

Reading: Friedland 10 (Cape Cod Method)
Model: 2013.Fall #20
Problem Type: Reserving Methods - CC with multiple adjustments

F-10 (030) CC (Problem 1)

Find Calculate the ultimate for AY 2025 using the reported Cape Cod method.

Given

AY	EP	on-level adj.	reported claims	pure premium trend	tort reform trend	rptd CDF to ultimate
2022	37	0.87	30	1.158	0.81	1.08
2023	40	1.20	24	1.103	0.81	1.21
2024	44	1.16	19	1.050	0.95	2.10
2025	49	1.00	18	1.000	1.00	3.60

Step 1 calculate the adjusted reported losses (*do not apply CDFs to the losses - we are not calculating the ultimate here*)

AY	rptd clms	x	PP trend	x	tort ref	=	adjusted reported claims
2022	30	x	1.158	x	0.81	=	28.139
2023	24	x	1.103	x	0.81	=	21.442
2024	19	x	1.050	x	0.95	=	18.927
2025	18	x	1.000	x	1.00	=	18.000
							86.508

Step 2 calculate the used-up-premium (UUP)

CY/AY	EP	x	on-level	/	CDF	=	UUP
2022	37	x	0.870	/	1.08	=	29.806
2023	40	x	1.200	/	1.21	=	39.669
2024	44	x	1.160	/	2.10	=	24.305
2025	49	x	1.000	/	3.60	=	13.611
							107.391

Step 3 calculate the adjusted ECR at the level: 2025 (*back out on-level adj, pure premium trend, tort reform*)

ECR	=	Step 1	/	Step 2	x	on-level	/	PP trend	/	tort reform
	=	86.508	/	107.391	x	1.000	/	1.000	/	1.00
	=	80.55%								

Step 4 calculate the **ultimate** using the data for: 2025

ultimate	=	rptd clms	+	(1 - 1 /	CDF)	x	ECR	x	EP
	=	18	+	(1 - 1 /	3.6)	x	80.55%	x	49
	=	46.507							<i><== final answer (ultimate)</i>

Or if you're asked for the **IBNR**, the answer is:

	=	ultimate	-	reported
	=	46.507	-	18
	=	28.507		<i><== IBNR</i>

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F-10 (030) CC (Problem 2)

Find Calculate the ultimate for AY 2024 using the reported Cape Cod method.

Given

AY	EP	on-level adj.	reported claims	pure premium trend	tort reform trend	rptd CDF to ultimate
2022	0	1.00	0	1.000	1.00	1.00
2023	50	0.90	25	1.061	0.75	1.25
2024	52	0.95	20	1.030	0.90	1.75
2025	54	1.00	10	1.000	1.00	2.50

Step 1 calculate the adjusted reported losses (*do not apply CDFs to the losses - we are not calculating the ultimate here*)

AY	rptd clms	x	PP trend	x	tort ref	=	adjusted reported claims
2022	0	x	1.000	x	1.00	=	0.000
2023	25	x	1.061	x	0.75	=	19.894
2024	20	x	1.030	x	0.90	=	18.540
2025	10	x	1.000	x	1.00	=	10.000
							48.434

Step 2 calculate the used-up-premium (UUP)

CY/AY	EP	x	on-level	/	CDF	=	UUP
2022	0	x	1.000	/	1.00	=	0.000
2023	50	x	0.900	/	1.25	=	36.000
2024	52	x	0.950	/	1.75	=	28.229
2025	54	x	1.000	/	2.50	=	21.600
							85.829

Step 3 calculate the adjusted ECR at the level: 2024 (*back out on-level adj, pure premium trend, tort reform*)

ECR	=	Step 1	/	Step 2	x	on-level	/	PP trend	/	tort reform
	=	48.434	/	85.829	x	0.950	/	1.030	/	0.90
	=	57.83%								

Step 4 calculate the **ultimate** using the data for: 2024

ultimate	=	rptd clms	+	(1 - 1 /	CDF)	x	ECR	x	EP
	=	20	+	(1 - 1 /	1.75)	x	57.83%	x	52
	=	32.888							<i><== final answer (ultimate)</i>

Or if you're asked for the **IBNR**, the answer is:

	=	ultimate	-	reported
	=	32.888	-	20
	=	12.888		<i><== IBNR</i>

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F-10 (030) CC (Problem 3)

Find Calculate the ultimate for AY 2023 using the reported Cape Cod method.

Given

AY	EP	on-level adj.	reported claims	pure premium trend	tort reform trend	rptd CDF to ultimate
2022	39	0.94	28	1.093	0.86	1.07
2023	46	1.00	27	1.061	0.86	1.28
2024	52	0.92	22	1.030	0.98	2.30
2025	55	1.00	21	1.000	1.00	3.80

Step 1 calculate the adjusted reported losses (*do not apply CDFs to the losses - we are not calculating the ultimate here*)

AY	rptd clms	x	PP trend	x	tort ref	=	adjusted reported claims
2022	28	x	1.093	x	0.86	=	26.319
2023	27	x	1.061	x	0.86	=	24.636
2024	22	x	1.030	x	0.98	=	22.279
2025	21	x	1.000	x	1.00	=	21.000
							94.235

Step 2 calculate the used-up-premium (UUP)

CY/AY	EP	x	on-level	/	CDF	=	UUP
2022	39	x	0.940	/	1.07	=	34.262
2023	46	x	1.000	/	1.28	=	35.938
2024	52	x	0.920	/	2.30	=	20.800
2025	55	x	1.000	/	3.80	=	14.474
							105.473

Step 3 calculate the adjusted ECR at the level: 2023 (*back out on-level adj, pure premium trend, tort reform*)

ECR	=	Step 1	/	Step 2	x	on-level	/	PP trend	/	tort reform
	=	94.235	/	105.473	x	1.000	/	1.061	/	0.86
	=	97.92%								

Step 4 calculate the **ultimate** using the data for: 2023

ultimate	=	rptd clms	+	(1 - 1 /	CDF)	x	ECR	x	EP
	=	27	+	(1 - 1 /	1.28)	x	97.92%	x	46
	=	36.853							<i><== final answer (ultimate)</i>

Or if you're asked for the **IBNR**, the answer is:

	=	ultimate	-	reported
	=	36.853	-	27
	=	9.853		<i><== IBNR</i>

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F-10 (030) CC (Problem 4)

Find Calculate the ultimate for AY 2022 using the reported Cape Cod method.

Given

AY	EP	on-level adj.	reported claims	pure premium trend	tort reform trend	rptd CDF to ultimate
2022	33	0.95	25	1.125	0.94	1.09
2023	38	1.17	20	1.082	0.94	1.29
2024	40	1.05	19	1.040	0.98	2.10
2025	43	1.00	17	1.000	1.00	3.10

Step 1 calculate the adjusted reported losses (*do not apply CDFs to the losses - we are not calculating the ultimate here*)

AY	rptd clms	x	PP trend	x	tort ref	=	adjusted reported claims
2022	25	x	1.125	x	0.94	=	26.438
2023	20	x	1.082	x	0.94	=	20.342
2024	19	x	1.040	x	0.98	=	19.274
2025	17	x	1.000	x	1.00	=	17.000
							83.053

Step 2 calculate the used-up-premium (UUP)

CY/AY	EP	x	on-level	/	CDF	=	UUP
2022	33	x	0.950	/	1.09	=	28.761
2023	38	x	1.170	/	1.29	=	34.465
2024	40	x	1.050	/	2.10	=	20.000
2025	43	x	1.000	/	3.10	=	13.871
							97.098

Step 3 calculate the adjusted ECR at the level: 2022 (*back out on-level adj, pure premium trend, tort reform*)

ECR	=	Step 1	/	Step 2	x	on-level	/	PP trend	/	tort reform
	=	83.053	/	97.098	x	0.950	/	1.125	/	0.94
	=	76.84%								

Step 4 calculate the **ultimate** using the data for: 2022

ultimate	=	rptd clms	+	(1 - 1 / CDF)	x	ECR	x	EP
	=	25	+	(1 - 1 / 1.09)	x	76.84%	x	33
	=	27.094						<i><== final answer (ultimate)</i>

Or if you're asked for the **IBNR**, the answer is:

	=	ultimate	-	reported
	=	27.094	-	25
	=	2.094		<i><== IBNR</i>