

Actuarial Society of India

Examinations

November 2005

CA12 – Liability and Asset Liability Management

Indicative Solution

Q.1)

- ? Going concern: that the business will continue to operate for the foreseeable future
- ? Accruals: revenue and costs are recognised as they are earned and incurred not as they are received and paid
- ? Consistency: like items are treated in a similar manner within each period and from one accounting period to the next
- ? Prudence: revenue and profits are not anticipated and provisions are made for all known liabilities.

[½ mark for naming each concept, ½ mark each for describing the concepts.]

Q.2)

A life insurance company might want to investigate its solvency position using stochastic modelling to get a more accurate picture of its financial position by, for example assessing the probability of ruin. In particular it allows the actuary to assess the company's ability to withstand future changes in both the external economic environment and the company's own experience.

It allows the actuary to place a value on options and guarantees that only become onerous as a result of particular events in the financial markets at some point in the future.

It allows the effects of management actions and the interrelationships between variables to be quantified.

It allows the company to determine the particular risks that expose it to insolvency and thus make informed decisions in advance of such events occurring, to help prevent future insolvency.

Depending on the company's business it might be appropriate to model basis elements other than investment returns stochastically. For example, a company writing protection business would be more interested in modelling mortality stochastically than it would investment items.

Accurate determination of the solvency position will allow the company to determine whether its current level of capital is adequate, and if not, to plan how it might raise capital. If the company doesn't believe future capital will be found, then it can take other actions, such as limiting the amount of new business written, so that the solvency position is maintained.

The company may be required, under the regulatory regime in which the company operates, or by professional guidance, to use stochastic modelling.

[1 mark for each paragraph – any 6 gets full marks]

Q.3)

Advantages

- ? Sets a minimum level of competence
- ? Sets a minimum level of consistency
- ? Promotes professionalism/PR for actuarial profession
- ? Provides a link to standards or guidance issued by other professional bodies
- ? Provides additional safeguard/security to scheme members about their pensions
- ? Provides interpretation of relevant legislation
- ? Guides less experienced actuaries or actuaries with little experience of a particular area
- ? May be a substitute/replacement for detailed legislation
- ? Provides a "legal defence" for actuaries
- ? Provides a check-list for the actuary that nothing has been omitted from a project

Disadvantages

- ? Maybe too prescriptive
- ? Restricts actuarial judgment
- ? Bureaucratic/costly
- ? May be difficult to make the guidance note definitive in all circumstances
- ? May become out of date quickly

[½ mark for each point, maximum 6]

Q.4)

- ? To be appreciated, benefits should meet employee needs e.g. income in retirement, income in other circumstances e.g. death
- ? may use net replacement value to assess
- ? Employer will wish to provide competitive benefits, to help attract/retain employees
- ? May offer different/no benefits to different types of employee.
- ? Employer will want to reflect employer culture e.g. paternalism makes generous defined benefit plan more likely
- ? Types of benefits will reflect custom & practice in country / industry
- ? Benefit design will reflect government influence e.g. compulsion to provide a benefit, tax incentives for certain benefit types, maximum limits on tax incentivised benefits
- ? Need to provide benefits that are simple to administer
- ? Need to provide benefits that are simple to understand and which can be communicated clearly to employees
- ? Facilitating other business needs e.g. business reorganisations, mergers, downsizing, opening career paths for younger employees
- ? Benefit design needs to meet financial requirements of employer e.g. cost level, predictability
- ? Other points/considerations
 - o stability of cost
 - o staff turnover

- employee contributions
- integration into any state provided benefits
- DB and DC — appeal to different type of employee
- size of employer
- type of employer
- availability of options

[½ mark for appropriate discussion of each factor including those under “Other points / considerations” – maximum 8 marks]

Q.5)

(i)

- ? To achieve a decent standard of living in retirement - a minimum target pension
- ? Universal coverage — widening pensions coverage to cover all the population
- ? To prevent people relying on the state: in the longer term individuals will provide for themselves.
- ? To reduce long term government budgets although in the short-term these could increase as existing benefits are paid and incentives are given to those who save
- ? To reduce cross-subsidies between generations
- ? To create value for money pensions provision
 - lower costs (e.g. pensions bought not sold)
 - standardised products/administration efficiency
 - less likely to be surrendered early
 - competition
- ? Capital generation — flow of capital for long term
- ? Investment in government bonds
- ? To enhance general awareness of pension schemes

[½ mark for each point, maximum 4]

(ii)

- ? Perceived as an extra tax/inflexible
- ? Politically sensitive
- ? Very low paid can't afford it
- ? Possible lack of general financial/investment awareness. The return will depend on the type of compulsion; e.g. investment awareness if DC
- ? Employers contributions = constraint on profitability/tax on jobs
- ? Difficult to communicate
- ? Transitional period for those (few) who have made existing arrangements
- ? Bureaucracy
- ? May distort/swamp local investment markets
- ? Needs trustworthy sellers of a trustworthy product

- ? May result in poor value for money for low earners where a high percentage of contributions will be taken for expenses or for older people with a short period to retirement
- ? Possible lack of incentive if there is a safety net

[½ mark for each point, total 6]

Q.6)

(i)

The main reason for underwriting a client's application is to establish the risk classification of the client. In particular to establish if the client is

- ? Uninsurable
- ? Acceptable on normal terms
- ? Subject to special terms

Adequate risk classification will help prevent the risk to the company that a client selects against it (i.e. counteracts anti-selection).

Underwriting enables the company to ensure mortality experienced is no worse than mortality assumed.

Reinsurance terms available will be better than for non-underwritten business.

To accept as many proposals at ordinary rates as is consistent with the mortality rates assumed.

To enable a life insurance company to calculate the special terms a proposer should be offered if not acceptable at ordinary rates.

To ensure equitable treatment of all potential policyholders; both those acceptable at ordinary rates and those not.

The company will expect to justify the cost of underwriting by reference to the cost of claims saved.

Financial underwriting can help avoid over-insurance.

[½ mark for describing each reason]

(ii)

Typically medical evidence can be obtained from the following sources:

- ? Questions on the application or proposal form completed by the applicant or a declaration of good health.
- ? Reports from medical doctors that the applicant has consulted
- ? A medical examination and report carried out on the applicant
- ? Specialist medical tests (such as AIDS/HIV test)
- ? Applicant's answers to further questions asked by the company
- ? Previous applications to the insurer or to other insurers.

[½ mark for identifying each source]

(iii)

The options available to a company if the underwriting process finds a client to have a higher level of risk than assumed by the company are as follows:

- ? Charge an additional premium for the additional risk.
- ? It may charge an additional premium for a limited period of time if the risk is of that nature.
- ? Reduce the level of life cover available for the premium payable, or impose a debt which could reduce over time
- ? Impose an exclusion clause, which excludes payment of the benefits that arise from a specific cause
- ? It could decline the application. There may be legal or regulatory constraints on declining an application or imposing special terms.
- ? It could defer the application (usually only used where the illness may be of a temporary nature)
- ? It could offer an alternative contract where the mortality risk is lower or a shorter term contract may be offered.
- ? It could ignore the extra risk and offer the contract on normal terms.
- ? If a reinsurance company is prepared to accept the client on normal terms then the company may reinsure the proposal. (Note this is not a way of accepting substandard life risks on normal terms. It may however be useful in a situation where the direct office has very little experience or exposure to a particular risk.)

[½ mark for describing each action – maximum 4 marks]

Q.7)

(i)

Reinsurance can reduce a provider's capital requirements [0.5]

- ? Since reinsurance reduces the uncertainty of the provider's outgo, the provider needs less capital to provide a cushion against adverse experience. [1]
- ? this point is reflected in a number of supervisory solvency tests that allow the minimum level of free assets to be reduced to reflect the extent of reinsurance. [1]
- ? Reinsurance can provide capital to meet initial expenses [0.5]
- ? Reinsurance can be arranged that provide an upfront payment (.commission.) from the reinsurer to the provider. This reduces cash flow strain arising from writing new business. [1]
- ? Effectively this is a loan from the reinsurer, repayable out of the provider's future profit stream, but only if a certain level of future profits is achieved. [1]

Total [5]

(ii)

(a) Insurance company writing motor insurance

- ? A motor account can give rise to the occasional enormous liability claim (eg one driver proved to cause a multiple pile-up). [1]
- ? So the insurer would need individual (and/or aggregate) excess of loss for occasional large liability claims. [0.5]
- ? Sufficient layers would be required to provide cover for any size of claim (*ie* effectively unlimited). [0.5]

(b) Large insurance company writing industrial property fire insurance

- ? Industrial fire risks can be very large, so even a large insurer is not likely to want to retain all the risk for each policy. [0.5]
- ? So the insurer would need proportional insurance whereby the proportion in excess of the desired retention level is reinsured (which might vary for different building). [1]
- ? A surplus treaty would be required, probably with quite a high maximum retention. Second or further surplus treaties may be required to cope with very large risks. [1]

Maximum [4]**Q.8)****(i)**

- Who is covered ? Individuals, families, adults & children? [0.5]
- Age restrictions [0.5]
- What is covered?
- All treatments / only certain types. [0.5]
- Preventive / cosmetic? [0.5]

- What is excluded? [0.5]
- Will there be limitations on
- dentists who can be used [0.5]
- amount per type of treatment [0.5]
- amount per annum [0.5]
- Accidental damage [0.5]
- Will indexation apply [0.5]
- What excess will apply? [0.5]

Total [5]**(ii)**

- Profitability/return on capital
- Initial set up costs
- Expected volumes / likely demand for the policy
- Expected method of sale
- Commission
- How will it be administered & the cost
- How will claims be settled

Have you got the staff with the expertise to underwrite and deal with claims
 Will current systems cope with this product?
 When would the premium be paid and how?

[½ per point: max 5]

(iii)

Sum Insured/maximum amount claimable
 Age
 level of cover
 excess
 Previous dental history

[½ per point: max 2]

(iv)

Name, address, policy number,
 Dates of commencement of the policy
 Expiry date
 Definitions of terms
 list of approved dentists
 details of the Standard cover
 benefits provided
 limits, level of excess, indexation of cover, exclusion
 details of any options available
 claim conditions
 claims procedure
 cancellation procedures
 Responsibilities of the Insured
 Geographical limits

[½ per point: max 6]

(v)

Reinsurers' advice
 Competitors' rates
 Industry statistics
 National statistics, if any
 Any self-administered medical scheme for own staff covering dental treatment
 Own company statistics if dental cover included in any medical insurance provided

[½ per point: max 2]

Q.9)

The company will wish to maximise its total profit, which is the profit per policy multiplied by the number of policies written.

Hence the company will be prepared to pay higher levels of commission to those intermediaries from whom it expects greater volumes of profitable business. This would help protect its market share.

The company shares the benefits of economies of scale with the intermediary in the expectation that this encourages the intermediary to continue placing business with the company. This sharing is achieved by the company accepting lower profit per policy in order to pay the additional commission.

If the company pays commission at a greater rate than is loaded into the product pricing then it accepts the risk that loadings may not cover all expenses if the anticipated business volumes are not written. This risk could be reduced by paying the additional commission as an override depending on the volume of business actually written.

If on the other hand the product is priced such that the highest level of commission the company pays is loaded for, then it may be that the product will appear uncompetitive.

Some intermediaries may do more administration themselves, reducing expenses and giving scope for increased commission.

The company might also offer higher rates of commission to intermediaries that it expects to introduce business with better persistency (lower lapses) than the average. Here the company is giving the intermediary a share in the benefits of improved persistency.

Similarly higher average premium sizes might attract higher commission rates. If fixed expenses are recovered by size related charges, there is a benefit that might be shared with the intermediary.

The obvious risk is that the persistency or average premium size deteriorates (or does not live up to that expected). It is thus necessary to monitor the performance of each intermediary. To avoid this the additional commission could be paid as renewal commission, or some years after commencement, or initial commission could be clawed back if the business proves not to be of better quality.

Another reason for paying higher commission might be to encourage business from a new source. The additional commission may be funded from a marketing budget rather than the commission loading. Unlike general marketing expenditure that may not result in additional business, the increased commission is only incurred if the business is written, and so risks are reduced.

It might be market practice to have a series of commission scales. There is a risk of losing business if intermediaries think they are on the wrong scale.

[1 mark per point; max 9]

Q.10)
(i)

A model point is a single policy that is used to represent a homogenous group of policies from an underlying portfolio of business. The results produced by a single model point will be scaled up in order to give the result for the group of policies represented by that model point. A number of model points will usually be used to represent a portfolio of business.

[1.5]

The crucial factor in choosing model points is that they must adequately reflect the distribution of the business being modelled. This is so that the results produced by the set of model points are as close as possible to those results that would have been produced if all of the policies in the portfolio had been run through the model individually.

[1]

It is necessary to consider the risk factors that affect the profitability of the contract. These factors will have been considered when the contract was being priced and checking the model points used in the pricing model would be a sensible first step.

[1]

The factors likely to have the most impact on the profitability of the contract are the age and sex of the policyholder, original term and date of entry of the contract, sum assured/size of the policy, smoker status and the premium rates in force at the time the policy started.

[2]

An extract of data providing details from the in-force portfolio of business will be obtained and the policies grouped according to the factors identified, with the number of policies and total sum assured in each cell being noted.

[1]

By summarising the in-force portfolio according to the number of policies in each cell, it will be possible to identify cells that may be banded together. For example, it is likely that there will be a small number of lives at very young ages and at very old ages, with a large number of policyholders in the 25-45 age group. It may, therefore, be appropriate to group into a single cell all lives less than 16, for example, with the policies for lives between 25 and 45 being grouped into 5-year age bands. The extent of the grouping will depend on the size of the portfolio, the accuracy required from the results of the model and the speed with which the results must be produced.

[2]

In any modelling work, there is usually a trade-off between the accuracy of the results, requiring a large number of model points, and the need for the model to be easy and quick to run, requiring a smaller number of model points.

[1]

Checks against independent sources can be carried out to ensure that all the appropriate risk factors have been identified and that the policies have been banded together appropriately.

[1.5]

Total [11]

(ii)

In order to check the appropriateness of the model points, the multiplying factor (i.e. policy count) attached to each model point need to be determined.

Compare the model points with those used in the pricing process.

Check the total number of policies and sum assured currently being modelled, against the in force data.

Check the data for outliers, such as sums assured greater than maximum allowed, ages above/below the maximum/minimum allowed, etc. Ensure these are removed or corrected before the model points are derived.

Check the sum assured against the premium paid for each cell to ensure that there is consistency between the two.

Calculate supervisory reserves using the model points and compare the result with the actual figure from published returns.

Calculate expected revenue account figures, such as premium income and claims, from the model points and compare with the actual results.

Vary the model points used and assess the impact on the modelled profitability results if there is doubt over the validity of the model points chosen.

Choose a model point and compare its calculation of profits with the subset of policies it represents.

[1 mark for each check – maximum 6 marks]
