

Reading: Friedland 13 (Berquist-Sherman Methods)
Model: 2019.Fall #21
Problem Type: Reserving Methods - RBS (Reported Berq-Sherm)

F-13 (010) Reported BerqSherm (Problem 1)

Find Use the reported Berquist-Sherman method to calculate the

ultimate for AY 2024

Given

AY	Cumulative Paid <u>Loss</u> (\$000s) (CPL)			
	12	24	36	48
2022	935	1,403	1,543	1,543
2023	1,041	1,564	1,717	
2024	1,156	1,734		
2025	1,285			

AY	Cumulative Reported <u>Loss</u> (\$000s) (CRL)			
	12	24	36	48
2022	1,309	1,683	1,605	1,543
2023	1,457	1,876	1,777	
2024	1,618	2,019		
2025	1,699			

AY	Cumulative Paid <u>Counts</u> (CPC)			
	12	24	36	48
2022	468	701	772	772
2023	491	737	811	
2024	514	772		
2025	540			

AY	Cumulative Reported <u>Counts</u> (CRC)			
	12	24	36	48
2022	608	772	787	772
2023	638	811	827	
2024	668	849		
2025	702			

* Assume no development past 48 months

Step 1a calculate Average Paid Loss (APL) & Average Case O/S (ACOS)

(Solution 1)

AY	Average Paid Loss (\$000s) (APL)			
	12	24	36	48
2022	1.998	2.001	1.999	1.999
2023	2.120	2.122	2.117	
2024	2.249	2.246		
2025	2.380			

Ex:
$$\frac{2.1}{\text{APL}} = \frac{1041}{491}$$

$$\text{APL} = \text{CPL} / \text{CPC}$$

AY	Average Case O/S (\$000s) (ACOS)			
	12	24	36	48
2022	2.671	3.944	4.133	0.000
2023	2.830	4.216	3.750	
2024	3.000	3.701		
2025	2.556			

Ex:
$$\frac{2.8}{\text{ACOS}} = \frac{(1457 - 1041)}{(638 - 491)}$$

$$\text{ACOS} = (\text{CRL} - \text{CPL}) / (\text{CRC} - \text{CPC})$$

Step 1b calculate & select severity trend down columns (if trend is not provided)

AY	Average Paid Loss TREND			
	12	24	36	48
2022				
2023	6.1%	6.0%	5.9%	
2024	6.1%	5.8%		
2025	5.8%			

severity trend selection: 6.0%
 severity trend given: n/a

AY	Average Case O/S TREND			
	12	24	36	48
2022				
2023	6.0%	6.9%	-9.3%	
2024	6.0%	-12.2%		
2025	-14.8%			

Note decrease along latest diagonal.
 (Evidence for case reserve weakening in CY 2025)

Step 2a restate ACOS by de-trending from latest diagonal of original ACOS

AY	Average Case O/S (ACOS)			
	12	24	36	48
2022	2.146	3.294	3.538	0.000
2023	2.275	3.492	3.750	
2024	2.411	3.701		
2025	2.556			

* latest diagonal doesn't change under de-trending

Ex:
$$2.275 = 2.556 / 1.06^2$$

Step 2b restate CRL using restated ACOS from step 2a: (restated ACOS) x (open counts) + (original CPL)

AY	Restated CRL			
	12	24	36	48
2022	1,235	1,637	1,596	1,543
2023	1,375	1,822	1,777	
2024	1,527	2,019		
2025	1,699			

Ex:
$$1,375 = 2.275 \times (638 - 491) + 1041$$

Step 3b apply development method to restated CRL from step 2b

LDFs	AY	12-24	24-36	36-48	48-ult
	2022	1.325	0.975	0.967	
	2023	1.325	0.975		
	2024	1.322			
	2025				
selected		1.324	0.975	0.967	1.000

Tail Factor: Set = 1.0 if triangle is fully developed.
 If triangle is not fully developed then select something different from 1.0

CDFs		12-ult	24-ult	36-ult	48-ult
age -> ult		1.248	0.943	0.967	1.000

<===== (selected) x (prior [age -> ult])
 (calculate from right-to-left)

Ults.		'25@12	'24@24	'23@36	'22@48
diagonal		1,699	2,019	1,777	1,543
ultimate		2,121	1,904	1,718	1,543

<===== (diagonal) x (age -> ult)

Step 3b ultimate for AY 2024 = 1,904 <-- final answer

Reading: Friedland 13 (Berquist-Sherman Methods)
Model: 2019.Fall #21
Problem Type: Reserving Methods - RBS (Reported Berq-Sherm)

F-13 (010) Reported BerqSherm (Problem 2)

Find Use the reported Berquist-Sherman method to calculate the

unpaid for AY 2025

Given

AY	Cumulative Paid <u>Loss</u> (\$000s) (CPL)			
	12	24	36	48
2022	795	1,193	1,312	1,312
2023	863	1,296	1,425	
2024	935	1,407		
2025	1,016			

AY	Cumulative Reported <u>Loss</u> (\$000s) (CRL)			
	12	24	36	48
2022	1,113	1,431	1,364	1,312
2023	1,238	1,595	1,510	
2024	1,375	1,716		
2025	1,444			

AY	Cumulative Paid <u>Counts</u> (CPC)			
	12	24	36	48
2022	398	596	656	656
2023	417	626	689	
2024	437	656		
2025	459			

AY	Cumulative Reported <u>Counts</u> (CRC)			
	12	24	36	48
2022	510	656	669	656
2023	542	698	709	
2024	575	723		
2025	578			

* Assume no development past 48 months

Step 1a calculate Average Paid Loss (APL) & Average Case O/S (ACOS)

(Solution 2)

AY	Average Paid Loss (\$000s) (APL)			
	12	24	36	48
2022	1.997	2.002	2.000	2.000
2023	2.070	2.070	2.068	
2024	2.140	2.145		
2025	2.214			

Ex:
$$\frac{2.1}{\text{APL}} = \frac{863}{\text{CPL} / \text{CPC}}$$

AY	Average Case O/S (\$000s) (ACOS)			
	12	24	36	48
2022	2.839	3.967	4.000	0.000
2023	3.000	4.153	4.250	
2024	3.188	4.612		
2025	3.597			

Ex:
$$\frac{3.0}{\text{ACOS}} = \frac{(1238 - 863) / (542 - 417)}{(\text{CRL} - \text{CPL}) / (\text{CRC} - \text{CPC})}$$

Step 1b calculate & select severity trend down columns (if trend is not provided)

AY	Average Paid Loss TREND			
	12	24	36	48
2022				
2023	3.7%	3.4%	3.4%	
2024	3.4%	3.6%		
2025	3.5%			

severity trend selection: 3.5%
severity trend given: n/a

AY	Average Case O/S TREND			
	12	24	36	48
2022				
2023	5.7%	4.7%	6.3%	
2024	6.3%	11.1%		
2025	12.8%			

Note increase along latest diagonal.
(Evidence for case reserve strengthening in CY 2025)

Step 2a restate ACOS by de-trending from latest diagonal of original ACOS

AY	Average Case O/S (ACOS)			
	12	24	36	48
2022	3.244	4.305	4.106	0.000
2023	3.358	4.456	4.250	
2024	3.475	4.612		
2025	3.597			

* latest diagonal doesn't change under de-trending

Ex:
$$3.358 = \frac{3.597}{1.035^2}$$

Step 2b restate CRL using restated ACOS from step 2a: (restated ACOS) x (open counts) + (original CPL)

AY	Restated CRL			
	12	24	36	48
2022	1,158	1,451	1,365	1,312
2023	1,283	1,617	1,510	
2024	1,415	1,716		
2025	1,444			

Ex:
$$1,283 = 3.358 \times (542 - 417) + 863$$

Step 3b apply development method to restated CRL from step 2b

LDFs	AY	12-24	24-36	36-48	48-ult
	2022	1.253	0.941	0.961	
	2023	1.260	0.934		
	2024	1.213			
	2025				
selected		1.242	0.938	0.961	1.000

Tail Factor: Set = 1.0 if triangle is fully developed.
If triangle is not fully developed then select something different from 1.0

CDFs		12-ult	24-ult	36-ult	48-ult
age -> ult		1.119	0.901	0.961	1.000

<===== (selected) x (prior [age -> ult])
(calculate from right-to-left)

Ult.		'25@12	'24@24	'23@36	'22@48
diagonal		1,444	1,716	1,510	1,312
ultimate		1,616	1,546	1,451	1,312

<===== (diagonal) x (age -> ult)

Step 3b unpaid for AY 2025 = 600 <-- final answer