

Subject F203 — *General Insurance*
Specialist Applications
28 October 2015
MEMORANDUM

QUESTION 1

(i)

- An aggregate non-proportional excess of loss reinsurance that provides protection based on the total claims, from all perils, arising in a defined class (or classes) / specified portfolio during a defined period.
- It indemnifies the ceding company against the amount by which its losses incurred during a specific period (usually 12 months) exceed either:
 - a predetermined monetary amount or
 - a percentage of the company's subject premiums (loss ratio) for the specific period. (Subject premiums are the premiums for the account that is being reinsured.)
- The Excess Point and the Upper Limit are often expressed as a percentage of the cedant's premium income rather than in monetary terms, e.g. cover might be for a claims ratio in excess of 110% up to a limit of 140%.
- Where this form of reinsurance exists in practice, it is common for the cedant to be required to retain a proportion of the risk (called the coinsurance proportion) in the reinsured layer, to reduce any moral hazard
- Stop loss is often used to smooth profit results
- There is a maximum amount / upper limit on the cover provided by the Reinsurer. Losses beyond this limit revert back to the insurer.

- (ii) *Examiners' notes: Although candidates appeared to know the theory (relating to part (i) of the question) many candidates did not apply stop loss reinsurance correctly and/or confused it with excess of loss reinsurance. For example, stop loss reinsurance does not have reinstatement premiums.*

The question was based on the current environment (in other words it didn't ask for the impact in a SAM environment) but credit was given where valid SAM-related comments were made.

Many key issues were not mentioned by candidates e.g. to determine whether the contract is written on an accident/underwriting year basis; the insurer needs to fund the difference between the actual loss ratio and the attachment point and details on some of the practical difficulties of implementation.

Need more information on the contracts themselves:

- What is the purpose of changing the contracts - only simplicity or is there an additional reason e.g. capital efficiency? If a reinsurance broker is involved, what is their recommendation and reason(s) for change in the structure? / Highlighting need to understand initial reasons for purchasing RI cover, establishing if those reasons still exists
- What is the premium that the insurer will pay and how was/will this be determined? (Also split between deposit and adjustment components)
- Is there a guarantee that this cover will be available for a period of time? / What is the probability that this cover will still be available after one year? / Will the insurer need to change the whole program again after a year?
- Might damage relationships with current reinsurers. Same offerings might not be available in the future
- What is the reinsurer's credit rating? (This will impact capital) What is credit rating compared to current reinsurer(s)?
- What is included in the loss ratio - does it include reserve movements?
- If the loss ratio include reserve movements, will the reinsurer have any restrictions on the changes in reserves/input into how the reserves are calculated? (Management may have incentive to make budgeted loss ratios as low as possible)
- Confirm if the stop loss is based on an accident/underwriting/calendar year basis - direct impact on how this needs to be monitored
- What is the size of the upper limit to the stop loss cover? / Size of upper limit relative to attachment point
- When was this limit determined? If set in the previous year, the company is exposed to unexpected growth in premium income, which could drastically reduce cover.
- Need to investigate what is the probability that the upper limit will be breached
- And investigate the possible size of losses that may occur above that limit
- To what extent do the current treaties allow for rebroking - there may be a minimum term clause
- Are there any exclusions in the contract?
- Need to determine if there is a gap in cover e.g. moving from "claims made" to "losses occurring" would leave claims that occurred last year but are reported now not being covered
- Overall loss ratio will vary based on mix of business. Are there restrictions imposed by the reinsurer on how the company changes its business? (Otherwise the insurer could write riskier business (higher risk-reward) with the reinsurer taking the risk.)
- Is the budgeted loss ratio fixed? Is it given to the reinsurer before commencement of the contract? Does the reinsurer have any input into this loss ratio and/or how it is being calculated?

- Stoploss is generally expensive -> should be considered in cost benefit analysis.
- Order of operation should be QS first with SL taking only net losses -> checked and confirmed for analysis. NOTE: Large/CAT losses shouldn't be capped or excluded from the analysis
- Confirm types of commission (return comm and profit comm) and their payment
- Indexation of monetary limit would protect limit of cover against inflation

Effect on reserving

- There will be no impact on the gross reserves - they will be unchanged
- It is difficult to include non-proportional reinsurance information in triangles - reserves using triangular techniques (e.g. IBNR) will probably be done excluding the non-proportional stop loss reinsurance.
- Therefore appropriate adjustments will need to be made to net IBNR reserves (where appropriate) to ensure that the reserve is not overstated.
- Quota share: net results will follow that of the gross development.
- if the stop loss treaty is not breached, only quota share will apply which is easy to calculate
- Historic claims will still run off with the historical (and current) reinsurance structure in place.
- Net historic information is therefore not an accurate basis for predicting future development.
- May need to look at the development of different accident years separately (per cohort) to distinguish between historical and future development (e.g. different development patterns)
- Need to determine whether current reserving processes can distinguish between "history" and "future" as suggested above.
- Current triangles may be built up using accident years whilst the stop loss reinsurance may operate on the reinsurer's "underwriting year" basis.
- Treating accident years separately will not necessarily include the same claims development for the insurer and reinsurer (depending on the definitions used)
- For premium provisions: deduct reinsurance premium to calculate net
- IBNR under interim measures - method stays the same

Capital

- Need to be able to fund the difference between the actual loss ratio and the attachment point (the 8% mentioned) (Consider size of free reserves)
- Is it a local or foreign reinsurer? If foreign need to consider whether the reinsurance will be approved or not.
- If not approved - need to determine if there is enough capital available as the reinsurance asset on recoveries will not be allowed
- If not approved - consider letter of credit or collateral to improve solvency position
- One insurer is offering the structure where it is likely that current Quota share and non-proportional treaties are with a number of reinsurance companies. Likely to be a loss of diversification/increase in concentration risk

Operational issues

- Can the insurer's system cope with the proposed reinsurance structure? (cost for changing system to administer RI structure)
- Stop loss recovery can only be determined at the end of the period (at least at the end of the first year)
 - How will monitoring take place on an ongoing basis to determine whether stop loss recoveries need to be made?

- Monitoring needs to be on a regular basis to ensure regulatory solvency position is not breached (and need to submit quarterly returns to the regulator)
- Stop loss is an annual contract - regular monitoring will need to be on a basis of actual experience (up to that point) and estimates for the remaining part of the year
- Monitoring will need to continue for a number of years into the future, until all claims development from the cohort has been completed
- Will monitoring of each year's contract take place for an unlimited time or will there be a time limit (e.g. 10 years)?
- Does the contract specify what will happen at the end of the monitoring period i.e. when and how commutation of remaining claims will take place?
- Need to be able to distinguish between new claims, and development on existing claims, that do not fall under the new treaty structure
- If there is a large claim during the year, can the insurer call on the reinsurer for payment before the end of the period?
- How the treaty premiums and recoveries are allocated per line will depend on how the insurer manages its business - "lines" must make sense from a practical point of view
- But allocation per line of business must also be available on the statutory lines of business for reporting to the regulator
- How will the reinsurance premium and recoveries be allocated per line of business?
 - Quota share: same proportion as specified in RI treaty applied to each line for both premium and loss recoveries
 - Stop loss:
 - Premium should be allocated at the start of the year.
 - In theory could allocate more premium to riskier classes (e.g. commercial lines expected to be more volatile than personal lines)
 - In practice easier to allocate the RI premium proportionally between lines of business
 - breach of stop loss could be due to a single large event or due to an accumulation of losses
 - single large event - could allocate recovery to the specific line involved
 - the above assumes that all lines contribute to a "pool" of risks and that the line that "claims" will get the benefit
 - accumulation of losses from different lines - allocate proportionally or based on a measure of volatility (e.g. reserve risk volatility)
 - (Marks given for another way of allocation if appropriately motivated)
- Did the reinsurer specify what information it needs and how often? / Should the insurer inform the reinsurer when the loss ratio is expected to go beyond the attachment point?
- Changes in processes / training to staff on new RI structure -> adds to cost

Profitability

- One commission rate for all lines
 - how are expenses split per line of business?
 - Need to know whether the commission is enough to be profitable per line, or will subsidies between lines of business be allowed? (How is profitability per class managed)
- Proposed programme likely to reduce volatility of future profits (benefit) while reducing future expected/mean profits (disadvantage) / maximise profitability for given premium and risk
- Insurer may have large losses that don't cause the limit to be breached. These may have been reduced by previous XoL contracts. This could cause the insurer to have more risk (or volatility) below the stop loss threshold than before

Appropriateness

- Simplistic structure is beneficial compared to existing complex structure
- Need to prepare a comparison between the existing and proposed structure's outcomes
- Consider whether return on capital is equal to or greater than required, if reinsurance treaty is implemented
- Would Board be satisfied with being exposed to one reinsurer - is it in line with risk appetite?
- What would the effect be if the business mix between lines of business change?
- Consider historical claims incurred, earned premium and loss ratios (gross and net) to illustrate the historical trend of losses in the company and how the new treaty would change the net experience.
- Compare the above with the historical net experience - would the new treaty have been more beneficial to the company (e.g. more profitable, less exposure to large losses etc.)
- Get the expected gross premium for the next (say) 3 years from budget/forecast plans
- For each future year determine simulated claims incurred values (after the quota share)
- From the simulations one can determine how many times the stop loss treaty is breached - this will indicate whether this is a "working" stop loss contract or whether it is expected to breach the treaty only in exceptional circumstances
- Determine the number of times the stop loss limit is exceeded (Add some stress testing)
- If the stop loss is exceeded, determine the average size of the losses above the limit - this will give information on how much additional capital may be needed (and how often)
- Show the maximum net losses incurred expected on the new treaty vs. the old structure and compare
- Analyses could be in total only (this is how the treaty works) but could be split into more detail e.g. to show how the reinsurance treaty will impact personal and commercial lines differently
- Show a simplified "income statement" to show the impact on profitability of the treaty
- If the operational impact is significant - can it be justified by the cost involved?
- Reasoning size of insurer and personal lines gives stability, resulting QS is therefore just passing profit to reinsurer
- Discussing appropriateness of single retention under QS across differing risk profile of contributing business classes
- Comparing surplus with QS for commercial lines to conclude QS might be inappropriate.
- Single RI commission inappropriate for differing commission and expenses per class of business
- Consideration for Reinsurance market cycle's price for reinsurance cover -> XOL might be cheap / expensive relative to proposed structure
- Commenting to checking alternatives to Reinsurance / alternative risk transfer mechanisms
- Highlighting reasons for RI to large insurer - potentially smoothing profit & protecting solvency margin (as opposed to funding new business)

(iii)

- Get historical information (as far back as possible) on
 - gross claims incurred (i.e. claims paid and reserve movements)
 - gross earned premiumto determine historical gross loss ratios
- Adjust historical information for inflation/other trends
- The information is needed in total (this is what the stop loss is based on) but can be more granular (e.g. per line of business) for further analyses
- Make sure that the historical claims incurred and earned premiums are obtained in a way that is consistent with the terms of the reinsurance treaty (e.g. accident or underwriting years)
- Fit a statistical distribution to the observed loss ratios / Determine aggregate claims cost distribution
- Look at the goodness-of-fit and make adjustments if needed (even if the insurer has many years' data, there will not be a lot of data points as there is only one loss ratio per year)
- Do a stochastic projection (based on the parameters of the distribution fitted) to project possible future outcomes
- The premium can be estimated as follows:
 - For each simulation where the projected loss ratio is larger than the treaty attachment point loss ratio
 - get the difference between the projected loss ratio and the treaty attachment point loss ratio
 - multiply this by the expected gross earned premium of the following year (Get this from next year's budget for example)
 - multiply by the quota share retention percentage
 - allow for upper limit where stop loss cover ceases
 - allow for loss sharing between lower and upper limits
 - the premium can be estimated by the average of the above result for the simulations where the projected loss ratio is larger than the treaty attachment point loss ratio
- Compare the estimated premium with the premium from the reinsurer / Are expected recoveries larger than the premium payable?
 - Would expect this "premium" to be lower than that determined by the reinsurer
 - reinsurer needs to make allowance for uncertainty - replace the average in the calculation above with higher percentiles of the distribution to estimate what level of uncertainty the reinsurer is targeting
 - The reinsurer must also allow for its own costs and profit (talk to brokers to get an idea of what the current market practice is)
 - The reinsurer might not have had detailed information from the insurer in determining the price and may have used other industry information that it has access to
- Perhaps approach a reinsurance broker to try and find if similar contracts exists and whether the terms and premium is commensurate with what available elsewhere. However, this type of non-proportional treaty is not common.
- As there is no commission receivable this will not form part of the calculation
- Similarly there will be no allowance for reinstatement premiums

QUESTION 2

(i) *Examiners' notes: Most candidates could relay the most important points required but failed to go into enough detail or to expand into more salient points.*

- If the claims are thought to be completely once-off (or catastrophe claims), and not likely to be repeated in the future, exclude them altogether from the data and account for them elsewhere.
- If the claims are likely to occur occasionally, include only part of the cost of such claims, corresponding to the probability of their recurrence and the length of the periods being analysed and projected. (i.e. return period)
- Personal short tail classes may include larger risks and the potential for individual large claims. However, it would not be expected that a single large claim would influence the results so much as large volumes of claims. / Threshold could differ by line of business
- Make sure that the data used treat excesses / deductibles consistently over the period of consideration
- Consider the definition of a large claim e.g. where policies have multiple perils.
- Having a limited number of large claims might mean there is little data on which to base a separate allowance for large claims but not excluding them can mean that an “all claims” analysis shows unstable experience due to distortion from those few large claims
- Claims at the start of development have higher levels of uncertainty and may still develop into large claims.
- Large claims are often subject to limited data and can occur in the tail of development, where their relative importance becomes greater.
- Judgement is needed to select the "cut-off" claim size representing the border between large and attritional claims
- The point at which a claim is considered large might balance a “natural” cut off that might be observed in the data (say, where there is an apparent gap between the size of the bulk of claims and a handful of large claims) and a point that would allow meaningful analysis.
- Threshold could be based on a percentile e.g. exclude the largest 5% of claims / use a statistical method
- Monitoring claims close to but below the adopted threshold can give the actuary a sense of the “pipeline” of potential large claims that are yet to emerge. (I.e. there is a potential for smaller claims to develop into large claims.)
- Development observed across a group of large claims can be a mixture of movement of reported incurred cost across individual large claims, and changes in the group of claims considered large.
- In order to better separate these impacts, analysis can include claims that have been large (with threshold appropriately defined) at any point in time in the past, although they may or may not be currently large
- An alternative is to use a “cap and excess” analysis, where rather than to separate claims into small and large, all claims are analysed together with a large claims cap.
- Only the portion of a claim above the cap is excluded and analysed separately.
- The excess above this cut-off amount could be spread over the experience of all other relevant groups.
- A large claims threshold may be held constant or indexed over time
- Where no indexation adjustment is applied, the actuary needs to be aware that in real terms the pool of large claims should be expected to change over time.
- Analysis of reinsurance recoveries and the net position can be simplified where the large threshold is chosen to mirror the reinsurance retention
- Considering splitting large and attritional on gross and net of reinsurance basis
- Commenting that peril can affect way claims develop and so should be a factor in separating claims

- Considering the purpose of reserving e.g. Statutory method does not require splitting claims (use premium volume measure)
- Splitting into homogeneous groups while considering credibility of remaining volume of data
- Settlement pattern of large losses is usually longer - consider discounting before applying threshold / indexation applied to future settlement date
- Use mean excess plots / graphical analysis

(ii) *Examiners' notes: Some candidates interpreted the "stating the current requirements where relevant" part of the question to mean "state the formulae for determining the various technical provisions". Many gave a too high-level narrative without giving detail on how to show this in financial statements. Creating a process or complying with legislation does not guarantee that the reserves are sufficient.*

General

- One should separately disclose information explaining the amounts that are recognised in the financial statements and the assumptions used for quantifying these amounts
- Sufficiency should be tested based on a sensible segmentation of the business
- But often simplified by considering the book as a whole
- To be complete the documentation should include
 - variance analysis
 - sensitivity analysis
 - back testing
- These calculations should be performed at least once a year
- Purpose is to estimate the level of uncertainty in the provisions
- Sufficiency should be tested on both a gross and net of reinsurance basis
- In future, according to IFRS4 the level of sufficiency, based on a percentile approach, must be reported
- Compare actual vs. expected run-off

Outstanding claims reserve (OCR)

- Components needed to test sufficiency are:
 1. OCR at the start of the period
 2. Claims paid from the beginning of the period to the end of the period which were reported until the beginning of the period
 3. OCR at the end of the period for claims reported until the beginning of the period
- Result of test is (1) - (2) - (3)
- If the result is <0 then the provision at the start of the period was not sufficient
- very high positive amounts could be a sign of a conservative approach and may cause excessive prudence which is not allowed under IFRS

Incurred but not reported (IBNR)

- Components needed to test sufficiency are:
 1. IBNR at the start of the period
 2. Claims paid from the beginning of the period to the end of the period for claims incurred until the beginning of the period but reported from the beginning of the period to the end of the period
 3. OCR at the end of the period for claims incurred until the beginning of the period but reported from the beginning of the period to the end of the period
 4. IBNR at the end of the period for claims incurred until the beginning of the period
- Result of test is (1) - (2) - (3) - (4)
- If the result is <0 then the provision at the start of the period was not sufficient
- very high positive amounts could be a sign of a conservative approach and may cause excessive prudence which is not allowed under IFRS

Unearned premium reserve (UPR)

- According to IFRS, if the expected value of claims and expenses attributable to the unexpired periods of policies in force at the balance sheet date exceeds the unearned

premiums provision in relation to those policies after deduction of any deferred commission expenses, the insurer assesses the need for an unexpired risk provision. (Or AURR - Additional Unexpired Risk Reserve)

- According to FSB (i.e. legislation) the insurer needs to hold an AURR (Additional unexpired risk reserve) if an underwriting loss occurs and after consultation with the insurer's auditors
- The test is performed assuming that the insurer is a going concern
- To create future cash flows one needs a combined ratio
- Loss ratios (per line of business) should be based on future expectations
- Expenses must include ongoing expenses i.e. initial/acquisition expenses can be deducted
- Expenses should be allocated per line of business
- Components needed to test sufficiency are:
 1. $UPR \text{ at start of period} * \text{Combined ratio} = URR \text{ (Unexpired risk reserve)}$
 2. $AURR = \max(0, URR - UPR)$

Data required

- OCR on a per policy basis (Gross and net)
- IBNR per line of business (gross and net)
- Claim payments (gross and net)
- Date claim was reported
- Accident date of claim
- Payment date(s) of claims
- Claim numbers linked to policy numbers
- Written premium per policy (gross and net)
- Earned premium per policy (gross and net)
- Expenses split by initial and ongoing expenses
- Deferred acquisition cost
- Loss ratios per segment - expected for the next period
- Use information to calculate expense ratio and combined ratio
- Separately noting ULAE
- Policy start date (for UPP)

(iii) *Examiners' notes: Bookwork relating to APN401. The answers were disappointing.*

- Before signing off on the actuarial report, the member should ensure that the results obtained from the actuarial valuation are reasonable, both in aggregate and for each valuation unit within the insurer's total portfolio.
- Reasonableness should be assessed in relation to:
 - comparable results for that valuation unit in the previous year;
 - development in the valuation unit over the inter-valuation period;
 - the experience of the valuation unit since the previous valuation; / processes changed
 - changes in economic assumptions, particularly investment and inflation assumptions;
 - changes to the actuarial model; and
 - available industry results or benchmarks.
- A useful reasonability check is an analysis of the movement in the technical provisions since the previous valuation.
- The member should be satisfied that differences between the previous result and the present result can be explained in terms of the experience in the intervening period and changes in the valuation model and assumptions.
- The member should compare the results to the results under the prescribed statutory method, although detailed explanations of deviations will not be required.

(iv) *Examiners' notes: Many candidates explained in detail what each ratio would be used for, which was not required by the question.*

General comments:

- comparison needs to be over a few years (on all elements) to determine trends and/or outliers
- comparison needs to be with similar insurers (i.e. size, type of business written etc)
- comment on evidence of the underwriting cycle and where the insurer (and industry) is currently estimated to be
- comment on any catastrophes that could impact/distort the results of insurers
- Noting publicly available data not granular enough to allow detailed comparison and / adjusting for differences between insurers.

Compare the size/market share of insurers:

- Gross written premium over time
- Gross earned premium over time
- similar net premiums as above - give an indication of net exposure and use of reinsurance
- compare growth in premium with an index such as CPI to determine real growth
- indicate if significant growth is due to exceptional circumstances e.g. take-over of another company

Compare profitability:

- Underwriting loss/profit - use underwriting margin (underwriting profit/earned premium) to eliminate size differences
- Compare total profit/loss (after taking investment income into account)

Compare key ratios

- Comparison should be both gross and net and as detailed as possible, depending on the disclosure in the financial statements (e.g. personal and commercial lines)
- Claims ratio (claims incurred/earned premium) / Loss ratio
- Acquisition cost ratio (acquisition cost/written premium)
- Commission ratio (commission paid/written premium) If Reinsurance is significant take account of reinsurance commission received as well.
- Expense ratio (operating expenses/written premium)
- Combined ratio (claims ratio + expense ratio) / Operational ratio

Assets:

- Compare investment performance of assets and compare with market performance (e.g. JSE all share index, All bond index etc depending on the type of assets)
- This is done by considering the total consolidated invested assets and income on invested assets
- Use above to calculate a return on the average invested assets (income/(Assets time t + Assets time t-1)/2)
- Look at the composition of assets and changes in the composition of assets over time
- Investment income/GWP - gives a sense of the investment return based on production
- Investment income as % of total profit to indicate split between UW and investment profit

Capital and solvency:

- Compare statutory solvency margin (Free assets/premium) / Compare capital cover ratio over time
- This is done by considering the available capital / Free assets / Own funds / Available financial resources
- less Capital requirement
- giving the free surplus
- Compare whether the insurers are on MCAR or SCR from the notes in the statements
- Calculate a ratio of capital requirements/premiums to determine how "efficient" the capital is being used

Other:

- Suggesting tracking return on capital as a key metric to track capital efficiency and profitability.
- Gross UPR divided by GWP to establish frequency of business and UPP period
- Reporting delays - IBNR divided by premiums
- Settling delays - OCR divided by premiums
- Comparison of share prices / PE Ratio as this is the market's perception of insurer value