9. (4.25 points)

Three insurers are using experience rating to determine premiums for a specific class of business. The same ten risks were rated using the experience plan of each insurer. Information related to each rating plan is given below:

Insurer 1's Plan

Risk #	Manual Premium	Loss	Mod	Standard Premium
1	$810	$750	0.97	$786
2	$900	$490	0.68	$612
3	$950	$1,075	1.13	$1,074
4	$975	$650	0.78	$761
5	$1,075	$850	0.88	$946
6	$1,100	$1,000	0.96	$1,056
7	$1,225	$1,300	1.06	$1,299
8	$1,300	$800	0.72	$936
9	$1,450	$1,175	0.90	$1,305
10	$1,500	$975	0.76	$1,140

Insurer 2's Plan

Quintile	Manual Loss Ratio	Standard Loss Ratio
1	58.6%	94.5%
2	65.7%	90.0%
3	80.2%	85.3%
4	91.6%	79.7%
5	109.2%	75.3%
Sample Variance	0.0411	0.0059

Insurer 3's Plan

Efficiency Test Statistic
0.0000

a. (2.75 points)

Rank each of the insurers' rating plans from most to least equitable using the Efficiency Test as described by Fisher et al.

b. (1.5 points)

Explain how adverse selection may affect each of the three insurers in a well-functioning insurance market. Assume that no adjustments are made to the experience rating plans over time.

CONTINUED ON NEXT PAGE

QUESTION 9

TOTAL POINT VALUE: 4.25 | **LEARNING OBJECTIVE(S): B4**

SAMPLE ANSWERS

Part a: 2.75 points

Plan 1

Risk #	Manual	Loss ($)	Mod	Standard
2	$900	$490	0.68	$612
8	$1,300	$800	0.72	$936
10	$1,500	$975	0.76	$1,140
4	$975	$650	0.78	$761
5	$1,075	$850	0.88	$946
9	$1,450	$1,175	0.90	$1,305
6	$1,100	$1,000	0.96	$1,056
1	$810	$750	0.97	$786
7	$1,225	$1,300	1.06	$1,299
3	$950	$1,075	1.13	$1,074

Quintile	Manual Prem	Loss	Man LR	Std Premium	Std LR
1	$2,200	$1,290	58.6%	$1,548	83.3%
2	$2,475	$1,625	65.7%	$1,901	85.5%
3	$2,525	$2,025	80.2%	$2,251	90.0%
4	$1,910	$1,750	91.6%	$1,842	95.0%
5	$2,175	$2,375	109.2%	$2,373	100.1%

Variance Manual LR: 0.04110
Variance Standard LR: 0.00472
Efficiency Statistic= 0.00472/0.04110
= 0.1147

OR (Using population Variance):

Variance Manual LR: 0.03288
Variance Standard LR: 0.00378
Efficiency Statistic= 0.00378/0.03288
= 0.1147

Plan 2

Efficiency Statistic= 0.0059/0.0411
= 0.1436

Rank (Most to least Equitable): 3, 1, 2

Part b: 1.5 points

Sample Responses Insurer/Plan 1

- In insurer #1 standard LR's trend up, meaning there is not enough credibility given to experience. Safe risks charged too much and high risks not charged enough. Safe risks will leave and high risks stay – company will lose money. High risk of adverse selection.
- Plan 1 will attract risks with higher mods since the standard premium charged will be less than other competitors overtime the company will see an eroding LR and will become unprofitable.

Sample Responses Insurer/Plan 2

- In insurer #2 standard LR's trend down meaning too much credibility to experience. High risks charged too much and lower risks not charged enough. High risks will leave and low underpriced risks will stay. Company will lose money.
- Plan #2 will attract risks with lower experience mods because that premium charged will be lower than competition and overtime the company will see a shift to risks with lower mods but will still see an eroding LR.

Sample Responses Insurer/Plan 3

- Insurer #3 is ideal. Test statistic indicates standard LR's are flat meaning credibility to

experience correct and products being priced. Adverse selection risk is very low.
- Plan 3 does not favor any set of risks and will not create adverse selection as all risk groups are adequately adjusted.

EXAMINER'S REPORT

Candidates were expected to demonstrate the ability to assess experience rating plans, including calculating an efficiency statistic and describing how each plan performs.

Part a

Candidates were expected to calculate an efficiency statistic for Plan 1 and Plan 2, then rank the efficiency of all three plans.

Common mistakes included:
- Not grouping by quintiles
- Grouping the quintiles incorrectly
- Using standard deviation instead of variance in efficiency calculation

Part b

Candidates were expected to explain how adverse selection may impact each insurer assuming a well-functioning market.

Candidates who explained adverse selection but did not specify how this will impact each insurer directly received no credit.

Common mistakes included:
- Reversed which risks will be underpriced/overpriced between plan 1 and plan 2
- Not discussing the impact adverse selection will have on profitability
- Not discussing the impact of adverse selection on each of the insurers
- Omitting an explanation for insurer/plan 3