

7.1 Summary

⌚ 10m

Berquist-Sherman Paid Claim Development Adjustment

- Also called **Berquist-Sherman Claims Settlement Rate Adjustment**.
- Restates paid claims data by interpolating paid amounts between the historical disposal rate and the most recent disposal rate for each maturity.
- Assumes that disposal rates are roughly proportional to the total percentage of ultimate claims paid for each maturity

MECHANICS OF THE ADJUSTMENT

1. Analyse the historical disposal rates. If the disposal rates changed significantly over the year, a B-S paid claims development adjustment is warranted.
2. (Assuming adjustment is appropriate) Restate the cumulative paid claims.
 1. Select the disposal rates by maturity.
 2. Interpolate between paid claims of consecutive maturities.
 - If historical disposal rate < selected disposal rate, then adjust paid claims upward.
 - If historical disposal rate > selected disposal rate, then adjust paid claims downward.
3. Perform the paid development method.

PAID B-S INTERPOLATION FORMULAS

If historical disposal rate < selected disposal rate:

$$\text{Adjusted Paid}_t = \text{Paid}_t + (\text{Paid}_{t+1} - \text{Paid}_t) \left(\frac{\text{Selected DR}_t - \text{Historical DR}_t}{\text{Historical DR}_{t+1} - \text{Historical DR}_t} \right)$$

If historical disposal rate > selected disposal rate:

$$\text{Adjusted Paid}_t = \text{Paid}_t - (\text{Paid}_t - \text{Paid}_{t-1}) \left(\frac{\text{Historical DR}_t - \text{Selected DR}_t}{\text{Historical DR}_t - \text{Historical DR}_{t-1}} \right)$$

Alternative to Linear Interpolation: Exponential Fits

After determining that an adjustment is needed:

1. Compute adjusted cumulative closed claim counts by multiplying the estimated ultimates for each accident year by the selected disposal rates for each maturity.
2. Apply the equation $Y = ae^{bX}$ to get adjusted closed claim amounts, where
 - Y is the adjusted closed claim amount
 - X is the adjusted closed claim count
 - a and b are regression parameters (typically given)
 - If the historical claim count is below the adjusted claim count, then adjust paid claims upward, i.e., use a and b at the next maturity.
 - If the historical claim count is above the adjusted claim count, then adjust paid claims downward, i.e., use a and b at the current maturity.

Berquist-Sherman Reported Claim Development Adjustment

- Also called **Berquist-Sherman Case Outstanding Adequacy Adjustment**.
- Restates reported claims data at a common level of case outstanding adequacy.

- Assumes that annual changes in the average case reserves at each maturity are due to changes in case outstanding adequacy or trends in claim severity.

MECHANICS OF THE ADJUSTMENT

1. Evaluate the data.
 1. Analyze the % change in claim severities.
 2. Analyze the % change in average case outstanding.
 3. If the changes deviate significantly, a B-S reported claims development adjustment is warranted.
2. (Assuming adjustment is appropriate) Restate the cumulative reported claims.
 1. Select a severity trend. (If a severity trend is given by the question, we can use it directly.)
 2. Adjust the average case outstanding by trending the most recent data backward.
 3. Restate the cumulative reported claims using the adjusted average case outstanding.
3. Perform the reported development method.

REPORTED B-S FORMULAS

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

$$\text{Adj. Reported Claims} = \text{Adj. Average Case OS} \times \left(\frac{\text{Reported Counts} - \text{Closed Counts}}{\text{Reported Counts} - \text{Closed Counts}} \right) + \text{Paid Claims}$$

Changes in the Claims Settlement Rate and Case Outstanding Adequacy

1. Perform the B-S paid adjustment to obtain the adjusted cumulative paid claims as normal.
2. Perform the B-S reported adjustment to obtain the adjusted average case reserves (not the adjusted reported claims).
3. Adjust the closed claim count for each period using the selected disposal rates from Step 1.
4. Restate the adjusted reported claims as the product of the adjusted average case reserve and the adjusted open claim counts, plus the adjusted paid claims.

$$\text{Adj. Reported Claims} = \text{Adj. Avg Case OS} \times \left(\frac{\text{Reported Counts} - \text{Adj. Closed Counts}}{\text{Reported Counts} - \text{Adj. Closed Counts}} \right) + \text{Adj. Paid Claims}$$