Section 5: Analysis of experience

IAI Seminar 3 December 2014

Over view

Principles

1. Purposes and users – this needs to be established as a first step of any analysis
2. Conflicts
3. General process over view
4. First priorities in a "first version"? For debate
5. Materiality, meaningfulness and actuarial priority

Specific

7. Claims
8. Terminations
9. Profitability
10. Expenses

Purposes & users

1. **Sample purposes of experience analysis**

   a) Compliance & assisting the regulator do their job efficiently (which helps us all!)

   b) Actuarial management of the organisation eg

      - Feedback on assumptions/methods of -
      - True solvency & outlook
      - Reserving adequacy
      - Premium adequacy
      - Any warning of emerging problems

   c) Learnings for the organisations on a wide variety of issues – terminations, ALM considerations etc etc

2. **Users of FCR** – Regulator, Board, Management (internal and regional), The acuary!, Other eg potential purchasers, auditors,

3. **Issues**

   - Compliance and actuarial management needs overlap but are not the same
   - Conflicts between needs for different purposes and users

Conflicts with any FCR (and other actuarial work)

- For efficient compliance **standardisation** is needed

- The most useful experience analysis will **vary according to the purpose and the situation** of a company (solvency, business mix, volume and type/quality of data available, age of organisation, resources, growth plans etc etc) Eg

  - The actuarial priorities will be different for a large mature company with low solvency than for a start up with lots of capital and extensive RI cover

  - What is a sensible focus for a health experience analysis for PSU will be different than for a company writing only pa!

- **Technical resources, data and time are always an issue** for any company – prioritisation to best meet the core actuarial functions is always needed – "need care not to lose sight of the wood to concentrate on the trees"

- An incoming actuary will take **time to come up to speed** on all issues yet sign offs will be quickly required

Conflicts with a standardised FCR (and other actuarial work)

Think about what the different needs and priorities might be for a TP claims analysis for –

1. A company a few years old with very little TP business
2. A large multiline private company that has been operating 10 years
3. A PSU
4. A large specialist TP insurer
5. A company in its first year of operation
6. A company with an actuary who joined 2 weeks before the sign off date

Consider issues such as different

1. Business mix
2. Size (absolute and by product)
3. Solvency
4. Data quantity (length and volume)
5. Data quality
6. etc

Sample general process steps

Steps 5 to 9 evolve over time- as they evolve usefulness grows

1. Clearly determine the *purpose and what questions need to be answered*

2. Gather the *data*

3. *Reconcile and understand data* against the accounts/past returns/general knowledge of the portfolio (this is often very time consuming.. and educational)

4. Design an *"initial method"* and apply to the data

5. *"Understand" the results* (and justify against past returns/analysis and general portfolio knowledge, justify apparent trends if possible)
   - The results of a "first cut" of a "new" analysis method will often throw "strange results" that are a function of limitations of the method or data as opposed to being genuinely useful information
   - It is quite possible that a number of detailed discussions will need to be had with other technical areas to understand both apparent trends and what exactly the data is/how recorded

6. *Adjust method and data* as indicated and redo the analysis until satisfied that the results are the best that can be gained from the available data (or are reasonable)

7. See what *meaningful information and lessons* comes out of the analysis
   - Often at this stage it is clear that other analysis needs to be done to answer the questions that the analysis raises. Also often need to speak to the other technical functions for what is going on. During the process it may identified that it would be good for some business processes to change.

8. Do the *subsequent analysis* (with validations) – which might need to extensive/time consuming

9. *Document and communicate*
   - Write a logicalreport, make recommendations – learnings from the analysis, data recording improvements any changes to business processes are additional monitoring required etc
   - Complete *"other communication"* to help get the messages across and get action eg
     - some Board members might be better reached by a simplified presentation and executive summary
     - Some "lobbying" might be needed to get processes changed and resources allocated etc etc
   - Complete documentation and tidy up spreadsheets for efficient future use

Example of how one analysis leads to another
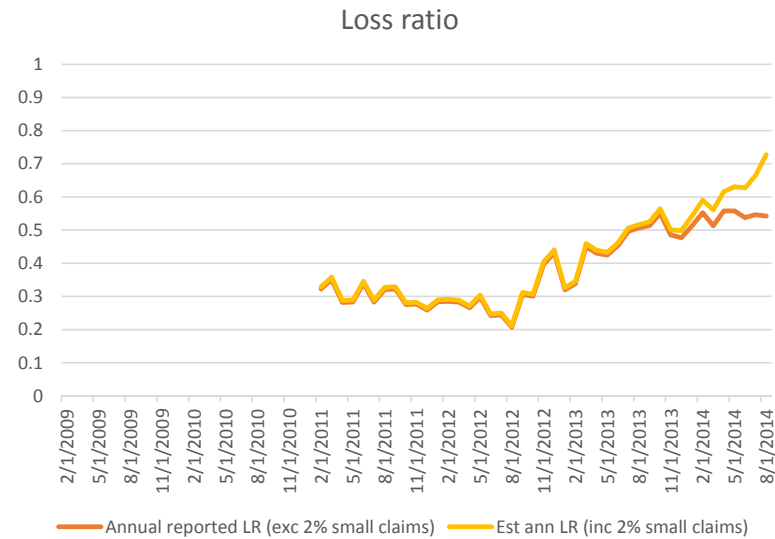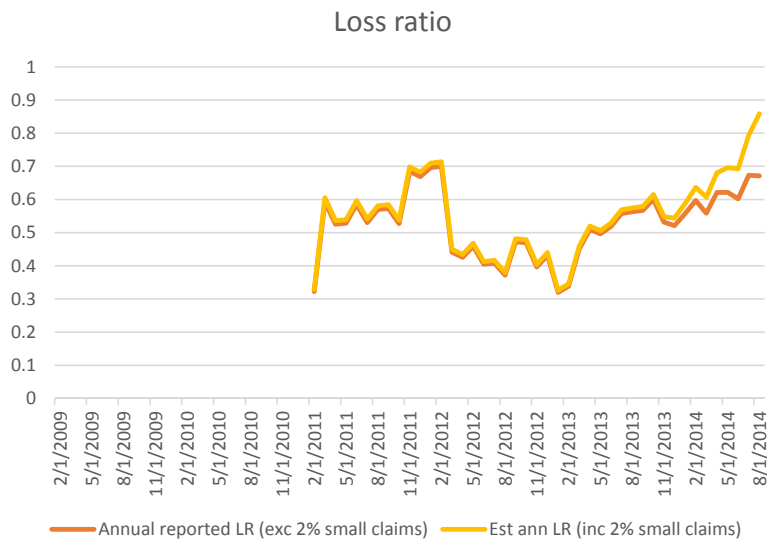
- The first graph is derived from an IBNR analysis – it shows large variation and a worrying trend in 2014
- The second graph is after 7 large claims were removed. There is an increase in 2013 which can be explained by a new massive group however the 2014 worrying trend still remains and needs further explanation

First priorities for new FCR?

1. **Getting the correct data in correct tables and using correct definitions?**

   - Reconciliations to the accounts and previous returns (more on this in the next slide)

   - Sub-totals add up to the total

   - "Strange features" are explained and understood eg negative NEP (this can be correct in accounting terms but not necessarily able to be used in an expense analysis as a % of premium

   - Good understanding of the main features of the most important sections of this business Eg

      - Maybe focus on LOB's that have the majority of the business and less emphasis on LOB's with say 60 policies

      - A company with low solvency might be more focused on ALM than free look analysis when they have little business subject to free look

      - A lot of the work to get in-depth understanding is never seen (see previous graph) & requires several exploratory analysis

   - What to do about the concept of materiality - diminishing returns can occur as you move closer to perfection. Sometimes extra work results in better technical perfection but little additional value eg analysis of "free look" experience if there were only 5 "free look" cancellations

   - Risk management – how should an incoming actuary divide focus between (i) reserves and RI program and (ii) expense breakdown by branch?

2. Communication framework set up

3. Identification or areas that need more in-depth work for the next version (actuarial control cycle)

Data issues when working with new breakdowns

1. Raise a lot of time consuming data issues and needs substantial time to understand both the data features and subsequent trends BEFORE the results can begin to be used

   - This is time consuming – needs justification of features requiring any/all of -
     - Confirming what is "statistical or accounting noise"
     - Checking with other technical areas
     - Another extraction/analysis to verify the results of the first
     - Testing the impact of things like JV journals, once of items, reconciliations etc etc
     - Development of a more meaningful subset of data eg "large claims removed"
     - Development of method that compensates for data limitations
     - Much of this work is exploratory, once off and will never be seen by other users

2. Give the actuary new learnings about the nature data and of the business (often leading to more analysis)

It is often only AFTER these steps that the high value actuarial analysis can be done and subsequent important conclusions and recommendations

Table No. 5.1: Renewal (Customer Retention)								
Financial year ending 31-Mar-X			Financial year ending 31-Mar-X-1			Financial year ending 31-Mar-X-2		
Number of policies due for renewals (A)	Number of policies renewed (B)	Renewal rate (B/A)	Number of policies due for renewals (A)	Number of policies renewed (B)	Renewal rate (B/A)	Number of policies due for renewals (A)	Number of policies renewed (B)	Renewal rate (B/A)

Split by retail/commercial & distribution channel - initially just by retail & Agency-other & broker-other. For health & motor have by duration as

Table No. 5.2: Analysis of Freelook Policies

Line of Business	Policies with free look option ending during the											
	Financial year ending 31-Mar-X						Financial year ending 31-Mar-X-1					
	Number	Annualized premium	Free look cancellations		% of Free look cancellations		Number	Annualized premium	Free look cancellations		% of Free look cancellations	
			Number	Annualized	Number	Annualized			Number	Annualized	Number	Annualized
	(1)	(2)	(3)	(4)	(5) = (3) / (1)	(6) = (4) / (2)	(1)	(2)	(3)	(4)	(5) = (3) / (1)	(6) = (4) / (2)
Health												
….												
…..												

Table No. 5.3 (a): Expense Analysis				
Description	Financial year ending 31-Mar-X	Financial year ending 31-Mar-X-1	Financial year ending 31-Mar-X-2	Financial year ending 31-Mar-X-3
Allocated Loss Adjustment Expenses				
Operating Expenses				
Commission Paid				
Other Expenses				
Total Expenses				
Total Expenses as a % of gross premium				
Total Expenses as a % of Sum insured				
Commission paid as a % of gross written premium				

Should Allocated loss expenses be zero if they are included with claims? If not this won't match the expenses reported in the accounts

| Table No. 5.3 (b): Expense Ratio | | | | | | | | | | |

LOB	Expense Ratio									
	Financial Year X			Financial Year X-1			Financial Year X-2			Financial Year X+1
	Actual (A)	Expected (E)	A/E	Actual (A)	Expected (E)	A/E	Actual (A)	Expected (E)	A/E	Expected
Fire										
Health										
…										
…										

Need consistency in the allocation methods between A & E

Table No. 5.4 (a): Volatility in Net Incurred Loss Ratio								
LOB	**Net Incurred Loss Ratio**							
	Financial Year X			**Financial Year X-1**			**Financial Year X-2**	
Fire								
...								
...								
...								
Include IBNR?								

- What goes in the 3 columns? NEP, net IC & loss ratio?
- Can be useful to have loss ratios on an accident year basis & 3 year averages – especially for small LOB's
- Good to have a column with the number of claims & maybe results with 2 or 3 large claims removed (as then can see if due to statistical variation)

Table 5.4(b1)

LOB	No of claims incurred	No. of exposures	Total no of Claims paid fully	Total number of claims paid partially	Total number of closed claims without claim payment	Net claim paid amount	Gross incurred claim amount	Net incurred claim amount	Average Frequency of claims		Average Severity of claims	
									Actual	expected	Actual	expected
Fire												
……												

Table 5.4 (b2): Large Claims

LOB	No. of Large Claims Incurred	Total Large Claim Incurred Amount
Fire		
……		

Definition of large claim?	Claim size where pdf is 95% by Class? If so nee

Table 5.4(b3): Catastrophe Claims

LOB	No. of Catastrophe Claims Incurred	Total Cat Claim Incurred Amount
Fire		
……		
	Count as 1 at portfolio level or count as 1 for ea	

Table No. 5.4 (c): Month-wise Claims Data										
	Financial year ending 31-Mar-X					Financial year ending 31-Mar-X-1				
	Claim Paid Amount			Closed claims without claim payment	Reopened claims	Claim Paid Amount			Closed claims without claim payment	Reopened claims
	w.r.t Outstanding Claims (A)	w.r.t. IBNR Claims (B)	w.r.t. Other than (A) & (B)			w.r.t Outstanding Claims (A)	w.r.t. IBNR Claims (B)	w.r.t. Other than (A) & (B)		
January										
….										
….										
….										

What's the purpose of this table?

| Table No. 5.4 (d): Tail Length of Claims			
	Average Tail Length of Claims for		
LOB	FY ending 31-March-X	FY ending 31-March-X-1	FY ending 31-March-X-2
Fire			
…			
…			

Claims – what can impact profit/solvency?

- What is good and important to look at depends on the company's major products, RI program, size and solvency level

- Impact of large claims on solvency & profitability (implications for RI program) – only for products where a single claim can have a large impact (if not covered in the RI section)

- Inflation – especially products like health and TP. Large variety of methods – needs to be selected to suit the product and data volume. Can be technically difficult (if covered in the IBNR report then a quick summary should be adequate referring reader to the IBNR report)

- Settlement speed for longer tail products – eg if a large number of say TP claims (Comparison to pricing basis

- For high volume business it can be good to have a set of notional risk premium rates" – which can be used as a divisor so that claims experience can be compared across a variety of factors such as age, duration, branch, agent, channel etc (otherwise results distorted by risk mix changes)

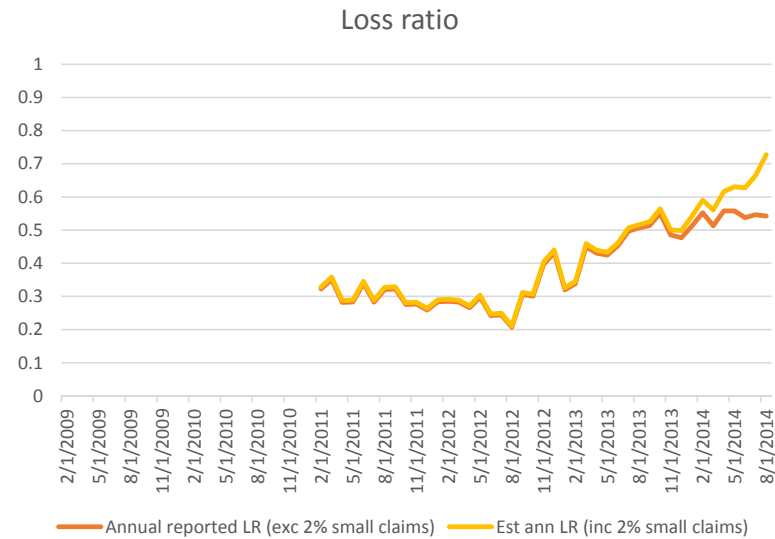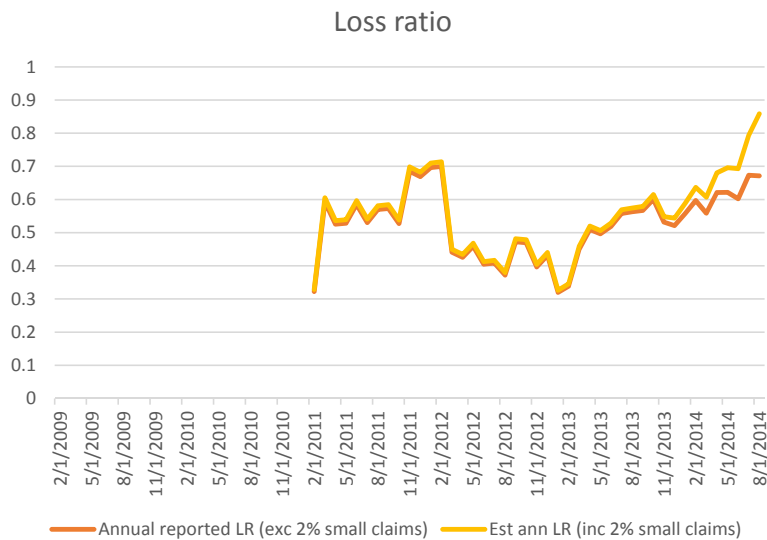- Claim size distributions (these are useful in understanding claim/profit volatility)

Seasonality and annual inflation (hlth)

Unit inclurred claims by month
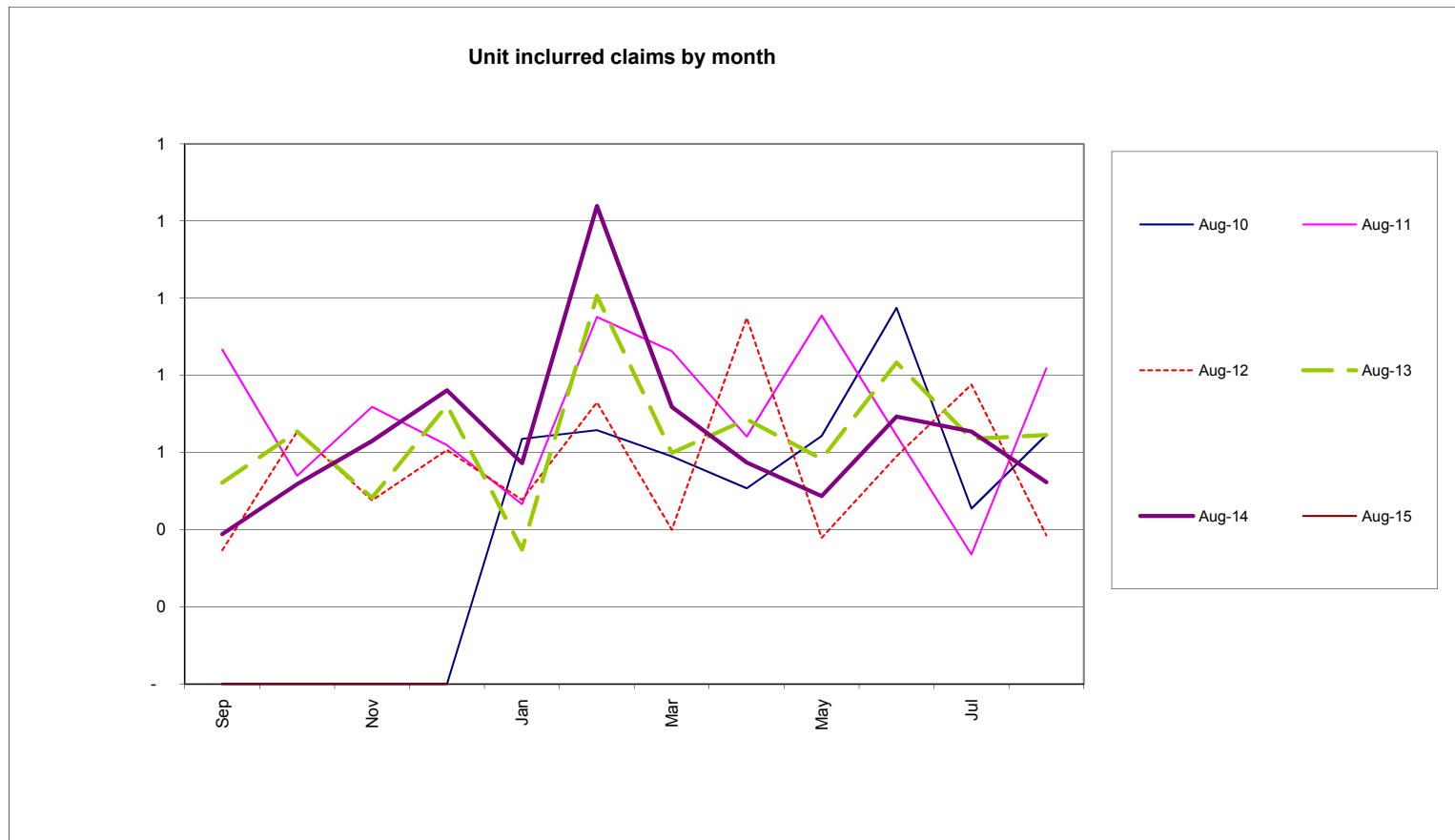
Inflation inherent in the previous graph
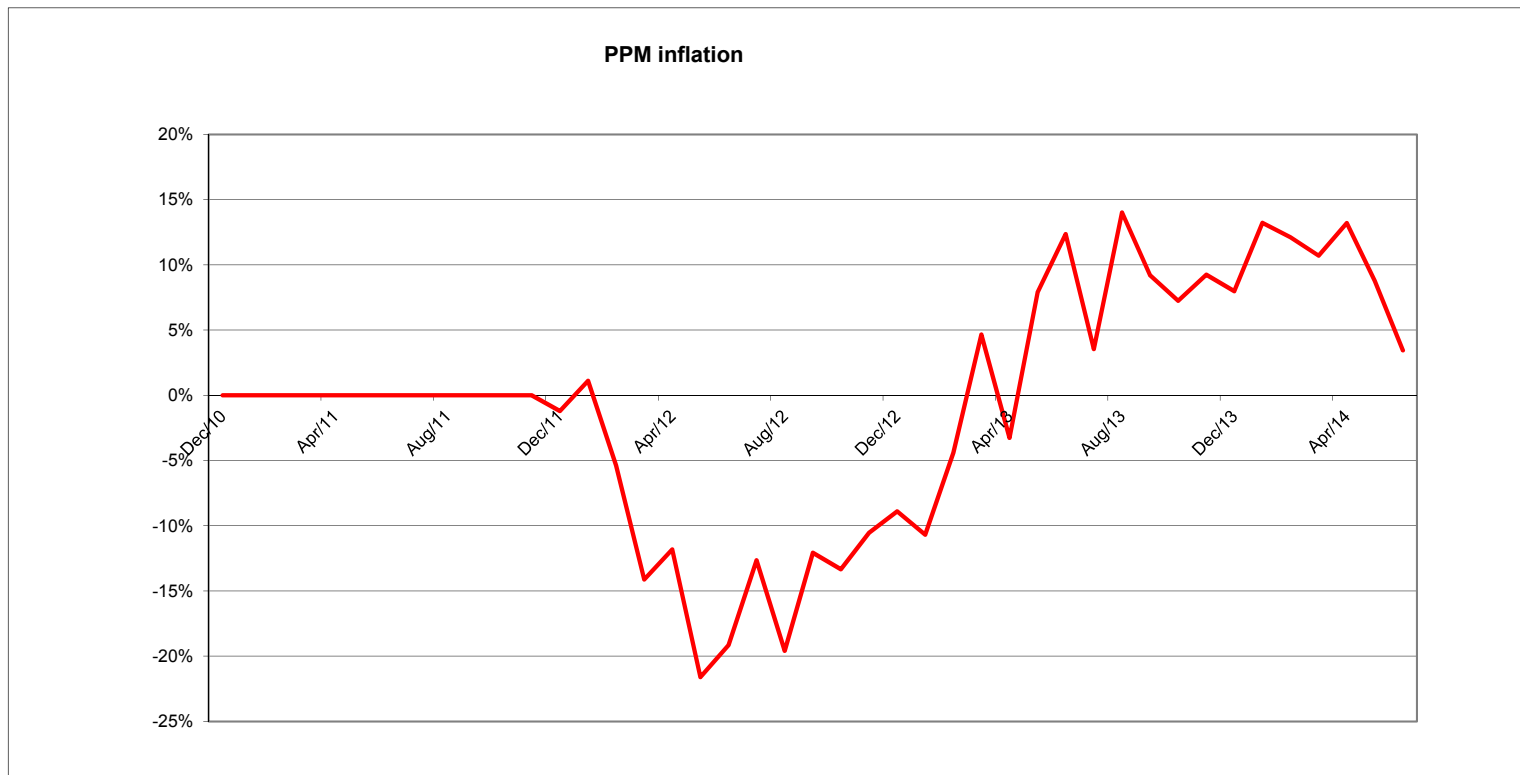
PPM inflation

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Terminations

- For large volume retail health and motor – terminations by duration
- Terminations by channel, branch (only where volumes will lead to "credible results"

Profitability

- Ideally an analysis of profit by LOB (only if significant business) – start simple and refine over time

- Accident year loss ratio over time by LOB (only where there are enough claims for statistical averaging and a reasonable IBNR can be determined) – this often takes a long time to drill down to explain the features

- Sensitivity analysis (covered by ALM sections)

Expenses

- A good expense model is often the foundation – these are often developed and refined over years.

  - Unit expenses are not very meaningful companies below critical mass or with very high fixed non-direct cost components

  - Model ideally allocates expenses into NB, maintenance, claims by product, channel and are divided into which will vary with volume and which won't. The best models take a long time to develop.

- Comparison of planned/actual unit expenses against pricing loadings by LOB – this can be difficult because of getting data into comparable forms. It is not always possible to do this meaningfully and practically

Other

- Other parts of the FCR cover relevant information such as –
  - Performance and effect of RI
  - Performance of reserving etc etc

Discussion and debate