Commercial Lines - A Potpourri of Reserving Issues

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Backward Recursive Method

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Something's Not Quite Right

AY	Open Claims	Case Reserves	IBNR	IBNR/ Case
1998	12	808,509	1,096,384	136%
1999	8	2,309,683	1,655,406	72%
2000	19	1,544,035	2,038,573	132%
2001	9	519,640	1,622,146	312%
2002	10	846,627	1,478,367	175%
2003	13	1,145,788	1,644,929	144%
2004	4	238,029	1,075,759	452%

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Characteristics

➤ IBNR (supplemental) projection based upon historical case reserve development

➤ Development factor applied to the case reserve ONLY

➤ Resultant IBNR (supplemental) independent of losses paid or incurred to date

➤ Forward looking

➤ Requires intimate knowledge of claims department case reserving practices and consistency

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Applicable Lines of Business

➤ Claims-made policies:
   ▪ Medical professional
   ▪ Non-medical professional
   ▪ Directors & officers

➤ Workers' compensation (AYs X-3 and prior)

➤ Occurrence policies on a report year basis (when coupled with a "Pure IBNR" projection method)

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The Backward Recursive Formula

$$Dk = (Rk * D(k-1)) + Pk$$

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The Backward Recursive Formula

$$Dk = (Rk * D(k-1)) + Pk$$

Dk is the development factor which, when applied to the case reserve at age k, projects the case reserve to a fully developed, ultimate basis

Pk is the proportion of case reserve of age k which will be paid by age k+1

Rk is the ratio of case reserve at age k+1 to the case reserve at age k

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The Backward Recursive Formula – Dk

$$Dk = (Rk * D(k-1)) + Pk$$

➤ If case reserves are always exactly adequate, Dk will always = 1.00 and the sum of Rk + Pk will always = 1.00

➤ If case reserves are always inadequate (e.g. "stair-stepping"), Dk will always > 1.00 and the sum of Rk + Pk will always > 1.00

➤ If case reserves are always redundant (yeah, sure) Dk will always < 1.00 and the sum of Rk + Pk will always < 1.00

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Backward Recursive Example

Paid Loss Development

Year	12	24	36	48	60	ULT
X-4	20	50	65	75	85	100
X-3	20	50	65	75		100
X-2	20	50	65			100
X-1	20	50				100
X	40					200

Incurred Loss Development

Year	12	24	36	48	60	ULT
X-4	50	75	85	90	95	100
X-3	50	75	85	90		100
X-2	50	75	85			100
X-1	50	75				100
X	50					100

Backward Recursive Example

Case Reserves

Year	12	24	36	48	60	ULT
X-4	30	25	20	15	10	0
X-3	30	25	20	15		
X-2	30	25	20			
X-1	30	25				
X	10					

Rk Ratio

Year	24/12	36/24	48/36	60/48	Ult/60
X-4	0.83	0.80	0.75	0.67	0
X-3	0.83	0.80	0.75		
X-2	0.83	0.80			
X-1	0.83				
Chosen	0.83	0.80	0.75	0.67	0.00

Backward Recursive Example

Incremental Paid Losses

Year	24/12	36/24	48/36	60/48	Ult/60
X-4	30	15	10	10	15
X-3	30	15	10		
X-2	30	15			
X-1	30				

Pk Ratio

Year	24/12	36/24	48/36	60/48	Ult/60
X-4	1.00	0.60	0.50	0.67	1.50
X-3	1.00	0.60	0.50		
X-2	1.00	0.60			
X-1	1.00				
Chosen	1.00	0.60	0.50	0.67	1.50

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Backward Recursive Example

Projection of Ultimate Losses					
AY	X	X-1	X-2	X-3	X-4
Cumulative Development Factor Dk = (Rk * D(k-1))+Pk	2.67	2.00	1.75	1.67	1.50
Case	10	25	20	15	10
Case + IBNR	26.67	50	35	25	15
Paid	40	50	65	75	85
Ultimate	66.67	100	100	100	100

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What are the advantages of using the Backward Recursive Method?

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Why do we like the Backward Recursive Method?

➢ Intuitive appeal and ease of communication

➢ Lack of "Pure IBNR" claims reduces uncertainty

➢ Loss development is solely a function of case reserve adequacy (not affected by changes in claims settlement/termination timing)

➢ Produces cosmetically appealing IBNR/case reserve ratios by AY on Schedule P (avoids nonsensical implied ultimates)

➢ Method requires continuous communications between actuarial & claims. You must get inside the claims adjustors head

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What don't we like about the Backward Recursive Method?

➤ Diminishing case reserve base makes Pk and Rk ratios more fortuitous and less stable

➤ Selection of the "tail factor" can be highly subjective, e.g. workers' compensation losses could be paid out over 50 years or more

➤ Selected Pk and Rk ratios are highly leveraged…much judgment may be involved to prevent "hyper-development" or unexplainable "reversals"

➤ Change in case reserving philosophies and settlement practices will dramatically negate benefits of the method

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"Try it, you'll like it"

Reluctance of actuaries to consider use of the Backward Recursive method, even on claims-made business. At least try it - no Alka-Seltzer needed

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