

EXAM C QUESTIONS OF THE WEEK

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Question 13 - Week of October 17

The number of losses arising from $m + 4$ individual insureds over a single period of observation is distributed as follows:

<u>Number of Losses</u>	<u>Number of Insureds</u>
0	m
1	3
2	1
3 or more	0

The number of losses for each insured follows a Poisson distribution, but the mean of each such distribution may be different for individual insureds. You estimate the variance of the hypothetical means using Empirical Bayes semiparametric estimation.

Suppose that $m = 10$ and suppose that a particular insured is observed for two periods of observation and is found to have 0 losses in the first period and 2 losses in the second period. Find the credibility premium for the number of losses for that individual in the next period of observation.

The solution can be found below.

Question 13 Solution

$$\hat{\mu} = \hat{v} = \bar{X} = \frac{5}{14} = .357 ,$$

$$V\hat{a}r[X] = \frac{1}{13} [10(0 - \frac{5}{14})^2 + 3(1 - \frac{5}{14})^2 + (2 - \frac{5}{14})^2] = .401 ,$$

$$\hat{a} = .401 - .357 = .044 .$$

$$\hat{Z} = \frac{2}{2 + \frac{.357}{.044}} = .2$$

The credibility premium is $(.2)(\frac{0+2}{2}) + (.8)(.357) = .49 .$