

2.5.0 → Overview

→ overview → Recall that the goal of ratemaking is to determine the premium to charge so that the fundamental insurance equation is balanced.

$$\text{Premium} = \text{Losses} + \text{LAE} + \text{ULAE} + \text{Profit}$$

→ So far, we have covered adjustments that should be made to premiums & losses so that they are at the level expected in the future when the new rates will be in effect. In this section, we will look at how to incorporate the last three components of the Fundamental Insurance Equation when setting rates.

2.5.1 → Loss adjustment expenses

→ overview → Loss adjustment expenses were briefly introduced in an earlier subsection. Recall that loss adjustment expenses (LAE) are expenses incurred in the process of settling claims, such as adjuster fees, claim department overhead, & legal defense costs. This can be broken into:

- 1) Allocated loss adjustment expenses (ALAE): LAE that are directly attributable to a specific claim
- 2) Unallocated loss adjustment expenses (ULAE): LAE that cannot be attributed to the processing of a specific claim

→ To improve consistency in reporting expenses, the U.S. insurance industry introduced another categorization. For reporting, LAE can be categorized as either:

- 1) Defense or loss containment (DCC) expenses: Expenses related to defense, litigating & loss containment services
- 2) Adjusting & other (AAO) expenses: All other expenses incurred during the claim settlement process, such as fees, claim adjuster salaries, & overhead expenses

→ In general, DCC expenses are treated as ALAE, while AAO expenses are treated as ULAE. However, we will use ALAE & ULAE in this subsection, as these divisions of LAE are more commonly used in ratemaking.

→ ALAE → ALAE typically varies by the dollar amount of each claim, so it has a close relationship to the amount of losses. There are two general approaches for incorporating ALAE in ratemaking, although the first is more commonly used:

- 1) Include ALAE w/ losses → losses + ALAE will be treated as a single element for projections & detecting patterns in loss development & trend
- 2) Study development & trend patterns for ALAE separately from losses → This approach is often used to detect any changes in ALAE patterns or when ALAE is significantly high, such as for some commercial lines of business.

→ While studying ALAE, it is also important to determine if ALAE is subject to policy limits or not, as the ALAE data being studied may only be the portion of ALAE that is within the policy limits, rather than the entire ALAE.

→ ULAE → ULAE typically varies by the # of claims reported, rather than by the dollar amount of each claim. It can be more difficult to incorporate ULAE into the loss projection process, compared to ALAE. For instance, a claims department may be working on settling claims from events that took place in several different historical time periods & for different lines of business at the same time. So, a reasonable method for allocating ULAE to losses is needed.

→ One simple approach is to assume that ULAE traces w/ loss & ALAE dollars consistently over time. This assumption applies to both the rate of payment & the amount of losses paid. The steps for incorporating ULAE using this approach are as follows:

- 1) Calculate the ratios of calendar year ULAE to calendar year paid loss plus ALAE over several years (e.g. 3 or more years, depending on the line of business)
- 2) Select a ratio to use (e.g. average or last 3 years or volume-weighted average)
- 3) Apply the ratio to each year's reported loss plus ALAE

→ When calculating the ratio, it is common to use data that has not been adjusted for trend or development since that data is used for other financial reporting & is more readily available. However, the ratio is then applied to loss plus ALAE data that has been adjusted for anomalies, development, & trend. So, it requires the assumption that ULAE trend & develop at the same rate as loss plus ALAE.

→ Example →

You are given the following information:

Calendar Year	Paid Loss	Paid ALAE	Paid ULAE
2016	552,750	42,300	50,800
2017	648,100	46,650	59,950
2018	751,000	51,250	65,850
2019	870,900	59,700	82,700

- Projected ultimate losses and ALAE for 2018 are \$892,500.

1. Select a ULAE factor.

2. Calculate projected ultimate losses and LAE for accident year 2018.

1) → First, sum the paid loss & paid ALAE amounts for each calendar year. Then, calculate the ratios of CY paid ULAE to CY paid loss plus ALAE.

Calendar Year	Paid Loss and ALAE	Paid ULAE	ULAE Ratio
2016	552,750 + 42,300 = 595,050	50,800	$\frac{50,800}{595,050} = 8.54\%$
2017	648,100 + 46,650 = 694,750	59,950	$\frac{59,950}{694,750} = 8.63\%$
2018	751,000 + 51,250 = 802,250	65,850	$\frac{65,850}{802,250} = 8.21\%$
2019	870,900 + 59,700 = 930,600	82,700	$\frac{82,700}{930,600} = 8.89\%$
Total	3,022,650	259,300	$\frac{259,300}{3,022,650} = 8.58\%$

→ The ratios for 2016 through 2018 are all similar so select a weighted average of

$$\frac{59,300}{3,022,650} = 0.00858$$

→ Then the ULAE factor is: $1 + 0.00858 = 1.00858$

→ Apply this factor to projected ultimate losses & LAE for 2018 and to determine the projected ultimate losses + LAE

$$1.00858 \times 892,500 = \$899,124$$

→ Other ways

→ For lines of business where ALAE is a small percent of loss, such as homeowners, a combined adjustment for ALAE & ULAE can be done using the approach above. Specifically, we can calculate an ALAE factor by comparing CY paid LAE data to CY paid loss data. This factor will then be applied to each year's reported loss.

→ Besides the dollar-based allocation method described above, ULAE can also be incorporated by

- 1) using count-based allocation methods → These methods assume the same types of transactions cost the same amount (regardless what the dollar amount of the claim is) & that there is a cost associated with a claim remaining open.

- 2) studying how claim adjusters spend their time → This involves studying how time is spent by type of claim, type of claim adjuster, type of business, etc. This method typically results in a better estimator but is more time consuming than other methods.

→ The details of these methods are not covered on the exam.

→ Example →

You are given the following information for a homeowners book of business:

Calendar Year	Amount of Insurance Years (\$000s)	Reported Non-Modeled Cat Losses & Paid ALAE
2006	2,927,233	245,287
2007	2,973,561	233,587
2008	2,957,807	95,833
2009	3,115,471	43,719
2010	3,542,699	2,882,314
2011	3,259,448	105,709
2012	3,420,296	310,671
2013	3,085,130	60,310
2014	3,385,704	556,363
2015	3,237,248	1,304
2016	2,865,198	80,844
2017	2,855,069	538,382
2018	3,171,067	31,202
2019	3,237,948	71,964
2020	3,368,559	196,020

- Modeled catastrophe pure premium (including LAE): \$30

- Ratio of ULAE to Loss and ALAE: 2.3%

- Future average AIY per exposure: \$275

Calculate the total catastrophe pure premium including LAE using all years of non-modeled catastrophe data.

→ First, calculate the ratio of non-modeled cat losses to AIY for each year. For instance, for 2006

$$\text{Cat-to-AIY ratio} = \frac{245,287}{2,927,233} = 0.08379$$

→ Complete this for all years.

Calendar Year	Amount of Insurance Years (\$000s)	Reported Non-Modeled Cat Losses & Paid ALAE	Cat-to-AIY Ratio
2006	2,927,233	245,287	0.08379
2007	2,973,561	233,587	0.07855
2008	2,957,807	95,833	0.32399
2009	3,115,471	43,719	0.01403
2010	3,542,699	2,882,314	0.81359
2011	3,259,448	105,709	0.03243
2012	3,420,296	310,671	0.09083
2013	3,085,130	60,310	0.01955
2014	3,385,704	556,363	0.16433
2015	3,237,248	1,304	0.00040
2016	2,865,198	80,844	0.02822
2017	2,855,069	538,382	0.18857
2018	3,171,067	31,202	0.00984
2019	3,237,948	71,964	0.02223
2020	3,368,559	196,020	0.05819

→ Then take a straight average of the cat-to-AIY ratios.

$$\text{non-modeled cat provision per AIY} = \frac{0.08379 + 0.07855 + \dots + 0.05819}{15} \\ = 0.12857$$

→ Load this average for ULAE.

$$0.12857 \times (1 + 0.023) = 0.13153$$

→ Apply this provision to the future average AIY per exposure.

$$\text{non-modeled cat AIY including LAE} = 0.13153 \times 275 = 36.17$$

→ Finally, sum the modeled & non-modeled cat AIY to find the total cat AIY, including LAE.

$$\text{total cat AIY including LAE} = 36.17 + 30 = 66.17$$

→ Note → As before, it is also reasonable to find a weighted average (rather than a straight average) of the cat-to-AIY ratios, w/ AIY as the weights.

→ Assignment

→ Q1) (1.5 points) Given the following countrywide calendar year information:

Calendar Year	Earned Premium	Paid Loss	Paid ALAE	Paid Loss and ALAE	Paid ULAE	ULAE to Paid ALAE (w/ ALAE & ULAE)
2006	\$696,667	\$47,500	\$52,500	\$26,125		
2007	\$733,333	\$50,000	\$50,000	\$55,000		
2008	\$805,673	\$49,850	\$24,938	\$52,368	\$52,369	0.10

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