Institute of Actuaries of India

Subject CA1-II – Actuarial Risk Management

September 2018 Examination

INDICATIVE SOLUTION

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:

- The type of new business and guarantees which can be written in the fund
- Obtaining appropriate and adequate reinsurance to protect the business
- Bonus Declarations and supportibility
- Meeting policyholders' reasonable expectations
- Adequacy of reserving for liabilities and guarantees embedded in participating business
- Solvency capital requirement and adequacy
- Ensuring that regulatory requirements are met in management of the business
- Investing and managing the assets of the fund
- Appropriateness of expense allocation to the participating funds
- Advice related to managing/mitigating the risks in the fund
- Surrender values (including market value adjustments)
- Communications with policyholders or potential policyholders
- Fairness between different stakeholders **[6 Marks]**

Solution 2:

i)

- The policy level data for the re-insured policies
- The retention limit under each of the policies
- The reinsurance premium rates as per the reinsurance treaties
- The long term best estimate/prudent mortality/morbidity assumptions of the insurer for the reinsured portfolio.
- Reinsurance related expenses if modelled explicitly
- Reinsurer rating/default probabilities to make any allowance for defaults with respect to expected recoveries from reinsurer

[3]

ii)

- The reinsurance recoveries are generally expected to be lower than the reinsurance premiums payable due to allowance for profitability and the expense loading in the reinsurance premium rates.
- The premium rates quoted by reinsurer is aggressive as the reinsurer was looking at garnering market share and the product was a loss leader for him.
- There could be error in modeling the cash flows
- Error in feeding the assumptions and/or reinsurance premium rates
- The expected experience and hence the long term morbidity assumptions is likely to be worse than the reinsurance premiums payable
- The assumption is based at the product level however the reinsured portfolio is expected to have better morbidity due to high SI policies getting re insured and impact of better socio economic class. Using the same assumption below and above the retention for re-insurance recoveries results in higher

present value of reinsurance recoveries than premiums payable. [4]

[7 Marks]

Solution 3:

Immediate/Short term impact

- The cost of certain departments particularly those related to acquisition will be reduced significantly as some departments are closed.
  This could include:
- Cost of Sales team
- Marketing and Product development costs
- Sales Branches
- New business servicing staff like policy issuance

But there will be cost associated with

- Redundancies
- Terminating long term lease agreements for branch buildings may be at a penalty

In short term impact there should be reduction in overall level of expenses of the company.

Medium/Long term

- The company might be possible to move to a smaller head office reducing overall costs
- IT development and related costs will come down
- The company may look to reduce the administrative staff as the quality of service may not be required to earlier standards to attract new business
- However staff would be required to service and to retain the current policies
- Company may after sometime have to think about outsourcing some of the admin functions
- There might be cost associated with retaining the key current staff like fund managers
- Or also difficulties in hiring the new staff due to uncertain future and reputation impact
- Now all the overheads now will be classified as maintenance expenses even though part of it was allocated to initial expenses earlier
- The Company may maintain a lean operation to ensure appropriate run off portfolio and to ensure minimum compliances
- As the portfolio runs off the per policy costs will increase significantly

[10 Marks]

Solution 4:

i) Business already written

- The uncertainty is related to both frequency and severity of claim and hence a major source of risk
  - Frequency: change in customer behaviour leading to more claims than expected
- Severity: driven by inflation of cost of paying for dental care. risks of higher inflation than expected
- Lack of clarity in policy wordings: The policy wordings may not be precise leading to issues in ensuring that only claims paid are those that the company intended to provide cover and has priced for. For e.g. Cosmetic care not covered is not appropriately mentioned in policy wordings

- There will be uncertainty in terms of cost of handling claims.
- Lack of appreciation of scale of the risks and purchase of inadequate reinsurance.
- The default risk of the reinsurer.
- Operational risks in relation to claims pay out
  - IT and system failure leading to delays in claim processing
  - Wrong claim amount paid out
  - Customer complaint handling
- Delays from occurrence to notification, or from reporting to settlement (IBNR) result in uncertainty regarding the ultimate cost of claims.
- Reputation risk due to claims repudiation/rejection leading to bad publicity and fall in new business or increased lapses
- Liquidity risks/solvency risks result of higher claims or expenses
- Increase in fraudulent claims practice either on account of policyholder or the doctor
- Risk from anti-selection if underwriting standards were weaker compared to market. [7]

ii) Future Re pricing

- Inadequate data/lack of relevant data for pricing- Past data if any may not be relevant due to data ageing, evolving changes in underwriting and claims practices
- Policy wordings may have changed over time leading to lack of relevant past data for pricing
- Change in customer behaviour over time
- Uncertainty towards inflation and its impact on medical costs
- Change in deductible and co-pay which could lead to differences in customer behaviours
- Relevance of past data to current target market
- Inability to decipher from past data whether changes in claims pay out year on year is due to changes in the underlying risk or merely random variation.
- Changes in the legislation for example there may be a change in the restriction of factors that can be used in underwriting which could make past data less relevant. [5]

[12 Marks]

<u>Solution 5</u>:

i) The likely reasons for the difference:

- The competitor might have more information on past experience for that client/similar clients whereas information you had was limited
- Expense loading is different reflecting the different cost structures within the companies.
- Competitor could be larger than your company leading to lower overheads loading per policy
- Risk appetite of shareholders is different leading to higher prudence in your pricing
  - For eg. You might give 100% credibility to past scheme experience where the number of lives is 30000 while your competitor may give full credibility at say 15000 lives
- The profitability criteria of your company could be higher
- The underwriting terms offered are more generous for eg.,
  - The competitor might have a lower medical underwriting limit and hence is offering lower rates but with medical examination above certain Sum Insured limits

- The competitor may be managing multiple schemes of the IT company for eg., superannuation scheme/gratuity scheme and hence may be looking at the profitability of the all client schemes as a whole or able to cross subsidise one scheme with another where as your quote allows for profitability of the group term scheme on a stand-alone basis .
- The competitor might have a better reinsurance terms with the reinsurer and hence able to pass on the benefit to the IT company.
- The information that the sales head has given may not be true. [5]

ii) Profit sharing arrangement could be where the company shares a percentage of the profits generated with the client.

This sharing should be in the nature of reduction in next year's premium rather than a cash refund.

Profit could be defined using the following basis-

It could be a percentage of premiums paid less expenses less claims (if it is positive) over the period of the contract for eg.,

X%*(P-E-C) [1]

Where ,

P-Premiums – office premium received

Where E,expenses = all administrative expenses(direct and allowance for overhands) including commission paid to intermediaries.

C, Claims = all claims incurred which will include claims paid, outstanding reported claims and provision for IBNR claims [4]

iii) Advantages of profit sharing:

- Attractive to the customer especially if actual claims have been low in the past or expected to be low
- The insurance company could charge slightly higher premium due to this feature.
- Increased chances of renewal of the scheme with the insurance company to make use of the reduction in premium.

Disadvantages

- Cumbersome for the client to understand and hence may not understand the value of profit sharing.
- The client may ask for higher share of profit.
- There is no way of recovering the losses incurred if any.
- The expenses used in the profit may have to be predetermined and the actual expenses incurred may be more than in the predetermined formula.

[3]

[12 Marks]

Solution 6:

i)

- Basis data level checks needs to be performed like boundary conditions for eg.,

- data is relevant to period of experience analysis, policy start date, policy end date are within period of investigation
- Check data with the data used for some other exercise for eg., latest supervisory reserves calculations
- Data movement check to ensure all movements are captured : Policies in-force at start of the period + new policies written during the period – policies lapsing during the period – policies exiting through other means like mortality/morbidity = in-force at the end of the period. This needs to be done for each major product class.
- Check if the results for the report are consistent with that in the previous report as some of the historic ratios might be showing recognizable trends.
- Reconcile the data with some other source like data received from IT can be checked with admin and finance, for example surrender claims pay out during the year
- Check that the policies are correctly classified as lapsed based on when premium was last received.
- Check that there is consistency between exposure and claim data
- Check for consistency in the method for calculation like treatment of reinstated policies, grace period etc.
- Check the data transfer and the operational process is carried out appropriately
- Sense check that the ratios looks appropriate like for eg., tied agency showing poorer persistency as compared to bancassurance.
- The analysis of surplus can be performed to check the data movements.
- Industry level trend can also be checked through latest public disclosures particularly for companies with similar business profiles to check for known consistencies

[7]

ii) The following steps can be taken to improve persistency:

- A dedicated persistency team could be set with focus on the efforts to improve the persistency
- Persistency could be introduced as key performance indicator for appraisals of the sales team to increase the focus on renewal and not just selling new business
- The sales practice can be improved to sell the products as per the needs of the customers
- Educating the surrendering the customer about the benefits of keeping the policy in-force
- Educating the distributors and corporate agents about the benefits of persistency and impact on fee income.
  - The product design could be altered to improve persistency like loyalty benefits
- Focus on renewal commissions rather than front end loading distributor compensation
- The surrender values could be altered to discourage surrenders
- Sending reminders to the policyholders before the premium due date through emails, messages etc.
- Efforts could be made to improve customer contactibility through emails, phone
- Adding the maximum options to pay the renewal premium like
  - online,
  - debit/credit cards,
  - cheque collections facility,

  - mobile app etc
- Implementing predictive modeling to identify and focus on policyholders who have propensity to lapse
- Making it mandatory for customers to use direct debit for premium remittance especially for small premium sizes, monthly mode of payment of premium etc
- Monitoring and discussing the persistency regularly in management meetings and ensuring it is a KPI for senior management bonuses
- Focusing on selling annual mode policies as they tend to exhibit better persistency

[8]

[15 Marks]

Solution 7:

i) The investor would need capital for the following:
At the start,

- To build the community (rooms/1bhk/2bhk/3bhk/villas) in a calm locality with adequate open spaces.
- To purchase land/ planning and obtain permissions and build the facility
- Common kitchen/ canteen facilities/ large dining areas
- Elderly friendly rooms/ flats/ lifts with railings/ slip proof bath rooms etc.
- Recreation clubs/ health clubs/ religious centres etc
- To purchase vehicles for transportation
- To build the high-class speciality hospital with all amenities required for elderly.
- To recruit doctors, nurses, physiotherapist and other staff for the hospital.
- To recruit helpers/ cooks/ maintenance staff/financial advisors/legal advisors/ security services etc. for the facility.
- Advertisement and publicity for the facility.

Once the facility is operational:

- Salaries for hospital staff/doctors etc.
- Salaries for facility staff
- Maintenance of facility
- Refurbishment of facility at regular intervals
- Either employ a catering agency or run the catering service
- Running of the recreation clubs.

[5]

ii) Advantages to the individuals:

At old age many will not be able to run the household and manage their day to day activities. This facility will provide them all the help to manage their life.

This facility will be helpful for individuals who do not have family or their family is far away or their children are too busy with their lives to help them.

this facility will offer lot of old age persons to mingle and fight the loneliness and lead a better quality of life.

Hospital means help available nearby so that their health can be monitored and care available in case of emergency.

[2]

iii) Risks for the investor:

While developing the facility:

- Risk that the costs of building the facility/hospital is more than expected.
- The investor is not able to find finance for building the facility/hospital
- Delay in building the facility due to workers unrest/natural calamity/accidents.
- Natural calamities while constructing.
- accidents to property and life.
- Not able to obtain permission for construction.
- Poor construction standards/ sub-contractors fraud/mismanagement.
- Mismanagement in the investor company.

After building the facility in running the facility:

- Less take up rate and hence not able to run the facility to the fullest.
- Lease term is uncertain as it is dependent on expected future life time of the tenants.
- Hence developer has risk that tenants live too longer than expected (longevity risk) and lease rental was calculated wrongly
- Early death of tenants can also cause unhappiness as could be seen as poor value of money
- Risk of anti selection as those in good health and expect to live long may only take up lease
- Poor maintenance of facility/hospital
- Reputational risk in case of any serious accident at premises
- Inefficiency of helpers/hospital staff affecting the inmates.
- Mismanagement in hospital
- Security lapse and hence threat
- Fire/Accidents in the building.
- Building collapse due to poor building quality.

[6]

iv) Insurance Needs:

- Life insurance to staff/ construction workers
- Insurance for perils like fire, explosion, lightning, theft, storm, flood etc.
- Motor Insurance &Motor third party insurance – insurance against motor accidents and accidents to third party caused by the insured
- *Employers' liability* – perils include accidents in the workplace due to negligence of an employer, exposure to harmful substances/working conditions
- *moveable property* (*ie* contents) insurance – major peril is theft, other perils as per buildings insurance
- *professional indemnity for doctors, lawyers and finance professionals employed by the investor.*
- *pecuniary loss* – perils include bad debts or failure of third parties
- *fidelity guarantee* – perils include dishonest actions by employees, such as fraud and embezzlement

- *business interruption*, also known as *consequential loss* – perils include fire in the insured's own property or in a neighbouring property.

[5]

[18 Marks]

Solution 8:

i)

a) The scheme may not be attractive for new joiners due to the following reasons:

- Nothing is payable if the employees leaves within 10 years of service which could be considered penal by new employees irrespective of reason for leaving service (for eg., ill health)
- Even for employees leaving service after 10 years pension is payable from the normal retirement age only which could be much late for young employees.
- Further even if the employee leaves later the salary as at date of exit is considered for pension calculations which does not provide inflation protection and could lead to very low pension
- The young employees may prefer other forms of flexible benefits than pension funding at young age. The benefit requirements could be
    - Holidays in lieu of salary
    - Medical benefit for self and family
    - Housing loans at concessional interest rates [3]

b) Reason for company to offer such a design are

- To encourage employees to put in longer service with them and not leave early.
- To reduce the cost of providing such a benefit
- Because competitors are providing similar benefits or it meets the minimum pension requirement as mandated by Government
- To be in line with other group companies. [2]

ii)

a) Benefit changes without increase in overall cost

- This would be possible if benefit is reduced for employees serving for longer term and increased for new joinees.
    - Reduce the accrual rate from $1/60^{th}$ to $1/70^{th}$
    - Reduce the discretionary pension increases, if any, being given to pensioners
    - Put a monetary limit the on maximum pension
    - Offer higher accrual rate for new joiners
- Offer transfer value on best estimate basis so that the existing deferred pensioners can transfer it to new employer/or make a cash settlement and reduce liability in respect of such members.

[3]

b) Benefit design changes with change in overall cost

- Reduce the minimum vesting period to less than 10 years.
- Allow salary growth upto NRA even after exit

- Give option to members to either take a cash settlement, transfer value or deferred pension on early leaving instead of waiting till NRA
- Offer Defined contribution scheme for new joiners . [2]

iii)

a) The actuary of the company 'B' would prefer a prudent basis being used.
This will place a higher value on the liability being transferred and hence so that there is less chances of losses for the company B due to this transfer.
This would be possible by placing higher value of liability and requires higher value of the assets to be transferred.
Hence Company B actuary could be making prudent assumption relating to salary growth up to NRA, longevity, discretionary pension increases, expenses, investment income.

As actuary of transferring company 'A', you would have assumed best estimate basis and hence lower liability.
Each company may have different scheme rules which dictate how the transfer values are to be calculated.
There could be difference in the investment strategy, salary increases and expenses of both the companies and hence leading to difference in assumptions.
Both companies could have different risk appetite and hence ending up with different set of assumptions. [5]

b) Integration could be difficult as there could be differences in pension scheme being offered by the 2 companies.
Company 'B' may have a defined contribution scheme for its employees
If the transfer agreement is to continue to offer the Defined benefits to the transferred employees, it could be administratively complex.

- The investment strategy may be different.
- It could increase the cost of managing.

Even if the company 'B' has a defined benefit scheme for its employees but the benefits offered could be different it could increase the complexities.
For example,

- Different vesting periods (5 years for company 'A' but 3 years for company 'B')
- Different accrual rates (1/60 per year for company 'A' but 1/40 per year for company 'B')
- Definition of salary different for pension (basic for company 'A' but basic + allowances for company 'B')
- Dependents pension available in any one company but not in another.

- Benefits payable on death and from when payable may be different.

[5]

[20 Marks]

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