Experience Rating Formula

Calculating the Mod

Calculating R assuming Poisson frequency

When to use a premium base for frequency

Poisson formula

Conclusions of paper

Calculating the Mod

$$\frac{\text{(\# of claims with rating) / (on-level EP for rating at 'B' rates)}}{\text{(\# of claims in total for class) / (class total on-level EP at 'B' rates)}}$$

Experience Rating Formula

Mod = ZR + (1-Z)

Z = credibility

R = ratio of actual loss experience to expected loss experience

When to use a premium base for frequency

Hazam states that a premium base only eliminates maldistribution if:

1. High frequency territories are also high average premium territories.
2. Territorial (rate) differentials are proper.

Calculating R assuming Poisson frequency

Years claim-free	**R**
1+	0
0	$\frac{1}{Pr(X\geq 1)} = \frac{1}{1-e^{-\lambda}}$

where $\lambda = \frac{\text{\# of claims from class}}{\text{earned car years of insureds in class}}$

Conclusions of paper

1. The experience of a single car for 1 year has significant and measurable credibility for experience rating.
2. Individual risk experience is more credible when there is more variance in loss experience within a risk class, which occurs in less refined risk classification systems.
3. The credibilities for varying years of experience should increase in proportion to the # of years of experience.

Poisson formula

$$Pr(X = k) = \frac{\lambda^k e^{-\lambda}}{k!}$$

Credibility for 2 and 3 years of experience relative to 1 year

Bühlmann Credibility

Bühlmann Credibility

Suppose X is a random variable with some distribution with parameter Θ, and Θ itself is a random variable with some distribution and additional parameters. In that case, the credibility of a sample of n observations from X is given by:

$$Z = \frac{n}{n+k}$$

n = # of claims in sample

$$k = \frac{E[Var(X|\Theta)]}{Var(E[X|\Theta])}$$

Credibility for 2 and 3 years of experience relative to 1 year

The credibility increases in proportion to the # of years only for low credibilities.

The closer the credibilities for 2 and 3 years of experience are to 2 and 3 times the 1 year credibility, then the less variation in insured's probability of an accident. This could be due to:

1. Less risks entering/exiting the portfolio.
2. Risk characteristics not changing much over time.