10. (1.75 points)

Given the following:

Territory	True Relativity	Univariate Indicated Relativity	Loss & ALAE ($000)
1	0.50	0.46	3,680
2	1.00	1.00	8,000
3	1.20	1.28	11,636

Earned Exposures (000)			
Territory	Class A	Class B	Class C
1	150	70	110
2	105	115	110
3	70	180	125

Class	A	B	C
Charged Factor	0.85	1.15	1.00

a. (0.5 point)

Explain why the univariate indicated relativities are different from the true relativities.

b. (1.25 points)

Calculate territory relativities using the adjusted pure premium method, keeping territory 2 as the base level.

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QUESTION 10

TOTAL POINT VALUE: 1.75 | **LEARNING OBJECTIVE(S): A8**

SAMPLE ANSWERS

Part a: 0.5 point

Sample 1

Univariate relativities do not adjust for exposure correlations. In this data, the class distributions are not the same in each territory.

Sample 2

Univariate indicated relativities cannot fully correct for exposure correlations between variables. Assuming "territory" and "class" are the only two variables in this model, there is exposure correlation between them. For example, most of Territory 1 is made up of Class A risks, which have a lower relativity. This is being "double-counted" in the Territory 1 factor, which is why it is too low.

Part b: 1.25 points

Sample 1

Terr 1 Adj Expos = 150(.85) + 70(1.15) + 110 = 318
Terr 2 Adj Expos = 105(.85) + 115(1.15) + 110 = 331.5
Terr 3 Adj Expos = 70(.85) + 180(1.15) + 125 = 391.5

Territory	Adj EE	PP	Ind Rel	Ind Rel @ Base
1	318	11,572	0.5167	0.4795
2	331.5	24,133	1.0775	1.0000
3	391.5	29,722	1.3270	1.2316

Sample 2

	(1)	(2)	(3)=(1)*(2)	(4)	(5)=(4)/(3)	(6)=(5)/(5 terr2)
Terr	Expos	Class Wtd Exp Adj	Adj Expos	Loss + ALAE (000s)	Ind PP	Ind Rel to Base (Terr 2)
1	330	0.964	318	3,680	11,572.33	0.48
2	330	1.005	332	8,000	24,096.39	1
3	375	1.044	392	11,636	29,683.67	1.232
Total			1042			

(2) Terr 1 ex: [150(0.85) + 70(1.15) + 110(1.00)] / 330 = 0.964

EXAMINER'S REPORT

Candidates were expected to identify assumptions of the univariate and adjusted pure premium methods and then apply the adjusted pure premium method to the provided data.

Part a
Candidates were expected to identify that the univariate indicated relativities assume a uniform distribution of exposures across other rating variables. Candidates were also expected to demonstrate that this assumption is violated in the data provided. A common mistake was identifying that univariate indicated relativities generally assume a uniform distribution but not discussing this assumption relative to the earned exposure distribution in the data provided.
Part b
Candidates were expected to use the adjusted pure premium method to develop indicated territorial relativities. This includes adjusting exposures for the average class factor by territory, calculating the adjusted pure premiums and relativities, and calculating final relativities keeping the same base territory. A common mistake was applying the average class factor by territory incorrectly, resulting in incorrect adjusted exposures within the territory.