reciprocity does not apply for a mutual)
Relationships with reinsurers
Advice through purchasing reinsurance (most likely the advice will come from the broker)
Reinsurance used by other mutuals (e.g. cover for a group of mutuals)

Regulatory requirements
Amount of capital — free reserves - could raise loan capital & reduce the need for RI

Comments on question 1(v): *Many candidates failed to pick up marks by not exploring a wide enough range of options.*

(vi) Percentage of claims cost below deductible = $39.81*(10\% *100)^{0.2}$
Percentage = 63.09

Percentage of claims cost below the limit = $39.81*(50\%*100)^{0.2}$
Percentage = 87.05

So the percentage retained is the deductible = 63.09
Plus the proportion above the limit = 100 – 87.05 = 12.95
Giving a total retained percentage of loss = 76.04%

It is unlikely that the importer would really want to retain this much of the risk.

As the shareholders of the component companies will want a steady trading profit from its core business rather than an uncertain profit driven by claims which could be insured.

Even a 1% of maximum value deductible would result in nearly 40% of the claim cost being retained. (Or similar calculation.)

The claims distribution is therefore very heavily weighted towards smaller claims.

Only insuring up to 50% of the maximum value without deductible means that 87% of the claim cost is covered. (Or similar calculation.)

This is a high proportion of the total claim cost and could be justified. It depends how frequent large losses are. If they are very infrequent and the financial implications have been evaluated then the importer may feel that it is worth the risk.

Even though the premium is higher than the expected claims due to expenses the cover provided may be very beneficial to the importer due to the reduction in volatility.

If the mutual is inefficient, or another insurance company takes a different view of risk then the insurance cost may be high and cheaper cover may be available elsewhere.

Comments on question 1(vi): *Most candidates scored well on the calculation, although disappointingly a number failed to perform this simple task. A common error was to misinterpret the 40% in excess of 10% layer as 40% of an unlimited excess of 10% layer. Conclusions were not well drawn. Candidates often did not notice that this loss distribution was very heavily weighted to smaller claims or that the very high proportion of retained claim cost is likely to be unsuitable for an importing company.*

2 (i) **Risks relating to premiums**

- Policy is longer than annual in that premium charged at start of policy has to cover risk of accident, sickness or unemployment over 3 to 5 year period so harder to get premium rating right.

- And Payit is a new company so the lack of data is especially problematic.

- Downturn in economic environment….sales of goods reduce hence volumes of payment protection insurance business reduce.

- Change in retailers' sales procedures may lead to loosening of underwriting conditions
- …e.g. more selection/moral hazard: policyholders expecting unemployment or deliberately becoming unemployed.

- Retailers may take their business elsewhere or demand higher commission or not sell enough policies.

- Credit risk with failure of retailers to return premiums.

- Greater scrutiny by regulators of levels of commission being charged => potential damage to reputation, reduction in market size as customers choose not to insure themselves.

Risks relating to claims

- Unexpected downturn in economic environment.
- ….leading to higher than expected unemployment rates.
- Increases in morbidity experience
- Pandemic
- Propensity to claim
- Reputational risk (media) may mean paying claims that you would otherwise have excluded
- Policy wordings not holding up in court e.g. unfair policy exclusions.

***Comments on question 2(i)**: This largely bookwork question was answered fairly well. A common shortfall was to simply say that moral hazard, or the economy were risks. It is an unexpectedly high level of moral hazard, or an unexpected downturn in the economy which are risks.*

(ii)

- Establish agreed sales procedures with retailers.

- A void accumulations by retailer and or region.

- Introduce profit commission terms to encourage retailers not to underwrite poor risks.

- Using the information gathered for credit scoring etc.

- Demographic information of retailer impacting sickness

- --- driving premium rates by store and region

- Implement exclusions in policy wordings…

  Examples:

  - Deliberate or wilful acts of self-injury.
  - Pre-existing conditions.
  - Acts which result in self injury — for example drinking alcohol or drug abuse.
  - Any mental or nervous conditions unless under the supervision of a psychiatrist.
  - Backache or related conditions without medical certification.
  - Unemployment within the initial exclusion period.
  - Voluntary unemployment.
  - Unemployment known before the start of the policy.
  - Casual, seasonal or temporary employment.
  - No payment for any period where policyholder is paid salary in lieu of notice.
  - Loss of job through any fault of policyholder's.
  - Or any other sensible exclusion e.g. waiting period.

- Or refer "special" cases to insurer for underwriting.

Comments on question 2(ii): *Most candidates got the basic ideas here but did not adequately elaborate on the policy exclusions which are so important to this policy*

(iii)

- Nature of loan payments: If level, then the outstanding repayment amount reduces uniformly with each payment hence risk reduces uniformly during the term of the loan..

- Nature of loan payments: If not level, (e.g. no repayments for a year or low start repayments rising later) Then the outstanding repayment amount does not reduce uniformly and hence the risk does not reduce uniformly during the term of the loan

- Insurance terms: period over which payments will be made (e.g. nothing to pay for the first year) ; are there limits? Waiting period?

- Term of policies.

- Morbidity rates rise as people age. Or Gender Or Age or Occupation.

- Changes in state of the economy.

- If underwriting is applied at the time of sale the risk will be lower initially

- Selection: does experience indicate that selection occurs earlier in the policy?

- Propensity to claim: does this reduce as policy approaches expiry?

- Unemployment and disability: makes sense to assume closer to level risk profile as payment is limited to 12 months and hence reduction of exposure would only occur in last 12 months of the policy.

Comments on question 2(iii): *Many candidates did not seem to understand that it was the repayments which were being guaranteed.   Loans on this type of purchase are normally by level repayment which does not change with the interest rate. In this case the outstanding repayments and therefore risk reduce uniformly through the policy term. Unemployment and disability pose a level risk for the majority of the policy term. Identification of these key features allowed some candidates to score well but many candidates did not seem to understand risk exposure.*

(iv)

- Monitor on monthly basis because company has only been writing for a few years.
- Segregate the policies by retailer as different commission levels.
- Segregate by country or region
- Split by any extra rating factor gathered at point of sale.

- Segregate policies by size of loan or type of credit scheme as some may encourage more selection/moral hazard than others.
- Analyse by policy term to estimate claims development and earnings pattern.
- Analyse sickness, accident and unemployment separately.
- Compile accident year triangles of paid loss ratios to monitor profitability on earned basis.
- Compile underwriting year triangles of paid loss ratios to monitor profitability on ultimate basis.

Comments on question 2(iv): *Generally answered well.*

(v)

- Company's outstanding claims reserve is likely to be about 80% of the £2m claims and expense reserve => £1.6m.

- This represents 14.2% of earned premium gross of commission.

- Plus 10% paid loss ratio gives 24.2% ultimate: higher than market loss ratio of 20%

- It is not entirely clear whether the IBNR contains allowance for the claim handling expense. If not then the claims handling reserve will also need to be added & will make the ULR higher still.

- Paid loss ratio in 2005 was 10%; allowing for 25% IBNR => "chain ladder" ULR of 10% / 0.75 = 13.3%.

- This is less than market loss ratio of 20%.

- Company's outstanding claims reserve is higher than predicted by chain ladder and by market average.

- However market loss ratio may be based on portfolios with very different commission levels.

- Portfolio likely to be less mature than market average with higher IBNR as percentage of ultimate.

- Plus actual experience may be poor guide to IBNR.

- Note than paid loss ratios have been increasing, which may suggest that earning pattern is inappropriate i.e. perhaps earning premium too fast.

- Lot of uncertainty because insufficient history on which to base projections.

- On the available information it is difficult to comment on the reasonableness of the outstanding claims reserve. However as Payfast is estimating a ULR approximately 20% worse than the market it suggests that they are not being unduly optimistic.

Comments on question 2(v): *Most candidates used the market loss ratio as their starting point. Very few candidates performed an independent calculation and then used this as a basis for comparison to the market. Any reasonable comparison scored well.*

(vi)

- No profits from new business.

- Assuming commission of 50%, say, and claims (+ claims handling expense) loss ratio of 20% => 30% profit (before other expenses) on earned premium.

- Premium earned in 2006 likely to be lower than that earned in 2005
- as some of the 3 year policies written in 2003 would earn little in 2006
- plus earning pattern reduces with term
- so assume EP in 2006 is less than half that in 2005 => £5m.

- Assuming 30% profit, this £5m will earn at least £1.5m of profit
- which is taxable at say 30% (or any reasonable tax assumption)

- Thus increasing shareholders funds by about £1m.

- Any reasonable expenses assumption
- Assumes no dividends.
- Any reasonable assumption on investment returns on free assets
- Also, any reasonable investment assumption on technical provisions

Comments on question 2(vi): *Many candidates got bogged down in calculating the earned premium in detail and a number of candidates did not make any attempt at this section. A sensible estimate using the understanding of part (iii) was all that was required. The remainder of the calculation was then straightforward. In estimating the profit margin, many candidates forgot to include the commission terms. Given the significant size of these this was a serious error.*

END OF EXAMINERS' REPORT