Reading: Odomirok.19-RBC (RBC (Model - 2014.Fall Q18)) 1a-Question

Model: 2014.Fall #18

Problem Type: Calculate RBC charge R_5

Given

	Line of Business		
	Comm Auto Liab	G/L	WC
industry average L+LAE ratio (10 yrs)			0.941
company average L+LAE ratio (10 yrs)			1.078
industry L+LAE ratio			0.912
adjustment for investment income			0.76
company NWP (current yr)	10,500	13,900	6,800
company U/W expense ratio (current yr)			0.38
portion of reserves on retro-rated plan			
% **direct** loss-sensitive			10.0%
% **assumed** loss-sensitive			2.0%
NWP RBC charge **after discounts**	2,205	2,085	

Excessive Premium Growth Charge *(add to total RBC)* : 260

Find Calculate the total R_5 RBC charge for all 3 lines combined

Total R_5 RBC for all lines = 4,514 <== final answer

Apply equations 4, 5, 6 in succession to arrive at the final answer.

Equation 4: *Base RBC*

R_5 Base RBC	=	(current yr NWP)	x	[(C x A) + U - 1]

where

C	=	**Company RBC** L+LAE ratio	=	0.979	<== see weighting below
A	=	Adjustment for investment income	=	0.760	<== given
U	=	U/W expense ratio	=	0.380	<== given

C is a 50/50 weighting between:

industry L+LAE ratio = 0.912 <== given (weight = 50%)

industry L+LAE ratio adjusted for **company experience**

=	**industry** L+LAE ratio	x	(**company average** L+LAE)	/	(**industry average** L+LAE ratio)	
=	0.912	x	1.078	/	0.941	
=	1.045	<== weight = 50%				

Putting this all together gives:

R_5 Base RBC	=	6,800	x	(0.9785	x	0.760	+	0.380	-	1)
R_5 Base RBC	=	841								

Equation 5: *Subtract Loss-Sensitive Discount (LSD)*

R_5 RBC after discount	=	Base RBC	-	LSD

where

LSD	=	Base RBC	x	(D%	+	A%)
	=	841	x	3.30%		
	=	27.7				
D%	=	30%	x	(% direct loss sensitive)		
	=	30%	x	10.0%		
	=	3.00%				
A%	=	15%	x	(% assumed loss sensitive)		
	=	15%	x	2.0%		
	=	0.30%				

Putting this together gives:

R_5 RBC after discount	=	Base RBC	-	LSD
R_5 RBC after discount	=	841	-	27.7
R_5 RBC after discount	=	813		

Equation 6: *Final RBC after apply Premium Concentration Factor (PCF)*

Calculate PCF and apply it to all lines of business

PCF	=	0.7	+	0.3	x	(max NWP by line)	/	(tota NWP)
	=	0.7	+	0.3	x	13,900	/	31,200
	=	0.834						

Putting this together gives the final answer:

Total R_5 RBC (all lines)	=	total RBC for all lines			x	PCF	+	growth charge
Total R_5 RBC (all lines)	=	(2205 + 2085 + 813)			x	0.834	+	260
Total R_5 RBC (all lines)	=	4,514	<== final answer					

Reading: Odomirok.19-RBC (RBC (Model - 2014.Fall Q18)) 2a-Question
Model: 2014.Fall #18
Problem Type: Calculate RBC charge R_5 (NWP risk)

Given

	Line of Business		
	Comm Auto Liab	G/L	WC
industry average L+LAE ratio (10 yrs)			1.025
company average L+LAE ratio (10 yrs)			1.017
industry L+LAE ratio			1.031
adjustment for investment income			0.76
company NWP (current yr)	15,900	12,100	7,700
company U/W expense ratio (current yr)			0.30
portion of reserves on retro-rated plan			
% **direct** loss-sensitive			17.0%
% **assumed** loss-sensitive			7.0%
R_5 RBC charge **after discounts**	3,816	2,541	?

Excessive Premium Growth Charge *(add to total RBC)* : 640

Find Calculate the total R_5 RBC charge for all 3 lines combined

Apply equations 4, 5, 6 in succession to arrive at the final answer. Total R_5 RBC for all lines =

Equation 4: *Base RBC*

R_5 Base RBC = (current yr NWP) x [(C x A) + U

where

C	=	**Company RBC** L+LAE ratio	=	1.027	<== see we
A	=	Adjustment for investment income	=	0.760	<== given
U	=	**company** U/W expense ratio	=	0.300	<== given

C is a 50/50 weighting between:

industry L+LAE ratio = 1.031 <== given (weight = 50%)

industry L+LAE ratio adjusted for **company experience**

= **industry** L+LAE ratio x (**company average** L+LAE) / (**industry average** L+LAE ratio

= 1.031 x 1.017 / 1.025

= 1.023 <== weight = 50%

R_5 Base RBC	=	7,700	x	(1.027	x	0.760	+
R_5 Base RBC	=	620					

Equation 5: *Subtract Loss-Sensitive Discount (LSD)*

R_5 RBC after discount = Base RBC

where

LSD	=	Base RBC	x	(D%	+	A%)
	=	620	x	6.15%		
	=	38.1				
D%	=	30%	x	(% direct loss sensitive)		
	=	30%	x	17.0%		
	=	5.10%				
A%	=	15%	x	(% assumed loss sensitive)		
	=	15%	x	7.0%		
	=	1.05%				

R_5 RBC after discount	=	Base RBC	-	LSD
R_5 RBC after discount	=	619.9	-	38.1
R_5 RBC after discount	=	581.7		

Equation 6: *Final RBC after applying Premium Concentration Factor (PCF)*

Calculate PCF and apply it to all lin

PCF	=	0.7	+	0.3	x	(max NWP by line)	/	
	=	0.7	+	0.3	x	15,900	/	
	=	0.834						

Total R_5 RBC (all lines)	=	pre-PCF total	x	PCF	+
Total R_5 RBC (all lines)	=	(3816 + 2541 + 581.7)	x	0.834	+
Total R_5 RBC (all lines)	=	6,424 <== final answer			

Apply equations 4, 5, 6 in succession to arrive at the final answer. Total R_5 RBC for all lines =

Reading: Odomirok.19-RBC (RBC (Model - 2014.Fall Q18)) 3a-Question

Model: 2014.Fall #18

Problem Type: Calculate RBC charge R_5

Given

	Line of Business		
	Comm Auto Liab	G/L	WC
industry average L+LAE ratio (10 yrs)			1.089
company average L+LAE ratio (10 yrs)			0.977
industry L+LAE ratio			0.943
adjustment for investment income			0.83
company NWP (current yr)	16,000	11,000	14,900
company U/W expense ratio (current yr)			0.33
portion of reserves on retro-rated plan			
% **direct** loss-sensitive			16.0%
% **assumed** loss-sensitive			2.0%
NWP RBC charge **after discounts**	3,680	1,870	

Excessive Premium Growth Charge *(add to total RBC)* : 330

Find Calculate the total R_5 RBC charge for all 3 lines combined

Total R_5 RBC for all lines = 5,685 <== final answer

Apply equations 4, 5, 6 in succession to arrive at the final answer.

Equation 4: *Base RBC*

R_5 Base RBC	=	(current yr NWP)	x	[(C x A) + U - 1]

where

C	=	**Company RBC** L+LAE ratio	=	0.895	<== see weighting below
A	=	Adjustment for investment income	=	0.830	<== given
U	=	U/W expense ratio	=	0.330	<== given

C is a 50/50 weighting between:

industry L+LAE ratio = 0.943 <== given (weight = 50%)

industry L+LAE ratio adjusted for **company experience**

=	**industry** L+LAE ratio	x	(**company average** L+LAE)	/	(**industry average** L+LAE ratio)	
=	0.943	x	0.977	/	1.089	
=	0.846	<== weight = 50%				

Putting this all together gives:

R_5 Base RBC	=	14,900	x	(0.8945	x	0.830	+	0.330	-	1)
R_5 Base RBC	=	1,079								

Equation 5: *Subtract Loss-Sensitive Discount (LSD)*

R_5 RBC after discount	=	Base RBC	-	LSD

where

LSD	=	Base RBC	x	(D%	+	A%)
	=	1,079	x	5.10%		
	=	55.0				
D%	=	30%	x	(% direct loss sensitive)		
	=	30%	x	16.0%		
	=	4.80%				
A%	=	15%	x	(% assumed loss sensitive)		
	=	15%	x	2.0%		
	=	0.30%				

Putting this together gives:

R_5 RBC after discount	=	Base RBC	-	LSD
R_5 RBC after discount	=	1,079	-	55.0
R_5 RBC after discount	=	1,024		

Equation 6: *Final RBC after apply Premium Concentration Factor (PCF)*

Calculate PCF and apply it to all lines of business

PCF	=	0.7	+	0.3	x	(max NWP by line)		/	(tota NWP)		
	=	0.7	+	0.3	x	16,000		/	41,900		
	=	0.815									

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Putting this together gives the final answer:

Total R_5 RBC (all lines)	=	total RBC for all lines		x	PCF	+	growth charge	
Total R_5 RBC (all lines)	=	(3680 + 1870 + 1024)		x	0.815	+	330	
Total R_5 RBC (all lines)	=	5,685	<== final answer					

Reading: Odomirok.19-RBC (RBC (Model - 2014.Fall Q18)) 4a-Question

Model: 2014.Fall #18

Problem Type: Calculate RBC charge R_5

Given

	Line of Business		
	Comm Auto Liab	G/L	WC
industry average L+LAE ratio (10 yrs)			1.040
company average L+LAE ratio (10 yrs)			0.926
industry L+LAE ratio			1.023
adjustment for investment income			0.85
company NWP (current yr)	8,700	15,900	10,000
company U/W expense ratio (current yr)			0.33
portion of reserves on retro-rated plan			
% **direct** loss-sensitive			17.0%
% **assumed** loss-sensitive			3.0%
NWP RBC charge **after discounts**	1,653	3,816	

Excessive Premium Growth Charge *(add to total RBC)* : 350

Find Calculate the total R_5 RBC charge for all 3 lines combined

Total R_5 RBC for all lines = 6,135 <== final answer

Apply equations 4, 5, 6 in succession to arrive at the final answer.

Equation 4: *Base RBC*

R_5 Base RBC	=	(current yr NWP)	x	[(C x A) + U - 1]

where

C	=	**Company RBC** L+LAE ratio	=	0.967	<== see weighting below
A	=	Adjustment for investment income	=	0.850	<== given
U	=	U/W expense ratio	=	0.330	<== given

C is a 50/50 weighting between:

industry L+LAE ratio = 1.023 <== given (weight = 50%)

industry L+LAE ratio adjusted for **company experience**

=	**industry** L+LAE ratio	x	(**company average** L+LAE)	/	(**industry average** L+LAE ratio)	
=	1.023	x	0.926	/	1.040	
=	0.911	<== weight = 50%				

Putting this all together gives:

R_5 Base RBC	=	10,000	x	(0.967	x	0.850	+	0.330	-	1)
R_5 Base RBC	=	1,520								

Equation 5: *Subtract Loss-Sensitive Discount (LSD)*

R_5 RBC after discount	=	Base RBC	-	LSD

where

LSD	=	Base RBC	x	(D%	+	A%)
	=	1,520	x	5.55%		
	=	84.3				
D%	=	30%	x	(% direct loss sensitive)		
	=	30%	x	17.0%		
	=	5.10%				
A%	=	15%	x	(% assumed loss sensitive)		
	=	15%	x	3.0%		
	=	0.45%				

Putting this together gives:

R_5 RBC after discount	=	Base RBC	-	LSD
R_5 RBC after discount	=	1,520	-	84.3
R_5 RBC after discount	=	1,435		

Equation 6: *Final RBC after apply Premium Concentration Factor (PCF)*

Calculate PCF and apply it to all lines of business

PCF	=	0.7	+	0.3	x	(max NWP by line)		/	(tota NWP)		
	=	0.7	+	0.3	x	15,900		/	34,600		
	=	0.838									

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Putting this together gives the final answer:

Total R_5 RBC (all lines)	=	total RBC for all lines		x	PCF	+	growth charge	
Total R_5 RBC (all lines)	=	(1653 + 3816 + 1435)		x	0.838	+	350	
Total R_5 RBC (all lines)	=	6,135	<== final answer					