Intermediate Track II

Investigating and Detecting Change

September 2009
Chicago, IL

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.

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

Introduction

This Session Will Discuss

- The potential impact of mix changes
- Changes in claim closing patterns
- Changes in case reserve adequacy
- What Else?

CHANGE IN MIX

Change in Mix

Cumulative Paid Losses (Combined)

Accident Year	Months of Development 12	24	36+	Ultimate
2005	$2,000	$4,000	$5,100	$5,100
2006	2,000	4,000	5,100	5,100
2007	2,000	4,000		5,100
2008	2,000			5,100

Change in Mix

Cumulative Paid Losses (Category A)

Accident	Months of Development			
Year	12	24	36+	Ultimate
2005	$1,500	$1,800	$2,100	$2,100
2006	1,500	1,800	2,100	2,100
2007	1,500	1,800		2,100
2008	500			700

Develops quickly

Most of $ paid within 12 months

Change in Mix

Cumulative Paid Losses (Category B)

Accident Year	Months of Development 12	24	36+	Ultimate
2005	$500	$2,200	$3,000	$3,000
2006	500	2,200	3,000	3,000
2007	500	2,200		3,000
2008	1,500			9,000

Develops slower than Category A

Most of $ paid between 12-24 months

Change in Mix

Paid Loss Ultimate Comparison

Accident Year 2008 ultimate loss if change in mix is ignored: $5,100 *(i.e. unchanged from 2005)*

Accident Year 2008 ultimate if data is separately analyzed: $9,700 *(i.e. sum of two category ultimates)*

Change in Mix

Key Principle

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

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

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

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

CLAIM CLOSING PATTERNS

Claim Closing Patterns

What is driving the divergence?

Unadjusted Paid Loss Development Method

Accident	Months of Development			
Year	12	24	36+	Ultimate
2006	$1,000	$4,000	$6,000	$6,000
2007	1,000	3,500		5,250
2008	750			4,219

Incurred Loss Development Method

Accident	Months of Development			
Year	12	24	36+	Ultimate
2006	$2,000	$5,000	$6,000	$6,000
2007	1,967	4,917		5,900
2008	1,867			5,600

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

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)

Claim Closing Patterns

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

Claim Closing Patterns

Reported Claims

Accident	Months of Development			
Year	12	24	36	Ultimate
2006	500	900	1,000	1,000
2007	480	880		980
2008	450			900

Closed Claims

Accident	Months of Development		
Year	12	24	36+
2006	250	810	1,000
2007	240	704	
2008	180		

Claim Closing Patterns

Closed / Reported

Accident Year	Months of Development 12	24	36
2006	50.0%	90.0%	100.0%
2007	50.0%	80.0%	
2008	40.0%		

Closed / Ultimate

Accident Year	Months of Development 12	24	36
2006	25.0%	81.0%	100.0%
2007	24.5%	71.8%	
2008	20.0%		

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

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)
2004	1,000	340	1,340	1,000	74.6%
2005	1,000	340	1,340	1,000	74.6%
2006	1,000	340	1,340	1,000	74.6%
2007	980	330	1,320	990	75.0%
2008	950	446	1,280	834	65.2%

1,280 = 950 + 330

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

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

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)

Claim Closing Patterns

Step 3: Restate Historical Closed Claims Using Current Closing Rates

Claim Closing Patterns

Adjusted Closing Percent (see slide 20)

Accident	Months of Development		
Year	12	24	36
2006	20.0%	71.8%	100.0%
2007	20.0%	71.8%	
2008	20.0%		

Adjusted Closed Claims

Accident	Months of Development		
Year	12	24	36+
2006	200	718	1,000
2007	196	704	
2008	180		

Ultimate Claims (slide 19) * Adjusted Closing %

200 = 1,000 * 20.0%

718 = 1,000 * 71.8%

196 = 980 * 20.0%

Claim Closing Patterns

Step 4: Restate Historical Paid Losses Using Restated Closed Claims

Claim Closing Patterns

Linear Interpolation of Adjusted Paid Losses

Accident Year 2006 @ 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 2006 @ 12 Months: 200 - 0 / 250 - 0 x (1,000 - 0) + 0 = 800

Accident Year 2006 @ 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 2006 @ 24 Months: 718 - 250 / 810 - 250 x (4,000 - 1,000) + 1,000 = 3,507

Accident Year 2007 @ 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 2007 @ 12 Months: 196 - 0 / 240 - 0 x (1,000 - 0) + 0 = 817

Claim Closing Patterns

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

Claim Closing Patterns

Adjusted Paid Loss Development Method

Accident	Months of Development		
Year	12	24	36+
2006	$800	$3,507	$6,000
2007	817	3,500	
2008	750		

From slide 28

Accident	Months of Development		
Year	12-24	24-36	36-Ult
2006	4.38	1.71	
2007	4.28		
Selected	4.33	1.71	1.00
CDF	7.41	1.71	1.00
Ultimate	**5,561**	**5,988**	**6,000**

Claim Closing Patterns

Impact of Adjustment

Acc Yr	Revised Forecast	Original Forecast	Difference
	Slide 30	Slide 15	
2006	$6,000	$6,000	$0
2007	5,988	5,250	738
2008	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).

CASE RESERVE ADEQUACY

Case Reserve Adequacy

What is driving the divergence?

Incurred Losses ($000)

Accident	Months of Development			Projected
Year	12	24	36+	Ultimate
2006	10,000	40,000	50,000	50,000
2007	10,000	45,000		56,250
2008	10,417			55,340

Paid Losses ($000)

Accident	Months of Development			Projected
Year	12	24	36+	Ultimate
2006	2,000	24,000	50,000	50,000
2007	2,500	30,000		62,500
2008	3,125			78,125

Case Reserve Adequacy

What if claim closing patterns are not changing?

Reported Claims

Accident	Months of Development			
Year	12	24	36	Ultimate
2006	5,000	8,000	10,000	10,000
2007	5,000	8,000		10,000
2008	5,000			10,000

Closed Claims

Accident	Months of Development		
Year	12	24	36+
2006	1,000	6,000	10,000
2007	1,000	6,000	
2008	1,000		

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

Case Reserve Adequacy

Step 1: Review Paid - To - Incurred Triangles

Case Reserve Adequacy

Accident Year	Months of Development 12	24	36
2006	20%	60%	100%
2007	25%	67%	
2008	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.

Case Reserve Adequacy

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

Case Reserve Adequacy

Accident	Average Paid Loss		Average Case Reserves	
Year	12	24	12	24
2006	2,000	4,000	2,000	8,000
2007	2,500	5,000	1,875	7,500
2008	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**

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.

Case Reserve Adequacy

Step 4: Adjust Historical Case Reserves to Current Adequacy Levels

Case Reserve Adequacy

Assumption:

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

Accident Year	Adjusted Average Case Reserves 12	24	36
2006	1,167	6,000	0
2007	1,458	7,500	
2008	1,823		

6,000 = 7,500 / 1.25

1,167 = 1,823 / (1.25^2)

1,458 = 1,823 / 1.25

Note: Use paid data for inflation assessment.

Case Reserve Adequacy

Step 5: Calculate Adjusted Incurred Losses

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 2006 @ 12 Months	2,000	+	4,000	x	1.167	=	6,667
AY 2006 @ 24 Months	24,000	+	2,000	x	6.000	=	36,000
AY 2007 @ 12 Months	2,500	+	4,000	x	1.458	=	8,334

Case Reserve Adequacy

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

Case Reserve Adequacy

Adjusted Incurred Losses

Accident Year	Months of Development 12	24	36+
2006	$6,667	$36,000	$50,000
2007	8,334	45,000	
2008	10,417		

from slide 44

Accident Year	Months of Development 12-24	24-36	36-Ult
2006	5.40	1.39	
2007	5.40		
Selected	5.40	1.39	1.00
CDF	7.50	1.39	1.00
Ultimate	78,125	62,500	50,000

Case Reserve Adequacy

Impact of Adjustment

Accident Year	Original Incurred Estimate (Slide 33)	Original Paid Estimate (Slide 33)	Revised Incurred Estimate (Slide 46)
2006	$50,000	$50,000	$50,000
2007	56,250	62,500	62,500
2008	55,340	78,125	78,125
Total	$161,590	$190,625	$190,625

What Else?

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

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

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?

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

New Sources of Loss

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

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!

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

Looking Ahead

Session 3 presents two case studies.

- Think about what's going on.
- Decide how to evaluate the impact.