

INSTITUTE AND FACULTY OF ACTUARIES

EXAMINATION

5 October 2020 (am)

Subject SP7 – General Insurance Reserving and Capital Modelling Specialist Principles

Time allowed: Three hours and fifteen minutes

In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.

If you encounter any issues during the examination please contact the Examination Team on T. 0044 (0) 1865 268 873

- 1** Describe ‘subscription business’ in the context of the Lloyd’s Market. [5]
- 2** Company A has been writing motor and home insurance business for the past 10 years. Company A has never purchased reinsurance cover and has delivered underwriting profits for each of the 10 years it has been in operation.
- A new director has joined Company A’s Board. The director has reviewed the company’s financial results and, based on their previous experience in other companies, has suggested that Company A should purchase reinsurance.
- (i) Describe four factors Company A should consider while deciding on an appropriate reinsurance structure. [4]
- The Chief Underwriting Officer disagrees with the new director and has stated that ‘We are consistently making an underwriting profit so we don’t need reinsurance’.
- (ii) Comment on the Chief Underwriting Officer’s statement. [4]
[Total 8]
- 3**
- (i) Define facultative reinsurance. [2]
- (ii) Outline the advantages and disadvantages of facultative reinsurance. [4]
- (iii) Describe different ways of allowing for facultative reinsurance in a capital model, commenting on when they may be appropriate. [4]
[Total 10]
- 4** Profit & Loss Attribution is the review of the causes and sources of profits and losses for each major business unit of a company compared to the initial business plan. It is required to be performed at least annually under Solvency II for all companies with approved internal capital models.
- (i) Outline potential different sources of profits and losses for a general insurance company. [6]
- (ii) Suggest why the European Insurance and Occupational Pensions Authority (EIOPA) would make Profit & Loss Attribution a requirement for all companies with approved internal capital models. [2]
- (iii) Suggest, with reasons, an alternative regulation that EIOPA could have implemented to achieve the same result. [2]
[Total 10]

- 5 Country B has a relatively young but thriving motor insurance market with the local regulator, the Country B Monitoring Authority (CBMA), playing a very active role. Recently, motor premium rates have been set via a motor insurance tariff imposed by the CBMA. This meant that the CBMA set the premium insurers could charge for a motor insurance policy for each of the standard risk profiles it set.

The CBMA decided to remove the motor insurance tariff with effect from 1 January 2020. It now allows insurance companies in Country B to charge a premium of their choice for policies written with effect from 1 January 2020, while still prescribing the rating factors to use. Industry analysts predict that this change will lead to a price war that could reduce premiums charged to an unsustainably low level.

Company C is a small-sized motor insurer in Country B with a roughly 6% market share of the motor insurance market. Company C has been in operation for the past 5 years. Company C's pricing actuary believes that the removal of the motor insurance tariff will lead to a rate reduction of up to 10% compared to premiums charged last year.

Company C's reserving actuary is about to perform a reserving exercise as at 31 March 2020.

- (i) Describe the factors that they should consider during the reserving exercise. [6]
- (ii) (a) Describe the reserving methods that could be used to estimate the Incurred But Not Reported (IBNR) claims for the current accident year. [3]
- (b) Recommend, with reasons, the most appropriate reserving method. [1]

Six months after the reserving exercise, Company C's market share has reduced from 6% to 2%.

- (iii) Suggest possible reasons for this reduction. [2]
- [Total 12]

- 6 The regulator of Country Z requires all insurance companies operating inside the country to pay a compulsory levy (fee) to an independent but regulated body called Country Z Protection Scheme (CZPS). CZPS's goal is to provide protection to customers in the event that an insurance company operating in Country Z were to go bankrupt.

CZPS uses an objective system of rating the risk associated with each insurance company to determine the amount of the levy to be paid by each insurance company, using the following risk measures:

- capital adequacy;
- reserve adequacy; and
- gross written premium income.

- (i) Explain the significance of each of the three risk measures CZPS is using to determine the amount of levy applicable to each insurance company. [6]

As a small general insurance company, Company Y provides commercial property insurance in Country Z. Over 40% of Company Y's premium income has historically come from high risk commercial properties. However, at the start of 2020, Company Y decided to stop writing the high risk business leading to a sudden drop in its annual premium income.

- (ii) Suggest possible reasons why Company Y may have decided to stop writing high risk commercial property insurance. [3]

CZPS has proposed significantly increasing Company Y's levy, citing the sudden drop in premium income as the reason.

- (iii) Comment on whether it is appropriate for CZPS to impose this levy increase on Company Y. [6]

[Total 15]

- 7 A new Chief Actuary has recently joined Company D and has been asked by the Chief Executive Officer (CEO) to estimate the reserves for the book of business. The Chief Actuary has been told that a new Chief Claims Officer joined the team in January 2015 who, in line with some new legislation governing Company D, changed the company's case reserving philosophy.

The Chief Actuary has been provided with the paid and incurred loss development triangles as shown below.

Paid claims development triangle

<i>Accident year/ development month</i>	<i>12</i>	<i>24</i>	<i>36</i>	<i>48</i>	<i>60</i>	<i>72</i>	<i>84</i>	<i>96</i>	<i>108</i>
2011	1,350	1,980	3,150	4,950	6,300	7,200	8,100	9,000	9,000
2012	1,395	2,046	3,255	5,115	6,510	7,440	8,370	9,300	
2013	1,095	1,606	2,555	4,015	5,110	5,840	6,570		
2014	1,305	1,914	3,045	4,785	6,090	6,960			
2015	1,350	1,980	3,150	4,950	6,300				
2016	1,575	2,310	3,675	5,775					
2017	1,455	2,134	3,395						
2018	1,275	1,870							
2019	1,380								

Incurred claims development triangle

<i>Accident year/ development month</i>	<i>12</i>	<i>24</i>	<i>36</i>	<i>48</i>	<i>60</i>	<i>72</i>	<i>84</i>	<i>96</i>	<i>108</i>
2011	2,435	8,000	11,880	12,000	7,650	8,100	8,550	9,000	9,000
2012	2,697	9,500	11,625	7,800	8,091	8,370	8,835	9,300	
2013	2,117	9,000	5,475	5,840	6,205	6,570	7,081		
2014	2,610	3,480	5,394	6,525	7,221	7,830			
2015	2,250	4,230	6,030	7,470	7,650				
2016	3,255	5,250	6,930	7,875					
2017	2,716	4,171	6,499						
2018	1,710	4,050							
2019	2,500								

They have also been provided with a calculated triangle showing the incremental incurred claim development factors.

Incremental incurred development factors triangle

<i>Accident year/ development period</i>	<i>12-24</i>	<i>24-36</i>	<i>36-48</i>	<i>48-60</i>	<i>60-72</i>	<i>72-84</i>	<i>84-96</i>	<i>96-108</i>
2011	3.2852	1.4850	1.0101	0.6375	1.0588	1.0556	1.0526	1.0000
2012	3.5224	1.2237	0.6710	1.0373	1.0345	1.0556	1.0526	
2013	4.2513	0.6083	1.0667	1.0625	1.0588	1.0778		
2014	1.3333	1.5500	1.2097	1.1067	1.0843			
2015	1.8800	1.4255	1.2388	1.0241				
2016	1.6129	1.3200	1.1364					
2017	1.5357	1.5581						
2018	2.3684							
2019								

<i>Development period</i>	<i>12-24</i>	<i>24-36</i>	<i>36-48</i>	<i>48-60</i>	<i>60-72</i>	<i>72-84</i>	<i>84-96</i>	<i>96-108</i>	<i>108-Ult</i>
All years' volume-weighted IDFs	2.4093	1.2338	1.0037	0.9289	1.0584	1.0619	1.0526	1.0000	1.0000
All years' volume-weighted CDFs	3.2789	1.3609	1.1030	1.0989	1.1830	1.1178	1.0526	1.0000	1.0000

(i) Identify the changes that were brought in by the Chief Claims Officer, based on the information provided, commenting on the possible reasons for the changes and their impact. [6]

(ii) Calculate the Incurred But Not Reported (IBNR) claims using an Incurred Chain Ladder method based on the above data, showing clearly how the change in case reserving in 2015 has been adjusted for. [7]

The Chief Actuary has commented to the CEO that they would be unlikely to select the Incurred Chain Ladder method for the most recent accident years as the best estimate of IBNR.

(iii) (a) Suggest a reason the Chief Actuary has made this comment.
 (b) Describe alternative reserving methods that they might select for these years.

[3]
 [Total 16]

8 A general insurance company has decided to move from modelling claims and premium reserves on a prudent basis to a best estimate basis in its stochastic capital model.

(i) Suggest reasons why the company may have decided to do this. [3]

(ii) Suggest, with reasons, which parameters within the capital model may change following the change in basis. [4]

The company has decided to roll-forward the model parameters relating to reserve risk instead of doing a complete re-parameterisation. It currently uses a Log-Normal distribution to model the gross reserve risk for each class of business.

(iii) (a) Suggest three different approaches that could be used to roll forward the model parameters.

(b) Discuss the potential impact on capital for reserve risk of each option. [6]

The capital model has five risk areas, namely Premium Risk, Reserve Risk, Credit Risk, Market Risk and Operational Risk. The company mainly writes liability business.

(iv) Discuss the correlations that may exist within and between these risk groups. [5]

(v) Suggest how the most material correlations and dependencies may differ if the company wrote mainly property business. [3]

(vi) Describe how copulas could be parameterised by the company. [3]

[Total 24]

END OF PAPER