

1. (1.25 points)

An actuary has devised a new method to assign credibility to observations of severity relativities by state. In order to test the validity of the method, the following quintile test has been prepared. The actuary has split the data into two distinct partitions: Test and Holdout. Test data was used to predict the credibility-adjusted relativities of the holdout data.

Quintile	Holdout Relativity	Prediction Based on Countrywide Average	Prediction Based on Raw Test Data	Prediction Based on New Credibility Procedure
1	0.55	1.00	0.25	0.90
2	0.75	1.00	0.40	0.95
3	0.90	1.00	0.85	0.99
4	1.30	1.00	1.40	1.05
5	1.50	1.00	2.10	1.10
Mean	1.00	1.00	1.00	1.00
Sum of Squared Errors		0.6150	0.5850	0.3931

a. (0.75 point)

Describe whether this new method overstates or understates the credibility of the state relativities.

b. (0.5 point)

Discuss whether the new method or the countrywide average should be used to determine state relativities.

EXAM 8 FALL 2014 SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 1

TOTAL POINT VALUE: 1.25

LEARNING OBJECTIVE: A2

SAMPLE ANSWERS

Part a: 0.75 point

Sample 1

New method understates the credibilities. New method has lower relativities than holdout at higher risks and larger relativities at lower risks. Thus, it gives too little credibility to actual experience.

Sample 2

Quintile	Pred/Holdout
1	1.636
2	1.267
3	1.100
4	0.808
5	0.733

Above should show no pattern, but it is decreasing

⇒ credibility is understated since predictions are not reacting enough to raw data

Part b: 0.5 point

The new method should be used since it has the lowest SSE from the quintile test

EXAMINER'S REPORT

General Commentary

- The candidate was expected to have a basic understanding of the credibility approach described in Courier & Venter
- Candidates largely received partial credit, most received full credit on part b

EXAM 8 FALL 2014 SAMPLE ANSWERS AND EXAMINER'S REPORT

Part a

- Overall, some candidates received full credit but most candidates received partial credit.
- Candidates were expected to have a basic understanding of the Couret & Venter credibility procedure
- In order to receive full credit a candidate needed to:
 - Correctly identify that credibility was understated
 - Describe the relationship between the raw, holdout, and new credibility predictions
- Common errors made by candidates:
 - Incorrectly assuming that increasing relativities by quintile meant credibility was understated. The proper assumption would have been that the ratio of holdout to prediction increasing would imply that credibility was understated.
 - Some candidates incorrectly assumed the new credibility procedure should be similar in magnitude to the raw data rather than the holdout data
 - Trying to relate a lower SSE to understated credibility

Part b

- Most candidates received full credit.
- Candidates were expected to identify the model with the lowest SSE (given) and state that as reasoning
- In order to receive full credit a candidate needed to:
 - Correctly select the new credibility procedure
 - Identify that the new method has the lowest SSE
- Common errors made by candidates:
 - Not selecting the new method due to incorrectly assuming that increasing relativities by quintile meant credibility was understated. (see part a)