

EXAMINATION

September 2007

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>Investment Returns</i>	<i>Corrected Calculation</i>
Purchase price of fixed interest securities	500.0
Market value of fixed interest securities as at 1/1/2006	625.0
Market value of fixed interest securities as at 31/12/2006	620.0
Accrued investment income during 2006	25.0
Return on fixed interest assets = {Accrued investment income} + {MV @ 31/12/2006} - {MV @ 1/1/2006} = 25 + (620 - 625) = 20	20.0
Purchase price of UK equities	30.0
Market value UK equities as at 1/1/2006	55.0
Market value of UK equities as at 31/12/2006	60.0
Net Dividend income during 2006	2.0
Return on UK equities = {Net dividend income} + {MV @ 31/12/2006} - {MV @ 1/1/2006} = 2 + (60 - 55) = 7	7.0
Underwriting Result	
Unearned premiums b/fwd	45.0
Written premiums	100.0
Unearned premiums c/fwd	(50.0)
DAC b/fwd	(9.0)
Acquisition costs paid	(18.0)
DAC c/fwd	10.0
Reinsurance purchased on 1.1 for 2006	(20.0)
Earned Premiums net of DAC and Reinsurance = {Unearned Premiums b/f} + {Written Premiums} - {Unearned Premiums b/f} - {DAC b/f} - {Acquisition costs paid} + {DAC c/f} - {Net Cost of Reinsurance} = 45 + 100 - 50 - 9 - 18 + 10 - 20 = 58	58.0
Outstanding and IBNR claims b/fwd	485.0
Net Claims paid in 2006	(60.0)
Outstanding and IBNR claims c/fwd	(475.0)
Allowable equalisation reserve transfer	(10.0)
Additional provision for future catastrophes	0.0
Claim handling expenses paid in 2006	(3.0)
Provision for future claim handling expenses for claims incurred in 2006	0.0
Increase in Claims and claims provisions = {OS & IBNR b/f} - {Net claims paid} - {OS & IBNR c/f} - {Allowable equalisation reserve transfer} - {CHE} = 485 - 60 - 475 - 10 - 3 = -63	(63.0)
Staff and buildings costs	(10.0)

Technical Result =

{Fixed interest return} + {Equity Return} + {Net Earned Premiums}

– {Increase in paid claims and claims provisions paid} =

20 + 7 + 58 – 63 – 10 = 12 12.0

of which no further tax due on dividend income 2.0

Taxable result = 12 – 2 = 10 10.0

Tax @ 30% = 10 × 0.3 = 3.0 (3.0)

Underwriting result after tax = 12 – 3 = 9.0 **9.0**

Alternative solution:

Gross Earned Premium	$100 - (50 - 45) = 95$
Less Earned RI	(20)
Net Earned Premium	= 75
Incurred Claims	$485 - 60 - 475 = (50)$
Allowable Expenses	31
Increase in DAC	1
Underwriting result	= (5)
Taxable fixed interest return	20
Taxable return on equities	5
Equalisation reserve provision	(10)
Taxable result	= 10
Tax @ 30%	(3)
Franked income from equities	2
Technical result after tax	= 9

- Investment Return
 - From Bonds or “Loan relationships” is taxed on the total returns whether realised or unrealised. The bonds are valued on a mark to market basis. Dividends from UK equities are not taxed further. Gains are taxed on a mark to market basis.
- Underwriting result taxable as follows:
 - Earned Premiums (net of RI), so unearned premiums net of DAC tax deductible
 - Expenses are tax deductible (acquisition costs, running costs of the business, ...)
 - Less claims handling expense provision is allowable to the extent that the expenses relate directly to claims for which claims provisions have been accepted by HMRC.
 - Less paid claims
 - Less change in o/s claims carried forward supported by case estimates or statistical projections
 - Change in IBNR subject to justification

Sensible mention of discounting.

The insurance technical provisions claimed for tax purposes are net of amounts recoverable from reinsurers.

For tax purposes it is necessary to assume that all amounts due will be recovered.

A deduction is allowed for specific provisions for amounts estimated to be irrecoverable from reinsurers but a general provision is not allowed.

In the UK, insurers are required to establish an Equalisation Reserve/provision over and above their claims provisions in respect of certain classes of business (regarded as

being potentially volatile). Statutory rules govern the calculation of transfers to the Reserve (which are tax deductible) and transfers from the Reserve (on which tax is payable).

Provisions for future catastrophe losses are not allowable except where required by law

Comments on Q1. *The template given should have guided the layout of the answer required. A minority of students followed this template and scored well. Those who chose their own format often made mistakes and the answers were harder to follow. Most candidates showed a reasonable grasp of the basics concerning equities and bonds returns and made a decent effort at correcting the calculation. However, very few candidates made many sensible comments on the principles of taxation (e.g. IBNR is deductible only subject to justification, change in outstanding claims is deductible provided that supported by case estimates or projections) so very few candidates scored highly on this question.*

2

(i) **APH risks**

- Claims reserves very uncertain because APH liabilities are long tailed due to long latency period (could be inadequate)
- Liabilities stem from early years when policy records may be incomplete: difficult to assess full extent of exposures
- Liabilities increase leaving the reserves inadequate due to: (need reason)
- Risk of legal judgements increasing liabilities
- Change to regulatory environment
- Risk of new latent diseases emerging thus increasing liabilities
- Propensity to claim
- Claim inflation higher than expected
- Gearing for RI policies
- Risk of accumulations
- Risk around the value of the discount within the discounted reserves:
 - + Timing of claims payments is uncertain — can be difficult to assess cashflows
 - + May not achieve return on assets implied by discount rate.
- Currency risk if liabilities not matched
- Mismatching of assets and liabilities
- Risk of disputes and bad debt on outwards reinsurance given the age of the liabilities
- Claims handling cost could be higher than expected (for various reasons, legal, cost of specialist handlers etc...)

Comments on Q2(i). *This was answered well by most candidates.*

(ii) **Benefits of sale**

- Removes risk of further reserve deterioration on APH
- More stability (less volatility)
- No longer distracts Company A management from ongoing business — frees up resources (future strategy)

- Brokers, potential customers and rating agencies may have undervalued Company A because of APH liabilities of B
- Sale of B may result in enhanced sale value of A...
- ...and increase ability to issue debt
- Administrative savings
- Extract capital from Company B (less capital needed)
- May get a good deal

Comments on Q2(ii). This was answered reasonably well.

(iii) **Alternative options**

- Part VII transfer to external company (or, alternatively, for Loss Portfolio Transfer and Novation)
 - + legal liability transferred
 - + so employee and shareholder rights not affected
 - + may improve the sale terms of Company B
 - + can transfer to specialist APH run-off company
 - + don't have to transfer non APH policies
 - need to get regulatory/court approval which can be time consuming
 - possible reputational risk
 - will need to commission an independent expert to opine on policyholder protection
 - this could be expensive
- Proactive commutation of policies
 - + does not normally require regulatory approval
 - + opportunity to make profits on individual policies
 - can be time consuming and needs senior input
 - will be impractical to commute all the policies and unlikely to be able to remove all exposures this way
- Scheme of arrangement
 - + Can achieve finality
 - + Do not have to get agreement from every policyholder
 - May be reputational issues for Company A if scheme fails or seen to be unfair
 - Can take some time to set up
 - May not have expertise in house to plan or execute

Comments on Q2(iii). This was poorly answered. Many candidates gave answers that either would not remove the liability from the company (e.g. ring fence within company) or were very unlikely to be realistic or practical. Those candidates that did suggest a Part VII transfer or a scheme of arrangement often did not give sufficient further detail. The wording of many candidates' answers gave the impression that the portfolio could be sold and all associated capital would be released. If such a transfer were to take place then a premium over the reserves will almost certainly be paid and this could be greater than the capital held. Loss portfolio transfers answer the question correctly only if they transfer legal liability. In the UK this is called a Part VII transfer, other legislation existing in other countries.

(iv) **Benefits of acquiring**

- Make a profit and/or diversify but VERY unlikely
 - best estimate reserves may be prudent following reserve injections
 - actual investment return is greater than assumed in the value of the discount
 - deal done on high estimate basis, for which reserves are an additional 50% on best estimate
- Expertise to be able to assess risks and price portfolio
- May have experience of doing schemes of arrangement
- May have own APH department so gain from economies of scale
- May have specialist claims handling and commutations expertise
- Bargaining power for class actions, set-off rights with brokers and reinsurers
- Better bargain with claimants if not involved in writing current business

Comments on Q2(iv). Most candidates did not give enough weight in their answers to the benefits of scale, expertise and bargaining power of a specialist company taking on this portfolio.

(v) (a) **Estimate discounted mean term**

- Discounted reserves ~ undiscounted reserves $\times (1 + \text{interest rate})^{-\text{DMT}}$
- So DMT can be estimated by $\ln(\text{undiscounted}/\text{discounted})/\ln(1 + \text{discount rate})$

<i>Liability Type</i>	<i>Best DMT</i>	<i>High DMT</i>
Asbestos	10.1	11.6
Pollution	5.0	5.0
Health Hazard	2.7	4.6
<i>Claim Handling Expenses</i>	5.5	4.9

(b) **Reasonableness:**

Asbestos DMT higher than others reflecting longer latency period of asbestos
 Some of pollution liabilities relate to clean up costs, which are not bodily injury claims so slightly shorter than asbestos
 Pollution mean term could be a bit short
 Pollution best = high could be an error (or other sensible comment)
 Health hazards DMT would depend on claim type but expected to be shorter tail than asbestos
 Health Hazard estimated DMT seems too low: may be error
 Health Hazard is more dependent on latent claims (IBNR) as low ratio of paid claims to case reserves therefore expect a bigger difference between best DMT and high DMT
 Asbestos High DMT > Best DMT

- May be reasonable if assume longer payment pattern accompanies deteriorating experience
 - Because it would take time to deteriorate
- Reasons for deterioration:* more new claims reported than expected
- inflation of average claims costs higher than expected
 - more mesothelioma claims (longer latency period and higher average cost)

Comments on Q2(v). A surprising number of candidates were unable to calculate the DMT's and those that were able to do the calculation typically made only brief comments.

(vi) **Challenges**

- Company C wants the amount of assets transferred to be as high as possible therefore challenges should focus on increasing discounted High estimates
- Discount rate may be too high and therefore discounted High reserves too low
 - need to allow for risk of past returns not being achieved in future
 - especially as need to consider long future payment patterns
- Nature of liabilities => outcome is very uncertain
- Calculation of IBNR to OS ratios
- Calculation of survival ratios
- Ratio between High and Best reserves is the same at 1.5 for all claim types
 - How likely is it that the High estimates represent the 90th percentile?
- Data provided are inadequate – would want to see lots more (need valid example of extra data)
 - Asbestos probably more uncertain than pollution due to longer latency and mean term to settlement
 - => may need to increase High estimate for asbestos
- Based on average claims payments, Health Hazards reserve could be exhausted in 2.5 years.
- How to allow for possibility of later emergence of claims e.g. lead paint, new claim types?
- Survival ratio for Claims handling expenses is just over three years, far less than the DMT's would suggest. Claims handling expense reserve appears to be understated.
- The ratio of High to Best undiscounted reserves is the same for claims handling expenses as for claims reserves. You might expect claims handling expenses to be proportionately higher than this in view of reducing economies of scale as time goes on
- What downside scenarios have been considered in assessing the range?
 - E.g. US legal developments
 - Rapid increase in claims inflation

Comments on Q2(vi). Candidates missed many obvious challenges in this question and most did not consider calculating survival or IBNR to outstanding ratios

3 (i)

development year	1	2	3	4	5	6	7	8	9
Age to age factors n to $n+1$ (reported claims)	10.00	3.00	1.80	1.40	1.15	1.09	1.03	1.01	1.00
Age to ult factor			3.286	1.826	1.304	1.134	1.040	1.01	1.00
1/cumf			0.304	0.548					
1 - 1/cumf			0.696	0.452					

BCL for 2003	$= 50 \times 1.826$	$= 91.3$
BF for 2003	$= 50 + 0.452 \times 92$	$= 91.6$
BCL for 2004	$= 34.6 \times 3.286$	$= 113.7$
BF for 2004	$= 34.6 + 0.696 \times 85$	$= 93.7$

Chain ladder does not take account of prior expectations and therefore projects the ultimate without adjustment.

2003 91.6 because a priori loss ratio in line with experience

2004 113.7 because a priori not in line with experience

It is the same as using the bf method with an a priori ultimate of 113.7%

The BF method is credibility weighted to take account of prior knowledge.

BCL could be distorted by one or two large claims hence big difference

If the a priori estimate is closer to the real ultimate then the BF method will give a more accurate result and vice versa

Which means that great care needs to be taken in selecting the a priori estimate.

Comments on Q3(i). All candidates should have scored full marks for the technical part of the reserving calculations. However, some candidates did not appear to know how to perform a BF calculation and others calculated it in a very inefficient way thus wasting valuable time. Also basic errors were made by some candidates.

- (ii) (2003 and 2004 booked starting points given in the table below. 2003 is a better starting point given the implausible 2004 number. There are other valid starting points including prior year basic chain ladder estimated ultimate loss ratios.)

(Increase in reserves shown here for part v calc)

There are alternative starting points e.g. 2003, BCL.....

Correct application of rate reductions:

Calculation of ultimates:

Clear tabulation of results

		a priori LR	bf ult	increase in reserves from bf ult of 93.7 (using an 85 a priori LR)	increase in reserves from 85% booked loss ratio
<i>using 2003 as a base</i>					
with 10% rate reduction	92 --->	102.2	105.7	2.41	4.16
with 15% rate reduction	92 --->	108.2	109.9	3.25	5.00
with 20% rate reduction	92 --->	115.0	114.6	4.20	5.95
with 30% rate reduction	92 --->	131.4	126.0	6.49	8.25
<i>using 2004 as a base</i>					
with 10% rate reduction	85 --->	94.4	100.3	1.32	3.08
with 15% rate reduction	85 --->	100.0	104.2	2.10	3.85
with 20% rate reduction	85 --->	106.3	108.5	2.97	4.73
with 30% rate reduction	85 --->	121.4	119.1	5.09	6.85

Comments on Q3(ii). Almost all candidates were able to select three ratios for use in the BF. Some candidates were happy to select unhelpful a prioris (ignoring information given) or made selections which were near-identical (e.g. comparing a volume weighted average with a simple average) missing the much greater uncertainty in other assumptions. The better candidates recognised that the key issue is one of uncertainty and calculated a range of a priori estimates accordingly. Mistakes were often made in the calculation of rate change impact. The better candidates recognised that there may well be claims trend in addition to the rate weakening. Many candidates dropped easy marks for not tabulating the results as instructed.

(iii) **Original loss ratio**

Original (budgeted) a priori loss ratio is now over three years old.
And we have newer information which suggests that this estimate is optimistic.
And could easily be 30 points out, significantly distorting the ultimate
Need to ask questions about currency of claims as could cause distortions

New estimate a priori loss ratios

The pricing database is an unknown to us and we do not know how the figures are calculated. Example required of why this may be a problem, e.g. granularity.
Assuming the calculations are correct then this estimate is very different to that assumed in the budget
Budget assumes approximately 8% rate increase compared to 10 point decrease, an 18 point gap.
It is unlikely that the rate changes due to wording changes will be accurately recorded, if at all.
The rate reduction may well be calculated as a change in premium per unit of exposure which will not take into account inflation of loss cost over the year, in which case the rate change will be worse by the amount of loss inflation (e.g. 4%)

The underwriter's estimate will probably be influenced (biased) by the calculated rate change and the poor experience of the portfolio to date, and it is likely that his figure is based on some of the larger and more memorable policies in the portfolio. However, his judgement seems to be credible. The difficulty is in knowing how much to add for the widening of policy coverages but bearing in mind that rate reductions are normally underestimated in a softening market

The true rate softening could easily be double the estimated 10%. This is more worrying given the sudden increase in the portfolio premiums from an otherwise stable position.

Ultimate loss ratio

The reported to date loss ratio for 2004 would suggest an ultimate loss ratio significantly higher than 85% using BCL

Using the 10% reduction gives a loss ratio 15 points higher (or alternative suggestion)

With different plausible assumptions there is a large range in the calculated answers

BCL could be distorted by one or two large claims hence making a big difference so it could be difficult to settle on one estimate

The range gives us significant concern over the budgeted ultimate as 85% is below the bottom of our range.

***Comments on Q3(iii).** Very few candidates raised questions on the pricing database and the way it calculates a rate change. Also many candidates did not discuss the difficulty of taking account of the underwriter's comments appropriately. Several candidates chose to dismiss the underwriter's views entirely and thus discarded a valuable source of information. Most candidates got very low marks on this part.*

- (iv) It is true that the BF method relies heavily, even critically, on the a priori estimate which is a strength if the a priori is chosen well and a weakness if chosen badly. Indications are that the selected a priori estimate needs revision as evidenced by
- the high reported loss ratio for a year at the end of 36 months
 - the rate reduction estimates in the database
 - and from the underwriter
- The company should be trying to book best estimate results which means using the best information available and should take precedence over an established practice which in this instance looks like it is not giving a good solution.

***Comments on Q3(iv).** Most candidates made some reasonable points in discussing the BF reliance on its a priori. However, few candidates stated clearly that reserves should be calculated as best estimates using the most up to date information. Most candidates gave a general description of the BF method and failed to tailor their answer to the specific circumstances given in the question and thus missed many easy marks. There was significant misunderstanding of what independent means in relation to the BF method.*

A commonly held incorrect view was that no information derived from the year in question could be used. Rate changes, claims inflation, wider wordings and increasing premium volume are all "independent" and should be used in determining a best estimate a priori.

(v) **For calculation of reserve deterioration see above tabulation**

Selecting one number: e.g. 20% rate reduction on 2003 gives a priori loss ratio of 115%. This gives an ultimate loss ratio of 114.6%

The increase in reserves is the change in IBNR

So the reserve deterioration is the premium multiplied by the change in ULR
 $= 20.1 \times (114.6\% - 85\%) = 5.95\text{m}$

Calculating reserve deterioration:

Ultimate claims are approximately $90\text{m} \times 92\% = 83\text{m}$ for the portfolio

Assume paid claims are at 25% which means reserves are about 62m

Then the increase in reserves will be about $5.95/62 = 9.6\%$

This has borderline materiality for this portfolio but will be immaterial for the whole company. One should check that this is an isolated instance and not systematic, in which case the overall impact may well be material.

Comments on Q3(v). Most candidates were able to calculate the reserve deterioration but very few considered paid claims and therefore the likely impact on unpaid claims. Further a surprising number of candidates did not pick up that for a large company this deterioration in itself is unlikely to be significant.

- (vi) Adverse development cover pays for the deterioration in claims over a specified period in excess of a pre-agreed amount.
The deterioration can be measured using paid claims or reported claims
The specified period would normally be more than one year.
It is usual for the ceding company to retain a share of the claims i.e. less than 100% is ceded.

Comments on Q3(vi). Most candidates appeared to know broadly what an adverse development cover was, but missed the detail.

(vii) **Risks to ceding company:**

Claims experience is better than expected and the company pays the claims and the reinsurance premium

Claims could deteriorate outside of the period of cover and therefore not be reinsured.

Claims could deteriorate badly and the company's retained share could still be significant.

The reinsurer could fail

Mitigated by:

Negotiating the lowest premium possible
Retaining the minimum possible share
Spreading the ceded risk amongst several reinsurers
Using only top credit rated reinsurers

Risks to the reinsurer

Underwriting risk — takes on a risk which is worse than anticipated at too low a premium
Timing of claims happens inside the covered period
Legislation/judicial decisions/interpretation mean that the original policies have wider coverage than expected, and hence claims more than expected. which may accumulate with other risks that it has.
There may be significant latent claims in the portfolio.
Currency fluctuations could make the claims larger than expected
Invested assets may perform worse than assumed in any calculation of premiums.
Moral hazard from the cedant, manipulating claims payment/reporting to fall within the policy period.

Mitigated by:

Thorough analysis and investigation of the policy and claims files
Purchasing reinsurance
Careful monitoring and limiting of aggregates
Hedging of currency
Diversification of assets
Participation clause
Increase profit margin
Claims audits to verify no changes in claims procedures.

Comments on Q3(vii). Most candidates gave reasonable answers, but only identified a few of the risks to the reinsurer.

- (viii) I would not think that buying this policy would be appropriate in this instance. (or clear statement of opposite opinion)
All years except for 2004 seem to be running off to the recognised pattern
With the exception of 2004....which will attract more scrutiny and a higher premium anyway.
The total reserve size is small and any adverse development is likely to be much smaller

So unless the company's solvency is very tight this does not look like a good option as the company will be ceding profit and paying brokerage when the company should be well able to pay the claims without reinsurance.

Comments on Q3(viii). Many candidates answered this well. However some lost marks by not stating a clear preference on whether the cover is appropriate in this case.

END OF EXAMINERS' REPORT