

Actuarial Society of South Africa

EXAMINATION

30 MAY 2011

**Subject F203 — General Insurance
Specialist Applications**

EXAMINERS' REPORT

Question 1

i)

Examiners comments:

This question was pure bookwork and candidates should've done better than the marks that were actually achieved for this question. Most candidates did not know what OGPI is.

Definitions

a) Original gross premium income

The gross premium income received by an insurer in relation to business that is covered by a non-proportional treaty. The reinsurance premium is calculated as a percentage of this OGPI (original gross premium income).

b) Net premium income

Usually the premium net of the cost of reinsurance although it could mean net of premium tax or net of acquisition expenses and/or commission.

c) Overriding commission

Additional commission paid by a reinsurer to an insurer ceding proportional business as a contribution towards expenses and profit. The term is often used on primary business written through agents or broker and refers to any addition to basic commission rates whether for volume or profitable business.

ii)

Examiners comments:

This question was reasonably well answered by most candidates. Candidates made mistakes because they got confused between the amount ceded and the amount retained on a quota-share. Some candidates also did not understand that reinsurance commission works on the ceded amount and not the GWP.

Net premium per class of business

	gwp	RI spend		Expenses	Gross comm		Return comm		CAT RI	Net risk Premium
PL	1,000,000,000	120,000,000	(1bn X 0.12)	100,000,000	177,500,000	(0.125 X 300 + 0.2 X 700)			25000000	577,500,000
Commercial	500,000,000	375,000,000	given	50,000,000	100,000,000	0.2 X gwp	75,000,000	(0.2 X 375)	12,500,000	37,500,000
Marine	100,000,000	95,500,000	(0.9 X R100m + 5.5% X R100m)	10,000,000	20,000,000		22,500,000	(0.2 X 100 X 0.9)	2,500,000	-5,500,000
PA	75,000,000	19,500,000	(0.26 X R75m)	7,500,000	15,000,000				1875000	31,125,000
Forestry	250,000,000	207,500,000	(0.75X)	25,000,000	50,000,000		56,250,000	(0.75 X 0.3 X 250)	6,250,000	17,500,000
	1,925,000,000	817,500,000		192,500,000	362,500,000		153,750,000		48,125,000	658,125,000

iii)

Examiners comments:

This question was not answered well. Many candidates wrote down the actual reinsurance arrangements without answering the question “evaluate the appropriateness”. Candidates did not show the appropriate depth of understanding the key issues, specifically surplus treaties. Very few candidates took the size of the book in terms of premium volume into account when they evaluated the treaties.

Appropriateness of RI per class

Personal lines

- Probably appropriate given info provided.
- Reduces volatility on income statement against individual large claims up to their maximum amount.
- One large property loss will only impact loss ratio by 0.5% (5m/1000m) so this will help with the aim of each class being profitable on its own.
- Premium volumes sufficient to absorb most claims, so net retentions can be set high, potentially higher. Especially motor. A R1m claim will have a 0.1% (1m/1000) impact on loss ratio only.
- Number of reinstatements needs to be taken into account to determine value for money.

Commercial

- Probably inappropriate.
- Adequate volatility protection against large losses.
- But large portion of premium ceded away.
- With no return commission benefit as return commission is the same as gross commission.

Marine

- Definitely inappropriate.
- It's too expensive as the product runs at a loss before allowing for actual experience.
- This is mitigated by the profit commission clause, but the extent of this will depend on the exact terms of the profit commission.
- There will still be a lot of volatility with this structure. Net written premium = R4.5m. They retain R2m of a large loss. So, one large loss can impact loss ratio by almost 50%.

Personal Accident

- Probably appropriate.
- Covers individual large claims and accumulations with relatively low retentions.
- Premium doesn't seem excessive with majority of large risks are being ceded away.
- Level and number of reinstatements does need to be considered though.
- There is not enough information to determine whether or not the event limit cover is appropriate or not – it covers 10 lives, but would need to know premium rate or total exposure in number of lives to evaluate appropriateness.
- One should also consider the exposure from group versus individual policies.

Forestry

- Appropriate in structure
- Given the fire risk and the fact that once a fire starts, there is a good chance that it burns the whole plantation down, stop loss cover is necessary.
- Return commission is set at a high level making it very affordable.
- Need more information to assess appropriateness of size of cover. The maximum sum insured is quite a bit bigger than the premium amount and if the portfolio consists of several maximum capacity properties in close proximity (fire risk) then the total loss ratio could be in excess of 400%, i.e. stop loss cover would be too low

Catastrophe cover

Why it is Appropriate:

- Catastrophe cover is needed for accumulation of exposure especially where this is not provided by the current stand alone reinsurance in place.
- Level of reinstatements needs to be considered.
- Would also want to know whether there are different layers. The higher layers will not need the same number of reinstatements as the lower working layers, as you would expect fewer claims in the higher layers.

Why it is potentially inappropriate

- It doesn't need to cover all classes of business – Personal Accident has its own catastrophe cover in place already, Forestry has a stop loss cover in place.
- Marine perils may be different to land perils and may not be subject to the same catastrophe events, so separate CAT cover may be more appropriate.
- Probably inappropriate to charge premium on gross written premium as it is not consistent with the underlying catastrophic exposure of each class (especially where net retentions are very low in comparison to gross risks).

iv)

Examiners comments:

This question was book work and poorly answered

Key components of a financial plan

- It must have one or more clear goals.
- It must contain the strategy to be followed to achieve these goals.
- It should have set targets that will enable the success or failure of the strategy to be measured.
- The actuarial control cycle should form the basis for the considerations behind the financial plan.
- Key benchmarks on which the plan will focus need to be included: e.g. expected loss ratio, capital implications, overall profitability rates of change of new business in the future.
- Regulatory capital implications will need to be shown.
- It will need to include financial modelling to predict the future.
- Assumptions contained within the modelling will need to be shown.
- Plan should show trade-off between growth and expenses of developing business over time.

- It may involve evaluating the economic value of individual contracts using net present value techniques & may be extended to all lines of business, e.g. a model office may need to be developed.

v)

Examiners comments:

This question was not well answered. Candidates didn't consider all the aspects appropriately, which was disappointing.

Factors to be considered

Cost benefit analyses & risk appetite consideration

- Required capital will increase due to the increase in net retention and this capital will need to generate a return for the shareholder. At the same time due to potential diversification, this additional capital could be reduced, potentially significantly.
- Shareholder appetite. The shareholder may not believe that this is a good use of its capital. They may prefer to extract the additional capital from the company rather than tying it up in the internal fund.
- The reinsurance spend will decrease, but the reinsurance benefit will be lost as many claims previously ceded to the reinsurance market will now be held for net. This will increase the volatility to the income statement. (i.e. bad years results will be held for net and vice versa) This will also impact the stand-alone profitability and increase the variability of the profitability for each class of business.
- The level of diversification and correlation between risks needs to be considered. Certain classes of business are negatively correlated e.g. dry weather could lead to fires, but lower property claims, which usually increase in wet weather. This could reduce the premium.
- If you have a really bad year and exhaust the fund, you will need to eat into your surplus to cover the risk in the following year. This is likely to be a lot more expensive than paying a reinsurer. A reinsurer will price or the expected risk in the following year. You may need to price for a worst case scenario if you don't have too much capital.
- Reinsurers may have lower capital requirements or lower return on equity requirements than your company. If this is the case, you may find that your overall return on equity decreases if you keep the risk in house. However, with the added risk you would expect greater reward, so over the long term the internal fund might be able to achieve this, but at the expense of short term volatility in results.

Administration of the internal fund

- Separate management accounts (or monitoring mechanisms) need to be established to ensure accurate accounting. Presumably a separate RI product will need to be established and monitored separately.
- Cost of admin and capital modelling – might be negligible as the cost should already be incurred in current reinsurance decision making and administering processes.
- An internal fund will have specific system requirements. In essence the RI division will provide RI to the rest of the business and will receive premiums and pay claims. They have to ensure that their current policy and claim administration system can handle this and if it can't, either expand the capabilities of their current system or develop/buy a new system. This will add costs.

Availability of Reinsurance

- Will there be reinsurance appetite for the remainder of the risk, e.g. a forestry stop loss, given that there is no QS available? Even if there is reinsurance available, you may find the rates go up if the reinsurers find the business less attractive.
- Is such a common account protection (i.e. internal fund mechanism covering all classes of business) available in the market at an affordable rate?

Premium between classes of business

- One would need to ensure that each class of business contributes the correct amount of premium relative to the risk protection afforded by the internal fund.
- Communication to business divisions is important as they need to understand the added volatility to their results in a current financial year, as opposed to the impact of reinsurance results on the reinsurance terms and conditions of the next year's reinsurance treaties.

Fund rules

- There would need to be a clear set of predetermined fund rules that would need to be agreed upon and understood by all business units. There should be clear guidelines up front to clarify scope for manipulation or cross-subsidy should the fund allow for such practices.

Investments

- Will the nature of the retained risks change substantially with regards to amount and timing of claim payouts? If the answer is yes, then the investment strategy of the company may have to be reconsidered in light of the establishment of a notional internal reinsurance fund.

Transition to an internal fund

- Current reinsurance arrangements will need to be cancelled and the risks moved to the internal fund arrangement. Care will be needed to ensure that there are no gaps in cover (e.g. moving from claims made to risk attaching treaties) and where necessary portfolio transfers (of reserves) will need to be considered and negotiated.

Assistance from reinsurers

- If you are relying on reinsurers for guidance for some of the classes of business, e.g. marine and forestry, you may find they are less willing to assist in future if they no longer see you as such a valuable customer.

vi)

Examiners comments:

This question was a mixture of bookwork and application and both aspects were poorly answered. Candidates struggled with this question. Most candidates failed to cover the specific issues raised in the question, i.e. the level of cover, the cost and the fact that the product will no longer benefit from the reinsurance return or profit commission.

Stress testing to justify benefits

Benefit: lower cost of reinsurance: Stress Test

- Stress test net premium by stressing the cost of the internal fund and comparing it to the net premium with the current reinsurance treaties:
- Worst case scenarios and best case scenarios
 - Good & bad administration of internal fund expense overrun.
 - Good & bad claims experience for the internal fund portfolio as a whole.
 - Good & bad claims experience for just the marine class of business to see if this impacts the rates.
 - Bad experience includes increasing number of claims and/or claim severity and/or catastrophic claims frequency and severity.

Benefit: Appropriate cover still provided by the internal fund:

- Stress Test claims experience (gross and resultant reinsurance) and show impact on profitability.
- Worst case & best case scenarios:
 - For Marine only class of business.
 - High frequency and severity of gross claims.
 - Separately for individual claims and claim accumulations.

Benefit: Comparative overall view of 2 structures to demonstrate lack of perceived value of override commission and profit commission

Stress Test: premium levels and commission levels for override and profitability/claims experience levels for profit share (1 – HO)

- Worst case & best scenarios, which shows the least benefit on the new internal fund structure:
 - Lower than 20% actual commission levels & maximum commission levels.
 - High, normal and low premium volumes to maximise override commission levels.
 - High & low profitability levels (i.e. low loss ratio) to maximise profit share under old arrangement.
- Compare both reinsurance structures to show the relative merit of each. Again compare the impact of the above on both income statements: one reflecting the old/current reinsurance and one reflecting the notional internal fund.

Question 2

i.

Examiners comments:

This question was not well answered. It appeared that candidates did generally not know their work well.

- GN12. No reference to any assumptions made during the calculation of the reserves.
- No reference to the sources of data and what he/she takes responsibility for.
- The nature and spread of reinsurance has not been mentioned.
- No comment has been made about the possible non-performance of reinsurers.
- Claims handling expenses have not been included.
- No reference was made to any changes in the underlying business environment such as:
 - Changes in policy coverage.
 - Changes in the processing of claims.
 - Changes in underwriting.
 - Changes in reinsurance arrangements.
- The report does not state whether explicit or implicit discounting has been used.
- No reference to the governing accounting principles was made.
- In general the report does not contain enough information for an independent, experienced actuary to form a view or to reproduce the results.
- The report does include the purpose and scope that states the intended recipient.
- No mention was made of the methodology used or the comparison between different methods.

ii.

Examiners comments:

a) This question was generally well answered.

b) This question was not well answered and candidates showed a lack of being able to apply their knowledge to the specific question.

a.

- The motor and property classes have a very low mean IBNR expressed as a percentage of NWP and for motor even the 99.5% sufficiency level is about 5%.
- Because the motor and property classes constitute more than 50% of the total book the overall IBNR is fairly low.
- The mean engineering and liability IBNR on the other hand is close to 7%.
- The 75% and 99.5% levels show that the liability reserve distribution is very skewed to the right which implies that they should hold more than the 7% to be prudent.
- The level of IBNR depends on the adequacy of case estimates. This might be part of the reason for the difference in IBNR percentages between the classes of business.
- It is not clearly stated whether each line is on a 75% sufficiency level or whether the total reserve is on a 75% sufficiency level, therefore allowing for diversification benefit between the lines.
- PGN401 states that the reserves should be on a 75% sufficiency level and 5% of NWP is less than the required 75th percentile (which is 5.9% of NWP).
- It would be more appropriate to hold different levels of reserves for different lines. This will avoid a distortion of reserves if the mix of business changes.

b.

- The guidance in PGN401 should be followed in the request for additional information.
- Details about the development factors chosen.
- This will give an implication of how conservative the estimates are.
- From this you will be able to determine whether discounting was applied.
- A comparison between the reserves as a result of using different reserving techniques such as BF, Cape Cod and chain ladder to get a better understanding of the stability of the results.
- Payment development patterns to test the rate of payment.
- Ask whether it is possible to do the reserves on a gross basis and do the recoveries separately to get to a net reserve.
- This will give a clear idea of the exposure to reinsurance failure on the reserves.
- For all classes ask whether they can split the reserve between pure IBNR and IBNER to get a better understanding of the adequacy of the OCR.
- Ask how changes in reinsurance programmes were taken into account in the triangles.

- Details about the quality of the reinsurers used to determine whether the reserves should increase with an additional margin for reinsurance default.
- An estimate of the claims handling expenses.
- An analysis of the accuracy of the information used to determine the reserves as well as a comparison with the financials.
- Are all the classes of business fully developed after 5 years and if not, which tail factor has been assumed.
- It is important to make sure that the other reserves are adequate (UPR, OCR) before deciding to reduce the IBNR. Ask the company to verify this.
- Ask for a comparison with previous IBNR valuations to get an indication of the stability of the reserves.
- To get an indication of the inflation that the company has been exposed to, ask for detailed claims information by line of business for the last 5 years.

iii.

Examiners comments:

This question was generally well answered (both parts a and b)

a.

The principles to consider are:

- The mean term of the assets and liabilities should match and if not the company should understand the potential consequences.
- Claims that are exposed to inflation should be matched with assets whose values are expected to increase in line with inflation.
- Classes of business with a history of producing widely fluctuating levels of claims should be backed with liquid assets.
- Even if these lines have reinsurance protection the company will often have to pay the claims well in advance before the recovery from the reinsurers are made.
- The general requirements for assets backing the solvency margin are:
- The insurer should avoid all significant risks.
- The safest option is to hold short-dated gilts because they offer
 - Security of payment.
 - Low volatility of capital value.

b.

- 7% of NWP equals R55.3 million.
- Adding the UPR, outstanding claims reserves and other liabilities, the total liabilities equal R184million.

- Only R50 million is backed by cash and the rest will have to be backed by equities and bonds.
- Equities are much more volatile and although these might be liquid, the value can be very diminished if you are forced to sell equities to pay claims.
- If this happens with a drop in the property and preference shares, it might result in the company being technically insolvent because the remaining assets (after matching liabilities) only constitute 25% of NWP.
Unlisted preference shares and the investment in Associates are illiquid and are highly correlated with the company's own underwriting experience.
- Motor and property is short-tailed but is also exposed to inflation (e.g. vehicle parts). These liabilities should be backed by liquid assets with some investment in equities to allow for the inflationary pressure.
- Liability is long tailed and the assets backing this do not necessarily have to be immediately available.
- Because the company is budgeting to grow at 20% there is expected to be generally positive cash-flow from premium income exceeding claims and expenses so liquidity requirements are less than if company was in run-off, say.

The company should at least do one of the following to have a better match between assets and liabilities:

- Reduce the investments in unlisted preference shares and increase the cash or near-cash portfolio.
- Reduce the investments in unlisted preference shares and increase short-dated gilts.
- Increase the capital base either through a cash injection from share-holders or through debt and invest this in cash, near-cash or short-dated gilts.

iv.

Examiners comments:

This question was poorly answered with most candidates not applying their knowledge to the question specifically.

- Although the reserve analysis shows that the IBNR can be reduced, there are inherent risks in this business which requires either a capital injection or higher reserves.
- This company cedes 50% of their business to reinsurers.
- This exposes it to reinsurer default and a delay in the recovery from a reinsurer. Both these events will cause capital strain.

- The solvency margin is $(\text{Assets} - \text{Liabilities})/\text{NWP}$
 $= (382\text{m} - 184\text{m}) / 790\text{m}$
 $= 25\%$
- Even reducing the IBNRs to 5% will only marginally increase the solvency position.
- Given the relatively low solvency margin, backed by very illiquid assets, a reduction in their reserves will increase the risk of becoming technically insolvent.
- The company is also exposed to exchange rate risk which might also threaten their solvency margin. Reducing the reserves will increase this risk.
- Depending on the specific African country in which the associates are domiciled, the company might also be exposed to political risks, e.g. nationalising all assets or civil war.
- Although the motor and property books might warrant a smaller reserve, the liability and engineering books do not.
- The engineering and liability business are usually longer tailed business with more reinsurance, as well as more volatile claims experience.
- This exposes the company to both adverse development in the reserves and reinsurance default risk.
- The company has a very aggressive growth strategy which is not currently supported by both the level and quality of assets.
- Aggressive growth might also lead to pressure on claims administrators which might affect the adequacy of the case reserves or increase the time to claim settlement.
- This might be exacerbated because of the UMA structure – less control over administration of policies and claims.
- It is also not clear in which classes they plan to grow. If it is in liability or engineering reserves cannot be reduced.
- However, if the growth is mainly in property and motor, reserve strain will be less and a reduction in reserves might be considered in future depending on their asset base at that time.

v.

Examiners comments:

This question was poorly answered with most candidates not applying their knowledge to the question specifically.

The company will have to demonstrate that they have enough capital

- To achieve their growth projections.
- And to provide a buffer if adverse events happen.
- Option 1: The company can develop an internal model (and get it approved). Depending on the results of the model, it might give the regulator comfort that the company currently has sufficient assets to cover the 1 in 200 year event.
- Option 2: The company can reduce the risk in their assets as follows:

- The asset base has to change so that the premium and claims reserves are covered by cash, near cash or short-term gilts.
- They can sell one or more of the associates or subsidiaries to reduce the risk on the asset side and increase the solvency margin. This will also reduce the correlation between the underwriting performance and the assets.
- If the mix of business changes such that engineering and liability reduce relative to motor and property, or if they add a new line of business which is short-tailed, the overall reserving requirement will reduce.
- If they change the reinsurance cover from proportional to non-proportional with fairly low attachment points the volatility in the claims experience will reduce and the IBNR will reduce.
- A pre-requisite for this is that the rating of the reinsurers should be good (investment grade) to reduce the credit risk.
- However, this will increase the capital requirement on the current formula because the net written premium will probably increase.
- An additional down-side of changing the RI program to non-proportional is that they lose the reinsurance commission which might affect their results negatively.

END OF EXAMINERS' REPORT