11. (2.5 points)

A workers' compensation insurer is facing an increasingly competitive market. Its management is concerned about customer retention, premium growth, and loss ratio deterioration. The insurer's actuaries have proposed an updated experience rating plan. After grouping insureds for the purposes of an efficiency test, the projected impact of this proposal is below (values in thousands):

Current Plan

Quintile	Manual Premium	Loss	Standard Premium	Loss Ratio to Manual	Loss Ratio to Standard
A	4,750	1,978	3,278	42%	60%
B	4,825	2,824	4,005	59%	71%
C	4,450	2,915	4,450	66%	66%
D	4,845	3,608	5,378	74%	67%
E	4,400	3,520	5,500	80%	64%
Total	23,270	14,845	22,610	64%	66%

Proposed Plan

Quintile	Manual Premium	Loss	Standard Premium	Loss Ratio to Manual	Loss Ratio to Standard
A	4,220	1,494	2,068	35%	72%
B	5,100	2,922	4,233	57%	69%
C	4,150	3,088	4,109	74%	75%
D	4,950	3,689	5,346	75%	69%
E	4,850	3,652	5,723	75%	64%
Total	23,270	14,845	21,478	64%	69%

It is estimated that the upfront cost to adopt the new rating plan will be $500,000.

a. (1.5 points)

Perform an efficiency test and evaluate the proposed experience rating plan relative to the current plan.

b. (1 point)

In light of management's concerns, evaluate the merits of adopting the new rating plan versus keeping the current plan, and provide a recommendation.

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SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 11	
TOTAL POINT VALUE: 2.5	**LEARNING OBJECTIVE(S): B4**
SAMPLE ANSWERS	
Part a: 1.5 points	

Sample 1

Efficiency Stat = Var(Standard LRs)/Var(Manual LRs)

Current Plan:
Sample Var (std LR) = [(0.6-0.66)^2 +……..+(0.64-0.66)^2]/4 = 0.00165
Sample Var (Man LR) = 0.021725

Efficiency Stat = 0.00165/0.021725 = 0.0759

Proposed Plan:
Sample Var (std LR) = 0.00175
Sample Var (Man LR) = 0.0308

Efficiency Stat = 0.00175/0.0308 = 0.0568

The proposed plan has a lower efficiency stat => the proposed is better.

Sample 2

Manual Variance Current =[(0.42-0.64)^2+……..+(0.8-0.64)^2]/5 = 0.01738
Standard Variance Current =[(0.6-0.66)^2+……+(0.64-0.66)^2]/5 = 0.00132

Efficiency stat = 0.00132/0.01738 = 0.076

Manual Variance Proposed =[(0.35-0.64)^2+……..+(0.75-0.64)^2]/5 = 0.02464
Standard Variance Proposed =[(0.72-0.69)^2+……+(0.64-0.69)^2]/5 = 0.0014

Efficiency stat = 0.0014/0.02462= 0.057

The proposed is better as it has a lower efficiency stat.

Part b: 1.0 point

Sample 1

Even though proposed has a better efficiency test, I would not choose the new plan. Its separation from min to max manual LRs is only a slight improvement (75% -35%) vs (80%- 42%) but at the cost of 3% on the standard LRs. And the implementation is expensive.

Sample 2

- Customer retention – changing plans may give big hikes to some customers, hurting retention as they go somewhere else.
- Premium growth – more efficient plan will grow premium healthily rather than by getting risks no one else wants.
- Loss ratio deterioration – more efficient plan => less adverse selection => less LRs deterioration

  I recommend adopting the new plan as its cost is only about 2% of premium and it addresses more concerns.

EXAMINER'S REPORT

Candidates were expected to assess the effectiveness of the experience rating plan and support a recommendation on whether or not to implement.

Part a

Candidates were expected to perform an efficiency test. To receive full credit, candidates needed to correctly calculate the variances (of manual and standard loss ratios) and efficiency test statistics for the current and proposed plans. A correct conclusion was needed based on the efficiency ratios. There were several reasonable ways to calculate variance, and full credit was given for both population or sample statistics, weighting with manual premium, and using the problem's supplied mean. Most candidates did very well on this part.

Common mistakes included:

- Calculating standard deviation or SSE instead of variance
- Switching the numerator and denominator in the efficiency ratios
- Stating a statistic is better without stating or showing the method of comparison

Part b

In order to receive full credit, candidates were expected to:

- Provide a CLEAR recommendation. While most candidates simply recommended keeping the current or adopting the new plan, credit was given for adopting the new plan with an off-balance or with reduced credibility.
- Provide adequate support for the recommendation.

Candidates did well on this part, with the most common mistake being just listing pros and cons without making a specific recommendation.