EXAM 8 – FALL 2011

1. (3 points)

An insurance company is using a merit rating plan for drivers in two states. State X has the following claims experience:

Group	Number of Accident-Free Years	Earned Premium at Present Group D rates	Number of Claims Incurred
A	3 or more	$500,000	240
B	2	$150,000	125
C	1	$200,000	190
D	None	$300,000	300
Total		$1,150,000	855

State Y has the following relative claim frequencies for accident-free experience:

Number of Accident-Free Years	Relative Claim Frequencies to Total
3 or more	0.70
2 or more	0.77
1 or more	0.84

Assuming that no new risks enter or leave either state, use relative credibility to explain which state has more variation in an individual insured's probability of an accident.

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Question 1

Sample 1

State X

# of yrs clm free	EP	# clms	Rel. Clm Free (M)		Z = 1-M
3+	500,000	240	240/500,000 A	= 0.6456	.354
2+	650,000	365	365/650,000 A	= 0.755	.245
1+	850,000	555	555/850,000 A	= 0.878	.122
0	300,000	300			
	1,150,000	855			

Let total clm freq for the state = 855/1,150,000 = A

State Y	Mod	Z = 1-M	n yr Z / 1 yr Z
3+	.70	.30	1.875
2+	.77	.23	1.438
1+	.84	.16	1.00

State X	n yr Z / 1 yr Z
3+	2.90
2+	2.00
1+	1.00

State X's n yr Z / 1 yr Z ratio is closer to 3,2,1 for 3+,2+,1+

- ⇨ State X is more stable
- ⇨ State Y has more variation

Sample 2

State X					
3+	500K	240	.48	.48/.743 = .646	.354
2+	650K	365	.561	.561/.743=.755	.245
1+	850K	555	.653	0.879	.122
	1,150K	855	.743		

State X

1+ 1-.879 = .121
2+ 1-.755 = .245 ≈ .121 * 2
3+ 1-.646 = .354 ≈ .121 * 3

State y

1+ 1-.84 = .16
2+ 1-.77 = .23 < .16 * 2
3+ 1-.70 = .30 < .16 * 3

Since the credibilities of 2 and 3 years without an accident for State X are approximately 2 & 3 times the 1 year credibility, State X has less variation in insured's probability of an accident, so State Y has more.