10. (2 points)

An insurance company develops territorial indications using a univariate pure premium analysis and has the following experience:

Territory	Earned Exposures	Reported Loss & ALAE ($000s)	Current Relativity
A	100,000	$60,000	1.00
B	250,000	$300,000	1.40
Total	350,000	$360,000	

Amount of Insurance Group	Charged Factor	Exposures	
		Territory A	Territory B
Low	0.75	50,000	25,000
Medium	1.00	30,000	75,000
High	1.50	20,000	150,000
Total		100,000	250,000

a. (0.5 point)

Describe how distortion can occur using a univariate approach.

b. (1.5 points)

Calculate the indicated pure premium relativities, while accounting for distortion that may be occurring due to amount of insurance differences by territory.

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Exam 5 – Question #10

A. The univariate approach assumes uniform distribution of exposures across all other rating variables, i.e. it does not account for exposure correlation/distributional bias. This can lead to a double-counting effect.

B. Adjusted PP approach

	(1) Adjusted Earned Exposure	(2) Rept loss and ALAE	(3)=(2)/(1) PP	(4) = (3)/3T Indicated Rel	Indicated Rel to base
A	97,500	60,000	615.38	.71154	1.0
B	318,750	300,000	941.18	1.088	1.529
	416,250	360,000	864.86		

(1) → Calculation

A. 50,000 x .75 + 30,000 + 20,000 x 1.5 = 97,500

B. 25,000 x .75 +75,000 + 150,000 x 1.5 = 318,750

7.

a. More than half of the candidates received full credit for this part. Some common mistakes were stating that both fixed and variable expenses were treated as one ratio and stating that variable expenses are related to exposures/policy counts instead of premium for the Exposure/Policy Based method.

b. A majority of candidates were able to correctly describe a shortcoming for the Premium Based method, while many had difficulty doing the same for the Exposure/Policy Based method. A common mistake was referencing a shortcoming of the pure premium or loss ratio methods, which aren't necessarily shortcomings of the methods for deriving expense provisions.

8.

Most candidates received full or nearly full credit. Some common errors include: incorrectly utilizing both the non-modeled and modeled CAT Pure Premiums, incorrectly applying credibility by year and not in total, incorrectly utilizing the ULAE factor, and incorrectly using the complement of credibility. Some candidates applied the ULAE factor to provisions that already included LAE.

9.

In general, most candidates were able to correctly calculate the weighted impact of the proposed relativity changes and recognize the need for an off-balance in order to neutralize the overall premium back to the starting premium. Most candidates were also able to then apply the targeted rate change of 20% in order to derive a total uncapped change for each territory.

Some candidates only showed that territory 2 would exceed the maximum rate cap of 25% without explicitly demonstrating that territories 1 and 3 would *not*. When attempting to calculate the premium shortfall due to the cap on territory 2, some candidates failed to identify the correct premium to which the excess ratio should be applied. Another common error involved candidates capping the rate change at the overall targeted change of 20%. Most candidates struggled with the final step of the calculation – either by not correctly identifying the denominator of premiums to which the excess premium should be applied or by forgetting to make an adjustment to compensate for the base rate cap.

10.

a. Most candidates received full credit. When candidates did lose points they correctly identified key ideas regarding exposure distributions or correlation of variables but misstated the concept in some way.

b. Most candidates received full credit. Most common mistakes for this calculation were: using the Loss Ratio method instead of Pure Premium or incorporating the current relativities, possible typos/miscalculations with no work shown.