

EXAM 5, SPRING 2014

8. (2.25 points)

A private passenger auto insurance company uses only two rating variables: territory and gender. The distribution of earned exposures is:

Earned Exposures		
Territory	Gender	
	Male	Female
1	180	120
2	500	500
3	350	150

Territory	Loss and LAE
1	\$11,127
2	\$51,335
3	\$32,983

Territory	Current Relativity
1	0.750
2	1.000
3	1.125

Gender	Current Relativity
Male	1.000
Female	0.800

- Assume no adjustments are made to the relativities for expense considerations.
- Assume territory 2 remains the base territory.

For a revenue neutral overall change, calculate an indicated relativity change for policyholders in territory 3, accounting for any distortion that gender rating may cause.

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EXAM 5 SPRING 2014 SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION: 8

TOTAL POINT VALUE: 2.25

LEARNING OBJECTIVE(S): A9

SAMPLE/ACCEPTED ANSWERS:

Sample 1:

Territory	Loss & LAE	Adj Exp	PP	Ind Rel	Ind Rel to Base
1	11,127	276	40.315	0.6953	0.7068
2	51,335	900	57.039	0.9837	1.0
3	32,983	470	70.177	1.2102	1.2303
	95,445	1,646	57.986		

Adj Exp = Male Exp (1.0) + Female Exp (0.8)

PP = (Loss + LAE)/Adj Exp

Ind Rel = PP/(total PP)

Ind Rel to Base = Ind Rel/ territory 2 Ind Rel

Territory 3 indicated relativity change:

$1.2303/1.125 - 1 = 9.36\%$

Sample 2:

territory	adjusted exposures	pure prem	IR	IR @ base
1	$180(1) + 120(.8) = 276$	$11,127/276 = 40.32$.6953	.707
2	$500(1) + 500(.8) = 900$	57.04	.984	1
3	$350(1) + 150(.8) = 470$	70.18	1.21	1.23
		57.99		

Territory 3 indicated rel change = $1.23 - 1.125 = .105$

EXAM 5 SPRING 2014 SAMPLE ANSWERS AND EXAMINER'S REPORT

Sample 3:

	(1)	(2)	(3)	(4)	(5)
Ter	Adj Exposure	LC	Ind Rel	Adj Cur Rel	Neutral Rate Change
1	276	\$40.32	0.6952	0.7547	- 7.9%
2	900	57.04	0.9836	1.0062	+ 2.2%
3	470	70.18	1.2101	1.1320	+ 6.9%
	1646	57.99	1.0	1.0	0%

(6) Avg Cur Rel = 0.9938

(6) Current rel weighted by (1)

(2) Loss & LAE / (1)

(3) (2)/\$57.99

(4) current Rel / 0.9938

(5) (3)/(4) – 1

EXAMINER'S REPORT:

- The candidates needed to know how to use the adjusted pure premium method to calculate the indicated relativity change by territory or to calculate the overall revenue neutral rate change by territory.
- Most candidates were able to calculate the indicated relativities correctly, but many failed to calculate the relativity change, failed to calculate the revenue neutral rate change, or calculated the base rate offset incorrectly.
- Candidates used many different acceptable approaches to calculating the indicated relativity change or the indicated revenue neutral rate change, and were able to arrive at the same correct answers. Many of these differences were due to rebalancing at different points in the problem.