Institute of Actuaries of India

Subject SP7 – General Insurance Reserving and Capital Modelling Principles

For 2022 Examinations

SP7 – General Insurance Reserving and Capital Modelling Specialist Principles

Aim

The aim of this General Insurance Reserving and Capital Modelling Specialist Principles subject is for students studying it to develop the following skills:

1 understand the main principles and techniques of reserving and capital modelling that are relevant to general insurance.

2 apply these principles in practice within the context of general insurance.

3 understand the techniques involved in estimating best estimate reserves and setting capital requirements and how reserving and capital modelling link to wider business processes (e.g. business planning and pricing).

4 analyse hypothetical scenarios, including using judgement to assess the implications of possible actions and to develop appropriate proposals or recommendations relating to reserving and capital modelling in general insurance business.

Syllabus topics

1 General insurance products and general business environment (20%)

2 Risk, uncertainty and regulation (15%)

3 Reserving (30%)

4 Capital modelling (17.5%)

5 Data, investigations, reinsurance and accounting (17.5%)

These weightings are indicative of the approximate balance of the assessment of this subject between the main syllabus topics, averaged over a number of examination sessions.

The weightings also have a correspondence with the amount of learning material underlying each syllabus topic. However, this will also reflect aspects such as:

• the relative complexity of each topic and hence the amount of explanation and support required for it.

• the need to provide thorough foundation understanding on which to build the other objectives.

• the extent of prior knowledge that is expected.

• the degree to which each topic area is more knowledge- or application-based.

Assessment

Exam questions are designed to test the following:

• Knowledge (demonstration of a detailed knowledge and understanding of the topic),

• Application (demonstration of an ability to apply the principles underlying the topic within a given context) and

• Higher Order (demonstration of an ability to perform deeper analysis and assessment of situations. This includes the ability to develop proposals and recommendations utilising actuarial judgement, i.e. taking into account different points of view, comparing and contrasting situations, clearly communicating any limitations and elements of uncertainty in the approach).

In the SP subject exams, the approximate split of assessment across these three skill types is 25% Knowledge, 50% Application and 25% Higher Order skills.

The use of a specific command verb within a syllabus objective does not indicate that this is the only form of question that can be asked on the topic covered by that objective. The Examiners may ask a question on any syllabus topic using any of the agreed command verbs, as are defined in the document 'Command verbs used in the Associate and Fellowship written examinations'.

Detailed syllabus objectives

0 Introduction

   0.1 Define the principal terms in use in general insurance.

1 General insurance products and general business environment (20%)

   1.1 Describe the main types of general insurance products in terms of:

- the needs of customers.
- the financial and other risks they pose for the general insurer including their capital requirements and possible effect on solvency.

   1.2 Describe the main types of reinsurance products for general insurance operations and the purposes for which they may be used.

   1.3 Describe the implications of the general business environment in terms of:

- the main features of the general insurance market.
- the effect of different marketing strategies.
- the effect of fiscal regimes.
- the effect of inflation and economic factors.
- the effect of legal, political and social factors.
- the effect of the climate and environmental factors.
- the general effect of professional guidance.
- the impact of technological change.

   1.4 Outline the key features of the Lloyd's market.

2 Risk, uncertainty and regulation (15%)

   2.1 Describe the major areas of risk and uncertainty in general insurance business with respect to reserving and capital modelling, in particular those that may threaten profitability or solvency.

   2.2 Discuss the purposes of regulating general insurance business.

   2.3 Outline possible methods by which general insurers can be regulated, including advantages and drawbacks of each.

3 Reserving (30%)

   3.1 Describe the purpose of calculating general insurance reserves.

   3.2 With regard to reserving work using triangulations:

- analyse the range of general issues that can affect reserving work using triangulations.
- identify how to deal with these general issues in reserving work.
- evaluate the main triangulation methods in use – namely the chain ladder method, the Bornhuetter–Ferguson method and the Average Cost per Claim method.

   3.3 Suggest appropriate reserving bases for general insurance business, having regard to:

- the different reasons for calculating reserves.
- the assumptions that may be appropriate in each case.
- when to calculate reserves at class level, at individual policy level or at claim event level.
- why the assumptions may differ from a rating exercise.
- the allowance for future inflation.
- whether or not to discount for investment income.

- the approach for additional unexpired risk reserve.
- communication of the reserving basis.

3.4 Evaluate stochastic reserving processes.

    3.4.1 Describe the uses of stochastic reserving methods.

    3.4.2 Describe the likely sources of reserving uncertainty.

    3.4.3 Describe the following types of stochastic reserving methods:

- Analytic methods
- Simulation-based methods.

    3.4.4 Describe Mack's model and the ODP model.

    3.4.5 Describe how to apply the bootstrapping to these two models.

    3.4.6 Describe the issues, advantages and disadvantages of each of the models.

    3.4.7 Describe the approach to aggregating the results of stochastic reserving across multiple lines of business, and discuss methods of correlation.

3.5 Evaluate reserving result analyses.

    3.5.1 Describe the factors an actuary should consider in assessing the reasonableness of the results of a reserving exercise.

    3.5.2 Describe typical diagnostics that are commonly used to assess the reasonableness of the results of a reserving exercise.

    3.5.3 Describe the factors an actuary should consider in assessing the reasonableness of changes in results of a reserving exercise over time.

    3.5.4 Describe how an analysis of experience may be carried out in the context of a reserving exercise.

    3.5.5 Describe how alternative results of reserving exercises can arise and highlight some of the professional issues in resolving them.

3.6 Assess uncertainty and its communication in reserving.

    3.6.1 Discuss what is meant by a 'best estimate' reserve.

    3.6.2 Describe the following approaches to estimating ranges of reserves:

- Stochastic models
- Scenario tests
- Use of alternative sets of assumptions.

    3.6.3 Discuss the uses, advantages and disadvantages of each of these methods.

    3.6.4 Discuss the issues to be considered when communicating reserve ranges and uncertainties.

4 Capital modelling (17.5%)

4.1 Evaluate the key considerations in deriving and applying capital modelling techniques.

4.2 Evaluate the following approaches to capital modelling:

- Deterministic models
- Stochastic models.

4.3 Discuss the following issues with regard to parameterisation of capital models:

- Developing assumptions
- Validation.

4.4 Describe approaches to the assessment of capital requirements for the following risk types:

- Insurance risk
- Market risk
- Credit risk
- Operational risk
- Liquidity risk
- Group risk.

4.5 Explain some of the areas to consider when approaching a capital modelling exercise.

4.6 Describe the practical considerations that should be borne in mind when undertaking capital modelling.

5 Data, investigations, reinsurance and accounting (17.5%)

5.1 With regard to the use of data in reserving and capital modelling:

- describe the types of data that are used.

- describe the main uses of data.

- describe the requirements for a good information system.

- outline the possible causes of data errors.

- analyse the effects of inadequate data.

5.2 Outline the major actuarial investigations and analyses of experience undertaken with regard to reserving and capital modelling for general insurers.

5.3 Describe the factors influencing the choice of an appropriate reinsurance programme for a general insurer.

5.4 Describe how to test the appropriateness of alternative reinsurance structures for a general insurer.

5.5 Describe how reinsurance purchasing decisions may be impacted by capital management considerations.

5.6 Describe the following approaches to reserving for outwards reinsurance:

- Gross less net

- Application of standard techniques to reinsurance data

- Use of appropriate factors

- Application of detailed contract terms.

5.7 Compare the advantages and disadvantages of each of the above methods and the appropriate circumstances in which to use them.

5.8 Discuss suitable approaches to reserving for inwards reinsurance.

5.9 Describe, within the context of investment and Asset Liability Management (ALM):

- the principles of investment.

- the asset-liability matching requirements of a general insurer.

- how projection models may be used to develop an appropriate investment strategy.

5.10 Describe the methods and principles of accounting for general insurance business and interpret the accounts of a general insurer.

6 Solving problems

6.1 Analyse hypothetical examples and scenarios in relation to the financial management of general insurance companies.

6.1.1 Propose solutions and actions that are appropriate to the given context, with justification where required.

6.1.2 Suggest possible reasons why certain actions have been chosen.

6.1.3 Assess the implications of actions within a given scenario.

6.1.4 Discuss the advantages and disadvantages of suggested actions, taking into account different perspectives.

Assessment

Three-hour and fifteen-minute written examination.

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