

Jacqueline Friedland,
Chapter 13: "Berquist-Sherman Technique"
in *Estimating Unpaid Claims Using Basic Techniques*, 2009, pp. 283–328.

OUTLINE

I. REACTING TO A CHANGING ENVIRONMENT THROUGH DATA SELECTION AND REARRANGEMENT

A. Use of Alternative Data

1. If claim count data is questionable or the definition of a claim count has changed, use earned exposures instead of claim counts
2. If policy limits or deductibles have changed between successive policy years, use policy year data instead of accident year data
3. If severity changes correlate more closely with report year data, use report year data instead of accident year data
4. If the rate of growth of earned exposures changes the average accident date significantly, distorting development factors, use accident quarter data rather than accident year data

B. Other Methods of Reacting to Changes in Operations

1. Use paid data if changes occur in case outstanding
2. Divide data into more homogenous groups, especially when there have been changes in the mix of business in regard to the following:
 - a. Jurisdiction
 - b. Coverage
 - c. Class
 - d. Territory
 - e. Size of risk
3. Of special importance is grouping by size of claim when claims department devotes greater/lesser time to small/large claims

II. TREATING PROBLEM AREAS THROUGH DATA ADJUSTMENT: DETECTING CHANGES IN THE ADEQUACY LEVEL OF CASE OUTSTANDING AND REDUCING THE EFFECT OF SUCH CHANGES ON REPORTED CLAIM PROJECTIONS

A. Overview

1. Problem when the reported claim development method and the paid claim development method produce significantly different estimates of ultimate claims
2. Possible causes
 - a. Highly leveraged nature of paid CDFs
 - b. Change in case outstanding adequacy

B. Testing the Assumptions of the Reported Claim Development Method

1. Assumption is that there has been no significant change in case adequacy other than as a result of inflationary pressures
2. Ways of testing the assumption
 - a. Obtain information from the claims department
 - b. Calculate various claim development diagnostic tests
 - 1) Ratio of paid to reported claims
 - 2) Average case outstanding
 - 3) Averaged reported claim
 - 4) Average paid claim
 - c. Compare annual rates of change between average case outstanding and average paid claims between accident years at the same maturity

C. Mechanics of the B-S Case Outstanding Adjustment

1. Two decisions requiring judgment
 - a. Selection of a diagonal from which other average case outstanding values are calculated
 - 1) Most common choice is the latest diagonal
 - 2) Selected diagonal remains the same in both the adjusted and unadjusted diagonal
 - b. Selection of the annual severity trend
 - 1) Based on review of company and industrywide experience
 - 2) Applied to the selected diagonal to produce other average case outstanding values
2. Goal of calculations in to restate the average case outstanding triangle so all values are at the same adequacy level
3. Sum of unadjusted paid claims and the product of the adjusted average case outstanding and the number of open claims produces adjusted reported claims
4. Select development factors from the triangle of adjusted reported claims and calculate estimated total unpaid claim estimate
5. If results from unadjusted reported, unadjusted paid, and adjusted reported development methods differ significantly, seek alternative methods and additional information

D. Potential Difficulty with the Adjustment

1. Need for care in the selection of the underlying trend for the following reasons:
 - a. Sensitivity of the estimates to the selected trend rate
 - b. Frequent need for substantial judgment
2. Complications involved in estimating severity trends
 - a. Slow payment of claims reduces data available by accident year
 - b. Distortion of severity trends by irregular settlements and variation in the rate of claims closed without payment

B. Detecting Changes in the Adequacy Level of Case Outstanding and Reducing their Effect

B5. You are given the following automobile property damage experience for an unpaid claims analysis:

Accident Year	<u>Paid Claims</u>				
	<u>12 Months</u>	<u>24 Months</u>	<u>36 Months</u>	<u>48 Months</u>	<u>60 Months</u>
1986	xxx	xxx	xxx	\$17,280,000	\$19,958,400
1987	\$1,155,000	\$5,775,000	\$13,860,000	\$19,958,400	
1988	1,331,000	6,655,000	15,972,000		
1989	1,597,200	7,986,000			
1990	1,830,125				

Accident Year	<u>Case Outstanding</u>				
	<u>12 Months</u>	<u>24 Months</u>	<u>36 Months</u>	<u>48 Months</u>	<u>60 Months</u>
1986	xxx	xxx	xxx	\$2,000,000	\$0
1987	\$5,418,000	\$7,599,375	\$6,735,750	\$2,520,000	
1988	6,385,500	9,157,500	8,470,000		
1989	8,001,000	11,979,000			
1990	9,982,500				

Accident Year	<u>Closed Claim Counts</u>				
	<u>12 Months</u>	<u>24 Months</u>	<u>36 Months</u>	<u>48 Months</u>	<u>60 Months</u>
1986	xxx	xxx	xxx	4,800	5,040
1987	1,050	2,625	4,200	5,040	
1988	1,100	2,750	4,400		
1989	1,200	3,000			
1990	1,250				

Accident Year	<u>Open Claim Counts</u>				
	<u>12 Months</u>	<u>24 Months</u>	<u>36 Months</u>	<u>48 Months</u>	<u>60 Months</u>
1986	xxx	xxx	xxx	240	0
1987	1,575	1,575	1,050	252	
1988	1,650	1,650	1,100		
1989	1,800	1,800			
1990	1,875				

Using Berquist and Sherman's methodology, indicate whether the data should be adjusted for changes in the level of case outstanding adequacy and why or why not. Show your work. (91-7-68-4)

B6. You are given the following information:

Accident Year	Reported	Paid	Paid	Open	Open
	Claims (000s)	Claims (000s)	Claims (000s)	Claim Counts	Claim Counts
	<u>12/31/93</u>	<u>12/31/93</u>	<u>12/31/91</u>	<u>12/31/93</u>	<u>12/31/91</u>
1989	117,160	100,758	64,031	441	1,210
1990	114,837	89,573	29,664	789	1,753
1991	110,973	73,242	7,186	1,348	1,500
1992	72,350	36,175		1,808	
1993	28,742	10,922		1,476	

As a result of a major change in reserving procedures, the company has significantly strengthened case outstanding during 1993. Use the method described by Berquist and Sherman to calculate adjusted reported claims for accident year 1990 as of 24 months. The annual severity trend is 10% .

- A . < 56,000 B. ≥ 56,000 but < 58,000 C. ≥ 58,000 but < 60,000 D. ≥ 60,000 but < 62,000
 E. ≥ 62,000 (94-7-32-1)

Solutions are based on pp. 284–87, 294–303

B5.	Accident	<u>Months of Development</u>				
	<u>Year</u>	<u>12</u>	<u>24</u>	<u>36</u>	<u>48</u>	<u>60</u>

- 1) Calculate average paid claims by dividing paid claims by closed claim counts:

	<u>Average Paid Claims</u>				
1986				3,600	3,960
1987	1,100	2,200	3,300	3,960	
1988	1,210	2,420	3,630		
1989	1,331	2,662			
1990	1,464				

These show a uniform trend of 10% per year.

- 2) Calculate average case outstanding by dividing case outstanding by open claim counts:

	<u>Average Case Outstanding</u>				
1986				10,000	0
1987	3,440	4,825	3,415	8,333	
1988	3,870	5,550	7,700		
1989	4,445	6,655			
1990	5,324				

- 3) Calculate annual trends in average case outstanding:

12 mos.: 12.5%, 14.9%, 19.8%
 24 mos.: 15.0%, 19.9%
 36 mos.: 20.0%
 48 mos.: 20.0%

As these trends are much higher than the trend in average paid claims, there is evidence of case outstanding redundancy and the data should be adjusted.

- B6. 1) Calculate the average case outstanding at 24 months for accident year 1992:

$$ACO = (\text{Reported Claims} - \text{Paid Claims}) / (\text{Open Claim Counts})$$

$$ACO_{92/24} = (72,350 - 36,175) / 1,808 = 20.01$$

- 2) Calculate the adjusted average case outstanding at 24 months for accident year 1990:

$$ACO_{90/24} = ACO_{92/24} (1 + \text{Trend})^2 = (20.01) / (1.1)^2 = 16.54$$

- 3) Calculate adjusted reported claims:

$$ARC = \text{Paid Claims} + (\text{Number of Open Claims})(ACO_{90/24})$$

$$ARC_{90/24} = 29,664 + (1,753)(16.54) = 58,659$$

Answer: C