12. (2.5 points)

Given the following information:

Policy Year	Premium	Present Value of Losses	Variable Expenses		Fixed Expenses		Income
			New	Renewal	New	Renewal	
1	$800	$656	$242	-	$142	-	$(240)
2	$872	$701	-	$54	-	$32	$86
3	$950	$748	-	$59	-	$33	$110
4	$1,036	$799	-	$64	-	$34	$139
5	$1,129	$853	-	$70	-	$36	$170

Policy Year	Persistency	Cumulative Persistency	Profit	Discount Factor	Present Value of Profits	Present Value of Premiums
1	100%	100%	$(240)	1.00	$(240)	$800
2	85%	85%	$73	1.12	$65	$662
3	86%	73%	$81	1.25	$64	$554
4	87%	64%	$88	1.40	$63	$469
5	88%	56%	$95	1.57	$61	$402
Total					$13	$2,886

- Premium-to-surplus ratio is 2 to 1.
- Surplus equals GAAP equity.
- The company seeks growth in this market.
- Management requires the present value of profit of policy years 1 to 5 to be positive in total.

a. (0.5 point)

Briefly describe two differences between asset share pricing and pure premium ratemaking when they are used to price property and casualty products.

b. (1 point)

After preparing the asset share model shown above, the actuary evaluates an alternative set of persistency assumptions in which persistency in the third and fourth policy years are changed to 81% and 82%, respectively. Calculate the revised present value of premiums.

c. (1 point)

Briefly discuss the results of the asset share model under each set of persistency assumptions with regard to Management's profitability requirement. Provide a recommendation to management on whether to make a change to the current rating structure.

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QUESTION 12

TOTAL POINT VALUE: 2.5 | **LEARNING OBJECTIVE: A13**

SAMPLE ANSWERS

Part a: 0.5 point

Acceptable Answers:

- Asset share pricing looks at the long term profitability of a policy where pure premium approach looks at profit over 1 policy period.
- Asset share pricing takes into account persistency rates (renewal rates) where pure premium method does not.
- Asset share pricing takes into account different expenses for new & renewal business whereas pure premium ratemaking uses the same expenses for both.
- Asset share pricing uses a discount factor in analysis but PP ratemaking does not.
- Asset share takes Present Value of losses + Premium. PP ratemaking does not.

Part b: 1.0 point

PY	Persistency	Cumulative	PV Premiums
1	1	1.00	800
2	0.85	0.85	662
3	0.81	0.689	524
4	0.82	0.565	418
5	0.88	0.497	357

Where PV Premiums = Prem x Cumulative Persistency/Discount factor

Part c: 1.0 point

Present value of profit using persistency rates from Part B

PY	Profit
1	-240
2	65
3	61
4	56
5	54
	-4

Under the first assumption of persistency, profits are positive; they are NOT under the second.

Sample Recommendation #1:
Management could offer a renewal discount to improve persistency. Discount could be calculated so that overall profits remain positive.

Sample Recommendation #2:

I recommend that marketing is increased to boost the persistency rates so that there can be growth and remain profitable. I am skeptical about increasing rates as this will reduce growth and persistency.

EXAMINER'S REPORT

Candidates were expected to know the differences between the standard pure premium rate making method and the asset share pricing approach, as well as the basic formulas for calculating the present value of both premiums and profits under the latter approach. Candidates were further expected to draw upon their understanding of ratemaking in general and the specific assumptions under the asset share pricing approach and provide a recommended course of action in light of the information provided in the question.

Subparts a & b of the question required the candidate to briefly discuss differences between methods and perform basic calculations showing an understanding of the asset share pricing method. Subpart c was challenging for most candidates with few receiving full credit, as it required a more comprehensive understanding of ratemaking in general and required synthesis across syllabus material. Many candidates confused the change in persistency assumptions with the requested rate change recommendation (that is, they thought that their recommendation should be whether or not to adopt the change in persistency, not whether or not to change the rating structure given the sensitivity of profitability results to assumptions in persistency).

Part a

Candidates were expected to be able to discuss two basic differences between the pure premium method and the asset share pricing method for ratemaking and identify the method associated with each of the characteristics for which those differences existed.

Common mistakes included:

- Restating the same difference twice, in two different ways, instead of providing two distinct differences.
- Providing characteristics that differed between the two methods but failing to identify the method to which those characteristics applied. (For instance, some candidates listed a difference as "persistency was used in the analysis", but failed to identify that it was the asset share pricing method and not the pure premium method that used persistency in its analysis.)

Part b

Candidates were expected to recalculate the cumulative persistency for PYs 3, 4 and 5, and to plug those revised persistency numbers into the formula to calculate the revised present value of premiums for all five policy years. The sum of the five revised policy years was not required to be shown if the five individual revised years were shown. Alternatively, the successful candidate could show only the three individual years requiring recalculation (for PYs 3, 4 and 5), in addition to either the final sum of the five policy years or a statement indicating that PYs 1 and 2 did not

change.

Common mistakes included:

- Failing to recalculate the cumulative persistency and thus the present value of premium for PY 5.
- Calculating revised cumulative persistency and the present value of premium for PYs 4 and 5 instead of PYs 3, 4 and 5.
- Failing to include either (1) a sum of the revised present value of premiums for all five policy years or (2) a statement indicating that the present value of premiums for PYs 1 and 2 did not change.
- Calculating the revised present value of profits rather than the present value of premiums. (This subpart of the question did not require the recalculation of profits.)
- Failure to show any calculations whatsoever in determining the revised present value of premiums (regardless of attainment of correct answer).

Part c

Candidates were expected to be able to discuss the results of the asset share model under each set of persistency assumptions and to make an informed recommendation as to whether or not to change the rating structure in light of the management's profitability and growth goals.

Common mistakes included:

- Failing to calculate the present value of profits under the revised cumulative persistency assumptions.
- Applying the revised cumulative persistency to the original profit numbers rather than the income (that is, double-hitting persistency).
- Applying the same decrease in the present value of premiums to derive the revised present value of profits (does not reflect the impact that persistency has on the present value of losses).
- Erroneously calculating the ROE comparison by changing only the present value of premium (ROE is calculated as the ratio of PV(Profit) to PV(Premium). Both the numerator and denominator change with the revised persistency assumptions.)
- Failing to discuss the comparison of present value of profits under both persistency assumptions (that is, only discussing the present value of profits under one scenario, not both).
- Failing to provide a recommendation.
- Failing to provide a recommendation regarding the rating structure.
- Failing to address both the growth and profitability goals in the recommendation.
- Erroneously assuming the change in persistency assumption was the rate recommendation.