10. (2.5 points)

Given the following:

Class	Premium at Current Rate Level	Reported Loss and ALAE	Number of Claims	Current Relativity
A	$1,257,600	$964,200	924	1.00
B	$879,500	$632,800	623	1.10
C	$254,900	$201,400	185	1.80

- Full credibility standard is 800 claims.
- Partial credibility is determined based on the square root rule.

a. (2 points)

Calculate the indicated rate change for each class to achieve a revenue-neutral overall change.

b. (0.5 point)

Briefly discuss two benefits of multivariate classification ratemaking.

CONTINUED ON NEXT PAGE

QUESTION 10

TOTAL POINT VALUE: 2.5 | **LEARNING OBJECTIVE(S): A8**

SAMPLE ANSWERS

Part a: 2 points

Sample 1

Class	Loss Ratio	Proposed Rel Change	Indicated Rel	Cred	Cred Wtd Ind Rel	Cred Wtd Ind Rel Rebased	Ind Change	Total Change
A	76.7%	1.020	1.0200	100.0%	1.020	1.000	0.0%	2.13%
B	71.9%	0.956	1.0516	88.2%	1.057	1.036	-5.8%	-3.80%
C	79.0%	1.051	1.8920	48.1%	1.844	1.808	0.4%	2.59%
Total	75.2%						-2.09%	

Sample 2

Class	Loss Ratio	Loss Ratio Rel	Cred	Cred Wtd Rel	Adjusted Ind Rel	Cred Wtd Ind Rel Rebased	Indicated Rate Change
A	76.7%	1.020	100.0%	1.020	1.020	1.021	2.1%
B	71.9%	0.956	88.2%	0.961	1.057	0.962	-3.8%
C	79.0%	1.051	48.1%	1.025	1.844	1.026	2.6%
Total	75.2%				0.999		

Sample 3

Class	Loss Ratio	Indicated Change	Z	Cred Wtd Change	New Rel	New Rel Rebased	Rel Change	Total Rate Change
A	76.7%	1.020	100.0%	1.020	1.020	1.000	1.000	1.021
B	71.9%	0.956	88.2%	0.961	1.057	1.036	0.942	0.962
C	79.0%	1.051	48.1%	1.025	1.845	1.809	1.005	1.026
Total	75.2%						0.979	

Off-Balance factor = 1/0.979 = 1.021

Part b: 0.5 point

- To account for the exposure correlations between variables
- To provide diagnostic statistics to evaluate the model and variables
- Multivariate ratemaking provides the ability to investigate possible interactions between many different rating variables
- Multivariate ratemaking attempts to focus on the "signal" of each variable and ignore the "noise" component
- Considers all variables simultaneously and accounts for correlation among variables
- It accounts for response correlation between rating variables

EXAM 5 SPRING 2016 SAMPLE ANSWERS AND EXAMINER'S REPORT

EXAMINER'S REPORT

Candidates were expected to calculate a revenue-neutral rate change, followed by a discussion of the benefits of multivariate classification ratemaking.

This question was relatively straightforward, and candidates performed well.

Part a

Candidates were expected to calculate rating differentials for classification relativities using no change as the complement of credibility. Candidates needed to calculate an off-balance and apply that to the indicated relativity change to make the change revenue-neutral.

Common mistakes included:

- Credibility weighting the indicated change with the current relativity
- Calculating the normalized current relativity and credibility weighting with the non-normalized indicated relativity
- Rebasing the indicated change prior to credibility weighting
- Not applying the correct revenue-neutral off-balance factor

Part b

Candidates were expected to demonstrate an understanding of the benefits of multivariate methods.

The most common error made by candidates was providing a response regarding the reasons multivariate methods are adopted, which includes reductions in adverse selection and enhanced fairness within rating variables.