Institute of Actuaries of India

Subject CP1 – Actuarial Practice (Paper B)

September 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) **Regulator**

- Adequacy of reserves to meet all policyholders liabilities
- The solvency position of the company and ability to withstand various stressed scenarios like
    - Lower new business volume
    - Higher claims
    - Lower persistency
    - Increase in the market risks like fall in equity, credit defaults
    - Combination of above

- The capital injection requirement of the company
- Any expected dividend pay-outs
- Expense control
- The impact on operations of the company and business continuity
    - Policy servicing
    - Settlement of claims
    - Resolution of complaints
    - Cyber Security

(3)

b) **With Profit Actuary**

- The supportability of the bonus rates in relation under various stressed scenarios like
    - Lower yields in the future
    - Higher mortality claims
    - Higher per policy expenses

- The following needs to be considered if reducing the bonus rates due to lack of supportability:
    - The actions of the competitors
    - Consideration to the policyholder reasonable expectations
    - The past practices of the company
    - Whether the situation is temporary and reverse in due course of time
    - Ability of the surplus in the participating fund to support continuation if bonuses

- The impact on the surplus of the participating as result of the following
    - Current economic scenario
    - Expected change in the NB volume and mix
    - Changes in the bonus levels

(4)

[7]

ii) Pricing

- The insurer may not have adequate mortality experience for the mass segment in order to price the plan
- Even if there is adequate data, the mortality experience post pandemic is likely to be higher
- This could lead to incorrect estimation of the mortality assumption and mis-pricing

- Limited capability to load full expenses in the plan in order to make the plan affordable
- The insurer is unlikely to make profit from selling the plan

Reinsurance
- The reinsurer may not be willing to quote for the plan
- Or quote could be substantially higher to discourage the insurer to place business
- The retention limit set by the re-insurer could be high which means that most of the risk will be retained by the insurer itself.
- Higher capital requirement if reinsurance is not considered while reserving
- This also means that the premium would be higher
- There could be more restrictive underwriting by the reinsurer
- The reinsurer can increase the rates for new business by giving few months' notice however it may be difficult for the insurers to increase the rates due to regulatory constrains

Regulator
- Since this is a standard plan, the premium rates could be compared with other insures by the regulator, it may force the insurer to reduce the premium in line with competitors
- The premium could be compared with other term plans like online plans with mandate that the premium for the standard plan cannot be higher by more than the Y% of existing plans
- In case the insurer goes for reinsurance to manage the mortality risk, it may pay higher premium to the reinsurer than what it could charge to the policyholder for the death cost, leading the plan to be financially un-viable
- The plan may be sold in limited quantities to manage the risk but such a stance could be challenged by the regulator
- Limited ability to re-price the plan if experience turns out not as expected as result of mandate of the regulator to make the plan affordable

Underwriting
- Difficult to conduct medical underwriting as the policies may be issued in large numbers.
- The product pricing may also not support high number of policies going for underwriting.
- Difficult to medically underwrite the policies as they may be sold in small towns and rural areas with no access to medical facilities.
- The pandemic will make it more difficult to underwrite as the prospective policyholder will be reluctant to go to the medical facilities due to fear of catching Covid-19
- Difficult to do tele and video medical underwriting due to connectivity issues in some rural areas

Claims Management
- Increased scope of conflict between insurer and reinsurer in approval of the claims
- Difficult to investigate the fraudulent claims as policies may be sold in interior locations
- There could be large number of claims depending on the volume sold which will make it impractical to investigate suspected fraudulent claims
- The cost of the investigation may not have been build in the pricing to keep premiums affordable
- There could be liquidity issues if large claims are reported
- The reputation risk of rejecting the claims

(Max 12, 0.5 mark each)

iii) The nature of the interest rate risk faced by the insurer:
- Future renewal premium required to be invested for the regular and limited pay plans

at unknown future rates which leads to interest rate risk as the benefit is guaranteed under nonparticipating traditional plans.

- The reinvestment of the proceeds from coupons and maturity proceeds from the existing assets holding at unknown future rate of interest rates.
- If the rate of investment is lower than what assumed under-pricing means that plan will generate lower profit or can also be loss making
- The risk of selective withdrawals by the policyholders at opportune time if the surrender values are not aligned with the movement in the interest rates
- The increased capital requirements if the risk is not effectively managed
- The interest rate risk exacerbated by the lack of asset classes having duration to match long liabilities
- Restrictions imposed by the investment regulation to hedge the interest rate risk like limit on investing in the recurring deposits

(3)

iv) The risk posed by entering into derivatives:

- The counterparty risk of default
- The liquidity requirement due to margin calls
- The impact on solvency as result on market movement in value of derivatives
- Governance and legal risk
- System risk
- Risk of unwinding the derivatives
- The persistency risk which could impact the level of hedging
- Limited or no experience of hedging through derivatives

The steps to control the risks:

- Provide training to the management and the board on derivatives
- Having proper policy for investment into the derivatives vetted by external consultants and approved by the Board
- Thorough due diligence before entering in the derivative deals
- Continuous monitoring of the derivatives like exposure, hedge ratios, liquidity requirement etc
- The adequate system testing while implementation which could be validated by running through various hypothetical derivatives deals
- Purchasing system from reputed vendors
- Performing sensitivities on the solvency and liquidity ratio of the company as result of the movement in value of derivatives
- If possible, purchasing over the counter derivatives
- Dealing with reputed banks and counter parties
- Enforcing strict margin call requirements
- Maintaining enough liquidity

(8)

v)

- The insurer can perform mortality analysis with the latest data to see impact of the covid claims
- If sufficient data is not available, then population statistics could be considered
- It could also consult the reinsurer to understand the broader impact
- There may not be any need to change the best estimate assumptions underlying the statutory basis as the pandemic is more like a one in a lifetime event
- If the current margins on mortality assumptions are sufficient then may not change the assumptions

- If additional reserves are required, then a separate catastrophe reserve may be set up
- The separate reserve is likely to be based on the excess mortality outgo over the best estimate assumptions over the next few years
- Or a higher margin may be allowed for and kept separately as catastrophe reserves
- The excess mortality outgo percentage can be estimated by comparing the actual covid and the non-covid claims data
- The data may not be of best quality as some of the covid claims may be reported under other categories like respiratory issues
- The additional mortality outgo may be taken for the next 2-3 years depending on the expectation of how long the additional claims or pandemic could last
- There might be need to strengthen the IBNR reserves due to increase in likely delay of reporting the claims
- The estimate of the reserve may be refined as more data emerges
- Any impact of increase in the provision on solvency needs to be considered as result of increasing the reserves.

(6)

vi) The international travel insurance policy is likely to provide the following coverage:
- Trip cancellations
- Trip curtailment
- Delays in travel and accommodation
- Cancellation/interruption due to medical reasons
- Health and medical emergencies expense cover
- Loss/delay of baggage/luggage
- Legal expenses cover
- Theft of personal belongings
- Personal liability
- Emergency medical evacuation
- Repatriation of remains
- Loss of passport
- Fraudulent charges on loss of payment card

(5)

vii) The impact on the travel insurance as result of the Covid-19 pandemic
- Reduced sales of the travel insurance policies due to implementation of lock downs
- Refund of the premiums due to cancellation of the travel policies
- Increased popularity of working from home, better technology e.g. zoom and reduced company budgets means lower international travel leading to reduction in business
- Increase in claim due to travellers stranded on international tours due to lockdown or flight cancellations
- Increase in claims due to cancellations of the trips on account of pandemic
- COVID-19 testing before boarding is allowed. This means increased cancellations arising where the insured has tested positive.
- Increase in medical expenses during the pandemic due to policyholders having contracted COVID-19 whilst abroad.
- Impact on the availability of support from the reinsurer for new business
- Or support available with stricter conditions which could impact the business

- Hardening of the reinsurer rates making the policies expensive
- Lack of data in pricing the plan particularly if new clauses are embedded in the terms and conditions
- Volatility in profit in the travel insurance segment due to economic uncertainly, new outbreaks and changes in travel advisory by governments.
- Increase in the provisions which could impact solvency
- Increase in reputation risk due to claim related disputes with the policyholder
- The policy wordings and the exclusions need to be made clear for the new policies
- Lower business volume means that the contribution to the expenses would be lower
- The rating factors are likely to change post covid
- For example vaccinated or not for Covid-19, whether contracted covid before and severity of the same.
- Short to medium term the sales of the policies are likely to be depressed
- The demand could increase in the long term as people realise importance of insurance whilst travelling

(Max 9, 0.5 mark each)

[50 Marks]

Solution 2:

i) Reasons for increasing requirement of capital infusion by Company B:

- Increase in business volume
- Change in business mix: If the mix of products offered are more capital intensive.
- Inappropriate pricing due to lack of data
- Inappropriate discounts/loadings due to weak underwriting procedures
- Inappropriate reserves or reserving methodology which would have led to high reserves.
- Adverse experience in claims or high volatility in claims
- Increase in operating expenses like one-time expenses of system set up
- Increase in commission to distribution channel partners
- Changes in capital requirement prescribed by regulator could have increased the capital requirement.
- Increase in options/guarantees. The company may be offering guaranteed premium long-term health insurance products.
- Inadequate or inappropriate reinsurance arrangements.
- Change in Investment strategy would have led to increase in capital.
- The value of assets would have decreased due to sudden fall in market rates.
- The non-performing assets or inadmissible assets would have increased.
- The volatility or catastrophic event would have led to increase in the margins for assumptions used for calculation of liability.
- Expansion of the organisation would have led to higher expenses.

(Max 7, 0.5 mark each)

ii) Set out the reasons for purchase of Company B by Company A:

- Expand into a different Target market
- Increase in market share
- Competitive advantage
- Economies of scale
- Because it believes it is undervalued and will generate high returns in the future
- Diversification of risk
- Tax advantages

- Want to invest Free capital
- Synergy of IT systems of both the companies
- Strong distribution network of Company B
- Strong employee force of Company B
- Quality business of Company B

(Max 6, 0.5 mark each)

iii) Set out the assumptions required for projecting solvency:

- Loss ratios for various lines of business like motor own damage, motor TP, Travel insurance, Individual health, group health etc.
- Development pattern of claims under various lines of business
- Claim related expenses and other expenses
- Any one time expenses for integration of both the entities
- Any one-off payments made to employees of Company B
- The investment income from the combined asset portfolio
- The business mix
- The premium income
- Distribution cost
- Growth rate of business
- Claim inflation
- premium income inflation.

(Max 6, 1 mark each for first and second points, 0.5 mark for others)

iv) The factors or issues to be addressed by actuary while setting above assumptions:

- The information on loss ratios and claims development factors of Company B won't be available.
- The premium rates of all the products especially group products mayn't be available
- The expense experience mayn't be available
- System integration costs may become difficult to assume
- Economies of scale is difficult to estimate
- The growth rate of business may be difficult to estimate as this is because of interaction of various factors like existing policyholders behaviour, employees and distributor network behaviour of Company B.
- Any tax issues that may arise on purchase of Company B need to be factored
- The investment pattern and quality of assets mayn't be available to project the investment income
- Asset liability matching information mayn't be available

(6)

v) Describe methods of analysis available to assess the range of scenarios generated while projecting the business.

- Scenario analysis
- Stress test scenario
- Combining Stress and Scenario testing
- Reverse stress testing
- Stochastic modelling

(Max 5, 1 mark for each with description of above analysis customised to the question given)

vi) Merits and demerits of request for reduction in solvency capital requirement

- The purpose of solvency capital is to ensure that the insurer will meet liability even in case of foreseeable adverse experience. Thus if solvency capital is reduced, the entity may fail to meet its liability in certain adverse scenarios
- The reduction of solvency capital may increase the available capital to insurer and enable it to procure more business.
- The reduction will reduce the chance of some insurance companies becoming insolvent.
- Some insurers who are managing their business prudently mayn't appreciate as they have managed their capital efficiently.
- The public confidence in financial strength of insurance companies may reduce
- The confidence of investors in insurance companies may reduce
- For the regulator, this may become a recurring request in future
- Some insurers may behave aggressively, as regulator may consider the demand

(Max 5, 1 mark for first point)

vii) Set out the various capital management tools available for Company B:

- Equity capital
  - Rights issue
  - Parent company
  - Public offer
- Internal sources of capital
  - Assets could be changed
  - Valuation basis could be changed.
- Subordinated debt
- Securitisation
- Financial reinsurance
- Derivatives
- Banking products
  - Liquidity facilities
  - Contingent capital
  - Senior unsecured funding
- Weakening valuation basis
- Changing asset classes – To reduce the inadmissible assets or non-performing assets.

(6)

viii) Various options available before Company B to reduce the capital strain:

- Diversification
  - By lines of business/ Product Mix – Ex: Between Group Health, Individual Health, Travel Insurance etc depending on the capital requirment.
  - Geographical Area of business – Ex: Between Metro business and Non-metro business as usually the Loss ratios are high in Metro areas due to high awareness and due to high medical costs
  - Providers of Reinsurance – To mitigate the credit risk of reinsurers.
  - Between distribution network – Ex: Between Online and Agency network as the commission is high for Agency network and nil for Online channel
  - Investment – Between various asset classes such that there will be reduction in non-performance assets and reduction in inadmissible assets.
- Underwriting at proposal stage
  - To avoid anti-selection

  - The selection of risks is as per the policy decided at pricing stage so that the loss ratios are as expected.
  - The loadings/discounts are as per the risk profile of the customer rather than based on underwriter discretion. The substandard risks are appropriately loaded.
  - Introduction of Financial underwriting to avoid over insurance.
- Claims control procedures
  - To mandate the claim investigation beyond certain amount of claims.
  - To check whether illness mentioned in the claim meets the conditions mentioned in contract
  - During the payment of claim, need to assess regularly the illness remains a valid claim
- Management control systems
  - Data Recording – With good quality of data regarding risks underwritten with information on risk factors identified at the time of design of product. Though it may not reduce the exposure, but it help in arriving at appropriate price and appropriate loading/discount.
  - Accounting and Auditing – Though it doesn't change exposure, but it enables to make appropriate provisions.
  - Monitoring of claims
  - Monitoring of options and guarantees whether any chance of biting those options and guarantees
- Reinsurance
  - Review the current reinsurance arrangements. The insurer may attempt at various reinsurance arrangements like Quota share, Excess of Loss etc.
  - Alternate Risk transfer.

(9)

[50 Marks]

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