

# Advanced Topics in General Insurance Exam

Fall 2022

## Important Exam Information:

<a href="#">Exam Registration</a>	Candidates may register online or with an application.
<a href="#">Order Study Notes</a>	There is no study note package for this examination.
<a href="#">Introductory Study Note</a>	The Introductory Study Note has a complete listing of all readings as well as errata and other important information.
<a href="#">Case Study</a>	There is no case study for this examination.
<a href="#">Past Exams</a>	Prior exams are available at this link. Past exams from 2000-present for other SOA exams are also available at that location. Prior exam questions for the excess of loss coverages and retrospective rating topic to 2015 can be found at the link for the General Insurance Introduction to Ratemaking and Reserving exam.
<a href="#">Updates</a>	Candidates should be sure to check the Updates page on the exam home page periodically for additional corrections or notices.

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**1. Topic: Basic Stochastic Reserving**

**Learning Objectives**

The candidate will understand how to use basic loss development models to estimate the standard deviation of an estimator of unpaid claims.

**Learning Outcomes**

The candidate will be able to:

- a) Identify the assumptions underlying the chain ladder estimation method.
- b) Test for the validity of these assumptions.
- c) Identify alternative models that should be considered depending on the results of the tests.
- d) Estimate the standard deviation of a chain ladder estimator of unpaid claims.
- e) Apply a parametric model of loss development.
- f) Estimate the standard deviation of a parametric estimator of unpaid claims.

**Resources**

- Mack, T., "Measuring the Variability of Chain Ladder Reserve Estimates," Casualty Actuarial Society Forum, Spring 1994  
This article may be accessed at [www.casact.org](http://www.casact.org) through the following navigation:
  - Publications & Research
  - CAS Papers \ E-Forum
  - Search Past E-Forum Issues
  - CAS Forum - 1994 Spring Volume 1 (pages 101-182)
- Venter, G.G., "Testing the Assumptions of Age-to-Age Factors," PCAS LXXXV, 1998  
This article may be accessed at [www.casact.org](http://www.casact.org) through the following navigation:
  - Publications & Research
  - CAS Internal Publications \ Yearbook and Proceedings
  - Search the Proceedings
  - 1998 Proceedings of the Casualty Actuarial Society, Volume LXXXV (pages 807-847)
- Clark, D.R., "LDF Curve Fitting and Stochastic Reserving: A Maximum Likelihood Approach," Casualty Actuarial Society Forum, Fall 2003  
This article may be accessed at [www.casact.org](http://www.casact.org) through the following navigation:
  - Publications & Research
  - CAS Papers \ E-Forum
  - Search Past E-Forum Issues
  - CAS Forum - 2003 Fall Forum (pages 41-91)

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<b>2. Topic: Risk Margins for Unpaid Claims</b>
<b>Learning Objectives</b>
The candidate will understand the considerations in selecting a risk margin for unpaid claims.
<b>Learning Outcomes</b>
The candidate will be able to: a) Describe a risk margin analysis framework. b) Identify the sources of uncertainty underlying an estimate of unpaid claims. c) Describe methods to assess this uncertainty.
<b>Resources</b>
<ul style="list-style-type: none"><li>• Marshall, K., Collings, S., Hodson, M., and O’Dowd, C., “A Framework for Assessing Risk Margins,” Institute of Actuaries of Australia 16th General Insurance Seminar, 9-12 November 2008, Coolumb, Australia <a href="http://www.actuaries.asn.au/Library/Framework%20for%20assessing%20risk%20margins.pdf">http://www.actuaries.asn.au/Library/Framework%20for%20assessing%20risk%20margins.pdf</a></li></ul>

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**3. Topic: Excess of Loss Coverages and Retrospective Rating**

**Learning Objectives**

The candidate will understand excess of loss coverages and retrospective rating.

**Learning Outcomes**

The candidate will be able to:

- a) Explain the mathematics of excess of loss coverages in graphical terms.
- b) Calculate the expected value premium for increased limits coverage and excess of loss coverage.
- c) Explain and calculate the effect of economic and social inflationary trends on first dollar and excess of loss coverages.
- d) Explain retrospective rating in graphical terms.
- e) Explain Table M and Table L construction in graphical terms.
- f) Explain the limiting case in retrospective rating.

**Resources**

- Lee, Y., "The Mathematics of Excess of Loss Coverages and Retrospective Rating—A Graphical Approach," , PCASLXXV, 1988  
This article may be accessed at [www.casact.org](http://www.casact.org) through the following navigation:
  - Publications & Research
  - CAS Internal Publications \ Yearbook and Proceedings
  - Search the Proceedings
  - 1988 Proceedings of the Casualty Actuarial Society, Volume LXXV (pages 49-77)

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<b>4. Topic: Reinsurance Pricing</b>
<b>Learning Objectives</b>
The candidate will understand how to apply the fundamental techniques of reinsurance pricing.
<b>Learning Outcomes</b>
The candidate will be able to: a) Calculate the price for a proportional treaty. b) Calculate the price for a property per risk excess treaty. c) Calculate the price for a casualty per occurrence excess treaty. d) Apply an aggregate distribution model to a reinsurance pricing scenario. e) Describe considerations involved in pricing property catastrophe covers.
<b>Resources</b>
<ul style="list-style-type: none"><li>• <a href="#">Clark, D.R., "Basics of Reinsurance Pricing," Actuarial Study Note, 2014</a></li></ul>

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<b>5. Topic: Underwriting Profit Margins</b>
<b>Learning Objectives</b>
The candidate will understand methodologies for determining an underwriting profit margin.
<b>Learning Outcomes</b>
The candidate will be able to: <ul style="list-style-type: none"><li>a) Calculate an underwriting profit margin using the target total rate of return model.</li><li>b) Calculate an underwriting profit margin using the capital asset pricing model.</li><li>c) Calculate an underwriting profit margin using the risk adjusted discount technique.</li><li>d) Allocate an underwriting profit margin (risk load) among different accounts.</li></ul>
<b>Resources</b>
<ul style="list-style-type: none"><li>• D'Arcy, S.P., and Dyer, M.A., "Ratemaking: A Financial Economics Approach," PCAS LXXXIV, 1997 (excluding Sections 7 and 8) This article may be accessed at <a href="http://www.casact.org">www.casact.org</a> through the following navigation:<ul style="list-style-type: none"><li>- Publications &amp; Research</li><li>- CAS Internal Publications \ Yearbook and Proceedings</li><li>- Search the Proceedings</li><li>- 1997 Proceedings of the Casualty Actuarial Society, Volume LXXXIV (pages 301-390)</li></ul></li><li>• Mango, D.F., "An Application of Game Theory: Property Catastrophe Risk Load," PCAS LXXXV, 1998 This article may be accessed at <a href="http://www.casact.org">www.casact.org</a> through the following navigation:<ul style="list-style-type: none"><li>- Publications &amp; Research</li><li>- CAS Internal Publications \ Yearbook and Proceedings</li><li>- Search the Proceedings</li><li>- 1998 Proceedings of the Casualty Actuarial Society, Volume LXXXV (pages 157-186)</li></ul></li></ul>