Reading: Werner 14: Implementation
Model: 2015.Fall #11 (without minimum premium requirement)
Problem Type: Base Rate - Extenstion of Exposures Method

Find Calculate the base rate required to achieve an average rate increase of 10%

Given current base rate 1,270

Relativities

AOI levels	current	indicated
less than 100,000	0.800	0.900
equal to or above 100,000	1.000	0.850

Territories	current	indicated
territory 1	0.600	0.500
territory 2	1.000	1.150

In-Force Exposures

AOI levels	Terr 1	Terr 2
less than 100,000	2,000	4,200
equal to or above 100,000	2,000	4,800

Fixed Expense Fee

	current	indicated
Fixed Expense Fee	0	0

Prelimiary Step: rebase the indicated relativies so the base level relativity for each variable is 1.0

AOI levels	current	indicated
less than 100,000	0.750	1.059
equal to or above 100,000	1.000	1.000

** rebased*

Territories	current	indicated
territory 1	0.800	0.435
territory 2	1.000	1.000

** rebased*

Step 1 calculate the current average premium by rerating every combination of AOI x Territory
(we can then infer the proposed average premium)

AOI	Territory	current AOI fctr	current Terr fctr	current fixed fee	in-force exposures	current premium
< 100K	1	0.800	0.600	0	2,000	1,219,200
>= 100K	1	1.000	0.600	0	2,000	1,524,000
< 100K	2	0.800	1.000	0	4,200	4,267,200
>= 100K	2	1.000	1.000	0	4,800	6,096,000
					13,000	13,106,400

= (base x AOI x terr + fee) x (in-force exposures)

====> current avg prem = 1,008.18

proposed average premium = 1,008.18 x 1.10 <==== apply 10% increase
= 1,109.00

Step 2 use an arbitrary base seed value B to calculate the proposed average premium by rerating every combination of AOI x Terr

AOI	Territory	proposed AOI fctr	proposed Terr fctr	proposed fixed fee	in-force exposures	proposed premium
< 100K	1	1.059	0.435	0	2,000	920,716
>= 100K	1	1.000	0.435	0	2,000	869,565
< 100K	2	1.059	1.000	0	4,200	4,447,059
>= 100K	2	1.000	1.000	0	4,800	4,800,000
					13,000	11,037,340

base seed value = 1,000

= (base x AOI x terr + fee) x (in-force exposures)

====> seed avg prem = 849.03

Step 3 calculate the final proposed base rate by adjusting the base seed value appropriately

final proposed base rate
= seed x (proposed avg prem - indicated fee) / (seed avg prem - indicated fee)
= 1,000 x (1109 - 0) / (849.03 - 0)
= 1,306.21 <== *final answer*

Note: *The actual exam problem assumed the fixed expense fee was 0 and also imposed a minimum premium requirement.*

Reading: Werner 14: Implementation
Model: 2015.Fall #11 (without minimum premium requirement)
Problem Type: Base Rate - Extenstion of Exposures Method

Find Calculate the base rate required to achieve an average rate increase of 5%

Given current base rate 1,000

Relativities

AOI levels	current	indicated
less than 100,000	0.750	0.800
equal to or above 100,000	1.000	0.900

Territories	current	indicated
territory 1	0.650	0.700
territory 2	1.000	0.900

In-Force Exposures

AOI levels	Terr 1	Terr 2
less than 100,000	1,700	4,200
equal to or above 100,000	1,600	4,000

Fixed Expense Fee

	current	indicated
Fixed Expense Fee	20	30

Prelimiary Step: rebase the indicated relativies so the base level relativity for each variable is 1.0

AOI levels	current	indicated
less than 100,000	0.750	0.889
equal to or above 100,000	1.000	1.000

** rebased*

Territories	current	indicated
territory 1	0.800	0.778
territory 2	1.000	1.000

** rebased*

Step 1 calculate the current average premium by rerating every combination of AOI x Territory
(we can then infer the proposed average premium)

AOI	Territory	current AOI fctr	current Terr fctr	current fixed fee	in-force exposures	current premium
< 100K	1	0.750	0.650	20	1,700	862,750
>= 100K	1	1.000	0.650	20	1,600	1,072,000
< 100K	2	0.750	1.000	20	4,200	3,234,000
>= 100K	2	1.000	1.000	20	4,000	4,080,000
					11,500	9,248,750

= (base x AOI x terr + fee) x (in-force exposures)

====> current avg prem = 804.24

proposed average premium = 804.24 x 1.05 <==== apply 5% increase
= 844.45

Step 2 use an arbitrary base seed value B to calculate the proposed average premium by rerating every combination of AOI x Terr

AOI	Territory	proposed AOI fctr	proposed Terr fctr	proposed fixed fee	in-force exposures	proposed premium
< 100K	1	0.889	0.778	30	1,700	1,226,309
>= 100K	1	1.000	0.778	30	1,600	1,292,444
< 100K	2	0.889	1.000	30	4,200	3,859,333
>= 100K	2	1.000	1.000	30	4,000	4,120,000
					11,500	10,498,086

base seed value = 1,000

= (base x AOI x terr + fee) x (in-force exposures)

====> seed avg prem = 912.88

Step 3 calculate the final proposed base rate by adjusting the base seed value appropriately

final proposed base rate
= seed x (proposed avg prem - indicated fee) / (seed avg prem - indicated fee)
= 1,000 x (844.45 - 30) / (912.88 - 30)
= 922.50 <== *final answer*

Note: *The actual exam problem assumed the fixed expense fee was 0 and also imposed a minimum premium requirement.*