

Institute of Actuaries of India

Subject CA1-I – Actuarial Risk Management

March 2018 Examinations

INDICATIVE SOLUTIONS

Introduction

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

Solution 1:

- i) Expect increase in claim trends to due to increase in crimes, frauds by companies [1.5]
- ii) Expect increase in claim trends due to employers cutting costs and compromising on safety measures leading to higher risk of death/disability at place of work [1.5]
- iii) Expect increase in claim trends, propensity to claim even for small amounts, fraudulent claims by motor owners and general civil unrest (riots etc.), theft [1.5]
- iv) Expect increasing claim trends due to frauds, general societal unrest (civil riots etc.) leading to strikes, damage to property etc leading to business interruption [1.5]

[6 Marks]**Solution 2:**

- a) The first thing is to compare the lease rent in the new geographical location to earlier one as this could impact profitability
- b) Availability of similar space and location in other geographical region
- c) What are the lease termination conditions in the current location?
- d) Is there any lock in period or penalty clause in the current agreement?
- e) Cost of statutory and legal approvals at new location and ease of getting same
- f) Difference in the cost of providing various services like office boys, coffee vendors, cafeteria, administration managers etc at the two locations
- g) Expected revenue from new location versus existing location-
 - a. occupancy rate,
 - b. lease rental on sub-lease,
 - c. reliability of sub-lessee
 - d. Sufficient no of sub-lessee to ensure diversification
- h) Expense involved of making this switch e.g. transferring furniture, equipment etc.
- i) Lease agreement clauses at the new location vs existing location – is more onerous/less onerous for eg., who is responsible for wear & tear etc
- j) Any additional regulatory requirements at new location – for e.g., any new license requirement, any rental limits, limits on sub-lease etc.
- k) Political stability in the new location and its impact on business

[7 Marks]**Solution 3:**

- a. Risk Profile and liabilities:
 - i. Stage 1 – At the time of marriage
 - o Likely risk-taking behaviour-
 - o No family responsibility yet
 - o Study loan and new vehicle purchase could be a liability
 - o Preferred asset allocation- More to equity and limited/ no debt

- ii. Stage 2- Birth of 1st child
 - o Family responsibility now
 - o Slight aversion to risk
 - o Savings required to fund child education
 - o Preferred asset allocation- More to equity and limited debt due to developing risk aversion
- iii. Stage 3 - After taking a home loan
 - o Home Loan a big liability now
 - o Likely increased in household and family expenses if child is also growing- planning for their future as well
 - o Save to pay off house loan as early as possible and protection for family in case of death, start seriously thinking about long term savings for retirement
 - o Preferred asset allocation- More risk aversion than before considering huge liability and increasing expenses- hence more of balanced exposure to debt and equity with other protection like insurance
- iv. Stage 4 - 5 years before retirement age
 - o Liabilities may still be there but limited future working life
 - o Save to pay off all liabilities, meet commitments towards children
 - o Limited volatility sought in investments
 - o Preferred asset allocation- Highest risk aversion than before considering imminent liabilities/desire to retire liabilities before retirement, intention to protect retirement savings- hence no /limited exposure to equity

[8 Marks]

Solution 4:

Advantages of using the performance of the shares of listed GI companies in the market in making a decision to subscribe to the IPO:

- a) It is proven fact that the share price movements of companies within the same industry tend to closely correlate more easily.
- b) The products sold by general insurance companies are similar and it is expected that their profit margins are in the similar range
- c) They supply insurance products to the same market (customers) and have similar competitive pressure
- d) Further, their financial structure is usually similar- due to regulatory requirements-
- e) for eg, level of debt allowed, level of permanent capital required
- f) They all fall under same rules and regulations
- g) related to taxes, allowed product features, solvency, reserve requirement, sales remuneration etc
- h) They will be influenced by the same economic and social conditions
- i) Broadly, all general insurance companies are exposed to similar risks/ return matrix and hence evaluating performance of other GI companies will indicate expected returns for upcoming IPO.

- j) The reinsurance terms offered should be similar for all GI companies
- k) The underwriting practise should be on similar lines
- l) They are exposed to similar type of risks e.g. underwriting risks, high expenses, low renewals, operational risks etc.
Disadvantages
- m) They may be at different levels of maturity and size
- n) Line of Business /product offering of the companies could be different and hence not comparable
- o) Could be working in different geographical areas and hence face different types of natural perils/CAT risks
- p) There could be significant difference in distribution strategy which could impact expenses/future sales
- q) Reinsurance strategy could be different leading to differences in risk profile, reinsurance cost etc
- r) There could be operational difference between them having cost implications
- s) Financial risks could be different due to differences in ALM strategy etc.
- t) Different management and Boards –corporate cultures, attitude to risk are different in the end

[10 Marks]

Solution 5:

- i) Debt portfolio could be diversified along following categories:
 - o Government and non-government
 - o Conventional and index linked
 - o By currency
 - o Domestic and overseas
 - o By term and coupon
 - o By size of issue and its marketability
 - o Market rating of issuer
 - o By fixed interest rate versus variable interest rates
 - o Others – convertibles, option redemption rates etc

The non-government bonds can be further diversified into:

- o Type of loan stock
 - Convertible loan stocks
 - Debentures
 - Unsecured loan stocks
- o Sector/industry

[4]

- ii) Reasons could be –
 1. Funds are not directly comparable, check whether comparison is appropriate – for eg.
 - i. Differences In terms of fund objective,
 - ii. performance benchmarks

- iii. In terms of dis-allowed investments
 - iv. Credit profile allowed
 - v. Exposure limits allowed –group, sector etc.
2. Level of freedom given to fund managers to deviate from benchmark is different- level of active risk and
 3. Have fund managers used this appropriately or have been pretty passive
 4. Inflow and out flow from funds are not comparable which could impact timing of investments
 5. Funds are of different sizes and hence varied in terms of level of diversification that can be achieved
 6. If comparing performance net of charges, performance could be poor due to different levels of charges
 7. Reasons could be more specific- poor choices by fund manager
 8. Credit profiles are different- higher defaults
 9. Higher dealing and brokerage expenses compared to peers
 10. Compensation given to fund managers is different – for eg. does not reward performance and does not incentivise them to take risks and deliver

[7]

[11 Marks]**Solution 6:****i) i. Main risk that would be introduced by the simplified underwriting product**

- **Adverse selection** is the main risk introduced. It arises as a result of information asymmetry.
- In this situation, due to limited underwriting, the individual knows considerably more about his health than the insurance company.
- Healthy individuals will likely choose to purchase traditional term products, because they will receive lower premium rates.
- Unhealthy individuals will gravitate towards the simplified issue product, since a medical examination is not required.

ii. strategies to manage the risk identified

- Risk transfer – Could enter into a Coinsurance arrangement/purchase re-insurance. This would transfer some mortality risk to the reinsurer and give company time to develop mortality experience for the simplified issue product.
- Risk reduction - could limit the sales of the simplified issue product, in order to reduce the mortality exposure until company becomes comfortable with the mortality experience of the new product.
- Limit risks by offering SI up to certain limits and for higher SI offer the traditional term product

[5]

ii) i. Risks

- People risk - Employees in the UW department require highly specialized skills and need proper training to ensure sound risk selection and pricing. High turnover in the could also lead to:
- Loss of intellectual capital
- Cost of recruitment and training new hires
- Decreased morale of remaining employees
- Losses if serious errors are made by new employees

ii. strategies to manage the risk identified

- Have a strong HR program to retain the right employees
- draw a competitive pay package benchmarking against industry to retain employees
- Employ a quality human resources department to find people with the right skills for the posts
- Implement training for new employees.
- Provide career advancement opportunities for the existing employees whom you want to retain

[5]

iii)

i. Risk associated with TPA

- By using a third party administrator company has to rely on a resource it does not control directly
- Loss of contact with customer – customer dissatisfaction of dealing with third party
- Losses if serious errors/lapses by TPA
- Fraud and serious compliance issues due to TPA negligence

ii. strategies to manage the risk identified

- Due diligence of third party vendor
- Service Level agreements on issues like TAT on claims intimated and their closure
- Agreement on fair level of compensation to be based on customer satisfaction
- Conduct regular customer satisfaction surveys
- Spot checks on TPA conduct, record maintenance
- Escalation matrix to company handle customer complaints

[5]

[15 Marks]

Solution 7:

i) Cost Benefit Analysis:

- a. First analyse the issues highlighted by internal audit team in home grown system.
- b. Do we have impact analysis of these issues? Example:

- c. Are reinsurance premiums being overpaid/underpaid?
- d. or reinsurance recoveries not done properly? or
- e. Reinsurer expressing concerns on delays in premium and claims reconciliation
- f. What is the impact on Company's financial results due to these issues –major or minor,
- g. Is it leading to excessive prudence in provisioning due to inability to allow for reinsurance appropriately
- h. Has it led to unnecessary delays in reporting of financial results?
- i. Have these issues been flagged by external statutory auditors/could come as a qualification in their report?
- j. What is the company's plan related to future business expansion? If reinsurance of business is going to increase then it's better to keep systems ready.
- k. What are the market reviews of this external package?
- l. Is it user friendly?
- m. Estimate the cost of implementation:
 - i. Purchase cost
 - ii. Annual license fee, if any
- n. Implementation support required
- o. Additional resources required to implement or cost of team members within company to carry this project
- p. Training cost of team members
- q. Estimate and project the implementation advantages:
 - i. No manual calculations to avoid mistakes
 - ii. Lower manual efforts/interference
 - iii. Improved regulatory compliances as regards financial reporting
 - iv. Benefit level reinsurance for different line of business- ability to negotiate new types of reinsurances
 - v. Any improvement in reinsurance recoveries expected after implementation (amount terms)
 - vi. Will better administration lead to better terms from reinsurers
 - vii. Fast processing of reinsurance accounts

[11]

ii) Steps that need to be taken care of while implementing the reinsurance package:

General:

1. First step is to define the clear objective of implementing the reinsurance package keeping all the issues raised by internal audit team.
2. Prepare a list of product types that need to be covered in the reinsurance package.
3. The support and responsibility from the company owning reinsurance package should be laid down clearly. E.g. support in integration with internal system, testing support, training etc.

4. Identify the “champions” from various user department like underwriting, claims, operations, finance and actuarial -The work and responsibility of each stakeholders must be clearly defined.
5. Prepare a road map defining work, responsibilities and respective timelines.
6. Prepare the key milestones for reviewing the project
7. A schedule of what needs to be considered at each milestone review point.
8. Thorough testing at all stages is must to ensure that new system works correctly.
9. The tools for planning, monitoring and reporting on the progress should:
 - o be user friendly
 - o allow technical, financial and other issues to be tracked
10. Assessing Data Requirements and level of integration with Policy Administration, underwriting and claims systems:
 - o The process of reinsurance treaties flowing in the various system need to be decided.
 - o Integration is required at proposal stage and claim stage to trigger reinsurance placement/recovery
 - o User training required- who needs to be trained, who and when should training commence and end, who would

Others:

11. Once the system gets implemented, then exhaustive performance review is required after the system goes live.
12. Measurement of performance and whether quality standards is satisfied
13. At the end, check the all issues raised by internal audit team have been addressed.

[8]

[19 Marks]

Solution 8:

i) Reason to invest in pension funds in private equity

- Because information about private companies is hard to obtain, efficient market theory may not apply, so managers with skill and insight may be able to produce superior returns.
- Private equity investments may enable the investor to exercise a degree of control and the company’s direction, board of directors, etc., possibly enabling superior returns.
- The lack of liquidity in private equity investments may result in lower purchasing prices for a given degree of value, thus potentially enabling higher returns.
- Private companies may be managed more for sound performance in the long term (appropriate for the time horizon for pensions), whereas public companies may be under pressure to perform quarter to quarter, possibly to the detriment of long term performance.

[4]

ii) Challenges faced by a pension plan sponsor when investing in private equity:

- Private equity is comparatively illiquid,
- making an exit difficult without price concessions, hurting returns.
- If there have not been many historical transactions in the investment, valuations reported can be badly out of date.
- Placing value on such investments is difficult and could be subjective sometimes
- Expenses could be high due to specialized skills required
- Regulatory constraints like inadmissibility etc in demonstrating funding levels
- It may be difficult to establish an expected return assumption for valuation purposes.
- They are not subject to same level of rigour and regulatory oversight as listed equities are

[4]

iii) Risks of investing pension plan assets in fixed income securities:

- Interest rate risk – Change in level of yield curve – absolute value of interest rate
- It is the risk that the portfolio's value will change due to a change in the shape rather than the level of the yield curve.
- Spread risk – Volatility of returns due to yield changes derived from changes in spread between the sector in question and the baseline yield curve (eg. government or swap curve).
- Default risk – risk that the cash flows will not be paid due to the inability of the borrower.
- Down grading risk- Risks that a high rated security gets downgraded leading to inadmissibility issues or non-compliance with scheme approved credit profile
- Interest rate Volatility risk – Impact based not on the change in the level of interest rates, but rather by how much interest rates move or are expected to move in either direction.
- Prepayment risk –from the wrong estimation of actual prepayment rates.
- Currency risk – exposure to investments denominated in a currency that is not the currency of the liabilities.
- Legal risk – risk of loss due to a dispute, lawsuit, or illegal activity.
- Liquidity risk – risk of loss due to inability to dispose of securities in a timely manner.
- Reinvestment risk – risk that cash flows will not be able to be invested at the rate of return when the investment was originally purchased.
- Marketability risk- risk of not being able to buy a willing buyer at the sought after price

[12]

iv) Main operational and legislative risks associated with DB**Operational Risk**

- o Possible poor scheme administration e.g. incorrect payments to and from the Scheme
- o Other compliance issues like regulatory non-compliance
- o Misappropriation of assets
- o System failure- loss of important records, information
- o Frauds by sponsor,
- o Fraudulent claims by employees (disability claims)
- o Failure to do due diligence on third party service providers

Legislation Risk

The impact of future unknown changes to legislation

For example

- o Introduction of minimum funding requirement
- o Requirements to provide higher minimum benefits
- o Increases to existing benefits
- o Winding Up requirements change
- o Change in admissibility requirements of assets

[4]

[24 Marks]
