Institute of Actuaries of India

Subject ST1 – Health and Care Insurance Specialist Technical

Nov 2014 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:

a) Replacement Ratio: This refers, in the context of income protection insurance, as the ratio of post-claim income to pre-claim income, in both cases net of income taxes. A value of less than one is desirable from the insurer's viewpoint, to provide a financial incentive for the claimant's return to work.

b) Terminal Illness: This is a medical condition that is expected to result in the person's death within a short period, say twelve months.

c) Cost Plus: Many of the largest group PMI schemes will self-insure. Some of these will seek to limit the possible downside by insuring against an extreme experience. Insurance will be arranged to cover the excess of a pre-agreed claims fund. Such an arrangement is called Cost Plus cover or Stop Loss cover.

d) Affinity Group: A group of people with something definitive in common, often membership of a particular organization, but not common employment.

[4 Marks]

Solution 2:

Advantages:

- Lower expenses in setting up office, sales training etc.
- No commission payable to agents
- Savings on expenses and commission can be partially shifted to customers in terms of lower premiums
- Potentially reach to a wider market
- Access to financially sophisticated customers and hence better claims experience

Disadvantages:

- Only simple products can be sold online
- Product sold might not suit customers' needs due to lack of direct communication with the customers
- The poorer/older section of the population may not be able to access the internet. Hence, limited customers access for online products.
- May be directly comparable with competition for premium rates, hence may need more frequent rate revision or else premium rates would be uncompetitive.
- Underlying experience may change if different people than those targeted buy the product
- Initial development of new system and cost of staff training if do not already use a website for selling other products
- If don't sell sufficient business these costs may not be recouped
- Potential reputational issues if website doesn't work or is hacked/data protection issues

[4 Marks]

Solution 3:

(i) Broad critical illness definition:

The advantages of this are:

- the product may appeal to more people

- one definition would be simpler to explain than four definitions and hence it would reduce the risk of miss-selling.

- it avoids the risk of disgruntled policyholders who suffer some serious medical condition not included in the list of four critical illnesses.

The disadvantages are:

- the company may not have access to data which correspond to this claim event

- The new definition might not exactly serve the purpose of covering critical illness as critically ill person could still carry out basic bodily function.

- Rates will be higher-this may put people off. For instance, people might not want to pay for cover that will now include serious accidents

- Claims control may be more subjective for instance someone who broke both arms might claim that they were eligible for benefit under the definition, but that is probably not the intention of the company in designing the product.

- Underwriting may be more difficult and may need to be more extensive.

- Reinsurance might be more expensive than before.

- May create similar expectation among existing policyholders

(ii) Direct marketing:

The advantages are:

- the company may be able to reach a wider and different audience from that which it would reach with broker sales.

- the company can target its audience precisely according to desired socio-economic and demographic traits.

- May reduce anti-selection risk

The disadvantages are:

- it is a complex product to explain fully in a brochure or with a short telephone call

- underwriting will be problematic

- a high withdrawal rate is likely

- the company may not be able to price correctly for the policyholders involved, for instance, 99% of the data used by the company might relate to broker sales.

- the company might see lower average premiums with this distribution channel, and this might cause a problem with expense coverage.

[10 Marks]

Solution 4:

(i) Main rating factors for Group PMI are:

- Number of Employees
- Age
- Occupation
- Gender
- Smoker Status
- Location of workplace
- Salary
- Grade of employees
- Health and safety practices
- Free Cover Level
- whether membership of the scheme is mandatory or voluntary
- length of claim moratorium for new entrants

[3]

(ii) Renewal Experience analysis:

- Past experience is the base of pricing group business, hence past experience should be analysed for pricing purpose.
- However, few adjustments are required to reflect expected future change in the experience.
- The company will analyse its portfolio of group PMI policy experience, by first choosing an appropriate recent time period.
- This should be as long as possible, but only to the extent that adequate homogeneity of the experience is maintained.
- The experience should be analysed separately for the major different treatment types and causes of claim.
- The data are then split into appropriate risk cells according to the rating factors listed in part (a).

- Risk cells will be grouped together if their experience appears sufficiently homogeneous, so as to increase credibility.
- Claim incidence rates for each cell and treatment type are calculated by taking the ratio of claims incurred to number of policy years exposed.
- Average claim amounts are similarly calculated by dividing total incurred claims by the number of claims.
- Adjustments will be made for historical inflation in order to bring claim amounts up to a common (recent) date.
- Multiplying incidence rates by expected claim amounts gives the historical risk premium for each risk cell.
- Summing over all treatment types will give the overall risk premium for each risk cell.
- A table of risk premium rates subdivided by significant rating factors could be constructed, by fitting an appropriate multiple regression model to the inflation-adjusted experience data.
- Further adjustments would need to be made so that the rates were appropriate for the future time period in which they will be used.
- These adjustments will need to take account of known or expected future changes in:
    - underwriting standards and approach
    - trends in experience (reinsurers' and industry data may be additionally used for this, if available)
    - changes in distribution channel or target market
    - past, current and future expected economic conditions (which could influence the employees' propensity to claim either individually or as a result of their employer's encouragement)
    - inflation.

[10]

(iii) **<u>Group Income Protection Insurance Product:</u>**

<u>Benefits:</u>

- The purpose of this product is to replace part of the income that the insured life would have earned if he or she becomes unable to work due to accident or illness.
- IP therefore pays a benefit in the form of a regular income.
- This is a valuable benefit in kind for employees that will enhance the employee's total reward package.
- This product will also encourage employees to return back to work early (in case replacement ratio is less than 1).
- The counseling and rehabilitation services provided under IP will help in minimizing sickness period and hence, employee can early return to work.
- The premium paid could help in minimizing tax liability.

The employer will want features:

- benefits that complement any ill-health retirement benefits available from an occupational pension scheme
- benefits that enable the employer to cover the risks of paying statutory sickness benefits
- a high free (of underwriting) cover limit
- benefits that look attractive to employees and match their needs for income while they are unable to work as a result of sickness or injury
- efficient claims processing with the minimum of paperwork
- counseling and rehabilitation services
- The availability of this service without cost during any deferred period before benefits are payable would be an added advantage.
- competitive premiums, perhaps with rating related to the employer's own experience.

[7]

(iv) Group Long Term Care Insurance Product (LTCI):

- The purpose of this product is to provide benefits in old age to cover the cost of care.
- The need for care in old age does not have a direct impact on an employer's business.
- LTCI does not have a high profile with the public in general, and so a LTCI benefit is not likely to be valued as much by employees as IP or PMI benefits.
- One exception is where group LTCI is offered to employees with cover that extends to their families, including their parents (and spouses' parents).
- Hence, this product will not fetch good business.

[2]
[22 Marks]

Solution 5:

(i) Factors that should be considered before implementing the premium reduction:

- First of all, compare the type of similar CI product offered by other competitors and particularly the diseases covered, options available and policy wordings.
- Is there a need to change the policy wordings?
- Is there a need to add new diseases/cover in the product?
- Is there a need to explore new market (target market)?
- Evaluate the reinsurance program; check if the reinsurance premium is not overpaid. Compare reinsurance premium paid with claims recovery from the reinsurance.
- Check the change in the product profitability post premium reduction. Check if the product will meet required shareholders IRR criteria.
- Otherwise, product will be a loss maker and will not be acceptable by the shareholders.
- The company may weaken its underwriting policy to attract new business. This might result in selecting bad risk.

- The company might improve its claims management to improves company's reputation. This might feed back to improving sales provided the change can be marketed properly.
- The company should consider the reaction of existing policyholders before implementing the premium reduction.
- The company also needs to explore other alternatives to increase sales.
- Example: improving product design, increase commission etc.
- Administration systems and support – if a much larger increase in sales is anticipated, the company should check that its systems and procedures are able to cope with this.
- In addition, improvements in general customer support services could improve the company's reputation, which should help to increase sales.
- If the desired increase in sales occurs, the capital strain on the company will increase; the company should check that it has adequate financial resources to cope with this.
- It should also consider possible arrangements it may put in place to increase available finance if needed (eg financial reinsurance).
- The company should check whether the sales team is sufficient (in number and capabilities) enough to meet the target.
- Ensure the consistency with other products before implementing the proposal.
- Practical issues should be considered e.g. how long it will take to implement the proposal.

[8]

(ii)

- The company should perform profit testing of its CI product, both at current level of premiums and at new proposed rates (25% lower).
- This involves projecting expected premiums, benefit outgoes, expenses, commission, reserves etc at different model points.
- Demographic Assumptions: Claims incidence rate, persistency rates, commission and expenses.
- Economic Assumption: Interest rate, risk discount rate and inflation.
- Take assumptions from company's recent experience and made adjustments to reflect future expected experience.
- Make adjustments for anyone off past experience, change in the target market and expected change in the processes like weakening underwriting criteria, improvement in claims management etc.
- These cashflows net of reserves should be projected at risk discount rate to arrive at profit margin.
- Compare profit margin, initial capital strain etc both for existing premium rates and proposed premium rates
- The RDR used with the new rates might contain a higher margin than the current rate to allow for any increased uncertainty of the resultant profit flows.
- Perform this profit testing on set of model points that will reflect future new business.

- As well as this per-policy profit testing, the company will do some model office aggregate profit testing, taking into account projected sales volumes.
- Perform some sensitivities like variation in sales volume, increase in incidence rates etc.

[6]

[14 Marks]

Solution 6:

(i) Company needs robust claims data management system

- To provide accurate data to different departments (claims, u/w, finance, actuarial, etc.)
- To ensure consistency between data shared and used by different department
- To reconcile data shared and used at different time intervals within the organization
- To provide data at requisite level of details by different departments
- To meet changing data requirements by internal users as well as by external users (like regulator)
- To able to integrate data from other systems(like systems used by third party administrators) within company's system
- To identify and correct data anomalies
- To have more flexibility in data analysis

[2]

(ii) Actuarial team's interests in company's claims management system

- To compute reserves, e.g. Calculation of IBNR depends on claims data to a large extent. Any issues in claims management system will affect the accuracy of reserves
- Performing product performance review. In order to accomplish this task they need detailed data of policy and claims. Here appropriate claims system that is able to capture detailed information will come handy
- For pricing and re-pricing of products. In order to price new products with innovative features the detailed claims information is required which can be provided by comprehensive Claims Data Management System only which is designed keeping in mind all these future requirements.
- Similarly, for pricing Group Health Insurance policies which can have very different features actuarial team depends on claims data. For re-pricing existing products also detailed claims information is a prerequisite.
- For various regulatory reporting
- For developing various analytical models for forecasting, prediction, etc.

[3]

(iii) Expectations from claims managements system:

- It should either be integrated with policy administration system or it should be able to take inputs from policy administration system seamlessly. In order to settle claims it is important that all information about claimant including his/ her eligibility of benefits should be retrieved easily and quickly.
- The output data can be obtained from the system easily and in the required format

- The Claims Data Management System should be able to capture all the data required as per regulatory requirements and it should be able to deliver the mandatory reports.
- It should be able to deliver all metrics related to efficiency of claims departments, like, turnaround time, outstanding claims, no. of claims processed during a period by categories, backlog of claims, etc.
- There should be a payment mechanism in the claims system which should be able to handle issues like, provider discount, TDS, etc. It is also important to either integrate it with financial system of the company or generate an output from claims system and provide that as input in financial system.
- The Claims Data Management System should be able to provide all the existing MIS reports and other desired reports. The reports can be in the form of claims paid in amount and numbers by ICD, hospital category, geography, age, gender, etc. If the system is integrated with policy administration, then it should be able to generate reports related to incidence rate, loss ratio and claim per capita by slicing and dicing data by different factors.

[3]

(iv) Criteria to be considered for technical evaluations:

Starting point will be the shortcomings of the existing system experienced by the company. Building from there following points should be considered:

- What are the IT requirements of Claims Management System in the form of hardware, operating system, software, etc.? Whether the requirements are being fulfilled presently or not? If not, what are the resources required?

- Whether Claims Management System has inherent capability to trigger for claims where there is a suspicion of fraud. There are various rule engine based Claims Management Systems which have inbuilt algorithm and can raise a flag if some claim is looking fraudulent.

- The Claims Management System should be scalable to handle future volume of business.

- The system should be flexible to handle not only existinh products but also the future products which will be developed.

- Whether present claims team can start working on the system with little bit of training or it requires special expertise to configure, enter data, take out reports, etc.

- What is the track record of the vendor from whom system is sourced, his standing, the support vendor is extending, upgrades to be provided, extent of customization, etc.

- In case of the system is being developed in house, what is the timeline and whether we can wait for that long. The in house system can be flexible and may accommodate lot of present and future requirements but will take longer to develop. On the other hand readymade system can be implemented very fast but may not have that many features to suit the specific requirement.

- The front end of the system should be such that data can be entered quickly and accurately. For this there should be automatic checks on reasonability of values, fields where compulsory inputs need to be provided, drop down instead of free text, etc.
- Huge volume can be easily handled.
- The data integrity should be ensured with provision of automatic backup.
- System should offer data security where users should have different levels of access and rights and cannot be easily tempered with.

[5]

[13 Marks]

Solution 7:

- the interest rate should be no greater than the risk-adjusted yields that are expected to be achieved on the backing assets
- may notionally apportion assets to liabilities to determine a weighted average yield for each liability type.
- the yields used depend on the asset type – for example, for fixed-interest it is the gross redemption yield
- must reduce the yield to allow for the risk of default
- additional restrictions apply in respect of sums to be invested in the future at unknown rates of interest
- must allow for tax as appropriate.

Also:

- consider whether any margin is in practice required for future expenses
- might not want to be as close to the maximum as possible
- only change from last year’s figure if necessary
- in particular, avoid arbitrary changes in basis
- in general, if in doubt, be prudent (ie low).

[5 Marks]

Solution 8:

Areas where Actuarial consulting firm can help:

- Data availability and relevant studies: Helping company to overcome data problems by sharing relevant data summaries(on the basis of info collected from different client projects) and helping in developing data system and processes
- Product Design: What contracts should the company offer and what benefits and design features should be included in them, given its risk profile and the resources available to it?
- Pricing of risk: What is the expected profit, and its variance, from selling a new contract at particular premium rates or with particular charges and will the company have the resources to sell the contract on those terms?
- Return on capital: What return on capital will the company expect to make by investing its capital in the development and issue of a new insurance contract?
- Profitability of future business: The process of checking the profitability of business which the company is planning to sell. It is important that an insurance company does not stop considering the profitability of its business once it is written, but continues to monitor it as part of its control cycle. Actuarial firm can help to establish framework for experience monitoring

- Supervisory reserves and solvency capital requirements: What assumptions should be used so that the reserves and solvency capital requirements provide adequate security for policyholders?
- Investments decisions: How should the company invest its assets so as to maximize expected return within the resources available to it?
- Capital management: Helping Company to achieve its short, medium and long term plans given the resources available to it.
- Risk management: How can underwriting and reinsurance be used to manage risk so that the company can increase profits, whilst keeping its risk profile within the resources available to it?
- Claims management: Helping company to develop adequate claims procedures and also establishing whether claims functions are properly followed or not. Establishing effective fraud control measures in place.

[10 Marks]

Solution 9:

(i) Wellness benefits comprise of benefits which are aimed at improving health and wellbeing of policyholders resulting in their improved health status.

[1]

(ii) Following are some of the examples of wellness benefits included in the health insurance policy:

- Screening employees by organising various diagnostic camps to assess their health status, so that, appropriate medical wellness advice can be offered to them
- Help chronically sick patient to manage their condition in a better way
- Educate policyholders about general health and hygiene.
- Encourage policyholders to incorporate exercise in their daily schedule and follow other fitness activities.
- Encourage preventive care related to lifestyle related diseases
- Offer various vaccinations and other preventive measures.
- Conduct sessions about nutrition, healthy eating habits, obesity control, etc.
- Smoking, tobacco and alcohol cessation programs.
- Training employees how to manage stress, overcome depression, etc.
- All these wellness programmes are made available online to help policyholders access them even when they are travelling.
- Reward programmes where customers get points for healthy habits and these reward points that used to reduce premiums later or enhance insurance benefits

[2]

(iii) Advantage for insurers:

- Not only this is a marketing tool in the hand of insurers, it also results in health cost containment in the long run.
- Insurance companies who are handling client account for a no. of years can assess which program will be more successful in improving their persistency experience
- They can also offer program best suited to clients belonging to particular kind of industry, e. g., manufacturing, IT & ITES, BFSI, etc or belonging to particular age or gender.

- Detailed analysis of claims can also throw light on which kind of claims are coming more from a specific risk segment, like, infectious diseases, accidental, lifestyle related, etc.
- It also helps insurance company to intervene at right intervals to help in containing claims experience of policyholders
- Thus a focused program will result in long run and permanent saving in claims cost resulting in lower future premium.

[3]

[6 Marks]

Solution 10:

(i) Factors that would determine insurer's choice of reinsurance programme:

- The size of the insurer in terms of the risk the reinsurer manages on its book
- The capacity of the reinsurer to share risk with the insurer.
- Competitiveness of the risk premium rates and other terms.
- The experience of the reinsurer in the local market.
- The efficiency in providing underwriting support.
- Its track record in terms of supporting the insurance companies in claim settlement.
- Ability to provide technical support like product development, experience studies etc.
- Its available free assets and credit rating
- Whether it satisfies the regulatory conditions if any put by regulator.

[4]

(ii) (a)

Figures in lacs:

Quote 1:	Before Reinsurance	Reinsurance Share	After Reinsurance
Premiums	2,000	900	1,100
Claims	1,600	800	800
Profits	400	100	300
Regulatory Capital	200		110

Figures in lacs:

Quote 2:	Before Reinsurance	Reinsurance Share	After Reinsurance
Premiums	2,000	250	1,750
Claims	1,600	191	1,409
Profits	400	59	341
Regulatory Capital	200		175

[4]

(b)

Quote 1:

Advantage:

- This approach helps to contain claim volatility for a smaller company as it shares risk in each case
- It helps to reduce the regulatory capital requirement

Disadvantage:

- Company has to pay for the cost of reinsurers' profit as is reflected by reduced profit.
- Quota share would not be helpful to contain risk of very high claim as company has to pay 50% claim for each case.
- Insurer needs to share premiums for smaller cases also, which may not be a concern area for the insurer.

Quote 2:

Advantage:

- Insurer do need not need to pay premium for smaller cases, rather it reinsures only big cases where claim's impact would be worse.
- It helps to improve the profit margin as evident- goes up from 20% to 27% of net premium.
- It helps to reduce the regulatory capital requirement

Disadvantage:

- Company has to pay for the cost of reinsurers' profit.
- It reduces the profit margin marginally.
- Claims above INR 1 crore are excluded so big claims would still pose risk for the insurer.

[4]

[12 Marks]

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