IFoA Reserving Seminar

Inmarsat
Wednesday, 20th June 2018

Format for this Roundtable

Three Themes

- Modelling Inflation - **Chris**

- Business Context - **James**

- Micro Level : Claims Drivers - **Keith**

Roundtable Discussion

- Clustering delegates in six groups
  - two groups per theme; *one facilitator per theme*
  - one scenario per group; *handouts provided*
  - one rapporteur per group
  - success is a good discussion in the room and capturing "***take away***" points

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Modelling Inflation

Chris

Modelling Inflation

A Modelling View of Inflation

$$E[\textbf{\textit{Incremental Loss}}_{AY=i, DY=j}]$$

$$= \textbf{\textit{Exposure}}_{AY=i}$$

$*$ Pure Loss Rate $\rightarrow$ Year 0

Earned Premium

Base Loss Ratio

$$* \prod_0^i \textbf{\textit{AY}}\, effect_t$$

$$* \prod_0^j \textbf{\textit{DY}}\, decay_t$$

$$* \prod_i^{i+j} \textbf{\textit{CY}}\, effect_t$$

AY "Level" Changes

Decay

CY Trend

$$\log\Big(E(\textbf{\textit{Loss}}_{i,j}) \Big) =$$

$$\log(\textbf{\textit{E}}_{\textbf{\textit{i}}}) + \textbf{\textit{intercept}} \quad + \sum_0^i \textbf{\textit{AY}}_t + \sum_0^j \textbf{\textit{DY}}_{t,k} + \sum_i^{i+j} \textbf{\textit{CY}}_t$$

A Simple Example

OLEP * Base ELR * AY Factor * DY Factor * CY Factor

Exposure

AY	OLEP
2011	1,000
2012	1,500
2016	2,000
2014	1,750
2015	1,500
2016	1,500
2017	1,500
2018	na
2019	na
2020	na
2021	na

Constant

Pure ELR
75.00%
na
na
na
na
na
na
na
na
na
na

AY Direction

Trends	Factor.
1.000	1.000
1.070	1.070
1.020	1.091
0.970	1.059
0.970	1.027
0.970	0.996
0.970	0.966
na	na
na	na
na	na
na	na

CY Direction

Trends	Factor
1.000	1.000
1.020	1.020
1.040	1.061
1.030	1.093
1.010	1.104
1.000	1.104
1.005	1.109
1.005	1.115
1.005	1.120
1.005	1.126
1.005	1.131

Incremental Loss / Forecast Triangle

AY	0	1	2	3	4	Ult	U L/R	
2011	130	231	162	147	111	782	78.2%	
2012	223	365	330	250	178	1,346	89.8%	14.8%
2016	257	542	410	292	220	1,721	86.1%	-4.1%
2014	263	464	330	249	188	1,495	85.4%	-0.8%
2015	244	405	305	230	173	1,358	90.5%	6.0%
2016	214	376	283	214	169	1,256	83.7%	-7.5%
2017	208	366	276	219	157	1,227	81.8%	-2.3%

Dev. Year

	0	1	2	3	4
Decay	17.3%	175.0%	75.0%	75.0%	75.0%
Factor	17.3%	30.2%	22.7%	17.0%	12.8%
Cum	17.3%	47.5%	70.2%	87.2%	100.0%

Loss Development Factors

	0-1	1-2	2-3	3-4
2011	2.785	1.450	1.281	1.166
2012	2.638	1.562	1.272	1.152
2016	3.111	1.514	1.242	1.147
2014	2.768	1.454	1.236	
2015	2.660	1.470		
2016	2.759			

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Structural Driver Model

$$\log\Big(E\big(\boldsymbol{Loss}_{i,j}\big)\Big) =$$

$$\log(\boldsymbol{E}_i)$$

$+\boldsymbol{Intercept}$

AY Structural Drivers

Unexpl ained

$$+\sum_{t=1}^{i}\boldsymbol{AY}_t + \sum_{n=1}^{N}\beta\_AY_n * \sum_{t=1}^{i}SD\_AY_{n,t}$$

$$+\sum_{t=1j}\boldsymbol{DY}_t$$

CY Structural Drivers

Unexpl ained

$$+\sum_{t=i+1}^{i+j}\boldsymbol{CY}_t + \sum_{m=1}^{M}\beta\_CY_m * \sum_{t=i+1}^{i+j}SD\_CY_{m,t}$$

1. GLM

- The reserving team implemented a GLM-based model for the current year.

- The chief actuary commended the team for their rigour and identifying the inflationary contributors and "common trends".

- They used on-level earned premium as their exposure base and found the ultimate net loss ratio trend to be -2% p.a. after adjusting for a fitted calendar year trend of +0.5% p.a.

- Note: The standard Link Ratio methods were less favourable.

A. ***What unknowns would you be <u>more</u> worried about than for your standard link-ratio methods?***

B. ***How would you decide what <u>weight</u> to give the GLM results and would this be different if the relative method indications were reversed (e.g., standard methods more favourable, GLM less favourable)***

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2. Past Trend Analysis

- The reserving team have refined their inflation analysis.

- They now re-segment their data to allow for business-mix effects, remove shock losses and other outliers, and obtain economic forecasts of their inflation drivers. Historically, the actual versus projected has been good.

A. *Is this a good approach?*

B. *What factors make your models susceptible to modelling error that we need research for?*
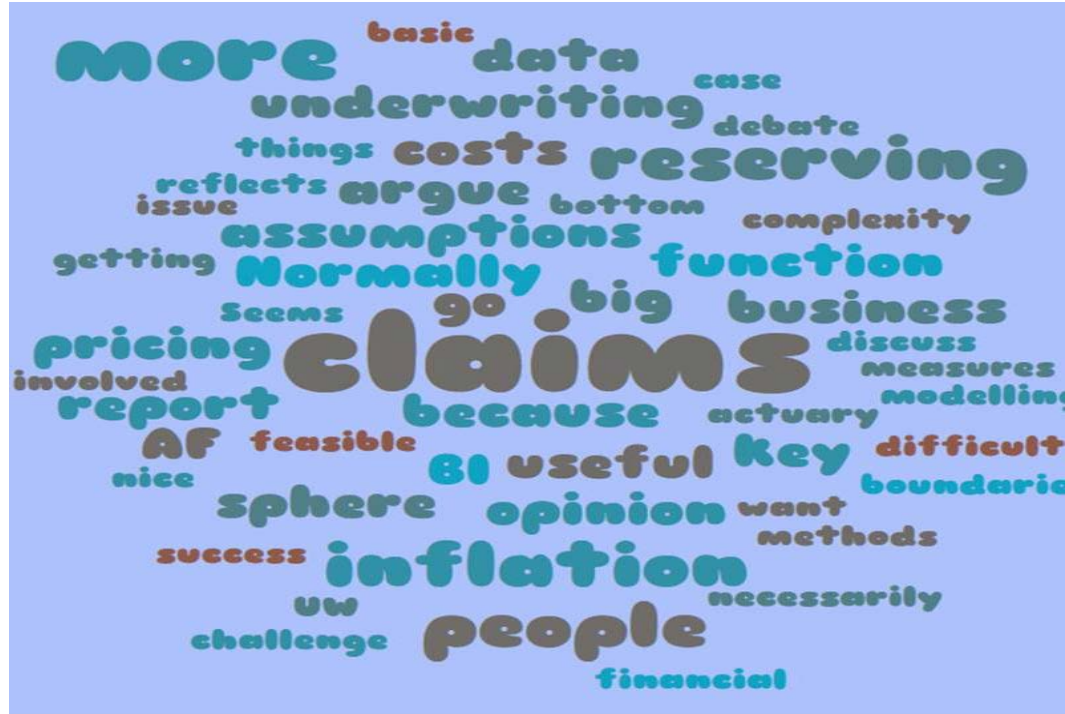
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Business Context

James

Business Context

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3. Financial Plan Assumptions Mismatch Reserving Risk

- During the reserve-risk assessment, analysis of smart phone inflation found an inflation rate of 2% +/- 1% p.a. These figures were agreed as assumptions to the latest capital calculation.

- In a department not so far, far away, the financial planning team provided their estimate of gross written premium. They allowed for 7% rating increases, as a result of claims-cost inflation being expected to be the same figure.

A. Who is right?

B. Why could they be different?

C. What happens if the reserving actuaries are wrong, should they revisit their analysis in the next reserve review?

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4. Underwriting Assumptions Mismatch Reserving

- The inflation committee at an insurer produced a joint inflation figure for household contents of 5% p.a. after pricing analysis showed flat inflation (0%) and reserving analysis gave 10.2% p.a.

- Underwriters suggested the agreed figure of 5% was very generous of them, reserving actuaries are after all known to be prudent!

A. *How could these estimates differ?*

B. *Is a single rate sensible?*

C. *How could we get a better estimate in reserving?*

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Micro Level: Claims Drivers

5. Concordia Shipping Loss – a Step Change?

- The Costa Concordia, a multi-story liner carrying over 4,000 passengers and crew, ran aground in January 2012 and capsized off Italy's west coast, killing 32 people.

- Loss estimate may rise to $2bn. The costs of removal were high, as it was decided for environmental reasons to remove the wreck piece-by-piece and re-float. LOF [Lloyd's Open Form], a salvage contract, was amended quite a few years ago to incorporate the ability to be paid for the prevention of pollution.

A. *Could this have been foreseen?*

B. *How could links between Claims and the rest of the business save future costs?*

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6. Escape of Water – a Creeping Trend?

- According to The Association of British Insurers, escape of water causes approximately £2million worth of damage every day. In the last three years, the average cost of these claims has risen by 31% to £2,638. ABI suggested this area may be a number-one priority in 2018.

- Factors such as more hidden or integrated pipework and less damage-resilient building materials may contribute towards higher claim costs.

- Also more plumbed-in domestic appliances; more central heating; an increase in en-suite bathrooms and downstairs toilets; more complex plumbing systems; hidden and integrated plumbing and the use of less damage-resilient materials such as chipboard could also be factors.

A. *Are the incidence of plumbed appliances/DIY linked to economy? Does this matter?*

B. *Could joint analysis help reduce risk for customers, whilst minimising risk for the insurer too?*

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Questions

Comments

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