Reading: Friedland 14 (S/S) (Fr14.SS) 02a-Question
Model: 2016.Fall #24(b)
Problem Type: Ratio method (multiplicative) for S/S

Problem Use the multiplicative approach to estimate the ultimate S/S for AY 2021

cumulative paid claims:

AY	12	24	36	48
2018	4,500	12,700	18,900	20,800
2019	3,900	11,900	17,900	
2020	5,200	17,200		
2021	4,800			

cumulative paid SS:

AY	12	24	36	48
2018	131	440	620	716
2019	117	432	560	
2020	135	663		
2021	134			

selected ultimate claims by AY (using paid claim development)

AY	ult clms
2018	20,800
2019	19,699
2020	28,322
2021	24,189

<=== *sometimes you are not given the ultimate claims*
- you would then have to calculate them using an appropriate method
- see 2016.Spring #23

When selecting development factors, you may select a SIMPLE AVERAGE in this problem.

** There is no development beyond 48 months.*

Step 1: Ratio of cumulative paid S/S to cumulative paid claims:

AY	12	24	36	48
2018	2.91%	3.46%	3.28%	3.44%
2019	3.00%	3.63%	3.13%	
2020	2.60%	3.85%		
2021	2.79%			

Step 2: Development triangle (multiplicative):

AY	12-24	24-36	36-48	48-		
2018	1.1890	0.9480	1.0488		<===	MULTIPLICATIVE development
2019	1.2100	0.8623				
2020	1.4808					
2021						
selected	1.2933	0.9052	1.0488	1.0000	<===	tail = 1.0
cum	1.2279	0.9494	1.0488	1.0000	<===	selected x (previous cum)
Ult Ratio	3.43%	3.66%	3.28%	3.44%	<===	cum x (latest diagonal from Step 1)

AY	2021	2020	2019	2018	<===	given information
ult clms	24,189	28,322	19,699	20,800		*(repeated here for convenience)*
pd S/S	134	663	560	716		

Step 3: Ultimate S/S = (Ultimate Ratio) x (Ultimate Claims)
Unpaid S/S = (Ultimate S/S) - (Paid S/S)

AY	Ult S/S	UnPd S/S
2018	715.5	(0.5)
2019	646.1	86.1
2020	1,036.6	373.6
2021	829.7	695.7
	3,227.9	1,154.9

Step 4: ultimate S/S for AY 2021 = 829.7 <=== final answer

For COMPARISON, the S/S ultimate and unpaid values using standard paid S/S development are:

Development method:

AY	Ult S/S	UnPd S/S
2018	716.0	-
2019	646.7	86.7
2020	1,035.7	372.7
2021	834.7	700.7
	3,233.1	1,160.1

% Difference: [(ratio method) - (development method)] / (ratio method)

Ult S/S	UnPd S/S
0%	100%
0%	-1%
0%	0%
-1%	-1%
0%	0%

Reading: Friedland 14 (S/S) (Fr14.SS) 03a-Question
Model: 2016.Fall #24(b)
Problem Type: Ratio method (multiplicative) for S/S

Problem Use the multiplicative approach to estimate the unpaid S/S for AY 2021

cumulative paid claims:

AY	12	24	36	48
2018	6,900	20,700	29,800	32,100
2019	5,600	16,100	25,400	
2020	7,100	21,700		
2021	7,500			

cumulative paid SS:

AY	12	24	36	48
2018	173	836	1,338	1,487
2019	112	400	550	
2020	156	629		
2021	165			

selected ultimate claims by AY (using paid claim development)

AY	ult clms
2018	32,100
2019	27,360
2020	35,264
2021	36,285

<=== *sometimes you are not given the ultimate claims*
- you would then have to calculate them using an appropriate method
- see 2016.Spring #23

When selecting development factors, you may select a SIMPLE AVERAGE in this problem.

** There is no development beyond 48 months.*

Step 1: Ratio of cumulative paid S/S to cumulative paid claims:

AY	12	24	36	48
2018	2.51%	4.04%	4.49%	4.63%
2019	2.00%	2.48%	2.17%	
2020	2.20%	2.90%		
2021	2.20%			

Step 2: Development triangle (multiplicative):

AY	12-24	24-36	36-48	48-		
2018	1.6096	1.1114	1.0312		<===	MULTIPLICATIVE development
2019	1.2400	0.8750				
2020	1.3182					
2021						
selected	1.3893	0.9932	1.0312	1.0000	<===	tail = 1.0
cum	1.4229	1.0242	1.0312	1.0000	<===	selected x (previous cum)
Ult Ratio	3.13%	2.97%	2.24%	4.63%	<===	cum x (latest diagonal from Step 1)

AY	2021	2020	2019	2018	<===	given information
ult clms	36,285	35,264	27,360	32,100		*(repeated here for convenience)*
pd S/S	165	629	550	1,487		

Step 3: Ultimate S/S = (Ultimate Ratio) x (Ultimate Claims)
Unpaid S/S = (Ultimate S/S) - (Paid S/S)

AY	Ult S/S	UnPd S/S
2018	1,486.2	(0.8)
2019	612.9	62.9
2020	1,047.3	418.3
2021	1,135.7	970.7
	4,282.2	1,451.2

Step 4: unpaid S/S for AY 2021 = 970.7 <=== final answer

For COMPARISON, the S/S ultimate and unpaid values using standard paid S/S development are:

Development method:

AY	Ult S/S	UnPd S/S
2018	1,487.0	-
2019	611.2	61.2
2020	1,040.0	411.0
2021	1,130.9	965.9
	4,269.1	1,438.1

% Difference: [(ratio method) - (development method)] / (ratio method)

Ult S/S	UnPd S/S
0%	100%
0%	3%
1%	2%
0%	0%
0%	1%