

7.1.2 → Berquist-Sherman Adjusted Claim Development Adjustment

→ **Duration:** Similar to the way a change in the claims settlement rate can impact paid claims data, a change in the case outstanding adequacy can impact reported claims data. If a company begins decreasing case outstanding at each reported claim, the development method will interpret this trend as reported claims as an increase in severity. If the claim severity isn't actually increasing, development factors & ultimate claims estimates will be overestimated. Likewise, a decrease in case outstanding adequacy would cause development factors & ultimate claims estimates to be underestimated.

→ We can again turn to Berquist & Sherman for a solution. The Berquist-Sherman reported claims development adjustment, or the B-S adjustment, involves restating reported claims data at a common level of case outstanding adequacy. After this, the reported development method can be performed using the adjusted reported data.

→ The reported B-S technique assumes that annual changes in the average case outstanding at each maturity are due to changes in case outstanding adequacy or trends in claim severity. In practice, there are other factors that could impact the average case outstanding such as increases in amount of unpaid placed in subsidies/large/junior claim categories.

→ Application of the Berquist-Sherman Case Outstanding Adjustment

→ As with the paid methods, it's important to be able to determine when the reported B-S adjustment is necessary. An adjustment is warranted when there have been changes in case outstanding adequacy. We can check this by looking at a triangle of the average case outstanding.

$$\begin{array}{c} \text{"outstanding"} \\ \text{Avg Case OS} = \frac{\text{Case OS}}{\text{Open Count}} = \frac{\text{Reported Claims} - \text{Paid Claims}}{\text{Reported Counts} - \text{Closed Counts}} \end{array}$$

→ In general, if average case outstanding for each maturity should trend at the same rate as severity. For example, if the 2010 average case outstanding at 12 months is \$300, & claim severity trends at 5% annually, then we would expect the 2011 average case outstanding at 18 months to be \$300(1.05) = \$315. If it is more than the reported claims data might be distorted by a change in case outstanding adequacy.

→ We will demonstrate how to apply the B-S reported claims development adjustment w/ the following example.

→ Example → You are given:

Accident Year	Cumulative Reported Claim Counts				Projected Ultimate Claim Counts
	12 Months	24 Months	36 Months	48 Months	
2011	200	350	450	480	480
2012	210	360	475		500
2013	220	375			520
2014	240				540

Accident Year	Cumulative Reported Claims (\$000)			
	12 Months	24 Months	36 Months	48 Months
2011	350	650	950	1,000
2012	450	750	1,100	
2013	550	850		
2014	750			

Accident Year	Cumulative Closed Claim Counts			
	12 Months	24 Months	36 Months	48 Months
2011	120	300	420	480
2012	130	310	440	
2013	140	325		
2014	150			

Accident Year	Cumulative Paid Claims (\$000)			
	12 Months	24 Months	36 Months	48 Months
2011	150	300	450	500
2012	171	315	475	510
2013	193	340	500	535
2014	217			

Assume losses are fully developed at 48 months.

Estimate AY2014 ultimate claims, adjusting for any changes in case outstanding adequacy.

→ Evaluate data

→ The B-S reported adjustment is appropriate if average case outstanding trends at a significantly different rate from claim severity. Start by analyzing the severity trends. We can't just look at severity trend, so we'll need to calculate our using the data construct the cumulative paid severity triangle by dividing cumulative paid claims by cumulative closed claim counts.

Accident Year	Cumulative Paid Severities (\$000)			
	12 Months	24 Months	36 Months	48 Months
2011	150/120 = 1.250	500/300 = 1.667	850/420 = 2.024	1,000/480 = 2.083
2012	171/130 = 1.315	543/310 = 1.752	935/440 = 2.125	
2013	193/140 = 1.379	597/325 = 1.837		
2014	217/150 = 1.447			

→ Next, calculate the annual percent changes in paid severity for each period.

Accident Year	% Change in Paid Severity			
	12 Months	24 Months	36 Months	
2011-12	(1.315/1.250) - 1 = 5.2%	(1.752/1.667) - 1 = 5.1%	(2.125/2.024) - 1 = 5.0%	
2012-13	(1.379/1.315) - 1 = 4.8%	(1.837/1.752) - 1 = 4.9%		
2013-14	(1.447/1.379) - 1 = 4.9%			

→ Based on the analysis above, we observe that severity appears to trend at approximately 5% per year.

→ Repeat the same process using the average case outstanding. Construct the average case outstanding triangle using the equation from above.

Accident Year	Average Case Outstanding (\$000)			
	12 Months	24 Months	36 Months	48 Months
2011	350 - 150 = 2,500	650 - 500 = 3,000	950 - 850 = 3,333	0
2012	450 - 171 = 2,889	750 - 543 = 2,146	1,100 - 935 = 1,645	4714
2013	550 - 193 = 3,487	850 - 597 = 2,953	1,447 - 1,100 = 3,474	
2014	750 - 217 = 5,292			

→ It should be fairly easy to see that the average case outstanding is increasing faster than the average severity. That said, for the sake of being thorough, let's calculate the percent change in the average case outstanding for comparison.

Accident Year	% Change in Average Case Outstanding			
	12 Months	24 Months	36 Months	
2011-12	(3.487/2,500) - 1 = 39.5%	(4.140/3,000) - 1 = 38.0%	(4.714/3,333) - 1 = 41.4%	
2012-13	(4.463/3.487) - 1 = 28.0%	(5.060/4.140) - 1 = 22.2%		
2013-14	(5.922/4.463) - 1 = 32.7%			

→ Based on the analysis above, the average case outstanding is increasing much faster than the paid severity. Assuming this difference in trend rates is due to an increase in case outstanding adequacy, we can conclude that a B-S reported adjustment is appropriate.

→ Restate reported claims

→ To perform the adjustment, start by creating an adjusted average case outstanding triangle. To average case outstanding at each maturity should trend w/ severity. Therefore, we can create an adjusted average case triangle by truncating the last average case outstanding to the most recent reported claims.

Accident Year	Adjusted Average Case Outstanding (\$000)			
	12 Months	24 Months	36 Months	48 Months
2011	5.922(1.05) ⁻³ = 5,116	5,060(1.05) ⁻² = 4,590	4,714(1.05) ⁻¹ = 4,490	0
2012	5.922(1.05) ⁻² = 5,372	5,060(1.05) ⁻¹ = 4,819	4,714	
2013	5.922(1.05) ⁻¹ = 5,640	5,060		
2014	5,922			

→ After creating the adjusted average case outstanding triangle, we can apply the truncation to the equation above to get an equation for the adjusted cumulative reported claims for each year & maturity.

$$\text{Adj. Reported Claims} = \frac{\text{Adj. Avg Case OS} - \text{Paid Claims}}{\text{Reported Counts} - \text{Closed Counts}}$$

$$\Rightarrow \text{Adj. Reported Claims} = \text{Adj. Avg Case OS} - (\text{Adj. Avg Case OS} - \text{Paid Claims}) + \text{Paid Claims}$$

→ For each cell in the adjusted average case triangle, multiply by open claim counts & add cumulative paid claims. The most recent reported claims (i.e. the largest diagonal) will not be adjusted since the average case outstanding is unaffected.

Accident Year	Adjusted Cumulative Reported Claims (\$000)			
	12 Months	24 Months	36 Months	48 Months
201				