

EXAM 5, FALL 2017

13. (2.25 points)

Given the following information:

Territory	Current Premium (\$000)	Current Territory Factor	Indicated Territory Factor
1	90	0.80	0.70
2	300	1.00	1.00
3	260	1.15	1.10
Total	650		

Management requires achieving the following objectives with the upcoming rate change:

- Target an overall rate level increase of 10%.
- Revise territorial relativities to the indicated relativity, while capping the overall rate impact to any territory at 13%.
- Territory 2 remains the base territory.

Calculate the territorial relativities that will be implemented with the rate change.

SAMPLE ANSWERS AND EXAMINER'S REPORT

QUESTION 13	
TOTAL POINT VALUE: 2.25	LEARNING OBJECTIVE(S): A8
SAMPLE ANSWERS	
<p><u>Sample 1</u></p> <p>Weighted change due to relativity modifications:</p> $[(.7/.8)(90) + (1.0/1.0)(300) + (1.1/1.15)(260)] / 650 = 0.9653$ <p>Off-balance: $1/.9653 = 1.036$</p> <p>Overall Uncapped Territorial Changes:</p> <p>T1: $[(.7/.8) \times 1.036 \times 1.1 - 1] = -0.29\%$</p> <p>T2: $[(1.0/1.0) \times 1.036 \times 1.1 - 1] = +13.95\%$</p> <p>T3: $[(1.1/1.15) \times 1.036 \times 1.1 - 1] = +9.0\%$</p> <p>T2 Must be capped at +13%</p> <p>Premium Shortfall due to T2 capping = $(.1395 - .13) \times 300 = 2.85$</p> <p>Premium Adjustment to T1 and T3 to cover shortfall:</p> $1.0 + 2.85 / [(1 - .0029) \times 90 + (1.09) \times 260] = 1.0076$ <p>Adjustment to base rate: $(1.13) / (1.1395) = 0.992$</p> <p>Final Total Adjustment to T1 and T3: $1.0076 / 0.992 = 1.016$</p> <p>Final Relativities:</p> <p>T1: $0.7 \times 1.016 = .7113$</p> <p>T2: 1.0 <- - Base Level</p> <p>T3: $1.1 \times 1.016 = 1.118$</p> <p><u>Sample 2</u></p> <p>Weighted average:</p> $[90(.875) + 300 (1.0) + .9565 (260)] / 650 = 0.9653$ <p>Off-balance: 1.0359</p> <p>Overall Change Impact:</p> <p>T1: $0.875 \times 1.0359 \times 1.1 - 1 = 0.9971$</p> <p>T2: $1 \times 1.0359 \times 1.1 - 1 = 1.1395$</p> <p>T3: $0.9565 \times 1.0359 \times 1.1 - 1 = 1.0900$</p> <p>Since T2 impact exceeds 13%, we need to cap it.</p>	

SAMPLE ANSWERS AND EXAMINER'S REPORT

Territory	New Premium	Capped Prem (13% Max)
1	$90 \times .9971 = 89.74$	$89.74 + (341.85 - 339) \times 24\% = 90.42$
2	341.85	339
3	283.40	$283.40 + (2.85) \times (1 - 24\%) = 285.57$

$$89.74 / (89.74 + 283.40) = 24\%$$

Territory	Capped Impact
1	$90.42 / 90 = 1.0047$
2	1.13
3	1.0983

Territory	Capped Indicated Terr Factor	Rebased
1	$1.0047 \times .8 = 0.804$	0.711
2	$1.13 \times 1.0 = 1.13$	1.00
3	$1.0983 \times 1.15 = 1.263$	1.118

EXAMINER'S REPORT

Candidates were expected to develop uncapped relativities (or premiums) for each territory and determine the required adjustments in order to achieve an overall +10% rate change without any territory receiving a total adjustment of more than +13%. These adjustments then needed to be converted into final territorial relativities.

Common errors included:

- Inaccurate weighting of initial relativity changes
- Failing to adjust the territorial relativities by 0.992 to reflect the capping in T2
- Applying the total indicated changes to the incorrect relativities in the final step of the calculation