8.2.1 → Estimating unpaid ALAE

→ ALAE data considerations

→ As emphasized in previous sections, it is essential for actuaries to understand the data that is available to them, as record-keeping differs throughout the industry. For instance, some insurers record ALAE but not case outstanding for ALAE, while some insurers keep detailed records regarding all ALAE expenses (the most important being legal expenses).

→ One common challenge when trying to estimate ALAE is obtaining ALAE data separate from claims-only data. Often, the result is that ALAE is lumped in w/ claims data when trying to estimate unpaid ALAE. The issue w/ this approach is that development patterns for ALAE can vary widely from claim development patterns, thus undermining the estimate.

→ Estimating unpaid ALAE

→ The two methods discussed in section 8.1, the development technique & the ratio technique, are also applicable to ALAE estimation. Paid ALAE can be estimated using the development technique; if case outstanding data is available, then reported ALAE can also be estimated using the development technique.

→ In addition to a multiplicative ratio approach, we can take an additive ratio approach to calculate ALAE. This is called additive development & is best used when ratios are small at early maturities, as it can improve stability. (We will show how to use the additive approach in the example below). Several advantages exist in using the ratio method. First, it acknowledges the correlation between ALAE & claims. Second, it results in less leveraged development factors than those based on paid ALAE data. Lastly, as the ratios can serve as a diagnostic tool, the ratio method allows for the flexibility of actuarial judgement, specifically in choosing the ultimate ALAE ratios from the latest years w/in the experience period.

→ Disadvantages include the possibility that there might be claims w/ no claim payment that still have a large ALAE. Another disadvantage is that an error in estimating ultimate claims can lead to an error in the ultimate ALAE estimate.

→ Example →

(1.75 points) You are given the following data as of December 31, 2010:

Accident Year	Paid Claims Only (excludes expense)			
	12 months	24 months	36 months	48 months
2007	$55,683	$68,489	$76,486	$77,685
2008	$62,489	$75,495	$82,168	
2009	$69,791	$80,489		
2010	$75,187			

Accident Year	Paid ALAE			
	12 months	24 months	36 months	48 months
2007	$2,985	$4,288	$5,217	$5,609
2008	$3,581	$4,968	$5,908	
2009	$3,979	$5,289		
2010	$4,315			

- Accident year 2010 ultimate paid claims estimate = $101,535
- Assume no further development after 48 months.
- Use all-year simple averages for all factor selections

a. Use the paid ALAE-to-paid claims only multiplicative method to estimate ALAE for accident year 2010.

b. Use the paid ALAE-to-paid claims only additive method to estimate ALAE for accident year 2010.

c. Briefly describe an advantage of using a ratio approach to estimate ultimate ALAE.

→ a) → Step 1: Compute ALAE-to-claim ratios

→ Given that we are instructed to use the ratio approach, begin by calculating the ratio of paid ALAE to paid claims by dividing the cells in the two given tables:

Accident Year	Paid ALAE-to-Paid Claims Only Ratio			
	12 months	24 months	36 months	48 months
2007	2,985/55,683 = 0.0536	0.0626	0.0682	0.0722
2008	0.0573	0.0658	0.0719	
2009	0.0570	0.0657		
2010	0.0574			

→ Step 2: Calculate multiplicative LDFs

→ From this, we can calculate the LDFs for 12-24, 24-36, & 36-48. Divide the values in each cell by the cell immediately to its left. Then, compute the average for each maturity period, which is what we were told to do in the question.

Accident Year	Loss Development Factors			
	12-24	24-36	36-48	48-Ult
2007	0.0626/0.0536 = 1.168	1.089	1.059	
2008	1.148	1.093		
2009	1.153			
Avg	**1.156**	**1.091**	**1.059**	
Age-to-Ult	**1.335**	**1.155**	**1.059**	**1.000**

→ Cumulative age-to-ultimate factor (multiplicative):

→ 12-ult = 1.156 * 1.091 * 1.059 = 1.335

→ Step 3: Estimate AY 2010 ultimate ALAE

→ The latest ALAE ratio (12 months) is 0.0574.

→ The AY 2010 estimated ultimate ALAE ratio is:

0.0574 * 1.335 = 0.0766

→ Given ultimate claims = $101,535, the AY 2010 estimated ultimate ALAE is:

0.0766 * $101,535 = $7,781.45

→ b) This is the same question as for part a, but we need to use the additive method instead of the multiplicative method.

→ Step 1: Compute the additive LDFs

→ We will start w/ the same table of ratios of paid ALAE to paid claims. To calculate the loss development factors, we will compute the difference between the values of two columns rather than the ratio. Then, we will compute the average for each maturity period, like we did in part a.

→ The LDF factors are:

Accident Year	Loss Development Factors			
	12-24	24-36	36-48	48-Ult
2007	0.0626 − 0.0536 = 0.0090	0.0056	0.0040	
2008	0.0085	0.0061		
2009	0.0087			
Avg	**0.0087**	**0.0058**	**0.0040**	
Age-to-Ult	**0.0186**	**0.0098**	**0.0040**	**0.0000**

→ Simple average → 12-24: (0.0090 + 0.0085 + 0.0087)/3 = 0.0087

→ 24-36: (0.0056 + 0.0061)/2 = 0.0058

→ 36-48: 0.0040 (only one value)

→ Cumulative age-to-ult factor (additive):

→ 12-to-ult = 0.0087 + 0.0058 + 0.0040 = 0.0186

→ Step 2: Estimate AY 2010 ultimate ALAE

→ The latest ALAE ratio (12 months) is 0.0574.

→ The AY 2010 estimated ultimate ALAE ratio is:

0.0574 + 0.0186 = 0.0760

→ Given ultimate claims = $101,535, the AY 2010 estimated ultimate ALAE is

0.0760 * $101,535 = $7,715.04

→ c) Any of the following are satisfactory:

→ Recognizes the correlation between ALAE & claims, providing a more accurate reflection of their relationship.

→ Reduces leverage in development factors compared to those based solely on paid ALAE dollars, leading to more stable estimates.

→ Offers flexibility for actuarial judgement by allowing the use of ultimate ALAE ratios from recent years, as the ratios can act as diagnostic tools to identify & adjust for outliers or anomalies in the data.

→ Assignment

→ Q1) Given the following information for an insurance company as of December 31, 2006.

Accident Year	Ultimate Claims	Paid ALAE
2003	$65,000	$3,000
2004	62,500	2,100
2005	66,000	1,200
2006	64,500	500

Accident Year	Ratio of Cumulative Paid ALAE to Cumulative Paid Claims			
	Age of Development in Months			
	12	24	36	Ultimate
2003	2.4%	3.0%	4.0%	4.8%
2004	2.0%	2.5%	3.7%	
2005	2.0%	2.6%		
2006	2.2%			

Calculate the unpaid ALAE for accident years 2003 through 2006.

→

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1						=XLOOKUP(E4,$K$9:$M$9,$K$19:$M$19,0)									
2					=($B$7-B4+1)*12		=MAX(XLOOKUP(B4,$B$13:$B$16,$C$13:$F$16))					=SUM(J4:J7)			
3		Accident Year	Ultimate Claims	Paid ALAE	Age	CDF	Latest ratio	Ultimate ratio	Est ult paid ALAE	Est unpaid ALAE		Total			
4		2003	$65,000	$3,000	48	0.00%	4.80%	4.80%	$3,120.00	$120		$5,113			
5		2004	$62,500	$2,100	36	0.80%	3.70%	4.50%	$2,812.50	$713					
6		2005	$66,000	$1,200	24	1.90%	2.60%	4.50%	$2,970.00	$1,770					
7		2006	$64,500	$500	12	2.47%	2.20%	4.67%	$3,010.00	$2,510					
8								=SUM(F4:G4)	=C7*H7	=I7-D7			=VALUE(LEFT(M12,2))		
9											12	24	36		
10		Ratio of Cumulative Paid ALAE to Cumulative Paid Claims									Loss Development Factors				
11			Age of Development in Months									Age-to-Age			
12		Accident Year	12	24	36	Ult				Accident Year	12-24	24-36	36-Ult		
13		2003	2.4%	3.0%	4.0%	4.8%				2003	0.6%	1.0%	0.8%	=F13-E13	
14		2004	2.0%	2.5%	3.7%					2004	0.5%	1.2%			
15		2005	2.0%	2.6%						2005	0.6%				
16		2006	2.2%												
17										Selected	0.57%	1.10%	0.80%	=AVERAGE(M13:M15)	
18															
19										Age-to-ult	2.47%	1.90%	0.80%	=SUM(M17:$M$17)	
20															