Institute of Actuaries of India

Subject CA1-II – Actuarial Risk Management

September 2017 Examinations

INDICATIVE SOLUTIONS

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable.

Solution 1:

	Quota Share	Surplus Reinsurance
Definition	Fixed % of each and every risk is reinsured	The direct writer chooses the retention limit for each risk
Diversification	Helps to diversify risk	Helps to diversify
Purpose	For new lines of business, the direct writer can use the assistance of the reinsurer in areas of design, pricing, support in setting up systems, administration, underwriting. As all cases will be reinsured, the reinsurer will get chance to enter the market through the direct writer	The direct writer can take up larger sum insured cases than that they can afford without worrying about capital and volatility of the financials
Capital efficiency	Can write more business for the same amount of capital	Can write more business but will depend on the retention limit and also the business being written. If more business with sum insured less than retention limit is written it may not be capital efficient
Flexibility	There is no/less flexibility to direct writer. • Same proportion reinsured irrespective of whether sum insured is small are large • Same proportion reinsured irrespective of the risk profile and volatility of risk • Even for very large sum insured there is no cap. Hence a risk for reinsurer.	Does not have to cede the same proportion and can aim at a more well balanced portfolio.
Administration	Simplicity of administration as a proportion of each risk is reinsured. But all cases will be reinsured irrespective of the amount reinsured.	For each risk the amount to be ceded needs to be calculated

[5 Marks]

Solution 2:

i)

- The insurance company decides the annuity rate assuming a certain life expectancy of the group of lives covered.
- Some (the unhealthy ones) will live less than the average expectancy and others (the healthy ones) will longer than the average
- Hence in all likelihood, the unhealthy ones will be the ones who will want to surrender their annuities. And the healthy one will continue under the policy there by increasing the longevity of the remaining lives.
- Due to information asymmetry, the annuitant is more aware of his health condition than the insurer would. There is a high chance of anti-selection.
- The insurer would have invested the single premium into assets matching average life expectancy of the portfolio. On surrender, these assets may have to be sold in the market at an inopportune time. This could lead to loss to the insurer, which he may or may be able to pass it to the policyholder.
- Hence it is not a common practice to offer surrender option under immediate annuity contracts [4]

ii)

- The insurance company may offer surrenders, as there could be a genuine need for lump sum money for meeting any financial need
- They could ask the customer to go through underwriting at the time of surrender to check the status of his health and set surrender terms/ basis accordingly
- The insurer can ask the underwriting costs to be borne by the surrendering customer to manage costs
- Surrender may be Ok if the annuity amount is very small, so it is not economical for servicing this annuity. Also the customer may not value such an insignificant annuity amount and in such cases.
- The insurer may be fine paying the surrender lump sum and close the annuity contract. It may be financially a better option for the insurer too.
- It case of any loss, while prematurely selling the assets to make the surrender payment, the loss may be charged to the customer in the form of a market value adjustment.
- There could also be some additional penalty on the surrender value to act as a deterrent in adverse market conditions for the insurer, so as to discourage customers from surrendering and reinvesting proceeds elsewhere.

[3]

[7 Marks]

Solution 3:

The provisions created could be outstanding reported claim reserve, incurred but not reported (IBNR) reserve, unexpired risk reserve, catastrophe reserve

Likely reasons for increase in provisions:

1. Have written more business in the period of accounting compared to prior period/s
2. May have added a new product line which could be with a long tail and hence more IBNR
3. Change in the mix of business, writing higher risker business hence higher provisions
4. Change in method for valuing the provisions
5. Change in assumptions for valuing the provisions
6. Change in business seasonality due to new products, customer preferences etc leading to higher unexpired risk reserve
7. Reduction in reinsurance coverage leading to higher retention and hence provisions
8. Increase in catastrophic reserves.
9. catastrophe reported but claims not yet paid increase in outstanding reported claims
10. Change in delay patterns (due to any external events)leading to change in provisions for e.g., removal/increase of time limit within which liability claims have to be reported, hence higher IBNR
11. More prudence in reserves provisions due to
    - increased uncertainty (like political turmoil; man-made or natural calamity, claim inflation assumption etc.)
    - a court award (now may encourage more people to claim)
12. Change in underwriting or claims process – can lead to change in the delay patterns or the claim settlements

Analysis of the trends not just over last two years but over last few years may provide further information about the reasons for the changes.

May also want to compare with similar companies in the industry; many of the above points may affect all insurers more or less in the similar manner.

[9 Marks]

Solution 4:

- Property Damage: Damage to the resorts,

…. contents of the resort, equipment, furniture, fittings etc.

The damage could happen due to various perils such as fire, explosion, rains, lighting, theft, storm, flood, earthquake etc. for each of their resorts.

The risk could be higher as the resorts may be situated in holiday destinations which are in hilly area, near the beach, etc.

Deluxe resorts will have luxury items and hence the damage could be more.

.. also the value of the contents could be very high.

resorts needs many types of insurance - fire insurance, property and contents insurance, burglary insurance, insurance to cover costly contents etc,

- Motor Insurance:

Vehicle insurance for the cars, jeeps, buses ,etc used by the resorts

The usage of the vehicles will be more, compared to personal vehicles.

Also need motor third party liability, incase any damage or accident to others, like passengers, visitors, etc

- Liability Insurance:

Injury to third party including resort customers from use of resort resources

Penalties due to damage to external environment (pollution) - the resorts are likely to be located in regions which are heavily regulated by government restrictions ad subject to heavy fines and penalties for damage due to pollution

Man made risks like cyber risks, hacking leading to loss of customer financial information like credit card nos etc.,

May need public liability, to indemnify against death or bodily injury to a third party or for damage to property belonging to a third party, other than those covered by other liability insurance.

- Business interruption cover/Loss of profit cover :

Risk of serious disruption to business from natural perils which could lead to cancellation and closure of resort for long periods leading to loss of profits

The company can go for professional indemnity insurance for its professional staff- like to indemnify against legal liability resulting from negligence in the provision of a service by professionals such as professionals providing adventure sports, event management professionals etc.

- Pecuniary Loss & Fidelity Insurance:

If management is outsourcing some of the services then the company is at risk of losses/ damage of reputation. Pecuniary loss insurance can be taken that protects against any bad debts, third party failures, sub-contractors failure.

Loss of money or goods to the company due to fraud/embezzlement by employees. The company can go for fidelity guarantee insurance for the same.

Fixed benefits and Employer's Liability:

The company may have to pay its employees/workers and third party incase of any accidental injury or death due to negligence of the company or any other employee while working in the resort.

To protect its employees/ workers in case of death/ illness/accident.

To protect the company in case of death of key personnel of the company.

Any health insurance requirements to employees, in the form of hospital cash, medical costs, etc.

If the company provides loans such as vehicle loans/housing loans or any other form of loan to its employees, the company may need protection against losses in case of death of its employees.

[11 Marks]

Solution 5:

i) This appears to be an industry wide problem and hence the causes could also be common for the companies.

They could be because:

- Policy document/proposal form ambiguous and can be interpreted differently leading to claims not intended to be covered
- Mis-selling on what is covered under the contract, leading to a claim not covered under the policy. This could be due to poor training of distribution channels across the industry and lack of accountability of distributors
- Disclosures at the time of sale are poor and there are no mandates from regulator or market conduct standards for minimum disclosures. leading to poor sales practices
- Customer education is poor hence there is significant wide spread non-disclosure at proposal form stage

- It could be that companies across the industry in their effort to manage claims experience and improve profits under term polices have been very quick to reject claims even on flimsy grounds compared to claims under other products [3]

ii)

- First, tighten the policy wordings/proposal form. Any ambiguous wordings to be legally tightened.
- Improve the initial underwriting process and make sure non-disclosure should not escape scrutiny
- Make sure you are asking enough questions in your proposal form and other disclosures expected.
- Better information we get, better can be the underwriting
- Communication to sales force, customers, etc. to be very clear, so that there should be no doubt on what is allowed under the policy the customer is buying
- Penalize any sales advisor whose clients are consistently claiming (due to mis-selling/fraud)
- Give enough warnings in the communications to customer ,the risks if proper disclosure is not made
- Realign with the reinsurer, your new processes and policy wordings
- Have reasonable sales targets, sometimes very high sales targets must be pushing your sales force to make poor quality pre sales scrutiny/suppress suppress disclosures, in order to complete their targets [4]

iii) Under the proposed regulation, the company needs to reassess

If the exclusions can be implemented. For example, if there is a claim reporting period, beyond which claims won't be entertained; that will have to be relaxed now.

Such change in claims processing may have impact on the IBNR provisions

If the claim is for smaller amount, don't waste time checking the claim for fraud. It may not be worth the expense the insurance company will incur fighting it in the court

Managing death claims may be easy, as definition is simple.

Other claims, like critical illness, disability etc. (in case they are offered as rider benefits) is where there has to be consensus on the interpretation

May need to get a legal opinion again. If wordings are ambiguous then the insurer may have to accept claims. And tighten the wordings for new policies

Clearly more claims will be paid compared from the past.

Correspondingly there may be increase in claims provisions.

Once customers know, there may be some policyholder behavior change; there may be more people claiming

Any change in claims processing or acceptance will need to consult the reinsurer too. There could be situations where you want to pay the claim but the reinsurer will not agree to your interpretation. [5]

[12 Marks]

Solution 6:

i) The different types of expenses

- Development cost
  - Market research
  - Product design
  - Pricing
  - Filing with regulator and approval (if applicable in that country)
- Advertising cost
- Training of sales force, Underwriting teams, administration teams etc.
- Printing of proposal forms, benefit illustrations, policy documents
- System development/purchase of new system
- Development of servicing procedure and accounting procedure
- Underwriting costs
- Setting up the new records in the system
- Policy stamping
- Administration of collecting premiums/ top up premiums at inception and later
- Commission to agents at initial stage and renewal
- Investment expenses
- Asset management systems and Net asset value declarations
- Accounting
- Servicing of the contracts such as address change, sending renewal notices, Switching of funds etc.
- Administration cost of paying the benefits
- Claims underwriting if death sum assured is high and different from unit fund

- Overhead costs such as rental, support staff costs etc. [5]

ii)

- The company would expect that the charges are more than sufficient to meet the expenses and contribute to profit.
- Charges should match as far as possible the quantum and the timing of expenses
- Expenses are expected to increase with inflation; charges should also have a provision for increasing with inflation
- Expenses will be of various nature; fixed, percentage of premium, SA and of fund; charges may match the nature of the expense
- The level of the charge may depend on various conflicting parameters.

➢ Marketability Vs capital requirement:

In order to match the timings and amount of expenses with the corresponding charges.

This may lead to making high upfront charges for eg. to meet initial expenses. There are some problems with this charging structure

- Even high upfront charges may not be sufficient in the case of small premium size policies.
- This structure may not be attractive to the prospective policyholders.

Hence the company may decide to have a level charging structure to keep the product attractive. This could lead to higher capital requirement.
This could also lead to a risk of losses/lower profit due to more lapses than expected at initial stages.

Also there is risk if the actual average premium is lower than expected.

➢ Simplicity Vs Profitability:

The company could plan to have different charges for different premium sizes or different fund sizes. This will help to match the amount of expenses and reduce the capital requirements.

Having a different charging structure may look complex and may not be easy for the policyholders to understand.

Hence there should be a balance between simplicity and profitability.

- Competition

The type and amount of charges of the competitor's products will have an influence on this product. If the product is not competitive it may not bring in the volume of business expected leading to non-recovery of development costs or higher per policy costs for other policies. Hence the charges may not be too different from competitor's product.

Also aligning it with the other existing products of the company is required.

- Reviewability

The company may have lower margins on charges if there is a provision to review the charges at later stages of contract.

- Regulations/ Legislations

Consideration should be given to any regulatory/legislative requirements. For eg. Cap on charges, maximum commission to distribution channel etc. [8]

[13 Marks]

Solution 7:

i)

a) These contracts will have underwriting at proposal stage as well as underwriting at claims stage.
b) Further the insured could claim multiple times due to sickness during the term of the contract and at each stage claims underwriting may be required.
c) Initial Underwriting will enable the insurer to identify risks for which special terms need to be quoted. The special terms could be some exclusion clauses. It will also help identify the risks that need to be declined.
d) For substandard risks the underwriting process will identify the most suitable approach and level of special terms to be offered. For e.g. increasing the premium for the same level of benefit.
e) Claims underwriting: It is needed to assess whether the impairment is as per the terms of the contract to start payment. It helps to guard against fraudulent claims. The payment will be made as long as the illness continues and regular checks may be needed to assess the continuing validity of the claim.

f) The important factors of product design that could affect initial underwriting are

- Definition of unable to work- Whether unable to do his own work or unable to do any work etc. In case the definition is unable to do his own work the expected claim cost will be high as it could take longer for the insured to get back to own work after sickness.
    - Initial underwriting: The underwriting could be stricter if the definition is unable to do his own work. Own work could include some jobs with high degree of fitness such as athlete, fire fighters etc. which the insured may not be able to continue after sickness/ disability even if they are able to do the normal jobs. In such cases underwriting could be strict, extras charged on policies with high risk occupations/occupations requiring extreme fitness or there could be exclusion clauses for e.g. Not covering that occupation or definition could be made unable to do any work etc.

- Deferred Period: The insurer generally will not pay the benefit during first few weeks of sickness. Longer the period, the risk is lower as minor sickness/fraud/anti-selection can be avoided. Underwriting can then focus on causes of sickness which would lead to inability to work.
- Replacement ratio is ratio of post claim income to pre claim income ad is required for this product due to.
    - Financial underwriting at proposal stage will help to reduce risk from over insurance and anti-selection especially for larger proposals. The income quoted by the insured would need to be first verified and it should also be ensured that the replacement ratio is not too high to discourage insured from going back to work.
    - Financial underwriting at claims stage may be required to check validity of the income. The procedures to be adopted if there is a huge increase/decrease in income between proposal and claims stage needs to be decided and mentioned clearly in document given to the insured.

For sickness risk, the additional factors that need to be considered at underwriting stage are:

The important factors that could trigger sickness risk could be
Age – higher the age more chances of sickness and it may last longer
Gender – for e.g. Female – Female have higher sickness risk than males at some ages and vice versa

Past history (or family history) of sickness/health of applicant – Individuals will poor health/past history of sickness are under greater risks of claiming frequently

Occupation – whether working in high risk occupations such as mining or occupations with high stress level (Lifestyle underwriting)

[10]

ii)

Since this is a quota share agreement, the reinsurance company may have been involved in many areas such as product design, pricing, underwriting policies, claims controls, policy wordings, training of underwriting staff etc. but

- The reinsurance company may not have control on many of the operational decisions of the company and any change in approach by the insurance company towards training of claims and underwriting staff could pose bigger risks to the reinsurance company. More so, as it is a new product these risks could be higher.
- The premium charged by the reinsurer may not be high enough in relation to the risks undertaken.
- Policy wordings: agreed with the insurer might still not be robust allowing too many un-anticipated claims being covered.
- This is especially likely is a product like this as the definitions in such policies are not as clear cut as death
- Pricing Risk : Since the company has no past experience the reinsurer may have to provide the data for pricing and pricing may not be correct ad choice of data may not be adequately representative of the underlying risks
- Sales to different socio economic group targeting low income groups or change in sales strategy could lead to change in target market and hence could lead to more risks than anticipated.
- Change in mix and volume of business: could affect the pricing assumptions. Hence the reinsurer would have been better off offering a different type of reinsurance.
- Selective withdrawal : Worsening of morbidity experience of the remaining lives
- Expense Risk –Product not successful or Insufficient Business volumes or product takes much longer to arrive at the desired level of business or the company changes focus to some other product could lead to expense incurred in development of the product not being recouped or delayed.
- Underwriting Risk : Underwriting not as adequate as expected
- Claims control not adequate in direct company

- Underwriting or claims policy not aligned between the insurer and reinsurer. May lead to reinsurer paying claims they didn't want to pay
- Operational risks: risk of loss resulting from inadequate or failed internal processes, people and systems or external events.
- Bad publicity to insurance company could affect the reputation of the reinsurer as well. [9]

[19 Marks]

Solution 8:

i) Stakeholders are
Trustees
Employer
Members (active, deferred and retired)
Dependents of members
Regulator
Government
Actuaries
Auditors

[4]

ii) The trustees will have to see, what are the options given in the scheme rules. Some of the options that may be available are

If the same sponsor has another scheme, then can transfer all these liabilities there. Nothing mentioned in the question, so seems unlikely

Else they can just pay all the employees the current value of the benefit and exhaust the liability. But the prevailing tax laws or regulations may not permit to take benefits anytime from an approved pension fund.

Allow the member to take a transfer value, if his new employer has a similar scheme and are allowing transfer values

Also if the member can have a personal pension fund (like NPS account); this money may be transferred there, provided the scheme rules, tax laws and other regulations allows it.

Purchase a deferred annuity from an insurance company for the same benefits the members would have got. The scheme will have to pay for the insurance company's charges

The trustees can continue to operate (if permitted in the regulations) and engage experts like investment managers, actuaries, etc. and let the fund continue till all the benefits are paid and exhausted. Unless it is a very large fund, this may not be a financially viable solution. These experts will be charging fees which the scheme will have to bear.

The trustees can choose to transfer the benefits to a central discontinuance fund, if available for such situations

What benefits to give:

Again the main basis would be what the scheme rules specify to be paid under such situations.

Would it be all the benefits they would have got had the scheme continued or some reduced benefits

What to do with the surplus in the fund

… give a one time increase to all active and pensioners

… give an increase in their yearly benefit

… should all members get the same discretionary increase or did some contribute more than others

….can it be given back to the sponsor, used to pay off some creditors, etc.

…. The cost of winding up has to be factored in the distribution

When was the scheme valued. If not recently, then to check if the scheme is still in surplus. If deficit whether the employer will meet the deficit or to reduce the benefits.

Also the basis of valuation may be different under windup situation and in a going concern basis

The investment strategy may need to be aligned to the wind up status. In which there may be some loss due to realignment.

There has to be good communication to all its members, both retiree and active members. They should be asked for what they opinion is and concerns are.

The scheme may still suffer from any future deficit arising in the fund, when there would be no employer to pay for the same [12]

iii) Risks for the insurance company:

Longevity

The key risk would be longevity. Members living too long and getting their pension.

Especially when the average age of the active members is mentioned as 35 yrs. Which means atleast 20-25 yrs before the vesting of their benefits and another 20 years of pension payment.

Even those retired recently will have about 20 years of payments to go.

Estimating the longevity or mortality improvements in this period can be a big challenge.

Expecting the death in deferment to be lower is fair in this case.

Investment

Given the long duration mentioned, can the insurance company find suitable assets.

It will have to guarantee the annuity rates, so investment returns can be difficult to estimate.

Even though the average age of active members is 35 years, the youngest one may be much lower and hence the duration of the investment could be much longer in that case.

Reinvestment risk – as it will be difficult to find such long dated securities, there is bound to be some reinvestment risk.

There is a risk on bonds defaulting and/or the actual investment returns not as expected.

They can invest in G-Secs, which may reduce the risk of default, but it will fetch a very low expected return, hence may be very uncompetitive

On the other hand, can invest in equities where there will be sufficient capital growth over the very long term. But we run the risk of selling the assets at the wrong time and hence getting lower returns. And there is the risk of not getting the capital back at all.

Expense

How to load for expenses for such a long contract.

The risk that the loaded expenses are insufficient compared to the actual ongoing expenses

How to factor in the expense inflation? What if the actual inflation turns out to be higher than expected.

Inflation in benefits

Incase the pension is meant to increase with inflation, this rate may be more than that anticipated by the insurance company.

Again finding a suitable asset which can grow at the same rate as the benefits are meant to grow is an issue.

Data:

The insurance company has to completely rely on the data provided by the trustees. Any error in data can change the calculations

Also interpreting the scheme rules, as the insurance company wants to pay as per scheme rules

Legal:

If there is a difference in the interpretation in the scheme rules, which is challenged later by member/s in the court.

Others:

If the insurance company takes reinsurance. Then the default of the reinsurance is a risk

If there are any options in the benefit structure, like optional retirement dates

Some benefits can be complicated to assess

…. like spouses pension on death.

…..What about members who are not married now get married later.

…..Or the age of the spouse is very less, etc.

The insurance company would usually use some average basis for all such assumptions; there is a risk of the actual experience being different from assumed.

Regulatory

Any onerous regulatory changes in future as regards capital requirement could also pose a risk to the company [8]

[24 Marks]

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