6.7.2 → Case outstanding Technique #2

→ Assumptions & uses

→ In the event that an insurer lacks historical claim data, <u>case outstanding Technique #2</u> is a viable option. It allows us to project future unpaid claims by combining case outstanding using industry-based development factors. Thus, the only information this technique requires is the insurer's current case outstanding.

→ Technique #2 has the same three <u>key assumptions</u> as Technique #1, with the exception that future development is based on industry-reported/paid CDFs.

→ 1) Claims recorded to date will develop in a similar fashion in the future to the industry benchmark

→ 2) Case outstanding gives us relevant information on claims that have yet to be observed

→ Throughout the policy period:

- → the mix of claims is stable
- → policy limits (if any) are stable
- → Reinsurance retention limits (if any) are stable
- → There is consistent claims processing (claim settlement rates & case outstanding adequacy).

→ Like Technique #1, Technique #2 is not commonly used. However, there are instances where case outstanding could be the only information available to the actuary. This is most common for self-insurers or in the aftermath of mergers or consolidations w/ companies that are self-insured, especially for older years.

→ There are several disadvantages to this technique, however. It relies on the insurer's ability to obtain industry CDFs, which may not always be feasible. Additionally, it assumes that the obtained industry CDFs are representative of the future claim development within the company. Lastly, any anomalies or large losses in the case outstanding can distort the results of this approach.

→ Technique

→ The main idea of case outstanding Technique #2 is to combine industry-based paid & reported CDFs to create a singular <u>case outstanding development factor</u>.

$$\text{Case outstanding Development factor} = 1 + \frac{(\text{Reported CDF} - 1)(\text{paid CDF})}{\text{paid CDF} - \text{Reported CDF}}$$

⇒ just memorize this

→ The factor is calculated by AY. We then multiply it by the case outstanding for the corresponding AY to project unpaid claims.

→ Let's see the action in an example.

→ Examples

→ A self-insurer has the following data available to them as of December 31, 2015.

Accident Year	Case Outstanding
2014	$27,000
2015	$11,000

Additionally, they are able to obtain the following industry cumulative development factors:

Maturity	Paid CDF	Reported CDF
12 Months	2.14	1.83
24 Months	1.58	1.30
36 Months	1.24	1.12

Estimate the self-insurer's current total unpaid claims.

→ For each maturity, use the provided industry CDFs to create the case outstanding development factor. AY 2014 is 24 months old as of the end of 2015:

$$\text{AY 2014 case outstanding dev factor} = 1 + \frac{(\text{Reported CDF}_{24} - 1)(\text{Paid CDF}_{24})}{\text{Paid CDF}_{24} - \text{Reported CDF}_{24}} = 1 + \frac{(1.30-1)(1.58)}{1.58 - 1.30} = 2.693$$

& AY 2015 is 12 months old:

$$\text{AY 2015 case outstanding dev factor} = 1 + \frac{(\text{Reported CDF}_{12} - 1)(\text{Paid CDF}_{12})}{\text{Paid CDF}_{12} - \text{Reported CDF}_{12}} = 1 + \frac{(1.83-1)(2.14)}{2.14 - 1.83} = 6.730$$

→ Multiply the case outstanding development factor by case outstanding for each development year to obtain the unpaid claims estimate.

AY 2014 unpaid claims = AY 2014 case outstanding × AY 2014 case outstanding Dev Factor
= 27,000 × 2.693
= 72,707.14

AY 2015 unpaid claims = AY 2015 case outstanding × AY 2015 case outstanding Dev Factor
= 11,000 × 6.730
= 74,030.45

→ Then, sum them up to estimate the total unpaid claims.

Total unpaid claims = 72,707.14 + 74,030.45 = 146,737.59

→ Given the following information on December 31, 2005:

Accident Year	Industry Case Outstanding ($000)			
	12 Months	24 Months	36 Months	48 Months
2002	18,000	27,000	9,000	0
2003	20,000	26,000	8,000	
2004	22,000	30,000		
2005	23,000			

Accident Year	Industry Cumulative Paid Claims ($000)			
	12 Months	24 Months	36 Months	48 Months
2002	52,000	89,000	110,000	122,000
2003	55,000	91,000	111,000	
2004	57,000	88,000		
2005	62,000			

- Assume no further reported claim development after 48 months
- Use an all-year straight average for all factor selections
- AY2005 case outstanding for Company A is $15,000

Estimate the AY2005 IBNR for Company A.

→ Notice that we're given the current case outstanding for Company A, but development triangles for the industry as a whole. This indicates that we'll need to estimate Company A's unpaid claims using case outstanding Technique #2.

→ AY 2005 is 12 months old as of the end of 2005. To apply this technique, we need the 12-month industry reported & paid CDFs. The cumulative paid claim triangle is provided to us, thus finding the desired CDF is straightforward.

Accident Year	Industry Paid Claims Development Factors		
	12 to 24 Months	24 to 36 Months	36 to 48 Months
2002	$\frac{89,000}{52,000} = 1.712$	$\frac{110,000}{89,000} = 1.236$	$\frac{122,000}{110,000} = 1.109$
2003	$\frac{91,000}{55,000} = 1.655$	$\frac{111,000}{91,000} = 1.220$	
2004	$\frac{88,000}{57,000} = 1.544$		
Average	1.637	1.228	1.109

→ The industry 12-month CDF for paid claims is

$\text{Paid CDF}_{12} = 1.637(1.228)(1.109) = 2.229$

→ To obtain the reported claims development factors, we need the reported claims triangle, which can be constructed by adding the case outstanding & paid claims triangles.

Accident Year	Industry Cumulative Reported Claims ($000)			
	12 Months	24 Months	36 Months	48 Months
2002	70,000	116,000	119,000	122,000
2003	75,000	117,000	119,000	
2004	79,000	118,000		
2005	85,000			

⇒ paid + case outstanding = Reported

→ Calculate the reported claims development factors & the 12-month reported CDF in the same way we calculated the paid development factors & CDF.

Accident Year	Industry Reported Claims Development Factors		
	12 to 24 Months	24 to 36 Months	36 to 48 Months
2002	$\frac{116,000}{70,000} = 1.657$	$\frac{119,000}{116,000} = 1.026$	$\frac{122,000}{119,000} = 1.025$
2003	$\frac{117,000}{75,000} = 1.56$	$\frac{119,000}{117,000} = 1.017$	
2004	$\frac{118,000}{79,000} = 1.595$		
Average	1.570	1.021	1.025

$\text{Reported CDF}_{12} = 1.570(1.021)(1.025) = 1.644$

→ Solve for the case outstanding development factor using the main equation.

$$\text{AY 2005 case outstanding dev factor} = 1 + \frac{(\text{Reported CDF}_{12} - 1)(\text{Paid CDF}_{12})}{\text{Paid CDF}_{12} - \text{Reported CDF}_{12}} = 1 + \frac{(1.644-1)(2.229)}{2.229 - 1.644} = 3.458$$

→ paid CDF ≥ reported CDF always b/c can't be paid if it wasn't first reported

→ Finally, multiply the factor by AY 2005 case outstanding to estimate AY 2005 unpaid claims, & subtract the case outstanding to estimate IBNR.

AY 2005 IBNR = AY 2005 unpaid claims − AY 2005 case outstanding
= (15000)(3.458) − 15000
= 36,867.92

→ Assignment

→ Q1) You are given the following information about Company A as of December 31, 2022:

Accident Year	Case Outstanding
2020	$5,000
2021	$15,800
2022	$24,000

They obtain the following industry cumulative development factors:

Maturity	Paid CDF	Reported CDF
12 Months	2.00	1.60
24 Months	1.50	1.30
36 Months	1.20	1.05

Estimate Company A's current total unpaid claims.

→

	A	B	C	D	E	F	G	H
1								
2				=($B$6-B4+1)*12	=XLOOKUP($D4,$A$10:$A$12,XLOOKUP(E$3,$C$9:$D$9,$C$10:$D$12))		=1+(F4-1)*E4/(E4-F4)	=G4*C4
3		Accident Year	Case Outstanding	Age	Paid CDF	Reported CDF	Case outstanding development factor	Est unpaid claims
4		2020	$5,000	36	1.2	1.05	1.4	$7,000
5		2021	$15,800	24	1.5	1.3	3.25	$51,350
6		2022	$24,000	12	2	1.6	4	$96,000
7								
8							Total est unpaid claims =	$154,350
9		Maturity	Paid CDF	Reported CDF				=SUM(H4:H6)
10	12	12 Months	2	1.6				
11	24	24 Months	1.5	1.3				
12	36	36 Months	1.2	1.05				
13	=VALUE(LEFT(B12,2))							