Reading: Bailey.Simon
Model: 2014.Q5
Problem Type: Experience of a single car-year

Given The following data shows the experience of a merit rating plan for a specific state

Number of Accident-Free Years	Earned Car Years	Earned Premium ($000)	Number of Incurred Claims
3 or more	250,000	250,000	1,200
2	300,000	100,000	625
1	25,000	100,000	750
0	12,000	150,000	1,500
Total	587,000	600,000	4,075

The base rate is $1,000 per exposure. No other rating variables are applicable.

Find

a.) The typical exposure base used to develop the merit rating plan is earned premium. Briefly discuss two assumptions in selecting this exposure base.

b.) Calculate the ratio of credibility for an exposure with two or more years accident-free experience to one or more years accident-free experience.

c.) Calculate the premium for an exposure that is accident free for two or more years.

Solution

a.) 1.) High frequency territories must also be high premium territories.
2.) Territory differentials must be proper (adequate).

b.) Notice here we're not told the earned premium is at present rates or relative to a particular group.

This could mean that earned premium is not the most appropriate base to use.
However, we're told in part a.) the typical base is earned premium so we'll use earned premium.

First we need the frequency for the entire group. Then we'll compute the frequency and experience mod for each merit rating group.
Total Frequency = (Total Claims) / (Total Earned Premium)
= 4,075 / 600,000
= 0.006791667

Years Accident-Free	Frequency (1)	Experience Mod (2)	Credibility (3)
3 or more	0.0048	0.7067	0.2933
2 or more	0.0052	0.7677	0.2323
1 or more	0.0057	0.8425	0.1575

(1) = (Incurred Claims) / (Earned Premium)
(2) = (1) / (Total Frequency)
(3) Since each group has had zero accidents in at least the past year, we know R=0 and the credibility formula becomes Mod = 1 - Z.

The ratio of 2 or more to 1 or more year accident-free years credibility is: 1.4750

c.) From the table in part b.) above, the experience mod for the group with 2 or more years accident free is 0.7677. Then
Premium = (Base rate) * Mod
= 1,000 * 0.7677
= $767.75

Reading: Bailey.Simon
Model: 2014.Q5
Problem Type: Experience of a single car-year

Given The following data shows the experience of a merit rating plan for a specific state

Number of Accident-Free Years	Earned Car Years	Earned Premium ($000)	Number of Incurred Claims
3 or more	258,000	308,000	1,159
2	274,000	140,000	726
1	27,000	136,000	656
0	11,000	167,000	1,452
Total	570,000	751,000	3,993

The base rate is $1,500 per exposure. No other rating variables are applicable.

Find

a.) The typical exposure base used to develop the merit rating plan is earned premium. Briefly discuss two assumptions in selecting this exposure base.

b.) Calculate the ratio of credibility for an exposure with three or more years accident-free experience to one or more years accident-free experience.

c.) Calculate the premium for an exposure that is accident free for one or more years.

Solution

a.) 1.) High frequency territories must also be high premium territories.
2.) Territory differentials must be proper (adequate).

b.) Notice here we're not told the earned premium is at present rates or relative to a particular group.

This could mean that earned premium is not the most appropriate base to use.
However, we're told in part a.) the typical base is earned premium so we'll use earned premium.

First we need the frequency for the entire group. Then we'll compute the frequency and experience mod for each merit rating group.
Total Frequency = (Total Claims) / (Total Earned Premium)
= 3,993 / 751,000
= 0.005316911

Years Accident-Free	Frequency (1)	Experience Mod (2)	Credibility (3)
3 or more	0.0038	0.7077	0.2923
2 or more	0.0042	0.7914	0.2086
1 or more	0.0044	0.8183	0.1817

(1) = (Incurred Claims) / (Earned Premium)
(2) = (1) / (Total Frequency)
(3) Since each group has had zero accidents in at least the past year, we know R=0 and the credibility formula becomes Mod = 1 - Z.

The ratio of 3 or more to 1 or more year accident-free years credibility is: 1.6088

c.) From the table in part b.) above, the experience mod for the group with 1 or more years accident free is 0.8183. Then
Premium = (Base rate) * Mod
= 1,500 * 0.8183
= $1,227.51