Reading: Fisher.TableM

Fisher_Vert (Problem 1)

Model: Source Text

Problem Type: Calculate an empirical Table M using vertical slices

Given Experience for a group of risks with expected annual aggregate loss of $100,000.

Risk	Actual annual aggregate loss
1	20,000
2	50,000
3	60,000
4	70,000
5	80,000
6	80,000
7	90,000
8	100,000
9	150,000
10	300,000

Find Construct a Table M in increments of 0.1 from 0 to 3 using the vertical slicing method.

Table M: For Aggregate Expected Loss E = $100,000

r	ϕ(r)	φ(r)
0		
0.1		
0.2		

Solution Fisher_Vert (Solution 1-1)

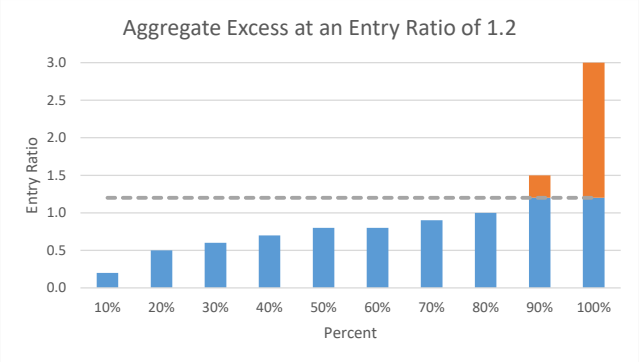
1.) Notice the risks in the group are already ordered by increasing actual loss. If your risks aren't ordered, do that first.

2.) Compute the entry ratio, r = [actual loss] / [expected loss], for each risk. Note they all have the same expected loss of $100,000
Note: If you were given the grouping by expected number of claims, use the average actual aggregate loss for the group as the expected aggregate loss.

Risk	Actual Loss	Entry Ratio
1	20000	0.2
2	50000	0.5
3	60000	0.6
4	70000	0.7
5	80000	0.8
6	80000	0.8
7	90000	0.9
8	100000	1.0
9	150000	1.5
10	300000	3.0

We want to build a Table M for entry ratios between 0 and 3 in increments of 0.1 using the vertical slicing method. We'll show the calculation for r = 1.2

3.) [Optional] Draw a Lee diagram and highlight the entry ratio being calculated.



In the graph, we've drawn a line corresponding to entry ratio r=1.2 and highlighted the portion of each risk's entry ratio that exceeds this.

4.) Calculate the portion of each entry ratio that exceeds the entry ratio under consideration and then the average value is the insurance charge, $\phi(r)$.

Risk	Actual Loss	Entry Ratio	Excess of r = 1.2
1	20000	0.2	0.0
2	50000	0.5	0.0
3	60000	0.6	0.0
4	70000	0.7	0.0
5	80000	0.8	0.0
6	80000	0.8	0.0
7	90000	0.9	0.0
8	100000	1	0.0
9	150000	1.5	0.3
10	300000	3	1.8
Total			2.10

Insurance charge at r = 1.2 is the Total / # risks = 2.1/10 = 0.21

5.) Compute the insurance savings using the formula: $\psi(r) = \phi(r) + r - 1$
$\psi(1.2) = \phi(1.2) + 1.2 - 1 = 0.21 + 0.2 = 0.41$

6.) Repeat this process for each entry ratio required in the Table M.
The next page shows the completed Table M, you should verify the calculation for a couple of the values.

Table M: For Expected Losses E = $100,000

r	ϕ(r)	φ(r)
0	1	0.00
0.1	0.90	0.00
0.2	0.80	0.00
0.3	0.71	0.01
0.4	0.62	0.02
0.5	0.53	0.03
0.6	0.45	0.05
0.7	0.38	0.08
0.8	0.32	0.12
0.9	0.28	0.18
1.0	0.25	0.25
1.1	0.23	0.33
1.2	0.21	0.41
1.3	0.19	0.49
1.4	0.17	0.57
1.5	0.15	0.65
1.6	0.14	0.74
1.7	0.13	0.83
1.8	0.12	0.92
1.9	0.11	1.01
2.0	0.10	1.10
2.1	0.09	1.19
2.2	0.08	1.28
2.3	0.07	1.37
2.4	0.06	1.46
2.5	0.05	1.55
2.6	0.04	1.64
2.7	0.03	1.73
2.8	0.02	1.82
2.9	0.01	1.91
3.0	0.00	2.00