# Intermediate Track I

## Considerations in Evaluating Changing Conditions

2013 CLRS

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# Introduction

- Must go beyond rote application of basic techniques to produce a meaningful reserve estimates.
- Additional considerations and diagnostic tools offer perspective in the effort to understanding risks and uncertainties.
- Communication among operating units is essential.
- Subsequent Intermediate Tracks will provide additional insights and techniques useful in addressing several of these issues.

# Considerations

- Aging of Claims
- Loss Adjustment Expenses
- Operations
- Limits and Deductibles
- Interpolation/Extrapolation
- Changing Indications

# Considerations

- Aging of Claims
  1. **Average Closed Value** is not the same as **Average Open Value**
  2. **Early Reported Claims** are not the same as **Late Reported Claims**

- Loss adjustment expense
- Operations
- Limits and Deductibles
- Interpolation/Extrapolation
- Changing Indications

# Consideration #1

**The average value of claims closed is often a poor estimator of the ultimate average settlement value of claims still open.**

# Consideration #1 (cont.)

## Accident Year 2003

| Calendar Date | Cumulative Paid on Closed Claims | | Number of Closed Claims | | Average Settlement Value |
|---|---|---|---|---|---|
| | $ | % of Ultimate | No. | % of Ultimate | $ |
| 12-03 | $50,000,000 | 25% | 1,000 | 50% | $50,000 |
| 12-04 | 100,000,000 | 50% | 1,500 | 75% | 66,667 |
| 12-05 | 150,000,000 | 75% | 1,800 | 90% | 83,333 |
| * | * | * | * | * | * |
| * | * | * | * | * | * |
| * | * | * | * | * | * |
| 12-12 (Ult) | 200,000,000 | 100% | 2,000 | 100% | 100,000 |

Why might this frequently be true?

# Consideration #1 (cont.)

- Claims that close early are smaller
- For example in Workers Compensation:
  - » The cases that close quickly are usually for minor injuries, and may involve just medical-only costs.
  - » The cases open for a long period represent severe injuries and may include:
    - – Major Medical Expenses
    - – Lifetime Pension Benefits

# Consideration #2

**The average costs for late reported claims may differ materially from those reported earlier.**

# Consideration #2 (cont.)

**Reason: Often, late reported claims have a very different nature than those reported early**.

(1) General Liability: Product Liability vs "Slip & Fall"

- » Product Liability cases are often reported later
- » Product cases are often complex, requiring expert testimony and lengthy litigation
- » Product cases reported very late may involve latent injury or cumulative exposure, cases which are difficult to define in terms of date of loss, party at fault, number of occurrences, and type or extent of injuries

# Consideration #2 (cont.)

(2) Workers Compensation:

Most Workers Compensation cases are reported within the first 18 months. However, when there are late reported claims they often involve occupational diseases (e.g. carpal tunnel), rather than trauma that is quickly identified and assignable to a single accident date and/or policy.

# Considerations

- Aging of Claims
- Loss adjustment expense
  3. The ratio of **Paid Defense & Cost Containment (DCC)** to **Paid Loss** increases over time
  4. **Segregate** into Components
- Operations
- Limits and Deductibles
- Interpolation/extrapolation
- Changing Indications

# Consideration #3

**For an accident year, the ultimate ratio of DCC to loss may be materially higher than has been true for payments to date.**

# Consideration #3 (cont.)

Reasons:

1) Cases open for lengthy periods often involve costly litigation.

2) Legal payments are occasionally disbursed later than loss payments.

# Consideration #3 (cont.)

Industry Schedule P Data
Other Liability and Products Liability*
Net Payments Through 12/31/02
(millions)

| Accident Year | Age (months) | Cumulative Paid Losses (1) | Cumulative Paid DCC (2) | Ratio (3)=(2)/(1) |
|---|---|---|---|---|
| 1998 | 60 | $10,258 | $2,272 | 22.1% |
| 1999 | 48 | 9,549 | 1,979 | 20.7% |
| 2000 | 36 | 7,673 | 1,612 | 21.0% |
| 2001 | 24 | 5,183 | 765 | 14.8% |
| 2002 | 12 | 2,600 | 209 | 8.0% |

* Includes both claims-made and occurrence

Source: The Thomson Corporation, June 2003

# Consideration #3 (cont.)

- This pattern by company can be influenced by many factors, such as the mode of payment of legal bills, which may vary by company between:
  - Interim Case Billing
  - End of Case Billing
- Other influences can include:
  - Geographical Differences
  - Use of Staff Counsel vs. Outside Counsel
  - Classes of Business
  - Primary vs. Excess Contracts

# Consideration #4

**Where DCC costs are volatile, it may be useful to split it into components such as:**

- **Attorney Fees (External or Internal)**
- **Other Legal**
- **Expert Witnesses**
- **Medical Audits/Reviews**

# Consideration #4 (cont.)

Reasons:

(1) Legal expense are typically the fastest growing component of DCC, with a growth rate exceeding trends in loss costs.

(2) Many companies have attempted cost savings steps such as:

- Use of staff counsel, rather than independent attorneys, in some situations
- Use of companies which audit legal bills
- More vigorous defense (which may slow payment patterns on loss side)
- Initiating contact with the claimant sooner

# Considerations

- Aging of Claims
- Loss adjustment expense
- Operations
  5. **Rate adequacy** can impact reserving
  6. **Positive Development** does not mean a **Claim Department problem**
  7. **Operational changes** affect reserving
- Limits and Deductibles
- Interpolation/Extrapolation
- Changing Indications

# Consideration #5

**Expected Loss Ratios based on prior years' experience, used in reserving, must be adjusted for any material changes in rate adequacy.**

# Consideration #5 (cont.)

**If adjustments are not made, severe distortions can result:**

| Accident Year (1) | Earned Premium (2) | Paid Losses (3) | 2008 Loss Ratio (4) | Reserves Using 2008 Loss Ratio (5)=(2)X(4)-(3) | Ratio of Actual Rates to Adequate Rates (6) | Actual Loss Ratio (7)=(4)/(6) | Reserves Using Actual Loss Ratio (8)=(2)x(7)-(3) |
|---|---|---|---|---|---|---|---|
| 2009 | 10,000 | 5,000 | 50% | 0 | 1.0 | 50% | 0 |
| 2010 | 9,000 | 2,700 | 50% | 1,800 | 0.9 | 56% | 2,300 |
| 2011 | 8,000 | 800 | 50% | 3,200 | 0.8 | 63% | 4,200 |
| | | | | **5,000** | | | **6,500** |
| | | | | | Error = $1,500 | | |

# Consideration #5 (cont.)

Think about it!

From another angle…

| Accident Year (1) | Earned Premium (2) | Paid Losses (3) | 2008 Loss Ratio (4) | Ultimates Using 2008 Loss Ratio (5)=(2)x(4) | Ratio of Actual Rates to Adequate Rates (6) | Actual Loss Ratio (7)=(4)/(6) | Ultimates Using Actual Loss Ratio (8)=(2)x(7) |
|---|---|---|---|---|---|---|---|
| 2009 | 10,000 | 5,000 | 50% | 5,000 | 1.0 | 50% | 5,000 |
| 2010 | 9,000 | 2,700 | 50% | 4,500 | 0.9 | 56% | 5,000 |
| 2011 | 8,000 | 800 | 50% | 4,000 | 0.8 | 63% | 5,000 |
| | | **8,500** | | **13,500** | | | **15,000** |

If rates are changing,

but exposure is not …,

What do you expect to happen with ultimate losses?

# Consideration #5 (cont.)

- Premium can be affected by increased competition and efforts to retain market share
  - » filed rate decreases
  - » increased use of flexible discounts
  - » accounts moved to “preferred” status
- Need to talk to your colleagues to understand what is happening in the marketplace
  - » underwriters
  - » marketing
  - » field office staff
  - » pricing actuaries

# Consideration #6

**Upward case development does not necessarily demonstrate something "needs fixing" in the Claims Department.**

# Consideration #6 (cont.)

**Resulting Development (Illustration):**

| ESTIMATE AT 12 MONTHS | | | STATUS 3 YEARS LATER | |
|---|---|---|---|---|
| Claims | Average $ | Total | Average $ | Total |
| 1-97 | $10,000 | $970,000 | $10,000 | $970,000 |
| 98-100 | 10,000 | 30,000 | 500,000 | 1,500,000 |
| TOTAL | | $1,000,000 | | $2,470,000 |

LDF = 2.47

**The Point:** Loss development can arise from the natural emergence of facts within the context of a company's reserving philosophy

# Consideration #7

**Internal company changes can dramatically affect patterns in reserving data, and distort the result of basic reserving methodologies.**

# Consideration #7 (cont.)

For example, suppose the company changed TPA's 12 months ago, and now has the following triangles:

**Paid Losses**

| Acc Yr. | 12 Mos. | 24 Mos. | 36 Mos. | 48 Mos. | 60 Mos. |
|---|---|---|---|---|---|
| 2008 | 100 | 150 | 180 | 198 | 208 |
| 2009 | 100 | 150 | 180 | 198 | |
| 2010 | 100 | 150 | 180 | | |
| 2011 | 100 | 150 | | | |
| 2012 | 100 | | | | |

**Reported Losses**

| Acc Yr. | 12 Mos. | 24 Mos. | 36 Mos. | 48 Mos. | 60 Mos. |
|---|---|---|---|---|---|
| 2008 | 125 | 167 | 189 | 202 | 208 |
| 2009 | 125 | 167 | 189 | 202 | |
| 2010 | 125 | 167 | 189 | | |
| 2011 | 125 | 167 | | | |
| 2012 | 125 | | | | |

# Consideration #7 (cont.)

**Paid to Reported Losses**

| Acc Yr. | 12 Mos. | 24 Mos. | 36 Mos. | 48 Mos. | 60 Mos. |
|---|---|---|---|---|---|
| 2008 | 0.80 | 0.90 | 0.95 | 0.98 | 1.00 |
| 2009 | 0.80 | 0.90 | 0.95 | .096 | |
| 2010 | 0.80 | 0.90 | 0.93 | | |
| 2011 | 0.80 | 0.85 | | | |
| 2012 | 0.75 | | | | |

Paid to Reported Ratios are an example of a diagnostic tool which can be used to check for:

- Case reserve strengthening (this example)
- Case reserve weakening
- Change in rate of payment

Later sessions will discuss methods, such as the Berquist & Sherman approach, to correct for these kinds of changes.

# Considerations

- Aging of Claims
- Loss adjustment expense
- Operations

- Limits and Deductibles
  8. **Higher limits** mean more future development
  9. **Higher deductibles** (attachment points) mean more future development

- Interpolation/Extrapolation
- Changing Indications

# Consideration #8

When reinsurance retentions and/or policy limits are higher, the portion of ultimate losses that are reported at each given maturity tends to be lower.

# Consideration #8 (cont.)

**ILLUSTRATION:**

| One Claim | Dollars Reported as of: 12 Months | 24 Months | 36 Months (Ult.) |
|---|---|---|---|
| Loss Limited to $100,000 | $50,000 | $100,000 | $100,000 |
| Loss Limited to $500,000 | 50,000 | 300,000 | 500,000 |
| Unlimited Loss | 50,000 | 300,000 | 1,000,000 |

| | % of Ultimate Losses Reported as of: 12 Months | 24 Months | 36 Months (Ult.) |
|---|---|---|---|
| Loss Limited to $100,000 | 50% | 100% | 100% |
| Loss Limited to $500,000 | 10% | 60% | 100% |
| Unlimited Loss | 5% | 30% | 100% |

# Consideration #9

When attachment points are higher for reinsurance, excess, umbrella or self-insured coverages, then the percentage of ultimate dollars that is reported at each given maturity tends to be lower.

# Consideration #9 (cont.)

**ILLUSTRATION:**

| | Dollars Reported as of: | | |
|---|---|---|---|
| **One Claim** | 12 Months | 24 Months | 36 Months (Ult.) |
| 1st Dollar Coverage | $50,000 | $300,000 | $1,000,000 |
| Losses in excess of $100,000 | 0 | 200,000 | 900,000 |
| Losses in excess of $500,000 | 0 | 0 | 500,000 |

| | % of Ultimate Losses Reported as of: | | |
|---|---|---|---|
| | 12 Months | 24 Months | 36 Months (Ult.) |
| 1st Dollar Coverage | 5% | 30% | 100% |
| Losses in excess of $100,000 | 0% | 22% | 100% |
| Losses in excess of $500,000 | 0% | 0% | 100% |

# Considerations

- Aging of Claims
- Loss adjustment expense
- Operations
- Limits and Deductibles
- Interpolation/Extrapolation
  - **10. Incomplete accident years** can be deceiving
  - **11. Tail development** is important
- Changing Indications

# Consideration #10

**Estimating ultimate losses for an incomplete accident year requires special adjustments.**

# Consideration #10 (cont.)

**Reported losses through Q3 2012**

| Accident Year | 9 Mos. | 21 Mos. | 33 Mos. | 45 Mos. | 57 Mos. (ult) |
|---|---|---|---|---|---|
| 2008 | 100,000 | 250,000 | 300,000 | 315,000 | 315,000 |
| 2009 | 100,000 | 250,000 | 300,000 | 315,000 | |
| 2010 | 120,000 | 300,000 | 360,000 | | |
| 2011 | 110,000 | 275,000 | | | |
| 2012 | 130,000 | | | | |

**Age to Age Factors**

| Accident Year | 9-21 | 21-33 | 33-45 | 45-57 |
|---|---|---|---|---|
| 2008 | 2.50 | 1.20 | 1.05 | 1.00 |
| 2009 | 2.50 | 1.20 | 1.05 | |
| 2010 | 2.50 | 1.20 | | |
| 2011 | 2.50 | | | |
| Cumulative Factor to Ultimate | 3.15 | 1.26 | 1.05 | 1.00 |

# Consideration #10 (cont.)

**Reported losses through Q3 2012**

| Accident Year | Reported as of Q3 2012 (1) | Factor to Ultimate (2) | Estimated Ultimate Losses (3)=(1)x(2) | Required IBNR as of Q3 2012 (4)=(3)-(1) |
|---|---|---|---|---|
| 2008 | 315,000 | 1.00 | 315,000 | 0 |
| 2009 | 315,000 | 1.00 | 315,000 | 0 |
| 2010 | 360,000 | 1.05 | 378,000 | 18,000 |
| 2011 | 275,000 | 1.26 | 346,500 | 71,500 |
| 2012 | 130,000 | 3.15 | 409,500 | 279,500 |

**IS THIS CORRECT?**

# Consideration #10 (cont.)

Estimating ultimate losses for an incomplete accident year requires special adjustments.

The latest year needs to be reduced by .75 for the incomplete policy period. Future claims for the final quarter need to be excluded.

# Consideration #11

**“Tail Development” can have a dramatic effect on reserve needs.**

# Consideration #11 (cont.)

**Some examples of when development occurs beyond 10 years**

| | |
|---|---|
| Products | Complex issues (Who's liable? How to prove injury was caused by product? Date of loss?) |
| Workers Compensation | Occupational Disease |
| | Life pension cases, with escalation clauses in some states' benefit structures |
| | Medical costs on life pension cases |
| Medical Malpractice | Child injured at delivery reaches legal age |
| | Delayed manifestation, with subsequent complex issues |

# Consideration #11 (cont.)

Techniques To Derive Tail Factors

1. Examine broader data sources

   e.g. ISO, NCCI, RAA, AM Best

   (Caution: Learn the limitations of such data)

2. Curve Fitting

3. Generalized Bondy Method

# Consideration #11 (cont.) - Broader Data Sources

## How Much Tail Can There Be?

Development in Reinsured Layers
Selected Cumulative Age to Ultimate Factors
Source: RAA data

| Line of Business | 15 Years to Ultimate | 25 Years to Ultimate |
|---|---|---|
| WC Treaty | 1.582 | 1.149 |
| GL Treaty | 1.234 | 1.030 |
| AL Treaty | 1.021 | 1.000 |

# Considerations

- Aging of Claims
- Loss adjustment expense
- Operations
- Limits and Deductibles
- Interpolation/Extrapolation

- Changing Indications

12. Indications can change for a variety of reasons - ask why!

# Consideration #12

**Why do indications change?**

- **Actual losses emergence differs from expected.**
- **Assumptions and/or methods change.**

# Consideration #12 (cont.)

**Last Year's Review**
**Reported Losses at 12/2011**

| Acc Yr. | 12 Mos. | 24 Mos. | 36 Mos. | 48 Mos. |
|---|---|---|---|---|
| 2008 | 125 | 167 | 189 | 202 |
| 2009 | 125 | 167 | 189 | |
| 2010 | 125 | 167 | | |
| 2011 | 125 | | | |

**Age-to-Age Factors**

| Acc Yr. | 12-24 | 24-36 | 36-48 | |
|---|---|---|---|---|
| 2008 | 1.34 | 1.13 | 1.07 | |
| 2009 | 1.34 | 1.13 | | |
| 2010 | 1.34 | | | |
| | | | | Tail |
| Selected | 1.34 | 1.13 | 1.07 | 1.00 |
| Factor to Ultimate | 1.62 | 1.21 | 1.07 | 1.00 |

# Consideration #12 (cont.)

| Acc Yr. | Reported Losses at 12/2011 | Factor to Ultimate | Estimated Ultimate |
|---|---|---|---|
| 2008 | 202 | 1.00 | 202 |
| 2009 | 189 | 1.07 | 202 |
| 2010 | 167 | 1.21 | 202 |
| 2011 | 125 | 1.62 | 202 |

Easy … right!

# Consideration #12 (cont.)

12 months later the actuary returns:

"Bad news, boss...

We have to take a big hit to cover deterioration in the prior years."

Will this be a pleasant discussion?

What happened????

# Consideration #12 (cont.)

| Acc Yr. | Reported Losses at 12/2012 | Factor to Ultimate | Estimated Ultimate | Prior Estimate | Impact |
|---|---|---|---|---|---|
| 2008 | 208 | 1.00 | 208 | 202 | 6 |
| 2009 | 206 | 1.03 | 212 | 202 | 10 |
| 2010 | 194 | 1.11 | 216 | 202 | 14 |
| 2011 | 177 | 1.28 | 226 | 202 | 24 |

| | |
|---|---|
| Total Prior Year impact: | 54 |
| Increase in 4-year ultimate | 6.7% |

# Consideration #12 (cont.)

**This Year's Review**

**Reported Losses at 12/2011**

| AY | 12 Mos. | 24 Mos. | 36 Mos. | 48 Mos. | 60 Mos. |
|---|---|---|---|---|---|
| 2007 | 125 | 167 | 189 | 202 | 208 |
| 2008 | 125 | 167 | 189 | 206 | |
| 2009 | 125 | 167 | 194 | | |
| 2010 | 125 | 177 | | | |
| 2011 | 133 | | | | |

**Age to Age Factors**

| AY | 12-24 | 24-36 | 36-48 | 48-60 | |
|---|---|---|---|---|---|
| 2007 | 1.34 | 1.13 | 1.07 | 1.03 | |
| 2008 | 1.34 | 1.13 | 1.09 | | |
| 2009 | 1.34 | 1.16 | | | |
| 2010 | 1.42 | | | | |
| | | | | | Tail |
| Prior selected | 1.34 | 1.13 | 1.07 | 1.00 | 1.00 |
| Selected | 1.40 | 1.15 | 1.08 | 1.03 | 1.00 |
| Factor to Ultimate | 1.79 | 1.28 | 1.11 | 1.03 | 1.00 |

# Consideration #12 (cont.)

Did the actuary miss the boat last year?

Did the actuary overreact this year?

What if factors (development assumptions) remained unchanged?

# Consideration #12 (cont.)

If assumptions remained unchanged?

| AY | Reported Losses at 12/2011 | Retain Prior Factor | Estimated Ultimate | Estimate Last Year | Impact |
|---|---|---|---|---|---|
| 2007 | 208 | 1.00 | 208 | 202 | 6 |
| 2008 | 206 | 1.00 | 206 | 202 | 4 |
| 2009 | 194 | 1.07 | 207 | 202 | 5 |
| 2010 | 177 | 1.21 | 214 | 202 | 12 |

Total Prior Year impact: 27

Increase in 4-year ultimate 3.4%

# Consideration #12 (cont.)

- Part of the impact is due to actual losses emerging different from what was expected.
- Should development assumptions change?
  - » If so, that accounts for the remaining impact.

# Conclusions

***It is seldom sufficient to simply manipulate the numbers. The actuary must actively seek a thorough understanding of...***

- **...the loss and claims process**
- **...the business and the exposures involved**
  - **underwriting**
  - **pricing**
  - **reinsurance**
- **…techniques and models to deal with the available data**

# Conclusions

***If professional colleagues are to rely on actuarial advice, they will expect meaningful interpretation of the indications, and the risks and uncertainties in changing estimates.***

# Looking Ahead

**Session II** **Investigating and Detecting Change**

**Session III** **Case Studies**