

LOB – 3 Commercial Lines *A Potpourri of Reserving Issues*

Cape Cod Method

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Cape Cod Method

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It's Like Bornhuetter-Ferguson

$$\text{Indicated ultimate losses} = (\text{Losses-to-date}) + (1 - 1/\text{LDF}) \times (\text{expected ultimate losses})$$

- B-F: ELR x premium
- CC: algorithm using company's data

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So, what are the algorithm inputs?

- Exposure base
- Relationship between exposure base and losses to be projected
- Development factors
- Company's loss data

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Basic Example

AY	(1) Exposures	(2) Reported Losses	(3) Trend at 7% per year	(4) = (2) x (3) Trended Reported Losses
1997	7,000	3,600	1,311	4,720
1998	8,000	4,000	1,225	4,900
1999	9,000	4,800	1,145	5,496
2000	10,000	3,600	1,070	3,852
2001	11,000	2,800	1,000	2,800
Total	45,000	18,800		21,768

AY	(5) Percent Reported	(6) Reported Exposure (1) x (5)	(7) Unreported Exposure (1) - (6)	(8) Trended Developed Loss Ratio (4) ÷ (6)
1997	85%	5,950	1,050	79.3%
1998	75%	6,000	2,000	81.7%
1999	60%	5,400	3,600	101.8%
2000	45%	4,500	5,500	85.6%
2001	25%	2,750	8,250	101.8%
Total		24,600	20,400	88.5%

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Basic Example - Continued

AY	Trended Developed Loss Ratio	"Two-way" weighting scheme			Weighted Loss Ratios
		Percent Reported	Exposures		
1997	79.3%	x 85.0%	x 7,000	=	4,720
1998	81.7%	x 75.0%	x 8,000	=	4,900
1999	101.8%	x 60.0%	x 9,000	=	5,496
2000	85.8%	x 45.0%	x 10,000	=	3,852
2001	101.8%	x 25.0%	x 11,000	=	2,800
Total					21,768
Weighted Average Loss Ratio		21,768	÷ 24,600	=	88.5%

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Basic Example – Final Step

AY	Expected Ultimate Loss Ratio	Expected Loss Ratio Detrended at 7%	Unreported Exposure	IBNR Reserve	(9)	(10)	(11)	(12)	(13)
									(2) + (12)
1997	88.5%	67.5%	1,050	709					4,309
1998	88.5%	72.2%	2,000	1,445					5,445
1999	88.5%	77.3%	3,600	2,782					7,582
2000	88.5%	82.7%	5,500	4,548					8,148
2001	88.5%	88.5%	8,250	7,300					10,100
Total								16,785	35,585

Column (11) = (1.0 - 1/LDF) x Exposure. AY2000 = 55% x 10,000 = 5,500

Column (12) completes B-F IBNR Calculation: Col (10) x Col (11)

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Basic Example with Decay

AY	Trended Developed Loss Ratio	"Three-way" weighting scheme				Weighted Loss Ratios
		Percent Reported	Exposures	Decay = 0.75		
1997	79.3%	x 85.0%	x 7,000	x 0.422	=	1,991
1998	81.7%	x 75.0%	x 8,000	x 0.563	=	2,756
1999	101.8%	x 60.0%	x 9,000	x 0.750	=	4,122
2000	85.8%	x 45.0%	x 10,000	x 1.000	=	3,852
2001	101.8%	x 25.0%	x 11,000	x 0.750	=	2,100
Total						14,822
Weighted Average Loss Ratio		14,822	÷ 16,498	=	89.8%	

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Special Reserving Issues

- Speedup/slowdown, case reserve strengthening/weakening
- Mix of business changes
- Changes in limits, retentions
- Large losses

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Special Reserving Issues

Cape Cod results are only as good as their inputs

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Development factors will always be the key

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When should the Cape Cod Method be used and selected?

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Reference

- Struzzieri – “Using Best Practices to Determine a Best Reserve Estimate”, CAS Forum, Fall 1998 – very practical; a good starting point for the actuary who is unfamiliar with the method
- Gluck – “Balancing Development and Trend in Loss Reserve Analyses”, PCAS LXXXIV (1997) – thorough, technical discussion of the “Generalized” Cape Cod method; introduces the “decay” concept
- Stanard - “A Simulation Test of Prediction Errors of Loss Reserve Estimation Techniques”, PCAS LXXII (1985) – theoretical and technical, includes an important discussion of why “blended” methods are less biased

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