Reading: NCCI.Circular

Model: Source Text

Problem Type: Calculate the basic premium factor

Given

Retrospective Rating Plan Parameters

(a)	Estimated Standard Premium	$500,000	
(b)	Max. Retrospective Premium Factor	130%	
(c)	Min. Retrospective Premium Factor	60%	
(d)	Loss Conversion Factor	1.12	<= c
(e)	Tax Multiplier	1.07	<= T
(f)	Loss Limit	$50,000	
(g)	Expense Ratio	0.201	
(h)	Expected Unlimited Loss Ratio	61.3%	

Find Using the NCCI Circular CIF-2018-28 calculate the basic premium factor.

You may use the information provided below.

Policy Excess Ratio	0.582
Expected Number of Claims	20.95

Extract from the Table of Expected Claim Count Groups in Appendix A

Expected Claim Count Group	Expected Number of Claims
50	15.7 – 17.3
49	17.4 – 19.1
48	19.2 – 21.1
47	21.2 – 23.4

Extract from the Table of Policy Excess Ratio Ranges in Appendix A

Sub-table	Excess Ratio Range
14	0.485 – 0.550
15	0.551 – 0.648
16	0.649 – 0.765

Extract from Table of Aggregate Loss Factors: Sub-Table 15

Aggregate Excess Loss Factors by Expected Claim Count Group

	Expected Claim Count Group		
Entry Ratio	49	48	47
0.04	0.9622	0.9619	0.9616
0.05	0.9530	0.9527	0.9524
0.06	0.9440	0.9437	0.9434
…	…	…	…
2.32	0.0735	0.0732	0.0729
2.33	0.0726	0.0723	0.072
2.34	0.0717	0.0714	0.0711

Solution NCCI_BasicPremFactor (Solution 1)

Alice: "This is a long calculation that consists of 21 steps which are illustrated below. Work through this example carefully, referring to the wiki article when needed for explanations of each line item."

Item	Value	Description	Calculation/Notes
(1.)	$500,000	Estimated Standard Premium	
(2.)	$306,500	Expected (Unlimited) Losses	(2) = (3) * (1)
(3.)	61.3%	Expected (Unlimited) Loss Ratio	
(4.)	0.582	Policy Excess Ratio	See sub-calculation below. Yields sub-table 15.
(5.)	0.357	Excess Loss Factor	(5) = (3) * (4)
(6.)	25.6%	Expected Limited Loss Ratio	(6) = (3) - (5)
(7.)	20.95	Expected Number of Claims	See sub-calculation below. Yields count group 48.
(8.)	$100,500	Expense, Profit & Contingency excluding Taxes	(8) = (1) * (g)
(9.)	0.814	Expected Loss Plus Expense Ratio	(9) = [(2) + (8)] / (1)
(10.)	0.687	Loss & Expense in Converted Losses	(10) = (3) * (d)
(11.)	0.127	Expense, Profit & Contingency in Basic Premium	(11) = (9) - (10)
(12.)	0.561	Minimum Retrospective Premium excl. Taxes	(12) = (c) / (e)
(13.)	1.215	Maximum Retrospective Premium excl. Taxes	(13) = (b) / (e)
(14.)	0.8824	Table of Aggregate Loss Factors Value Difference*	(14) = [(9) - (12)] / [(d) * (6)]
(15.)	2.28	Table of Aggregate Loss Factors Entry Difference**	(15) = [(13) - (12)] / [(d) * (6)]
(16.)	0.05	Ratio of Losses for Minimum Retrospective Premium to Expected Limited Losses	See line-by-line wiki discussion for this figure.
(17.)	2.33	Ratio of Losses for Maximum Retrospective Premium to Expected Limited Losses	See line-by-line wiki discussion for this figure.
(18.)	0.0723	Table of Aggregate Loss Factors – Aggregate **Excess** Loss Factor for (17.)	AELF for (17), found in Appendix B.
(19.)	0.0027	Table of Aggregate Loss Factors – Aggregate **Minimum** Loss Factor for (16.)	
(20.)	0.020	Net Aggregate Loss Factor	(20) = [(18) - (19)] * (d) * (6)
(21.)	0.147	Basic Premium Factor	(21) = (20) + (11)

* Calculated to 4 decimal places to match the precision found in the Appendix B tables.

** Calculated to 2 decimal places to match the entry ratio precision found in the Appendix B tables.

Policy Excess Ratio Calculation

Although we gave you the Policy Excess Ratio in this question, it's conceivable you may be asked to calculate it from first principles.
It should be calculated at the State/Hazard Group level using the table approach below.

State	Hazard Group	Modified Expected Loss	Excess Ratio at Loss Limit	Expected Excess Loss	Policy Excess Ratio
X	C	106,500	0.5	53,250	
X	G	150,000	0.7	105,000	
Y	A	50,000	0.4	20,000	
Total		306,500		178,250	0.582

- The expected excess loss is the product of the modified expected loss and the excess ratio at loss limit.
- The policy excess ratio is the total expected excess loss divided by the total modified expected loss.

- The modified expected loss is the manual premium multiplied by both the experience modification (assuming the risk is also experience rated) and the expected loss ratio.

Expected Number of Claims Calculation

State	Hazard Group	Manual Premium	Experience Modification	Expected Loss Ratio	Modified Expected Loss	Average Cost per Case	Expected Number of Claims
X	C	217,170			106,500	12,000	8.88
X	G	305,873			150,000	23,000	6.52
Y	A	101,958			50,000	9,000	5.56
Total			0.8	61.3%			20.95

Alice: "Remember the NCCI experience mod and expected loss ratio are the same for all states and hazard groups within a risk."