

Actuarial Society of South Africa

EXAMINATION

1 November 2013

**Subject F203 — General Insurance
Specialist Applications**

EXAMINERS' REPORT

Question 1

Examiners' comment: This was bookwork and was generally answered well. Most candidates omitted the fact that pillar 1 includes the valuation of assets and liabilities on an economic balance sheet approach.

- a) Outline the basic structure of the SAM framework
(Bookwork, from notes)

The SAM structure consists of 3 major pillars:

Pillar 1:

- Stipulates the quantitative requirements that insurers must satisfy to demonstrate they have adequate financial resources
- Valuation of assets and liabilities ...
- on an economic total balance sheet approach
- Setting of Capital Requirements
 - calculated using either the standard formula or internal model approach

Pillar 2:

- Qualitative requirements
- Standards and guidance on corporate governance, internal controls (or control functions), risk management (also gave marks for risk appetite) and supervisory processes

Pillar 3:

- Reporting and Disclosure

b) Identify potential sources of relevant data as well as the data items that you would need to assess the following risks under SAM:

i) Credit risk

Sources of data:

- Credit ratings from credit rating agencies
- Reinsurers
- Media reports
- Investment Schemes / Fund managers
- Credit ratings as determined internally by insurer
- Merchant Banks / Investment analysts' reports
- Credit bureaus

Data items needed:

- List of assets with credit risks:
 - Banks – deposits, NCDs,
 - Government bonds
 - Other bonds and debentures
 - Outstanding reinsurance balances
 - Debtors
 - Reinsurance asset (i.e. difference between gross and net liabilities)
 - Etc. (any other relevant, justifiable asset types that are subject to credit risk)
- Outstanding duration of each item
- Market value of each item / Exposure
- International local currency credit ratings
- Internal ratings of items (where available)
- Methodology used to determine internal ratings
- Collateral held from reinsurers
- Countries the insurer is operating in
- Table to compare credit ratings of different credit rating agencies
- Loss given default assumptions

ii) Natural catastrophe risk

Sources of data:

- Catastrophe models available from vendors in the market
- South African industry data on natural catastrophes that have already happened / Data from SAIA
- Information on probability and severity from industry specialists on specific risks (e.g. seismologists)
- Information from reinsurers
- Company specific scenarios of possible events relating to its own risk profile
- Need to identify potential risk concentration i.e. risk addresses / sources of business

Data items needed:

- List of risks/policies on the insurer's book that are exposed to natural catastrophe claims
- Internal data: List of catastrophe claims as far back as possible
- Sizes of claims / Severity / EML / Exposure
- Probability function / Probability of occurrence / Expected frequency
- Reinsurance recovered
- Exclusions / Deductibles
- Number of reinstatements
- Settlement delays

c) Discuss the factors that you would take into consideration to evaluate whether it would be suitable for your organisation to join this consortium.

- In what currency (ies) are the data collected – will it be applicable?
- What jurisdiction(s) are covered – will the information contained in the database be applicable to the insurer? (i.e. relevance to insurer)
- How do they ensure/guarantee the confidentiality of data submitted?
- Cost of joining and subscription fees
- Comparison of the standard model's operational risk vs. the possible benefits of using this data to develop a full/partial internal model. Will the cost of developing an internal model outweigh the potential benefit?
- Will the insurer use this for other purposes (apart from modelling operational risk) as well? E.g. for risk management purposes?
- Is the information scaled? I.e. do you know whether an event of Rx is from a big/small company (relative size of information)
- Does it only include actual losses or near misses as well?
- What is the size of the reporting threshold of losses? (If set too high, much of the information is lost.)
- Would the regulator be satisfied if these data were used in internal modelling and/or ORSA?
- How many entities are currently subscribing and how many South African entities are (or will) subscribe i.e. is there a suitably large relevant pool of data?
- What is the time lag from providing the data to the data being available for analysis?
- What other services do they offer and how to access the data? For instance, do you need to go through the database yourself or do they produce reports?
- How do they ensure data quality and a correct classification?
- How is the data imported into the system? Is it a manual process or can one import data from a risk management (or other) system?
- What are the technology specifications needed to implement this system and is it compatible with the insurer's current set-up?
- What training and support would this group offer?
- Likely "adoption rate" of competitors
- Is the insurer's current processes and information on operational risk at such a level that it can contribute to this consortium?

- Are there other alternatives available in the market that this consortium can be compared with?
- d) Explain how the reserves for a cash-back benefit will likely be calculated in a SAM environment. Consider what the likely impact of introducing such a benefit will have on the insurer's solvency position.

Examiners' comment: Many candidates included how cash-back benefits are calculated under interim measures, which was not part of the question and gained no marks. This is a specific reserve, but also part of the technical provisions. It was therefore necessary to state how the technical provisions will be calculated and then have some specific points regarding this particular reserve.

Reserves:

- Technical provisions in a SAM environment will be calculated using a discounted cash flow approach
- Technical provisions need to be best estimates
- Discounting will be at a risk-free rate, (or FSB yield curves)
- with an additional risk margin
- To determine the likely cash flows one needs to know the exact rules of the policy wording:
 - when will a benefit be payable, definition of a claim that will lead to a forfeit of the cash-back benefit
 - Options that the policyholders have
 - What benefit is payable, for example if it is a % of premium, what premium is used (e.g. excluding commission?)
- To determine the likely cash flows one need to make assumptions about the following:
 - Likely claim ratios (assuming on a claim the benefit is forfeited) This benefit will discourage small claims – the claim ratios will need to be adjusted to allow for this.
 - Termination ratio (due to withdrawals/cancellations, lapses and death)
- The contract boundary will probably be the end of the period when the benefit will be payable (E.g. if a benefit is given after 3 claim-free years, the boundary will be 3 years)
- The reserve for the cash-back portion will need to be calculated separately from the

rest of the best estimate reserves

Impact on solvency position:

- There should be a premium for this benefit, therefore if the premium is calculated correctly it should counter the increased reserving requirements
- Having a cash-back benefit acts as a risk mitigant for underwriting risk – if there are increased claims, more of the cash-back reserve is released which adds a buffer and decreases underwriting risk for capital purposes
- If reserves are increased, it increases premium and reserving risk in the underwriting risk component of the SCR
- The impact on capital will also depend on the volume of this business that the insurer intends to write.
- Operational risk will increase (dependent on premium)
- The actual investments in which these reserves will be held will impact the market risk component of the SCR.

However, if kept in cash it won't have a large impact except for credit risk.

- The impact on solvency is therefore dependent on factors that operate in opposite directions. To estimate a more accurate number additional information is required. (For example, correlations between market risk and underwriting risk will also have an influence on the final number.)

Question 2

- (a) List the factors that you would consider in determining purchase price

Examiners' comment: Many candidates included items that is valid to consider when purchasing another insurer in a different country, but will not necessarily affect the price that will be paid, for example language issues.

- Is the management of Emerge staying on or not?
- What is the basis of the target insurer's published reserves – best estimate, level of prudence, etc.
- Is time value of money taken into consideration and if so consider the discount rate used in setting reserves – it needs to be consistent with the nature, duration, currency and uncertainty of the liability
- Data quality. What validation checks have been performed, what system controls in place, etc
- Method of calculation of reserves – appropriateness and drawbacks
- Historical accuracy of reserve estimates (Actual vs. Expected)
- Future expected reinsurance recoveries and the allowance for recoveries in the IBNR calculation
- The effect of the acquisition on reinsurance contracts
- The historical accuracy of case estimates and therefore whether an IBNER needs to be considered
- The adequacy of the unearned premium to cover future expected claims and expenses and therefore whether an AURR is required
- Whether there is an allowance for expenses on outstanding claims in the reserve (both direct and indirect) and therefore whether a ULAE is required
- What is an appropriate risk margin for this commercial transaction given:
 - risk appetite of All-Risk
 - required return on capital of the All-Risk shareholders and the alternative options i.e. opportunity costs
 - emerging market risks
 - Tax differences in emerging market compared to local market

- potential differences in motor accident legislation i.e. whether third-party liability claims are included in the cover as opposed to covered by the state (e.g. RAF)
- historic performance of Emerge
- differences in capital regulation and uncertainty thereof / Regulatory capital requirement in foreign country
- extent of data available, particularly for liability claims
- experience and skills in the market
- Potential profitability of the book of business
 - Historical performance i.e. volatility of combined loss ratios
 - Expected future profitability
 - Potential goodwill
- Are there any other contingent liabilities on Emerge's books?
- Political risks. Given emerging market potential for onerous liability legislation. Existing accident funds and interplay with motor insurers
- Regulatory approval process and potential restrictions of local regulations (e.g. tariffs)
- How the purchase price will be used – e.g. to pay down existing debt or as a dividend.
- Fit with existing business in order to gain efficiencies and economies of scale. Emerge is a motor business and All-Risk is personal lines so there may be efficiencies to gain (i.e. synergies)
- Any diversification benefit that can be gained upon consolidation
- Operational risks within the business
- Market risks i.e. the volatility of assets invested in
- Credit Risks i.e. credit ratings of reinsurers and investment counterparties as well as premium debtors and broker balances
- Exposure to Catastrophes i.e. geographical distribution
- Spread of assets
- Quality / Size of assets
- Ageing of premium and other debtors
- Sales volume expected / Growth potential / Premium written in recent years
- Historical expense ratios
- What is the strength of the financial soundness of Emerge? / Solvency Position / NAV
- Time and costs involved to reconcile IT system platforms with that of All-Risk

- Administrative costs to (for example) inform clients of acquisition, changing policy wording and amending marketing material
- Currency risk
- Is sale of Emerge at current owners' instigation? (What is the reason for the sale?)
- Although Emerge is "small" , what is its relative size in the local market – e.g. is it a major player in the local market?

(b) Explain what you would include to provide management with information on these items.

Examiners' comment: Many candidates produced a list of items without explaining what it will be used for or not relating it back to the specific scenario. This is expected in an F100 series exam, but not in a fellowship examination.

Most candidates missed that a comparison should be done between results after and before the acquisition. Some candidates interpreted "portfolio management" as asset portfolio management whilst the intention was the insurance portfolio.

Profitability

- Need to demonstrate claims experience in the emerging market.
- Loss ratios split by major product line/vintage/channel. This will be necessary to understand the premium sufficiency of existing product line and distribution network.
- Where claims experience is deteriorating/improving need to drill deeper and match it to changes in the business
- Should also highlight expenses per major product line/vintage/channel by demonstrating combined loss ratios for each of these. Expense experience will need to be monitored closely before and after sale especially if operation or system changes are made.
- Highlight products/channels/vintages that are underperforming and provide recommendations in terms e.g.
 - ways to improve experience e.g. marketing; or
 - reduce new business in certain areas; or
 - stop using a particular channel or broker
- Include notes on major events impacting numbers e.g. large claims, operational issues

- Cost of reinsurance
- Comparison between actual price charged and theoretical price – gives an indication of discounts in premium
- Average premium rate – premiums / exposures.
- Must compare loss ratios and combined loss ratios before and after acquisition

Sales and competition

- New business volumes by channel/product over time. Necessary to understand sustainability of growth. These should be split by distribution channel and product.
- Any competitor analysis available including areas of growth/decline against our own
- Analysis of leads or quotations as compared to new business levels
- Sales and competition should be compared before and after acquisitions and any new measures taken since acquisition should be highlighted

Portfolio management

- Claims settlement statistics – number reported, average time taken to report as well as average time from reporting to payment by vintage, etc in order to assess operational efficiency/backlogs
- Lapse experience by duration in-force and distribution channel. If possible look into cancellation reasons and trends in these numbers.
- This should be compared to that before the acquisition to see if the acquisition affected policyholder confidence.
- Concentration of exposures of new business which might cause a change in the mix of business. This will give indication of potential catastrophe exposure
- Composition of premium income by month by distribution channel and explanation of any declines/increases excluding the effect of rate changes

Capital management

- Comparison of actual solvency levels against economic capital requirements and rebased regulatory solvency levels using regime of head –office
- Rate of return on capital used to buy Emerge
- Is the company achieving the risk tolerance / risk appetite metrics that were set
- Legal action/pending legal action/regulatory fines/compliance issues

- Composition of assets by asset class and return on assets experienced

Question 3

- a) Define mortgage guarantee insurance and describe key characteristics

Examiners' comment: Candidates did not know this bookwork well.

- Mortgage Indemnity guarantee covers the lender in a mortgage loan against the risk of the borrower defaulting and the value of the property not being sufficient to pay the loan (usually if mortgage > 75% of value of the property at purchase).
- Typical policies lasts for duration of mortgage and have terms of many years)
- MIG Covers non-payment for ANY reason
- Lender takes out policy – sometimes borrower must pay premiums. This can be a single upfront premium or regular premium with bond repayments
- Upon default, the insurer will pay out a single lump sum equal to the value of the mortgage above the sale value of the property
- Measure of exposure is the excess loan above % of property value (this is termed the normal advance).
- This product is highly correlated to economic factors
- Risk and rating factors include; quality of business associates (i.e. lender), rating and collection processes and normal advance value and possible term of mortgage
- MIG insurers don't incorporate the circumstances of individual borrower in premium rating – rely upon the lender to be prudent.
- Effect of house price falls will be factored into premiums as a whole and not specific to certain house types or mortgages
- This product has a decreasing risk profile

- b) Set out the factors you would consider in constructing a model to assess the profitability of this product.

Examiners' comment: It seems that the candidates do not know the local industry very well. Currently this product is not written in South Africa – therefore there is no local historic data and also no immediate competitors.

- The model would either need to be deterministic with scenario testing or stochastic due to the correlations with economic conditions and the uncertainty of past experience being representative of the future.
- The structure of the model will need to be a cash-flow projection of:
 - Premium income
 - Investment income
 - Initial and any future injection of capital
 - Claims outgo
 - Expense outgo broken down into fixed/variable/claims handling/initial
 - Tax
 - Reinsurance premiums
 - Recoveries
 - commission
- The net cash flows at each point in time will need to be discounted at the required rate of return by the shareholders (or cost of capital) to achieve the NPV.
- The IRR could also be used as a measure of profitability and compared to a specified hurdle rate
- Will need to make several important assumptions such as economic forecasts including:
 - property values and the property growth rate
 - contractual interest rates and therefore prime rate
 - investment return (and asset allocation)
 - investigate correlation of loss experience with other macro factors
- Other important assumptions
 - repayment terms of the loans
 - volumes of business
 - mix of business / demographic profile

- default rates
- allocation of expenses (e.g. how overheads will be assigned to this line of business)
- expected losses (frequency and severity) per segment of business
- minimum capital requirements
- earning patterns for premiums
- premium rates per risk segment (pricing structure)
- The model will need several sense checks to enable explanations to banks, government and other stakeholders. These sense checks would include reconciling the capital reduction on the bank's exposure before insurance cover compared to after insurance cover and paying a premium.
- Lack of credible data (new product)
- Time period that needs to be considered – need to use longer term projections due to the nature of the product
- The model may also allow for profit testing whereby premium rates that achieve a specified profit or return on capital are solved for.

c) Discuss the risks to the insurer should they write this product

Examiners' comment: Candidates regurgitated bookwork on risks without making it specific to the question and focusing on the unique features of the product. For example "There is a risk that investment return is not as expected" is too generic and did not score marks – it needed to be related to the long-term nature of the product. It was clear that many candidates did not understand this product very well.

Claims/insurance risks

- Claims will be correlated with economic conditions, in particular property prices, interest rates and unemployment. This will be difficult to correctly allow for in the pricing of the product
- Pricing of product will need to build in margins for periods of stress.
- Claims will be long tailed as the property will need to be reclaimed and sold which involves legal processes
- Lack of education in the market / uncertainty of demand / business volume
- No historical data – difficulty to price accurately

- There is a risk that banks are less inclined to recover properties and if so, that they recover at a lower price due to the fact that they are insured i.e. moral hazard
- Potential reputational damage if houses are repossessed by the insurer as opposed to the Bank.

Expense risks

- Risk that expenses are not recovered, for example due to expense inflation being greater than expected In particular, expense inflation associated with legal component of collections process is uncertain

Investment risks

- Liabilities potentially difficult to match due to long term nature and correlation with economic stresses. Lack of available assets that meet these criteria.

Business risks

- There is a timing risk in this product. If a claim occurs early on in the loan term of the mortgage, then the level of equity in the property will be less and therefore the loss suffered by the bank and the claim made on the insurer will be higher
- There is potential for anti-selection. Banks have intimate knowledge of credit risk of applicants and will exploit mispricing if rate structure is not sufficiently granular or if it is not a compulsory product
- There is a risk of late collections once a mortgage holder has defaulted. This is due to interest continuing to accumulate on the outstanding balance after default whilst no payments are being made. Also, these properties are generally neglected so deterioration in price may occur
- Banks will most likely pass on premiums to customers which will increase level of repayments and may have a knock on effect on claims experience
- Government may wish to use this product in line with the Mzansi product range to encourage lending in lower income segments

Capital risks

- Solvency position will be difficult to assess as new class of business. SAM interim requirements as well as the current proposed SAM standard formula for guarantee business is stringent and not risk sensitive (within this class)
- Parameterising claims for this line of business in an internal model may be difficult and uncertain (and costly if consultants (especially international ones) and/or reinsurance brokers need to be used for expertise or data)

- Large uncertainty (variance) as well as costs could significantly diminish the expected saving of using an internal model compared to the standard model
- Due to the long period of cover provided (probably a 20 years mortgage term in most cases), the insurer will need access to significant capital if claims are latent.

Other risks

- Finding compatible technology with the banks may be a challenge
- Risk of not being able to obtain reinsurance cover as they cannot write any volume of this business without such cover
- Finding skilled resources for this niche product may be a challenge

d) Advise your client on the mitigating actions that can be put in place to manage the risks of writing this product.

Claims/insurance risks

- Should widely investigate sources of data including international sources and willingness of banks to supply own data or alternatively build in a margin for uncertainty
- Investigate potential for a pilot study to understand market demand and understanding
- Efficient claims handling will be critical given the high profile nature of the product/potential for legal recourse/costs involved. If this is performed by the banks then active monitoring of collection processes must take place.
- Active monitoring and re-pricing will be critical given the potential for anti-selecting by the banks i.e. passing on only bad risks
- Risk sharing arrangements with the banks should be explored to mitigate anti-selection
- Insurer will need to have sight of/some control and monitoring over bank's underwriting standards
- If the banks will be keeping collections in-house then insurer will need to have sight of/some control over standards to mitigate lengthening processes/dropping standards. This also has a cost implication for the premium
- Investigate whether government support/backing would be available for example

in the form of cheap capital or other incentives to banks to take up the product

- Consider alternatives to reinsurance such as co-insurance
- Reinsurance may be helpful in pricing and in sharing of risks but may be difficult to find at an appropriate cost

Expense risks

- Expenses should be charged upfront as including them in a regular premium per mortgage holder will result in premium income stream stopping if mortgage holder defaults. Expenses should be segmented into variable and fixed components in pricing
- Can manage expenses down by drawing off other (potentially new and less expense intensive) product lines and any existing support functions although this will result in business mix risk

Investment risks

- Consider more liquid assets and therefore price for a lower investment return
- Diversification and liquidity requirements are important as economic stress will be highly correlated with liabilities
- Active monitoring of investment returns and Asset Liability Modelling will assist in matching, avoiding liquidity issues.
- Investigate potential for tax relief/other forms of government support

Business risks

- Do not cover the full default amount
- Specify minimum such as minimum loan amount / minimum premium
- Only offer the product on an “all-in” basis, i.e. a bank cannot select which loans it insures
- Interest accrued after the point of default not covered in insured amount

Capital risks

- Try to source data from banks or internationally and perform impact studies
- May need to look at developing an internal model to reduce capital requirements in the long term

- e) Assess the potential benefits to both the insured banks (as potential buyers of this product) as well as your client for launching this product

Insurer:

- Insurer will be the first in the market (the market is almost non-existent at the moment in South Africa) - “first mover advantage”
- The insurer will also establish a monopoly in terms of data, systems, bank relationships and government backing which will increase barriers to entry
- Launching a new product results in increased volumes of business and therefore will enable less volatility and therefore greater capital efficiency
- Brand awareness and image improvement due to the social responsibility aspect of assisting banks to lend to e.g. lower-income earning individuals
- Insurer will get access to a large client base creating cross-selling opportunities of other products / Better relationship with bank
- Diversification benefit with other products due to unique claim features
- Longer tailed liabilities so could pursue assets with higher investment returns

Banks:

- Banks can increase their mortgage lending capacity
- Banks’ capital requirements will decrease
- Banks are able to obtain better credit ratings
- Banks can offer credit cheaper to clients (who probably couldn’t get credit previously)
- Banks could save on asset repatriation costs if some of this is included in the insurer’s claims handling cost

f) Give an opinion to your client on whether they should continue to pursue this product

Examiners’ comment: Candidates had to give a firm opinion with a valid reason, otherwise no marks were given.

- Drawing on whether the potential benefit above exceeds the risks and costs of mitigating actions. Needed to say either “yes” or “no” with a valid reason. No marks obtained for “maybe” or a paragraph without coming to a firm conclusion.

END OF EXAMINERS’ REPORT