



Institute of Actuaries of India

Subject
ST7– General Insurance –
Reserving & Capital Modeling

For 2017 Examinations

Subject ST7 – General Insurance: Reserving and Capital Modelling Specialist Technical

Aim

The aim of this General Insurance Specialist Technical subject is to instil in successful candidates the ability to apply, in simple reserving and capital modelling situations, the mathematical and economic techniques and the principles of actuarial planning and control needed for the operation on sound financial lines of general insurers.

Links to other subjects

Subject CT3 – Probability and Mathematical Statistics: provides a basic grounding in statistics

Subject CT4 – Models: covers some stochastic models used in general insurance.

Subject CT6 – Statistical Methods: covers some of the mathematical methods relevant for general insurance.

Subject CA1 – Actuarial Risk Management: covers the general underlying principles affecting all specialisms.

Subject ST8 – General Insurance: Pricing Specialist Technical.

Subject SA3 – General Insurance Specialist Applications: will use the principles of general insurance developed in this subject to develop a deeper understanding of general insurance business and United Kingdom practice.

Objectives

On completion of this subject the candidate will be able to:

- (a) Define the principal terms in use in general insurance.
- (b) Describe the main types of general insurance product 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
- (c) Describe the main types of general reinsurance products and the purposes for which they may be used.
- (d) 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
- (e) Outline the key features of the Lloyd's market.
- (f) Describe the major areas of risk and uncertainty in general insurance business with respect to reserving and capital modelling, in particular those that might threaten profitability or solvency.
- (g) With regard to the use of data in reserving and capital modelling:
- (i) Describe the types of data that are used.
 - (ii) Describe the main uses of data.
 - (iii) Describe the requirements for a good information system.
 - (iv) Outline the possible causes of data errors.
 - (v) Understand the effects of inadequate data.
- (h) Outline the major actuarial investigations and analyses of experience undertaken with regard to reserving and capital modelling for general insurers.
- (i) With regard to reserving work using triangulations:
- (i) Understand the range of general issues that can affect reserving work using triangulations.
 - (ii) Gain an appreciation of how to deal with these general issues in reserving work.
 - (iii) Have an understanding of the main triangulation methods in use – namely the chain ladder method, the Bornhuetter-Ferguson method and the Average Cost per Claim method.
- (j) Develop appropriate reserving bases for general insurance business, having regard to:
- the different reasons for calculating reserves
 - the assumptions that might be appropriate in each case
 - 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
- (k) (i) Describe the uses of stochastic reserving methods.
- (ii) Describe the likely sources of reserving uncertainty.

Subject ST7 – General Insurance: Reserving and Capital Modelling Specialist Technical

- (iii) Describe the following types of stochastic reserving methods:
 - analytic methods
 - simulation-based methods
- (iv) Describe the Mack and Bootstrapping approaches to reserving.
- (v) Describe the issues, advantages and disadvantages of each of the methods.
- (vi) Describe the approach to aggregating the results of stochastic reserving across multiple lines of business, and discuss methods of correlation.
- (l) (i) Describe the factors an actuary should consider in assessing the reasonableness of the results of a reserving exercise.
- (ii) Describe typical diagnostics that are commonly used to assess the reasonableness of the results of a reserving exercise.
- (iii) Describe the factors an actuary should consider in assessing the reasonableness of changes in results of a reserving exercise over time.
- (iv) Describe how an analysis of experience might be carried out in the context of a reserving exercise.
- (v) Describe how alternative results of reserving exercises can arise and highlight some of the professional issues in resolving them.
- (m) (i) Understand what is meant by a “best estimate” reserve.
- (ii) Describe the following approaches to estimating ranges of reserves:
 - stochastic models
 - scenario tests
 - use of alternative sets of assumptions
- (iii) Discuss the uses ,advantages and disadvantages of each of these methods.
- (iv) Discuss the issues to be considered when communicating reserve ranges and uncertainties.
- (n) Describe:
 - the principles of investment
 - the asset-liability matching requirements of a general insurer
 - how projection models might be used to develop an appropriate investment strategy

- (o) (i) Understand the key considerations in deriving and applying capital modelling techniques.
- (ii) Understand the following approaches to capital modelling:
- deterministic models
 - stochastic models
- (iii) Discuss the following issues with regard to parameterisation of capital models:
- developing assumptions
 - validation
- (p) 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
- (q) Explain some of the areas to consider when approaching a capital modelling exercise.
- (r) Describe the practical considerations which should be borne in mind when undertaking capital modelling.
- (s) (i) Describe the factors influencing the choice of an appropriate reinsurance programme for a general insurer.
- (ii) Describe how to test the appropriateness of alternative reinsurance structures for a general insurer.
- (iii) Describe how reinsurance purchasing decisions might be impacted by capital management considerations.
- (t) (i) 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
- (ii) Understand the advantages and disadvantages of each of the above methods and the appropriate circumstances in which to use them.
- (iii) Discuss suitable approaches to reserving for inwards reinsurance.

Subject ST7 – General Insurance: Reserving and Capital Modelling Specialist Technical

- (u) (i) Describe the methods and principles of accounting for general insurance business and interpret the accounts of a general insurer.
- (ii) Describe the changes to accounting methods expected under IFRS.
- (v) (i) Discuss the purposes of regulating general insurance business.
- (ii) Outline possible methods by which general insurers can be regulated, including advantages and drawbacks of each.

END OF SYLLABUS