General insurance pricing seminar
Beth Fitzgerald

U.S. trend sources and techniques for commercial lines classes

Trend Sources and Techniques

• Data for Trend Analysis
• Data available for Reinsurance/Excess Pricing
• Issues in Selecting Trends
• General Liability Manufacturers & Contractors example
• Commercial Property Basic Group I (Fire) example
• Directors and Officers
• EPL, Crime Frequency
ISO Industry Data

- Data available for claim severity, claim frequency and exposure trend analysis
- Detailed transaction reporting of premium and losses
  - individual policy information
  - individual occurrence/claimant information
- More flexibility in compiling data for analysis
- Enhanced quality and accuracy
U. S. Economic Data

- Historical data sources
  - Federal Reserve
  - U.S. Bureau of Labor Statistics
  - Bureau of Economic Analysis
- Forecasted information
  - IHS Global Insight *
  - ISO models

* Neither IHS Global Insight nor any of its third party licensors make any warranties, expressed or implied, as to the results obtained using their data and forecasts.

Consumer Price Index Data for U. S.

* source: Bureau of Labor Statistics
Breakdown of CPI - All Items

CPI - All Items
- Housing
- Transportation
- Food/Beverage
- Medical Care
- Recreation
- Education/Communication
- Apparel
- Other Goods/Services

6.50%

Consumer Price Index Data

Annual Change in U. S. Consumer Price Index *

* source: Bureau of Labor Statistics
Inflation Risk for U. S.

- Near term, increased liquidity not enough to ignite inflation

- Core inflation (excluding food and energy) expected to be stable
  - Employment rising but continuing high unemployment rate
  - Housing market still weak

- Long term, risk if monetary policy not tightened as economies approach full employment

Alternative Trend Forecasts for Severity

- Inflation Adjusted Trend Procedure
  - Calculate inflation index (or severity deflator) by weighting economic price indices
  - Compute real severities by dividing historical nominal severities by inflation index
  - Price inflation = trend in the (forecasted) severity deflators
  - Social inflation = exponential fit of historical real severities
    - changes in claim settlement, laws, court practices
Alternative Trend Forecasts for Severity

- Inflation Adjusted Trend Procedure
  - trend in real severities (social inflation) is constant
  - trend in severity deflators (price inflation) varies depending on trending period

- Forecasted Nominal (or total) severity
  = forecasted real severity x forecasted severity deflators

General Liability Severity

- Bodily Injury Severity Deflators
  - Medcare – weighted price index of CPIs for hospital, physician services and medical commodities
  - Legal – price index for personal legal services

- Property Damage Severity Deflators
  - PCWC – personal consumption price index
  - Legal
Commercial Auto Severity

- Bodily Injury and Personal Injury Protection Severity Deflators
  - Medcare – weighted price index of CPIs for hospital, physician services and medical commodities
  - Wage – employment cost index for private industry workers

- Property Damage and Physical Damage Severity Deflators
  - CPI for Motor Vehicle Body Work

General Liability Exposure

- Contractors Payroll
  - hourly earnings for construction workers
  - wages for private industry workers
- Manufacturers Sales
  - consumption of durables & nondurables
  - consumption of food services
  - net exports of merchandise
  - private domestic investment
- OL&T Sales
  - retail sales including food services
General Liability Frequency

- Forecasts: frequency with interest rates and unemployment rates
  - Use Unemployment rate & 5-year Treasury note interest rate

General Liability Frequency

- High interest rates
  - businesses have increased financial pressure
  - claimants under greater financial stress (higher debt service, lower asset values)
- High unemployment
  - poor business climate
  - claimants under greater financial stress
- Potential for less investment & maintenance and production cutbacks
General Liability - Frequency Example

![Graph showing frequency per $1,000,000 of ALCCL over time with Actual, Economic Model, and Exponential lines.]

* Frequency per $1,000,000 of ALCCL

External Data for Commercial Property

- U.S. Economic Data
  - Retail Sales
  - Manufacturers Sales
  - Producer Price Indices (PPI)
- Xactware Commercial Index (XCI) for buildings
Data Compilations

Standard Compilations

• Size of Loss data for General Liability (“GL”) and Commercial Property (“CP”)
• Layer of Loss data for GL
• 5-years historical primary experience by Class and State/Territory for GL & CP

Custom Compilations

• Size of Loss by Amount of Insurance for CP
• Layer of Loss by Policy Limit for GL
• Other possibilities for both lines
General Liability Increased Limit Analysis

- Calculate Increased Limit Factors using mixed exponential curves fit to paid occurrence data by accident year & settlement date
- Analyze paid/settled data for many years by policy limit purchased
- Analyze basic limit and total limit paid and incurred accident year data
- Select long-term average unlimited severity trend for CSL

TREND ISSUES
Trend Method

- Fit data to exponential curves
- Calculate goodness of fit $R^2$
- Calculate fits for different number of years

Trend Selection Issues

- Stability
- Regulatory Support
- Compliance with Actuarial Standard of Practice #13 on Trending Procedures
  - consider bias or distortions in data
  - consider economic or social influences either in data or in projection period
Manufacturers & Contractors Claim Severity and Frequency Trend

- By coverage (bodily injury, property damage, pers & advertising injury)
- Internal ISO claim severity and claim frequency data
  - Basic limits accident year loss data (unlimited ALAE)
  - losses/claims developed to ultimate
  - paid and incurred
  - indemnity, ALAE, indemnity + ALAE
  - 10, 8 and 6 year fits
Manufacturers & Contractors Exposure Trend

- Use Economic Trend forecasts
  - Contractors classes – use contractors payroll price index
  - Manufacturers classes – use manufacturers sales price index

Issues for Manufacturers & Contractors Trend Selections

- Analyze severity fits excluding latest point(s) due to loss development
- Use paid severity to avoid bias in case reserve changes over time
- Incurred development more stable
- Analyze Indemnity vs. ALAE for any severity distortions
- Frequency selection also reflects any recent patterns and any external information
### Manufacturers & Contractors Example

#### $100k/$200k Bodily Injury Paid Severity

<table>
<thead>
<tr>
<th></th>
<th>Indemnity + ALAE Fits</th>
<th>Indemnity + ALAE R²</th>
<th>ALAE Fits</th>
<th>ALAE R²</th>
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<tbody>
<tr>
<td>6 year</td>
<td>6.5%</td>
<td>.75</td>
<td>9%</td>
<td>.70</td>
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<tr>
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<td>6.0%</td>
<td>.84</td>
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<tr>
<td>10 year</td>
<td>8.0%</td>
<td>.85</td>
<td>10%</td>
<td>.80</td>
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<tr>
<td>9 year (ex latest)</td>
<td><strong>6.2%</strong></td>
<td><strong>.95</strong></td>
<td>7%</td>
<td>.88</td>
</tr>
</tbody>
</table>

Last year’s selection = 7.0%
This year’s selection = 6.5%
Basic Group I (Fire) Claim Severity and Claim Frequency Trend

- By coverage (buildings, contents, time element)
- Fit internal ISO claim severity and claim frequency data
  - losses/claims developed to ultimate
  - total vs. normal accident year losses
  - 10, 7 and 5 year fits
  - by deductible & “blended” weighted avg. of all deductible data

Basic Group I (Fire) Claim Severity

- Fit 12 points of External data
  - XCI for buildings
  - PPI for contents
  - Manufacturing sales & Retail sales for time element
- Determine Current Cost Factor & Loss Projection Factor using External data
**Basic Group I (Fire) Loss Trend**

- Select Severity Loss Trend Adjustment (LTA) to complement external economic indices
- Select Frequency LTA based on internal data
- Apply severity trend to individual occurrence
  - first add $ded back to loss amount
  - apply severity trend
  - subtract $ded

**Basic Group I (Fire) Exposure Trend**

- By coverage (buildings, contents, time element) using internal ISO data
- Determined from actual changes in amounts of insurance from one year to the next
- Based on a sample of renewal policies, matched on premium record ID, insurer, state, territory, construction, coverage, protection, occupancy class and rating ID
Issues for Commercial Property

- Deductible distribution changes over time = rely on “blended average” of all deductibles
- Distortions due to large losses = rely more on normal losses
- Bias in distribution of losses by cause in different years - analyze fire, VMM, theft, water claims each year

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Commercial Property Example

Basic Group I Building Internal Severity

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<tr>
<td></td>
<td>Normal</td>
<td>Total</td>
<td>Normal</td>
<td>Total</td>
</tr>
<tr>
<td>10 Yr. Fits</td>
<td>3% 4.5%</td>
<td>4% 4.5%</td>
<td>6% 5.5%</td>
<td>4.2% 5%</td>
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<tr>
<td>R²</td>
<td>.85 .80</td>
<td>.90 .88</td>
<td>.80 .78</td>
<td>.90 .85</td>
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Last year’s selection = 4.0%
This year’s selection = 4.2%
### DIRECTORS AND OFFICERS

#### Annual Number of Securities Class Action Filings*

<table>
<thead>
<tr>
<th>Year</th>
<th>Ponzi/Options Backdating Filings</th>
<th>Credit Crisis Filings</th>
<th>All Other Filings</th>
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<td>2009</td>
<td>750</td>
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</table>

* Data from Stanford Securities Class Action Clearinghouse and Cornerstone Research
Stanford Securities Class Action Lawsuits

• Litigation for credit crisis cut nearly in half from 100 in ‘08 to 53 in ‘09
• Financial sector still about half of claims with 84 in ‘09
• Increase in “older lawsuit” in ‘09
• Disclosure dollar loss (DDL*) decreased from $220B in ‘08 to $83B in ‘09

*DDL is dollar value change in firm’s market capitalization between trading day before and after end of class day period.

Volatility Index by Chicago Board of Trade *

*CBOE Volatility Index (VIX)

*VIX is measure of market expectations of near-term volatility conveyed by S&P 500 stock index option prices.
Issues with Directors and Officers Claims

- U. S. SEC spur increase in fraud litigation?
- Corporate accountability for climate risk?
  - emissions, government mandates
  - transportation, energy, manufacturing firms at higher risk

*DDL is dollar value change in firm’s market capitalization between trading day before and after end of class day period.
Employment Practices Liability Frequency

Frequency of EEOC Charges Filed per Employee *

* Frequency per 10,000 employees

CRIME FREQUENCY TREND
**Burglary & Theft Frequency**

- Frequency per $1000 of ALCCL

**Commercial Fidelity Frequency**

- Frequency per $10000 of ALCCL

* * Frequency per $1000 of ALCCL
Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged. The views expressed in this presentation are those of the presenter.