Reading: Fisher.ExperienceRating

Fisher_QuintilesTest (Problem 2)

Model: 2018.Q9

Problem Type: Apply the quintiles test

Given

Risk #	Manual Premium	Loss	Mod	Standard Premium
1	921	605	0.85	783
2	1,054	867	1.19	1254
3	1,766	766	1.00	1,766
4	1,480	1,366	1.06	1569
5	1,072	648	0.73	783
6	1,959	1,793	1.25	2,449
7	1,537	1,783	1.15	1,768
8	1,456	1,361	1.10	1,602
9	841	1,251	0.86	723
10	865	1,551	1.23	1,064

Find Apply the quintiles test

Solution

First rank the risks from smallest to largest experience modification

Rank	Risk #	Manual Premium	Loss	Mod	Standard Premium
1	5	1072	648	0.73	783
2	1	921	605	0.85	783
3	9	841	1251	0.86	723
4	3	1766	766	1.00	1766
5	4	1480	1366	1.06	1569
6	8	1456	1361	1.10	1602
7	7	1537	1783	1.15	1768
8	2	1054	867	1.19	1254
9	10	865	1551	1.23	1064
10	6	1959	1793	1.25	2449

Next, collapse into five groups. Here it is natural to group into consecutive pairs - on the exam make sure to state your logic when grouping.

Risk #s	Quintile	Manual Premium (1)	Loss (2)	Manual LR (3)	Average Mod (4)	Standard Premium (5)	Standard LR (6)
5, 1	1	1993	1253	62.9%	0.79	1566	80.0%
9, 3	2	2607	2017	77.4%	0.95	2489	81.0%
4, 8	3	2936	2727	92.9%	1.08	3171	86.0%
7, 2	4	2591	2650	102.3%	1.17	3022	87.7%
10, 6	5	2824	3344	118.4%	1.24	3513	95.2%

(1), (2), (5) Sum over risks in quintile
(3) = (2) / (1)
(4) = Sumproduct of the experience mod and manual premium within quintile, divided by the sum of the manual premium in the quintile.
(6) = (2) / [(4) * (1)]

Notes:
1.) Since Standard Premium = Experience * Manual Premium for any given risk, it wasn't necessary to calculate the average experience modification factor for each quintile.
2.) We get the same result if we calculate (6) = (2) / (5).

Reading: Fisher.ExperienceRating

Fisher_QuintilesTest (Problem 3)

Model: 2018.Q9

Problem Type: Apply the quintiles test

Given

Risk #	Manual Premium	Loss	Mod	Standard Premium
1	1,410	699	0.93	1311
2	1,348	2,288	1.17	1577
3	787	913	1.08	850
4	1,192	888	0.77	918
5	1,133	1,066	1.07	1212
6	930	1,137	0.85	791
7	1,488	888	1.31	1,949
8	1,019	1,888	0.95	968
9	999	1,229	0.99	989
10	1,953	2,186	1.16	2,265

Find Apply the quintiles test.

Solution

First rank the risks from smallest to largest experience modification

Rank	Risk #	Manual Premium	Loss	Mod	Standard Premium
1	4	1192	888	0.77	612
2	6	930	1137	0.85	936
3	1	1410	699	0.93	1140
4	8	1019	1888	0.95	761
5	9	999	1229	0.99	946
6	5	1133	1066	1.07	1305
7	3	787	913	1.08	1056
8	10	1953	2186	1.16	786
9	2	1348	2288	1.17	1299
10	7	1488	888	1.31	1074

Next, collapse into five groups. Here it is natural to group into consecutive pairs - on the exam make sure to state your logic when grouping.

Risk #s	Quintile	Manual Premium (1)	Loss (2)	Manual LR (3)	Average Mod (4)	Standard Premium (5)	Standard LR (6)
4, 6	1	2122	2025	95.4%	0.81	1548	118.5%
1, 8	2	2429	2587	106.5%	0.94	1901	113.5%
9, 5	3	2132	2295	107.6%	1.03	2251	104.3%
3, 10	4	2740	3099	113.1%	1.14	1842	99.5%
2, 7	5	2836	3176	112.0%	1.24	2373	90.1%

(1), (2), (5) Sum over risks in quintile
(3) = (2) / (1)
(4) = Sumproduct of the experience mod and manual premium within quintile, divided by the sum of the manual premium in the quintile.
(6) = (2) / [(4) * (1)]

Notes:
1.) Since Standard Premium = Experience * Manual Premium for any given risk, it wasn't necessary to calculate the average experience modification factor for each quintile.
2.) We get the same result if we calculate (6) = (2) / (5).