Non Traditional reserving methods – D&O, Excess Casualty and Property Cat

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Agenda

- Reserving for D&O using blend of traditional and non-traditional methods
- Reserving for high excess casualty
- Catastrophe and other large event reserving
- Catastrophe Reserving Case Study – New Zealand earthquakes

Reserving for D&O – contagion versus non contagion

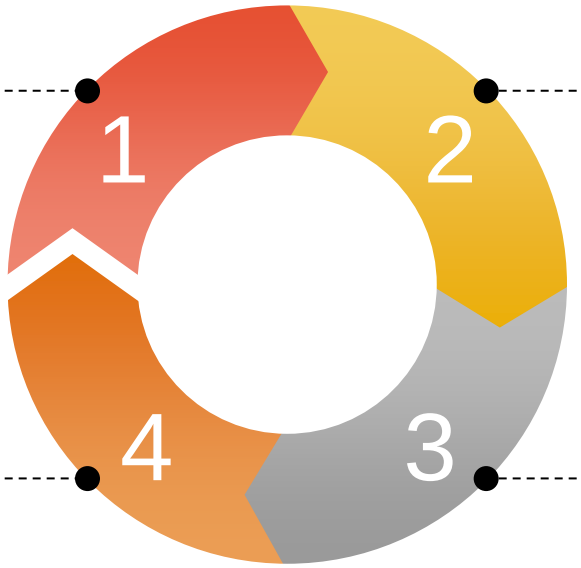
- Historically, industry D&O results have been heavily impacted by "contagion" events such as:
  - IPO laddering
  - Options backdating
  - Credit crisis
  - LIBOR scandal?

- Conceptually, the expected loss ratio for D&O can be thought of as being the sum of a contagion and non-contagion element
  - Contagion provision can be based on claim specific modeling
  - Non-contagion portion may be estimated utilizing traditional methods

Construction of a claim specific model for measuring D&O losses associated with credit crisis

1. Tier insureds into a select number of tiers (we selected 5 initially)

- Selection of tier based on consultation with claims department, outside experts



2. Factors judgmentally selected to apply to limit for each insured. Factors vary based on:

- Tier
- Attachment point
- Coverage (Side A only vs. ABC)

4. Continually revisit assumptions based on developments

3. Overall factors calibrated based on review of:

- Historical dismissal ratios
- Implied market loss

Claim specific reserving approach for high excess casualty coverages

- For high excess casualty, traditional approaches are generally not responsive to characteristics of reported claims which are below the attachment point
- As an enhancement, a claim specific approach can be incorporated for known claims
  - May involve ranking or tiering of claims into severity bands based on claims department's opinion as to likelihood of loss to insured layer
  - Straight frequency/severity approaches may not work well as majority of reported claims will never pose a threat to insured layer
  - As history is built up, probabilities of a claim arising from each claim severity band can be estimated
  - Conditional layer severity (size of claim given a claim to the layer) can be estimated using size of loss curves

Excess casualty – other considerations

- Provision for pure IBNR still needs to be determined
  - Number of pure IBNR ground up claim counts can be estimated using development techniques
  - As a next step, need to decide whether late reported claims are likely to be more or less severe than reported claims at a given point in time

- For certain large events, additional considerations may need to be incorporated:
  - Significant coverage defenses
  - Correlated outcomes (e.g. Deepwater Horizon cases)

- Additional calibration may be needed after comparing to results of traditional methods across a number of years

Overview of catastrophe reserving process

1 Gathering Information & Data

2 Consider Qualitative Factors

3 Determine Market Estimates

4 Determine Appropriate Methodologies

Gathering Information and Data

- Sources of industry estimates
- Client specific loss information and intelligence

Consider Qualitative Factors

- Coverage issues
- Type of event and extent of damages
- Cultural issues
- Limitations on time horizon for claim reporting

Determine Market Estimates

- Overall industry estimate
- Split commercial vs. residential, reinsurance vs. primary

Determine Appropriate Methodologies

- Consider maturity
- Model estimates
- Cedant advices
- Actual losses

Overview of catastrophe reserving process

- Market share in affected region
- Coverage – limits, attachment points, sublimits for business interruption, Direct & Facultative vs. treaty
- Ground up paid and reported losses by catastrophe and cedant
- For large cedants, reported claim counts by week or month
- For large cedants, closed claim counts and average paid on closed
- Qualitative information from claims department regarding individual claims (more useful for large Commercial risks written on D&F basis)
- Identification of all potentially exposed treaties

Overview of catastrophe reserving process

- Coverage issues
  - e.g. wind vs. water in Katrina
  - application of hurricane deductibles in Irene
  - Number of occurrences and apportionment of damages between occurrences (Thailand floods and NZ earthquakes)
- Type of event and extent of damages
  - Estimates for earthquake are prone to more development than estimates for hurricanes
  - Larger events may exhibit slower development as there may delays in claim examiners gaining access to affected areas
- Cultural issues - e.g. pressure from government to settle claims quickly/generously

Overview of catastrophe reserving process

- Catastrophe Models
  - Historically model estimates have been biased low post event, but changes to models make it unclear as to whether any bias still exists. For example, initial model estimates for a selection of cedants that we reviewed severely underestimated Katrina losses (producing estimates that were roughly half of ultimate losses); more recent models are producing estimates that are somewhat higher than current ultimate losses
- PCS
  - We have examined the historical development over time and generally apply a development factor to the PCS estimate for a particular catastrophe

Overview of catastrophe reserving process

Catastrophe reserving for a reinsurer – early maturities

- Model estimates for a specific portfolio
- Apply market share estimates for each cedant
  - Apply reinsurance structure (attachment point, limit, share, aggregate retentions and limits, etc.) to ground up estimates
  - May want to utilize a simulation approach to reflect uncertainty in estimates
    - Market share estimates, especially for companies with relatively low market share, can prove to be significantly understated or overstated in some circumstances
    - Simulation approach may assign expected losses to a particular treaty even if ground up losses are below attachment point
- Cedant advices
  - As cedants begin to report anticipated losses, important to understand the basis for the estimates:
    - Modeled results versus actual review of claims
    - IBNR estimation method (if any)
    - Number of claims received, number of properties surveyed
    - Historical accuracy of estimates for this cedant on other catastrophes

Overview of catastrophe reserving process

Catastrophe reserving for a reinsurer – later maturities

- Layer development
  - Apply benchmark development patterns to paid and reported losses for each catastrophe
    - One potential source of benchmarks is the Reinsurance Association of America (RAA) catastrophe development study
    - Need to know whether reported losses for some cedants include IBNR (not always clear)
- Ground-up development
  - Similar concept as layer development, but apply factors to ground up losses
  - Need to adjust excess RAA patterns to ground up basis, or review ground up development experience from prior events
- Important to consider unique characteristics of each event
  - Professional judgement is required!

Background: 2010-2011 Christchurch Major Earthquakes

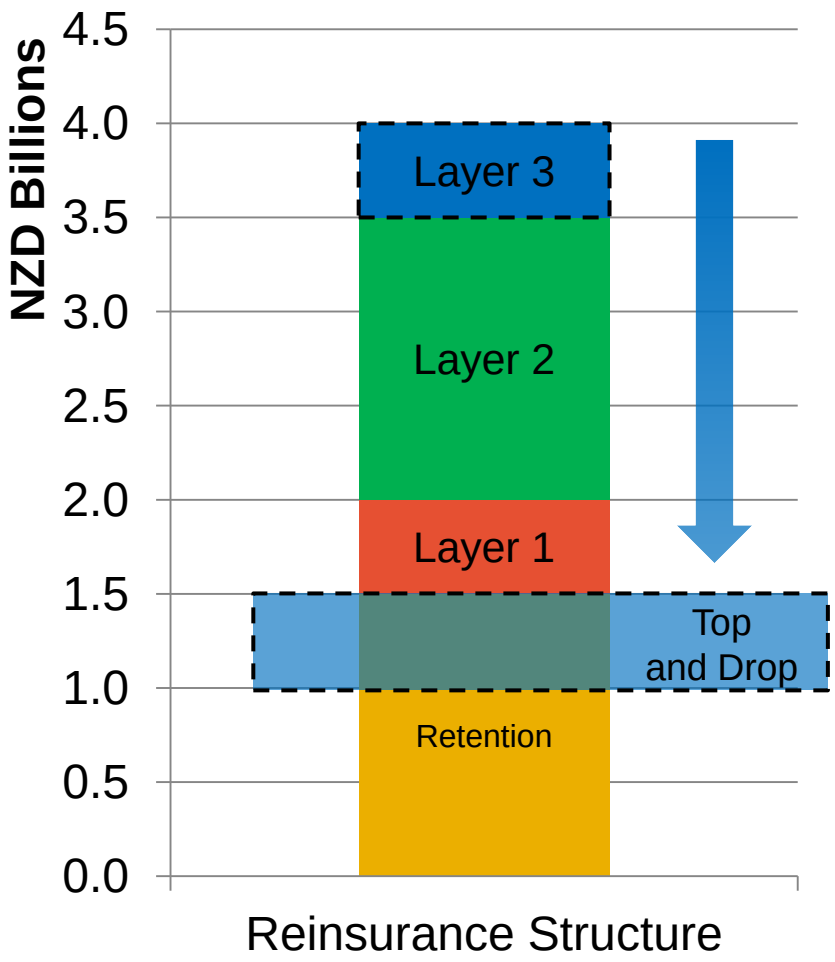
- New Zealand 1 – Darfield (September 4, 2010)
  - A 7.1 magnitude earthquake hit about 5 miles to the southeast of the town of Darfield and about 25 miles due west of Christchurch
- New Zealand 2 – Lyttelton (February 22, 2011)
  - A 6.3 magnitude earthquake struck very close to Christchurch, New Zealand's second most populous city
  - The epicenter of the earthquake was about a mile west of Lyttelton and only 6 miles southeast of the center of Christchurch.
  - While a lower magnitude event, this earthquake struck a more populous area and caused far more damage
- New Zealand 3 – Sumner (June 13, 2011)
  - An aftershock of the Lyttelton earthquake struck to the northeast of the original February earthquake
  - Also measuring 6.3 on the Richter Scale, this event was less damaging than the Lyttelton earthquake as it struck the same area, most of which was not yet rebuilt following the Lyttelton earthquake

New Zealand Earthquake Commission (EQC) provides coverage for residential building, contents and land damage

- Will pay first NZD 100,000 of building damage, NZD 20,000 for contents; private market insurance is excess

- The EQC buys significant amounts of reinsurance from the United States, Bermuda, London and European based reinsurers

The New Zealand earthquake commission's reinsurance structure



- The 2010 New Zealand Earthquake Commission's (EQC) reinsurance structure was comprised of three reinsured layers:
  - Layer 1 – NZD 500M xs NZD 1.5B
  - Layer 2 – NZD 1.5B xs NZD 2B
  - Layer 3 – NZD 500M xs NZD 3.5B
- Layer 3 had one reinstatement and once pierced, the layer would attach at NZD 1B for any following event – this is known as the "Top and Drop" layer
- EQC's program is effective on June 1st

The EQC's damage appraisal methodology

- Damages estimated via an online survey
  - Homeowners can submit claims by answering survey
  - Volunteers visited homes and filled out survey for homes without internet access
- Based on survey results (i.e., number of broken windows, number of cracked walls, other types of easily observed damage) and estimated cost of common repairs, initial damage estimates are calculated
- Second phase of estimates determined by trained appraiser visits to damaged home
  - These estimates of damages have been found to be significantly greater than the survey results
  - As at 2011 year end, the available estimates for Sumner were based on almost no completed appraisal visits six months after event

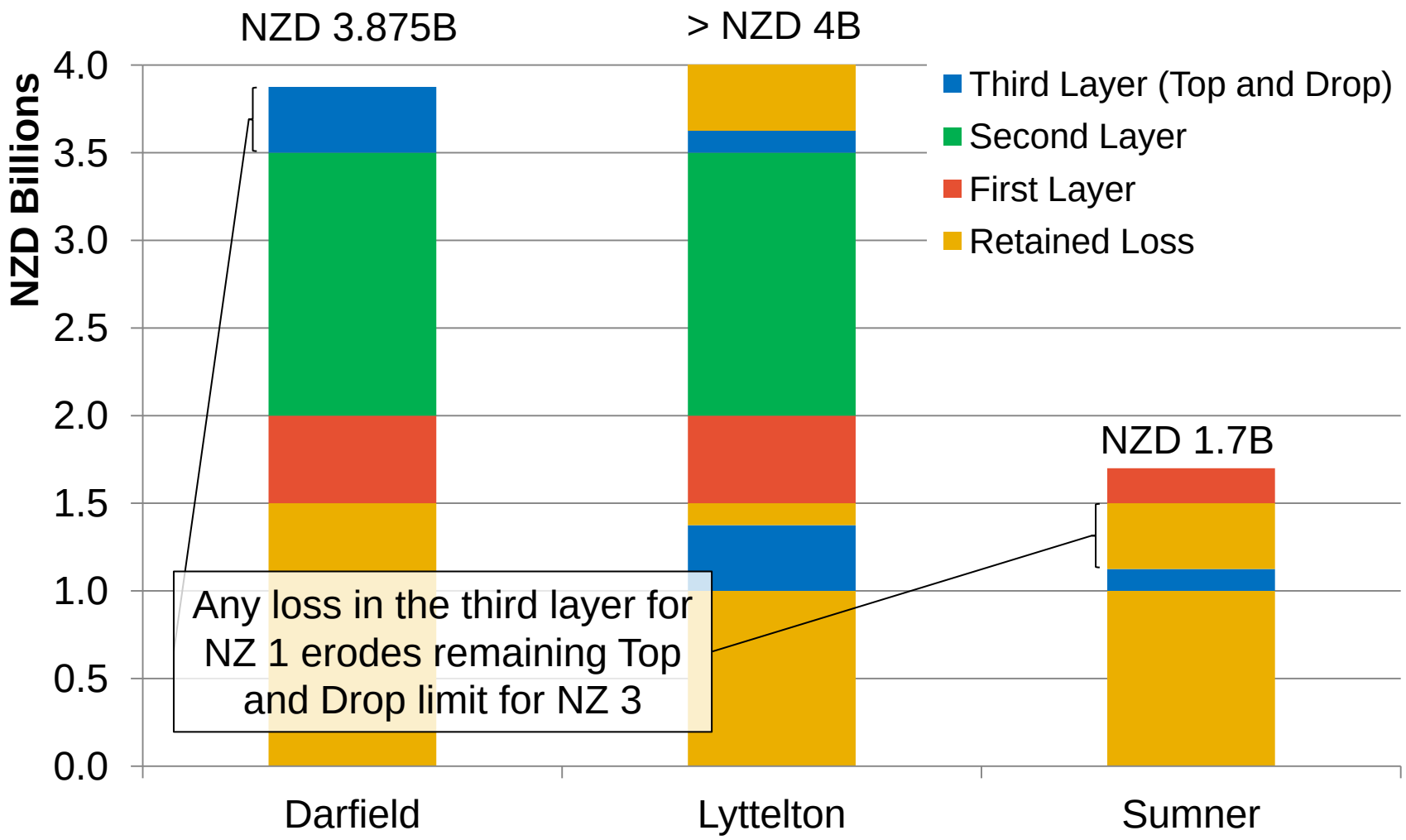
Initial reserving approach

- Darfield
  - We reviewed publicly available claim filing information and categorization of claims in various severity bands based on publicly available information on the EQC website
  - Our internal estimates of EQC losses were higher than early amounts advised by EQC
- For Lyttleton, amounts reported by cedants were reasonability tested with consideration given to:
  - Overall industry loss estimates
  - Relativity of losses to Darfield
  - Accuracy of initial Darfield estimates

Sumner estimate and probabilistic framework

- To estimate Sumner losses at year end 2011, we evaluated the development in survey estimated severities for land damage, building damage and contents implied by Darfield and Lyttelton
- We selected slightly more favorable development than might have been implied by first two events
  - Many homes impacted by Sumner were already damaged by Lyttelton and the marginal additional damage may not be significant as most rebuilding had not yet taken place
  - We had qualitative information that the propensity to file a fraudulent claim had increased following the first two events and therefore we expected more claims that would eventually settle without payment.
  - We had qualitative information that efforts had been made to improve the accuracy of the survey estimates
- When developing estimates, one must consider order dependency
  - As shown in the chart on the next two pages, development into the third layer on Darfield impacts the remaining limit available on the Top and Drop for Sumner
- We created a probabilistic framework where we assigned probabilities to various outcomes above and below our mean expectation of loss for each event and calculated probability-weighted mean expectations of loss for Sumner, Darfield and Lytttleton
- The following slides display two scenarios included in our probabilistic framework

Sample scenario 1 (medium Darfield, high Sumner)



Sample scenario 2 (low Darfield, medium Sumner):