Institute of Actuaries of India

Subject SP1 – Health and Care Principles

March 2021 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:

i)

a) Investments should be appropriate to the nature, term, uncertainty/liquidity and currency of liabilities. [0.5]

b) Investments should also be selected such that it maximizes the overall return on the assets, where overall return includes both income and capital. [0.5]

The extent to which (a) may be departed from in order to meet (b) will depend inter alia, on the extent of the company's free assets and company's appetite to the risk. [1]

[2]

ii) There will be expense element to the reserve along with the benefit reserve. Since expenses increases at real rates, index-linked Government bonds or similar may be appropriate for part of the investment. [0.5]

Outstanding claims have been already incurred, reported, but not settled. As such they will be payable imminently, but some claims may have relatively long tail. An estimate to run off the claims should be made, to estimate the future pattern of outgo which may be difficult to match. [0.5]

The most likely backing asset is cash (short term assets would be cash and assets needs to be liquid. Would also hold some medium term bonds to reflect that some of the benefit payment may be long tailed. Invariably, the reserves should match by currency. [1]

[2]

[4 Marks]

Solution 2:

i) Initial Underwriting as a part of risk management:

- Protect the company from anti-selection
- In particular from lives whose health is seriously impaired where it is difficult to assess the risk accurately
- Leading to increased frequency of claims
- It helps to identify sub-standard lives for whom special terms are to be quoted
- Or whether the proposal needs to be postponed or declined
- Will identify appropriate level of premium for special terms
- Risk classification will help to ensure that all risks are rated fairly
- Financial underwriting helps to reduce the risk from over insurance
- Helps in ensuring that actual morbidity experience may not vary too much from pricing assumptions
- Helps to get better reinsurance rates and terms

[0.5 mark each. Max 4]

ii) Analysis of the proposal to increase the underwriting limits:

- The proposal would reduce the hassle factor and will increase the sales volume

- It would also reduce the turnaround time of acceptance
- Increase in sales would increase the capital strain
- And decrease the per policy expenses
- Main savings are the cost of medical report and underwriter's time in assessing the reports
- The total cost generally forms a small portion of initial expenses
- It is not the case that always the medical reports are called for due to sum assured exceeding certain limits according to age
- Reports are also called as a result of information provided in the proposal form
- The proposal of higher level of underwriting limit will generally attract sub-standard lives
- And could increase sales
- Some of these may need medical as a result of information on the proposal form which would increase the medical cost and reduces the benefit of savings
- Some of these lives, may also get cover on standard rates though they are sub-standard if the information is not provided in the proposal form
- This would probably worsen our morbidity experience from current levels
- In that scenario, company has to increase the premium despite the cost savings i.e., the increased claim experience may outweigh the benefit savings through medical cost
- This would make the premium rates less attractive to standard lives
- This would result in standard lives seeking cover elsewhere with a further worsening of morbidity experience and thereby further increase in premiums
- XYZ being small sized company, it is unlikely that competitors would follow our strategy of increasing the medical limits
- This may also affect the reinsurance terms which needs to be considered
- Would require to make changes in systems and internal processes
- Need to monitor the experience frequently
- Overall company will need to assess the balance between the extra underwriting expenses against possible benefit increase

[0.5 mark each , Max 8]

iii) Reasons for reinsurance:

- Principle reason is risk transfer / diversification of risk
- Reinsurer can help the insurer to limit exposure to risk
- Reinsurers also provide technical expertise in pricing the product, setting the underwriting limit of the company; helps in policy wordings and in proper claims management. These benefits will be more valuable to small sized companies like XYZ insurer.
- Reinsurance helps to write large cases and avoid large single losses as well
- When insurer is uncertain about the future trends in claims experience which affects the results of the business, reinsurance should be considered
- It helps to write large number of policies
- Reinsurer can help the insurer to smooth the profits
- Reinsurance helps to reduce the variance of insurer's morbidity experience
- The insurer could use reinsurance till it builds up enough expertise and once expertise is built it can slowly increase its retention limit

- Being small sized company the insurer may have insufficient capital backing which may restrict its new business by particular sector or volume, where reinsurer can provide financial assistance as part of reinsurance arrangement
- Reinsurance can help to reduce the solvency /capital requirement
- Reinsurance prices may be cheaper thereby helping to price the products competitively
- Having reinsurance may improve profitability
- There may be benefits from tax and arbitrage

[0.5 mark each, Max 5]

iv) The method of finding retention limit:

- It is necessary to estimate the statistical distribution of the risk experience of the portfolio with various retention limits.
- One approach is to set the retention limits at such level as the probability of insolvency below a specified level

  Using stochastic model for expected claims can be projected forward together with company's assets and liabilities.

  Using simulation, a retention level can be determined such that company stays solvent for 995 out of 1000 scenarios [1]
- Another approach is to consider the total of
  (1) Cost of financing an appropriate risk experience fluctuation reserve and
  (2) Cost of obtaining reinsurance – the reinsurer will obviously incorporate an expense and profit loading in their reinsurance rates and the insurer also incurs some administrative expenses relating to this

  To calculate (1) the simulation approach would probably be used to decide on the level of reserves the company need to hold.

  As the retention limit increases (1) increases and (2) decreases, and a retention limit can be adopted which minimizes the total cost (1) + (2) [2]

- Also need to look into the regulatory guidelines before deciding on the retention limits so that there are no regulatory breaches [1]
- XYZ being small sized company might have lower retention limits as uncertainties are involved. Retention limits depends on level of risk appetite of the company as well. [1]

[Max 4]

v) factors to consider on choosing the reinsurer:

- Price is normally the key factor, everything being same, insurer will choose the reinsurer who offers lowest price
- Insurer prefers reinsurer with high credit rating; there may be a minimum credit rating that insurer would find acceptable
- The reinsurer should have expertise in critical illness business so that they can assist insurer in underwriting, pricing and claims management
- Need to check how easy it will be for the reinsurer to provide any required support
- System compatibility with the reinsurer i.e ability to provide data in a suitable format

- Whether the insurer has an existing relationship with the reinsurer; it may be helpful if there is existing relationship with the reinsurer for other lines of business
- However, the insurer may choose a reinsurer where the insurer has low credit exposure to the reinsurer in order to reduce the concentration of credit risk
- Capability of the reinsurer to provide reinsurance cover for a reasonable period of time
- Ability of reinsurer to provide the various reinsurance structures required by the insurer for eg., quota share, surplus
- The insurer may require financial assistance / profit sharing facilities from the reinsurer
- Reputation of the reinsurer e.g speedy underwriting / claims decisions
- Arbitrage opportunities with the reinsurer

[0.5 marks each, Max 5]

[26 Marks]

Solution 3:

i) Ways on how to conduct the investigation:

- The most recent data to be used for investigation
- Investigation to be done separately for income protection and critical illness business
- Data used for investigation needs to be complete and accurate
- Data used needs to be consistent and or the required order of detail
- Investigation also can be done basis the channel which procured the business, gender, coverage amount etc so that we can find out whether the worsening experience is because of the business through any channel or under low ticket size or under any particular gender
- Provided we have sufficient data we can investigate the critical illness claims by each claim type e.g., first heart attack
- For income protection it is necessary to analyze the claims incurred and around claim inception and on-going payments
- Any one off events would be allowed for when interpreting the results
- This and several previous years' results would be considered together, in order to establish whether any trends were developing; this may be necessary as the claim costs are getting worse over time
- Whether any changes made in underwriting process/claims management/ sourcing pattern in the recent years can also be analyzed to find out whether these are the coz of worsening experience in recent years.

[0.5 mark each , Max 4]

ii) Data correctness:

- Compulsory fields
  - Claim record will not be accepted without a policy number for reference
  - Certain fields in the policy record will be mandatory and will not be accepted without the same. For example. Age/date of birth, policy term, sex, coverage amount, coverage type

[1]

- Controls on data
  - Input checks to prevent erroneous data being inputted/accepted for investigation
  - Age should be within the boundary conditions specified in the file and use
  - Sex field should be either Male or Female and no other inputs should be permitted

- Coverage amount should be a whole number, if the file and use prescribes that it should be multiple of '000s or so then the appropriate checks should be in place
- Coverage type should be one of the allowable combinations in the particular product
- Have to ensure all necessary fields are available in the data so that investigation can be done appropriately for example., business channel sourced, medical/non-medical, premium, accepted at ordinary rates/special rates, mode etc so that meaningful analyses can be carried out after investigation [2]

- Reasonability and consistency checks
  - Check consistency of data over time i.e compare data on policies at this valuation with that of last valuation (for example number of policies/sum assured allowing the movements between the two valuation dates)
  - Check consistency of individual data for example the premium vs. sum assured [1]
- Spot checks
  - Regular checking of the process by which data is accepted
  - Carry out checking of few sample policy records by comparing the paper record with the one stored in the system
  - Check that data captured is comprehensive
  - Built queries in the system to ensure the data correctness and consistency [1]
- Other measures to ensure data correctness
  - Staff training: Ensure adequate training is provided to staff responsible for data input. Train and develop the ability that they can spot the incorrect data
  - System capability: Ensure systems are capable to capture the required data
  - Ensure close liaison between the person responsible for establishing software and the person who is checking data correctness [2]

[7]

iii) possible reasons for worsening claims experience & Actions Company can take:

- Reasons:
  - Rise in sales of female lives may be because the company's premium for females may be cheaper than that offered by competitors
  - Application process might have been simplified, which might have made intermediaries to sell this product easily
  - Claim management process might have been relaxed which may be a reason for worsening claims experience [1 each ,max 2]
- Possible actions:
  - It is necessary to ensure that premium charged is adequate to cover the risk. Re-pricing may be necessary by revising the pricing assumptions.
  - Reserving assumptions may also need to be changed as the existing assumptions are no longer in line with the experience and hence not prudent.
  - Need to check the application process & product design: Is the underwriting limits are in line with industry? Are we pioneer in relaxing any medical limits? Is there a need to revisit our existing product structures, for example the occupation definition from own occupation to any occupation or the critical illness conditions, introducing linked claims clause and encouraging return to work etc.
  - More stringent Claims management process can include

- Implement rehabilitation services to help claimants back to work
- Implement early claims notification scheme to allow early claim intervention
- Improve the process of validating new claims and existing claims
- Ensure claims management staff have necessary expertise in this area

[1 each Max 2]

[Max 4]

[15 Marks]

Solution 4:

i) Some of the possible items in questionnaire:

- General details like Age, gender, educational qualification, occupation, coverage amount applied for, income level, marital status, number of family members etc.
- Height and weight
- Existing health insurance policy and coverage level
- Any pre-existing medical conditions
- Smoker status
- Use of drugs, alcohol or tobacco products
- Family history of diseases
- Any major surgeries in past
- Ever been declined health insurance in past
- Ever been diagnosed or treated with depression or any medical illness
- Any disability due to illness

[1 mark for first point, rest 0.25 each, Max 2]

ii) Some of the factors to consider are:

Product design:

- Do a market research to assess which illnesses customers perceive to be critical.
- Need to decide on the optimum number of illnesses covered under this plan. If the claim experience is majorly from some specific illnesses, then as long as those are covered, cost may not reduce.
- Alternatively, if such major conditions are excluded, the product may not be competitive or meet customer's need.
- Any regulatory or professional guidelines on CI product design should be adhered to
- Assess whether there is a need for alternation to waiting period, exclusion of pre-existing disease coverage, introduction of moratorium clause.
- Customer segment – whether this product is for a specific target market
- If the sum assured of the product is low, it may not be able to meet the medical cost in future due to medical inflation

Competitor

- Whether such product already exist in the market and;
- How competitors will react to such launch

Data availability

- Whether there is enough data to price this product.
- Will company's own past data be relevant to price the new product or need data from alternate sources like industry, reinsurer etc.

Assumptions

- Company will need to revisit the existing pricing and reserving morbidity and mortality assumptions to reflect the changes in product design:
  - Due to underwriting practices, there may be higher risk of anti-selection
  - Change in illnesses covered and correlation between illnesses covered
- Increased expense due to additional expenses related to product launch and marketing. Alternatively, higher sale volume of cheaper CI product might reduce the per policy expense loading
- There may be an issue of lapse and re-entry as the new product is cheaper. This may require revision in lapse assumption.
- Since it's a new product, company may need to incorporate additional margins for adverse deviation in premium rates

Marketability

- Do a market research to understand if there is a demand for the cheaper version of existing CI.

Risks

- Risk of anti-selection as the product is offered on short form underwriting basis for lower sum assured.
- Reputational risk - Customer may not be clear on which illnesses are excluded and may perceive it be similar to standard CI. Therefore, there may be additional litigation cost due to increase in claims rejection

Distribution

- Whether the product can be sold through existing distribution channels
- Will it be available for sale through all channels or sold only through specific channels?
- Since there is a change in product design from existing product, there will be a need for training of sales staff, so they can clearly highlight the changes from existing version to the customers.

Capital requirement

- Whether the existing capital position of the company can support the additional volumes from the sale of cheaper version. Sale of cheaper version may be higher than the existing product.
- Need for additional margins in reserves due to change in product design and underwriting practices.
- Higher cost related to launch of a new product will create strain and may adversely impact solvency.

Reinsurance

- To decide on the suitable reinsurance for this plan
- Whether reinsurer will support such changes in design at existing rates or would there be an upward revision.

[0.5 each, Max 10]

iii) Merits in structuring the plan as tiered CI:

- It may be perceived as a better value proposition by the customer and hence helps the company to increase sales volume.
- Multiple claims under a single policy increases customer satisfaction and helps in improving persistency.
- It will help the company to differentiate the product from existing CI policies in the market and allow company to generate higher sales and profits.
- Since it is a short form underwriting product, there is a higher risk of anti-selection against the company. Tiered benefit will help in reducing the incentive for anti-selection and exaggeration of claims as the benefits are closely matched with the financial needs of the customer.
- Under tiered benefit structure, a proportion of overall sum assured is received at early stages of illness, which may prevent the spread of disease and reduce the associated cost of claim for insurer.

[1 each, Max 4]

Challenges

- Since the above product is already a budget version, adding an additional feature will increase the cost of claim as there is an increase in probability of claim under a single policy.
- Also, the claim management cost under tiered CI will increase as it allows multiple claims under single policy.
- Tiered structure is complex to explain to customers. Adding it to a plan which has reduced number of illness may lead to lack of understanding as regards to the conditions covered under the product. There is reputation risk to company as there may be higher claims rejection under this plan.
- It may be difficult to design a tiered structure for low sum assured policies as dividing a small sum assured into small proportions may not meet customer's need and simply add complexity to the design.
- Also, there may be additional cost due to
    - Changes required in administrative systems to handle tiered payout
    - Company may need to change the distribution strategy for this product as it has multiple variations from the existing version. May need to offer higher commission to sell such complex product

[1 each, Max 4]
[8]
[20 Marks]

Solution 4:

i) General business environment

- Increase in customer interest to understand the features of health insurance products leading to higher demand for health insurance.
- Increase in the demand for products where Covid-19 is perceived to be covered such as PMI and IP. However, the demand for CI may have reduced during this period.
- Health Insurance companies may have to revisit their sales strategies, sales volume and mix assumed in business plan.
- Depression in the economic activity is likely to impact the persistency of existing business, especially in case of CI product.
- Need for enhanced IT infrastructure to ensure seamless customer experience during sales, underwriting and claims process.
- Economic crisis caused by pandemic will impact the financial markets, leading to a reduction in the value of assets backing liabilities, impacting the solvency position of the company.
- Higher claims under PMI due to higher Covid-19 related claims. Higher claims in IP plans due to loss of job as a result of lower economic activity and reduction in return to work.
- This may be offset (to some extent) by the reduction in non Covid-19 claims, due to delays in planned surgeries and delay in claims reporting.
- Reduction in volume of group insurance products, especially in small scale enterprises due to reduction in overall business activity leading to unemployment.
- Alternatively, there might be greater demand from the corporates for group health plans for enhanced health coverage of their employees.
- Business continuity planning – greater impetus on the importance of business continuity planning, especially on processes related to underwriting and claims.
- Increase in the fraudulent claims due to rise in unemployment.

[0.5 each, Max 5]

ii) Product design and Underwriting

- Pandemic may result in focus of the health insurers on disease specific covers. Companies are likely to launch products which specifically provide cover for Covid-19.
- There may be greater focus on the need to widen health insurance coverage to include mental health and depression.
- There may be greater impetus from the regulator on standardization across the insurer of health plans which cover Covid-19. Regulator may regularly issue guidelines on coverage structure and T&C of standalone Covid-19 plans
- Pricing challenges associated with product covering Covid-19:
    - Lack of sufficient data – Covid-19 experience may vary considerable at different age bands and there may not be enough data points to assess experience at each age group.
    - Difficult to ascertain the cost of treatment as it varies considerably between the type of medical provider, method of treatment like home isolation or hospitalization etc.
    - Cost of cover would also vary depending on whether diagnostic test, disposables like PPE kit, masks etc. are cover under the plan.
- Since Covid-19 experience is still unfolding, it may take some time to finalize underwriting policy suited for Covid-19 products.
- Health underwriting may need to be updated to assess the long-term impact of Covid-19 on benefits covered under existing products such IP, CI etc.

  - Need for additional morbidity loading for prospective policyholder with Covid-19 history.
  - Such a loading requirement may differ by age band
- There may be a need to revisit policy conditions such as co-pay, waiting period, policy exclusions etc.
- This may include relaxation of waiting period for Covid-19 claims, home treatment covers due to fear of infection in hospital etc.
- Since the existing PMI policies have not priced for Covid-19 claims, but may still be required to pay, there may be a need to revisit and increase premium rates at the time of renewal.

[0.5 each, Max 5]

iii) Reserving

- Revisit all the existing valuation assumption to ensure that any changes in the morbidity, mortality, lapse and economic assumptions are adequately allowed for.
- This would imply assessment of
  - any trend impact on morbidity and mortality due to the pandemic
  - correlation between the illness covered under the existing policies
  - medical inflation to allow for increase in cost of care
  - any adverse impact of economic crisis on persistency and economic assumptions
  - impact of additional cost incurred related to upgrading of IT capabilities, higher claim expenses and legal cost due to higher claims litigation in expense assumptions
  - impact of higher lapsation on per policy expense loading
- Need to assess if there is a requirement to increase margins for adverse deviation in mortality and morbidity assumptions to allow for long term deterioration in claims experience.
- There might be an increase in delay pattern due to lock-down during pandemic, leading to increase in IBNR and IBNER reserves to meet such long-tailed claims.
- Unavailability of adequate medical care during pandemic lockdown might have deteriorated the health of policyholders, causing a higher cost of treatment (as against if the treatment was provided at the right time)
- Need for additional one-off reserves to meet the expected Covid-19 related claims.

[0.5 each, Max 5]
[15 Marks]

Solution 6:

i) Possible reasons for breach:

- Solvency of the company may already be nearing the regulatory minimum and due to lack of adequate solvency monitoring framework, the company did not address this issue at the right time, leading to a breach in solvency in a particular month.
- Change in solvency may be due to reduction in the value of assets due to market conditions such as default in the debt security where company has major exposure, unfavorable equity movements etc.
- Movement of asset backing solvency from admissible to inadmissible. For e.g., due to some regulatory guidelines or fall in credit rating of issuer.
- Default on receivables from third party, for e.g., reinsurance.

- Sales volume – higher sales volume than expected in the business plan leading to greater new busines strain.
- Change in new business mix compared to business plan towards high strain products.
- Any one -off expenses such as regulatory penalties etc.
- Higher than expected claims due to one-off high sum assured claims.
- Decline of large claims by the reinsurer due to concerns related to admissibility of claim.
- Lack of reinsurance for pandemic and aggregation of Covid-19 claims
- Higher claims due to catastrophe events, especially if the company does not have adequate catastrophe cover.
- Increase in reserve liability due to:
    - change in valuation assumptions or methodology
    - need to hold additional one-off reserves, for e.g.; provision for Covid-19 claims
    - regulatory changes, increasing the minimum benefits guaranteed under the products

[0.5 each, max 5]

ii) Possible course of action:

- Investigate why such breach has occurred, ensure that there are no estimation errors and have a monitoring framework with adequate scenario modeling in place to ensure such breaches can be avoided in future
- Submission to the regulator explaining the reasons for breach and action plan to restore the solvency position.
- Emergency board meeting to assess the financial position and decide on corrective actions. Some of the possible management actions may include:
    - Infusion of capital by shareholder
    - Raise capital from market such as subordinate debt
    - Explore alternate risk transfer solutions to get capital relief
    - Movement of assets from inadmissible to admissible category, e.g.; investment in high rated instruments such as government securities
    - Reduction in shareholder dividend to ensure there is no capital outflow
    - Immediate halt on the sale of high strain products such as IP and LTCI plans
    - Increase in duration of assets to ensure better asset liability matching for long term contracts.
    - Explore possibility of release of any extra prudence in reserves

[0.5 each, Max 5]

[10 Marks]

Solution 7:

Since it is a newly set-up IT company, most of its employee are likely to younger and familiar with the digital platforms. The needs of the employees can be divided as per the age band:

Age 20 -25

Needs

- Most of them would have recently graduated and have student loans to repay
- Would be in good health and may not perceive health insurance to be valuable

- May require cover for injuries due to accident, activities with physical exertion such as adventure sports etc.

Suitable product

- Can be offered IP plan to ensure a regular source of income for meeting expenses
- PMI product which also provides cost of treatment of sports injuries etc.
- Accelerated CI cover to repay student loan in event of ill health, death or disability

Age 25-35

Needs

- Most of the employees in this age band would be married with children and in good health
- Greater awareness of need for health care for self and family
- Have dependents and likely to be concerned about the loss of income due to unemployment
- May have large debts to repay for e.g.; to buy homes etc.

Suitable products

- IP - to ensure regular source of income for meeting expenses
- Accelerated CI cover to repay loan in event of ill health, death or disability
- Personal Accident insurance to protect against the loss of income to family if policyholder suffers an accident resulting in loss of limb or other specified injury.

Age 35 – 60

Needs

- Reduced debt or may have to pay off the debts
- Need to provide for cost of health care after retirement
- Children may still be dependent, so concerned about loss of pay due to unemployment

Suitable products

- IP products to protect against loss of pay
- Accelerated CI cover to repay loan in event of ill health, death or disability
- Pre funded LTCI plans to provide for the cost of care post retirement
- PMI plan to cover for the treatment of acute illness
- Personal Accident insurance to protect against the loss of income to family if policyholder suffers an accident resulting in loss of limb or other specified injury.

Generic

- A combination of the above plans can also be offered to the customers
- For e.g., LTCI can be added as a rider to IP policy so that policyholder has complete coverage even beyond the retirement age. The definition of disability can be occupation based while in employment and activity related post retirement.

[0.5 each, Max 10 Marks]

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