Intermediate Track II

Investigating and Detecting Change

2010 CLRS
September 20-21, 2010
Lake Buena Vista, FL

2010 CLRS 1

Introduction

The Ideal Situation

Loss reserve data should contain a long, stable history of homogeneous claim experience, where no significant operations changes materially affect either the mix of business or the handling of claims, and there should be a sufficient number of claims to produce credible loss patterns.

2010 CLRS 2

Introduction

The Reality

Virtually all elements of "The Ideal" are periodically violated:
1. The Mix Changes
2. Claim Handling Changes
3. Case Reserves are Strengthened/Weakened
4. Other Factors
   ◆ Changes in Deductibles, Limits, SIRs
   ◆ Changes in Reinsurance
   ◆ Tort Reform, other law changes
   ◆ New Sources of Loss
   ◆ Changes in the Economy

2010 CLRS 3

Introduction

This Session Will Discuss

◆ The potential impact of mix changes

◆ Changes in claim closing patterns

◆ Changes in case reserve adequacy

◆ What Else?

2010 CLRS   4

CHANGE IN MIX

2010 CLRS   5

Change in Mix

Cumulative Paid Losses (Combined)

Accident Year	Months of Development			
	12	24	36+	Ultimate
2006	$2,000	$4,000	$5,100	$5,100
2007	2,000	4,000	5,100	5,100
2008	2,000	4,000		5,100
2009	2,000			5,100

2010 CLRS   6

Change in Mix

Cumulative Paid Losses (Category A)

Accident	Months of Development			
Year	12	24	36+	Ultimate
2006	$1,500	$1,800	$2,100	$2,100
2007	1,500	1,800	2,100	2,100
2008	1,500	1,800		2,100
2009	500			700

Develops quickly
Most of $ paid within 12 months

2010 CLRS 7

Change in Mix

Cumulative Paid Losses (Category B)

Accident	Months of Development			
Year	12	24	36+	Ultimate
2006	$500	$2,200	$3,000	$3,000
2007	500	2,200	3,000	3,000
2008	500	2,200		3,000
2009	1,500			9,000

Develops slower than Category A
Most of $ paid between 12-24 months

2010 CLRS 8

Change in Mix

Paid Loss Ultimate Comparison

Accident Year 2009 ultimate loss if change in mix is ignored: $5,100 *(i.e. unchanged from 2005)*

Accident Year 2009 ultimate if data is separately analyzed: $9,700 *(i.e. sum of two category ultimates)*

2010 CLRS 9

Change in Mix

Key Principle

Always search for subdivisions of
data related to possible causes of
variable loss development

2010 CLRS

10

Change in Mix

Suggested Subdivisions of Data Include

Primary:
1. Geographic
2. New Products vs. Old
3. Subline or Coverage
4. Deductibles or Policy Limits
5. Type of Loss Payment (e.g., Medical vs. Indemnity)

Reinsurance:
1. Attachment Point
2. Production Source
3. Line or Subline

2010 CLRS

11

Change in Mix

How Do You Decide?
Ask:
1. Underwriters
2. Claims Department
3. Agents
4. Actuaries

The Key:
Learn as much as possible about the book of business
you are evaluating.
◆ What it has been historically
◆ What it is becoming

2010 CLRS

12

Change in Mix

What Should be Done if Mix Change Includes New Business for Which You Have Insufficient Data?

Seek Alternative Sources of Data

Perhaps general liability book formerly was comprised solely of "OL&T" exposures, but in recent years began adding "M&C" risks.

Possible Solution: Relate ISO development patterns for M&C to OL&T and modify development factors for your analysis.

Discuss Potential Impacts with Claims, Underwriting, Other Actuaries

◆ Length of Tail
◆ Frequency
◆ Severity
◆ Loss Ratios

2010 CLRS 13

CLAIM CLOSING PATTERNS

2010 CLRS 14

Claim Closing Patterns

What is driving the divergence?

Unadjusted Paid Loss Development Method

Accident Year	Months of Development			
	12	24	36+	Ultimate
2007	$1,000	$4,000	$6,000	$6,000
2008	1,000	3,500		5,250
2009	750			4,219

Incurred Loss Development Method

Accident Year	Months of Development			
	12	24	36+	Ultimate
2007	$2,000	$5,000	$6,000	$6,000
2008	1,967	4,917		5,900
2009	1,867			5,600

2010 CLRS 15

Claim Closing Patterns

1) Review Closing Rates to Determine Whether There Has Been a Change
2) Seek Independent Confirmation That a Change Has Occurred
3) Restate Historical Closed Claims Using Current Closing Rates
4) Restate Historical Paid Losses Using Restated Closed Claims
5) Apply Standard Loss Development Method To Restated Paid Losses

2010 CLRS   16

Claim Closing Patterns

Data Needed

◆ Paid Loss Development Triangle (slide 15)
◆ Reported Claims Development Triangle (slide 19)
◆ Projected Ultimate Claims (slide 19)
◆ Closed Claims Development Triangle (slide 19)

◆ Calendar period data offers alternative perspective and added insight (slide 22)

2010 CLRS   17

Claim Closing Patterns

Step 1: Review Closing Rates to Determine Whether There Has Been a Change

2010 CLRS   18

Claim Closing Patterns

Reported Claims

Accident Year	Months of Development			
	12	24	36	Ultimate
2007	500	900	1,000	1,000
2008	480	880		980
2009	450			900

Closed Claims

Accident Year	Months of Development		
	12	24	36+
2007	250	810	1,000
2008	240	704	
2009	180		

2010 CLRS — 19

Claim Closing Patterns

Closed / Reported

Accident Year	Months of Development		
	12	24	36
2007	50.0%	90.0%	100.0%
2008	50.0%	80.0%	
2009	40.0%		

Closed / Ultimate

Accident Year	Months of Development		
	12	24	36
2007	25.0%	81.0%	100.0%
2008	24.5%	71.8%	
2009	20.0%		

2010 CLRS — 20

Claim Closing Patterns

Calendar period data from the Claim Department may also offer a useful tool for monitoring change.

- ◆ New Reported Claims

- ◆ Open Claims

- ◆ Closed Claims

2010 CLRS — 21

Claim Closing Patterns

Calendar Year-end	(1) New Reported Claims	(2) Open Claims @ year-end	(3) In-Force Claims = (1) + prior year (2)	(4) Closed Claims	(5) Closure Rate = (4) / (3)
2005	1,000	340	1,340	1,000	74.6%
2006	1,000	340	1,340	1,000	74.6%
2007	1,000	340	1,340	1,000	74.6%
2008	980	330	1,320	990	75.0%
2009	950	446	1,280	834	65.2%

1,280 = 950 + 330

Columns (1), (2) and (4) derived from slide 19

2010 CLRS

22

Claim Closing Patterns

Note that the slowdown in claims closing produces LOWER estimated reserves with the paid development method (will you look a gift horse in the mouth?)

Applies to incurred losses as well

2010 CLRS

23

Claim Closing Patterns

Step 2: Seek Independent Confirmation that a Change Has Occurred

◆ Ask the Claims Department About Changes in:
  ❖ Opening and Closing Practices
  ❖ The Claims Handling Environment
  ❖ Levels of Staffing, Reorganizations
  ❖ Definition of a Claim (e.g., Multiple Claimants)

2010 CLRS

24

Claim Closing Patterns

Step 3: Restate Historical Closed Claims Using Current Closing Rates

2010 CLRS

25

Claim Closing Patterns

Adjusted Closing Percent (see slide 20)

Accident Year	Months of Development		
	12	24	36
2007	20.0%	71.8%	100.0%
2008	20.0%	71.8%	
2009	20.0%		

Adjusted Closed Claims

Accident Year	Months of Development		
	12	24	36+
2007	200	718	1,000
2008	196	704	
2009	180		

Ultimate Claims (slide 19) * Adjusted Closing %
200 = 1,000 * 20.0%
718 = 1,000 * 71.8%
196 = 980 * 20.0%

2010 CLRS

26

Claim Closing Patterns

Step 4: Restate Historical Paid Losses Using Restated Closed Claims

2010 CLRS

27

Claim Closing Patterns

Linear Interpolation of Adjusted Paid Losses

Accident Year 2007 @ 12 Months	Age 0	Age 12
Actual Closed Claims (slide 19)	0	250
Actual Paid Loss (slide 15)	0	1,000

Therefore, 200 Claims would expect to have $800 paid loss

AY 2007 $\frac{200 - 0}{250 - 0}$ x (1,000 - 0) + 0 = 800
@ 12 Months

Accident Year 2007 @ 24 Months	Age 12	Age 24
Actual Closed Claims (slide 19)	250	810
Actual Paid Loss (slide 15)	1,000	4,000

Therefore, 718 Claims would expect to have $3,507 paid loss

AY 2007 $\frac{718 - 250}{810 - 250}$ x (4,000 - 1,000) + 1,000 = 3,507
@ 24 Months

Accident Year 2008 @ 12 Months	Age 0	Age 12
Actual Closed Claims (slide 19)	0	240
Actual Paid Loss (slide 15)	0	1,000

Therefore, 196 Claims would expect to have $817 paid loss

AY 2008 $\frac{196 - 0}{240 - 0}$ x (1,000 - 0) + 0 = 817
@ 12 Months

2010 CLRS

28

Claim Closing Patterns

Step 5: Apply Standard Loss Development Method to Restated Paid Losses

2010 CLRS

29

Claim Closing Patterns

Adjusted Paid Loss Development Method

Accident Year	Months of Development		
	12	24	36+
2007	$800	$3,507	$6,000
2008	817	3,500	
2009	750		

From slide 28

Accident Year	Months of Development		
	12-24	24-36	36-Ult
2007	4.38	1.71	
2008	4.28		
Selected	4.33	1.71	1.00
CDF	7.41	1.71	1.00
Ultimate	**5,561**	**5,988**	**6,000**

2010 CLRS

30

Claim Closing Patterns

Impact of Adjustment

Acc Yr	Revised Forecast	Original Forecast	Difference
	Slide 30	Slide 15	
2007	$6,000	$6,000	$0
2008	5,988	5,250	738
2009	5,561	4,219	1,342
Total	$17,549	$15,469	$2,080

The slowdown in claims closing produces LOWER estimates!

AND the revised forecast is IN LINE with the incurred method estimate of $17,500 (slide 15).

2010 CLRS   31

CASE RESERVE ADEQUACY

2010 CLRS   32

Case Reserve Adequacy

What is driving the divergence?

Incurred Losses ($000)

Accident Year	Months of Development			Projected
	12	24	36+	Ultimate
2007	10,000	40,000	50,000	50,000
2008	10,000	45,000		56,250
2009	10,417			55,340

Paid Losses ($000)

Accident Year	Months of Development			Projected
	12	24	36+	Ultimate
2007	2,000	24,000	50,000	50,000
2008	2,500	30,000		62,500
2009	3,125			78,125

2010 CLRS   33

Case Reserve Adequacy

What if claim closing patterns are not changing?

Reported Claims

Accident Year	Months of Development 12	24	36	Ultimate
2007	5,000	8,000	10,000	10,000
2008	5,000	8,000		10,000
2009	5,000			10,000

Closed Claims

Accident Year	Months of Development 12	24	36+
2007	1,000	6,000	10,000
2008	1,000	6,000	
2009	1,000		

2010 CLRS   34

Case Reserve Adequacy

1) Review Paid-To-Incurred Triangles
2) Review Trends in Average Paid Claims Versus Trends in Average Case Reserves
3) Review Potential Reasons for Observed Trends
4) Adjust Historical Case Reserves to Current Adequacy Levels
5) Calculate Adjusted Incurred Losses
6) Project Ultimate Losses Using Adjusted Incurred Losses and Standard Loss Development

2010 CLRS   35

Case Reserve Adequacy

Step 1: Review Paid - To - Incurred Triangles

2010 CLRS   36

Case Reserve Adequacy

Accident	Months of Development		
Year	12	24	36
2007	20%	60%	100%
2008	25%	67%	
2009	30%		

[paid loss / incurred loss from slide 33]

Ratios are increasing. Since settlement rates appear consistent, may be due to a decrease in case reserve adequacy.

2010 CLRS   37

Case Reserve Adequacy

Step 2: Review Trends in Average Paid Claims Versus Trends in Average Case Reserves

2010 CLRS   38

Case Reserve Adequacy

Accident	Average Paid Loss		Average Case Reserves	
Year	12	24	12	24
2007	2,000	4,000	2,000	8,000
2008	2,500	5,000	1,875	7,500
2009	3,125		1,823	
Trend	25%	25%	-4.5%	-6.3%

Avg Paid $ = Paid $ Triangle (Slide 33) / Closed Claim Triangle (Slide 34) * 1,000

Avg Case Reserves = (Incurred $ Triangle - Paid $ Triangle (Slide 33)) /

(Reported Claim Triangle - Closed Claim Triangle (Slide 34)) * 1,000 OBSERVATION: CASE RESERVE **WEAKENING**

2010 CLRS   39

Case Reserve Adequacy

Step 3: Review Potential Reasons for Observed Trends

- Is the book shifting to a lower severity mix?
- Have policy limits and/or reinsurance retentions kept pace with claims inflation?
- Has anything material changed in the handling of claims?
    - Turnover in claim department staff
    - Changes in philosophy

If you conclude there has been case reserve weakening (or strengthening), adjust the data. Here's one approach.
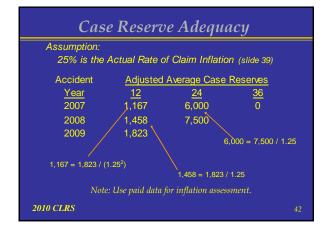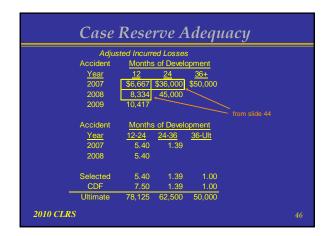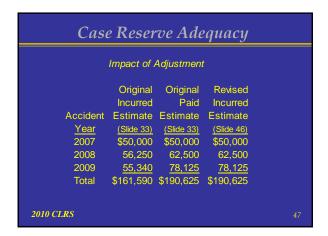
2010 CLRS 40

Case Reserve Adequacy

Step 4: Adjust Historical Case Reserves to Current Adequacy Levels

2010 CLRS 41

Case Reserve Adequacy

Assumption:
25% is the Actual Rate of Claim Inflation (slide 39)

Accident	Adjusted Average Case Reserves		
Year	12	24	36
2007	1,167	6,000	0
2008	1,458	7,500	
2009	1,823		

6,000 = 7,500 / 1.25

1,167 = 1,823 / (1.25²)

1,458 = 1,823 / 1.25

Note: Use paid data for inflation assessment.

2010 CLRS 42

Case Reserve Adequacy

Step 5: Calculate Adjusted Incurred Losses

2010 CLRS   43

Case Reserve Adequacy

	Paid to Date Losses (slide 33)	+	# of Open Claims (slide 34)	x	Adjusted Average Case Reserves (slide 42)/1000	=	Adjusted Incurred Losses
AY 2007 @ 12 Months	2,000	+	4,000	x	1.167	=	6,667
AY 2007 @ 24 Months	24,000	+	2,000	x	6.000	=	36,000
AY 2008 @ 12 Months	2,500	+	4,000	x	1.458	=	8,334

2010 CLRS   44

Case Reserve Adequacy

Step 6: Project Ultimate Losses Using Adjusted Incurred Losses and Standard Loss Development

2010 CLRS   45

Case Reserve Adequacy

Adjusted Incurred Losses

Accident Year	Months of Development 12	24	36+
2007	$6,667	$36,000	$50,000
2008	8,334	45,000	
2009	10,417		

from slide 44

Accident Year	Months of Development 12-24	24-36	36-Ult
2007	5.40	1.39	
2008	5.40		
Selected	5.40	1.39	1.00
CDF	7.50	1.39	1.00
Ultimate	78,125	62,500	50,000

2010 CLRS   46

Case Reserve Adequacy

Impact of Adjustment

Accident Year	Original Incurred Estimate (Slide 33)	Original Paid Estimate (Slide 33)	Revised Incurred Estimate (Slide 46)
2007	$50,000	$50,000	$50,000
2008	56,250	62,500	62,500
2009	55,340	78,125	78,125
Total	$161,590	$190,625	$190,625

2010 CLRS   47

What Else?

- ◆ Deductibles/Limits/SIRs change
- ◆ Reinsurance Arrangements Change
- ◆ Tort Reform
- ◆ New Sources of Loss
- ◆ Changes in the Economy

2010 CLRS   48

Deductibles/Limits/SIRs change

- Deductibles may change the number of claims
- May change loss $ as well
- Need to review profile of deductibles and limits – inherent assumption is no change
- Treat like change in mix

2010 CLRS

49

Reinsurance Arrangements Change

- Effect on total net liability
- Might also affect claims handling
  e.g., if retention is limited to $100,000 by reinsurance, is there an incentive to settle a $500,000 case more quickly than if you were on the hook for the whole thing?

2010 CLRS

50

Tort Reform

- Change in benefits which would affect severity and payout (e.g. cost containment)
- Change in statute of limitations (frequency change, less "tail" development)
- New patterns – e.g., ability to do lump-sum settlements of permanent workers' comp claims

2010 CLRS

51

New Sources of Loss

◆ Mold
◆ Terrorism
◆ Asbestos – just keeps on running
◆ Stacking of auto limits

2010 CLRS

52

Conclusion

◆ Know what's going on in the company
◆ Know what actuarial methods can and can't do
◆ Pick the right tool for the job
◆ BE AWARE!

2010 CLRS

53

Summary

Assumption of long, stable history is often violated.

◆ The mix of business can change

◆ Claim closing patterns can change

◆ Changes in case reserve adequacy can change

2010 CLRS

54

Looking Ahead

Session 3 presents two case studies.

» Think about what's going on.

» Decide how to evaluate the impact.

2010 CLRS

55