

The Actuarial Profession
making financial sense of the future

GIRO Conference and Exhibition 2011
Robert Murray and Alastair Lauder



Modelling the claims process

an alternative to development factor modelling

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Session overview

1. Background
2. Introduce and explain a new (but simple) approach for deriving development models
3. Case studies from LCP and Barbican

Background

- Traditional chain ladder modelling has some limitations:
 - Requires sufficient past data
 - Assumes ‘one pattern fits all’
 - Fails to recognise changes in the underlying exposures, and processes for reporting and settlement
 - No direct links between various stages of the insurance claims process
 - But in reality payment patterns will depend on reporting patterns which will depend on exposure patterns etc.
 - Expert judgements made at relatively low levels
 - eg the removal of development factors)

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A new (but simple) approach

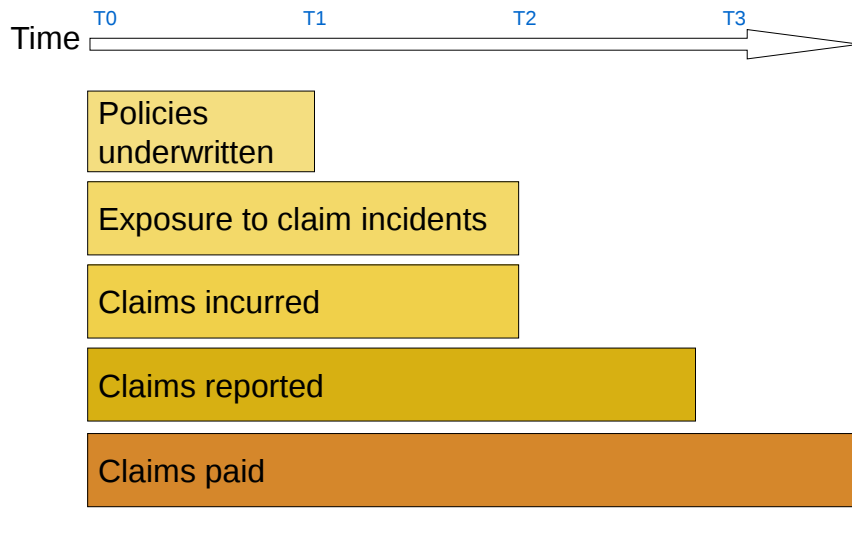
- Deconstruct the claims process into its component parts
- Build these parts back up into a working model
- Populate the model with assumptions or actual data where available

“The significant problems we face cannot be solved at the same level of thinking with which we created them”

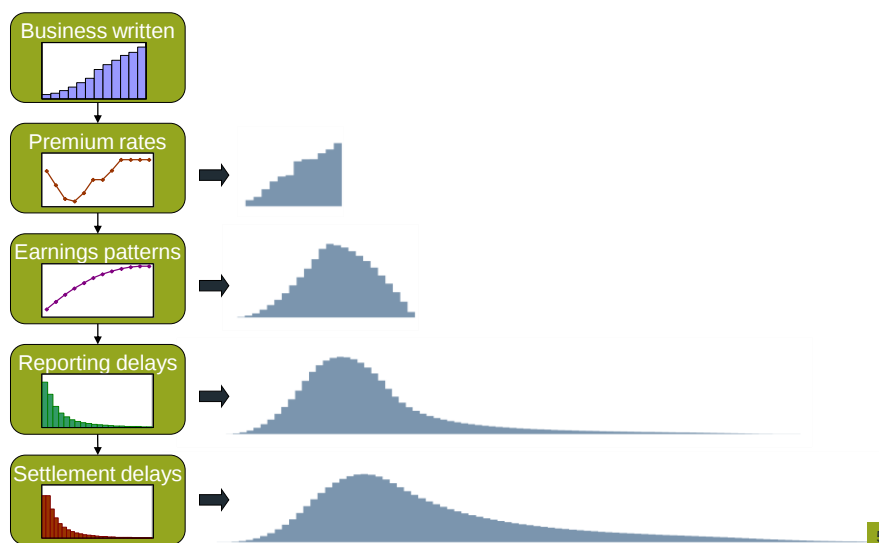
- Albert Einstein

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Deconstructing the claims process

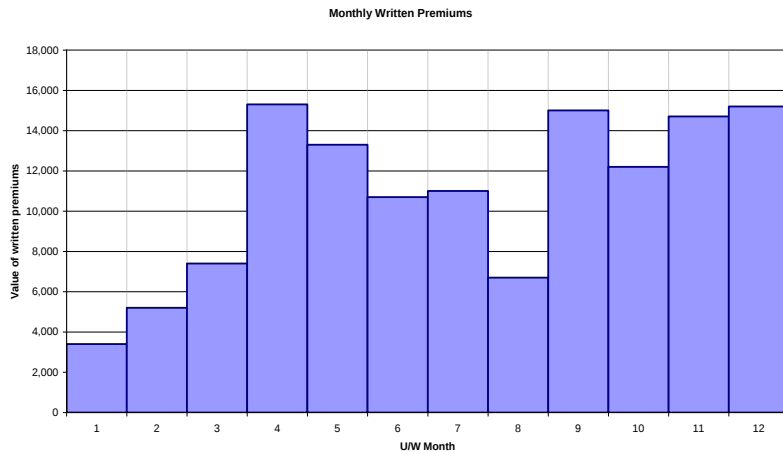


Building the model - summary



Building the model: the detail (1)

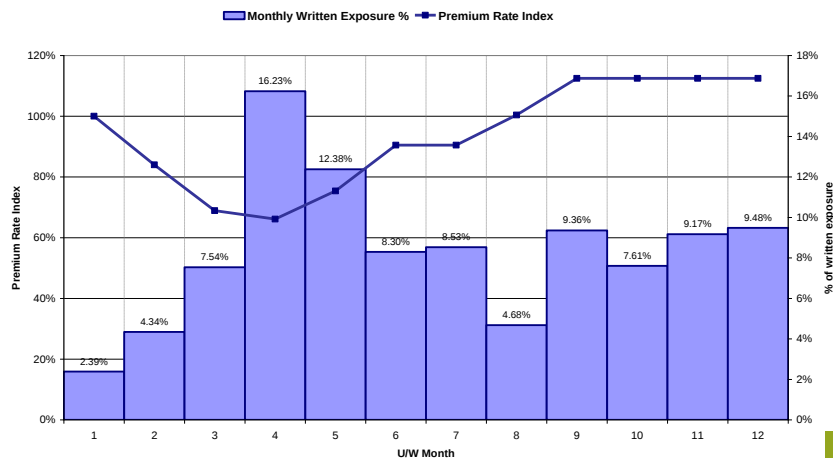
- Analyse the written premiums:



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Building the model: the detail (2)

- Allowing for premium rate changes, gives a written exposure profile:



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Building the model: the detail (3)

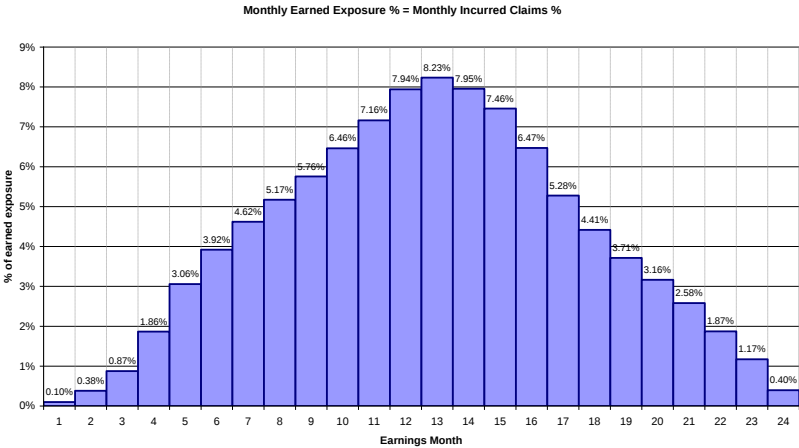
		Exposure Profile												Total Business	Cumulative Total
Earnings Pattern	Exposure Month	Month 1 Business	Month 2 Business	Month 3 Business	Month 4 Business	Month 5 Business	Month 6 Business	Month 7 Business	Month 8 Business	Month 9 Business	Month 10 Business	Month 11 Business	Month 12 Business		
	Total	2.39%	4.34%	7.54%	16.23%	12.38%	8.30%	8.53%	4.68%	9.36%	7.61%	9.17%	9.48%	100.00%	
4.17%	1	0.10%												0.10%	0.10%
8.33%	2	0.20%	0.18%											0.38%	0.48%
8.33%	3	0.20%	0.36%	0.31%										0.87%	1.35%
8.33%	4	0.20%	0.36%	0.63%	0.68%									1.86%	3.22%
8.33%	5	0.20%	0.36%	0.63%	1.35%	0.52%								3.06%	6.28%
8.33%	6	0.20%	0.36%	0.63%	1.35%	1.03%	0.35%							3.92%	10.19%
8.33%	7	0.20%	0.36%	0.63%	1.35%	1.03%	0.69%	0.36%						4.62%	14.81%
8.33%	8	0.20%	0.36%	0.63%	1.35%	1.03%	0.69%	0.71%	0.20%					5.17%	19.98%
8.33%	9	0.20%	0.36%	0.63%	1.35%	1.03%	0.69%	0.71%	0.39%	0.39%				5.76%	25.74%
8.33%	10	0.20%	0.36%	0.63%	1.35%	1.03%	0.69%	0.71%	0.39%	0.78%	0.32%			6.46%	32.20%
8.33%	11	0.20%	0.36%	0.63%	1.35%	1.03%	0.69%	0.71%	0.39%	0.78%	0.63%	0.38%		7.16%	39.36%
8.33%	12	0.20%	0.36%	0.63%	1.35%	1.03%	0.69%	0.71%	0.39%	0.78%	0.63%	0.76%	0.40%	7.94%	47.30%
4.17%	13	0.10%	0.36%	0.63%	1.35%	1.03%	0.69%	0.71%	0.39%	0.78%	0.63%	0.76%	0.79%	8.23%	55.53%
	14		0.18%	0.63%	1.35%	1.03%	0.69%	0.71%	0.39%	0.78%	0.63%	0.76%	0.79%	7.95%	63.49%
	15			0.31%	1.35%	1.03%	0.69%	0.71%	0.39%	0.78%	0.63%	0.76%	0.79%	7.46%	70.95%
	16				0.68%	1.03%	0.69%	0.71%	0.39%	0.78%	0.63%	0.76%	0.79%	6.47%	77.41%
	17					0.52%	0.69%	0.71%	0.39%	0.78%	0.63%	0.76%	0.79%	5.28%	82.69%
	18						0.35%	0.71%	0.39%	0.78%	0.63%	0.76%	0.79%	4.41%	87.11%
	19							0.36%	0.39%	0.78%	0.63%	0.76%	0.79%	3.71%	90.82%
	20								0.20%	0.78%	0.63%	0.76%	0.79%	3.16%	93.98%
	21									0.39%	0.63%	0.76%	0.79%	2.58%	96.56%
	22										0.32%	0.76%	0.79%	1.87%	98.43%
	23											0.38%	0.79%	1.17%	99.60%
	24												0.40%	0.40%	100.00%



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Building the model: the detail (4)

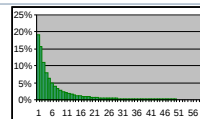
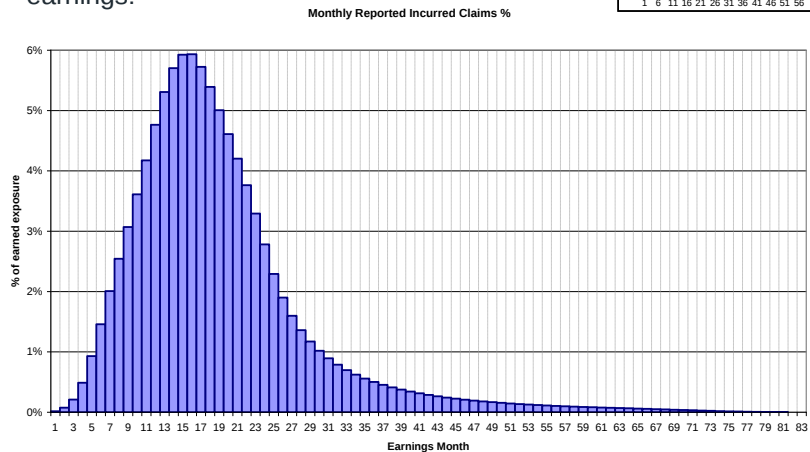
- Spread each month's written exposure over the policy term using the selected earnings pattern:



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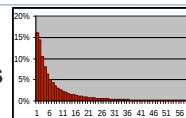
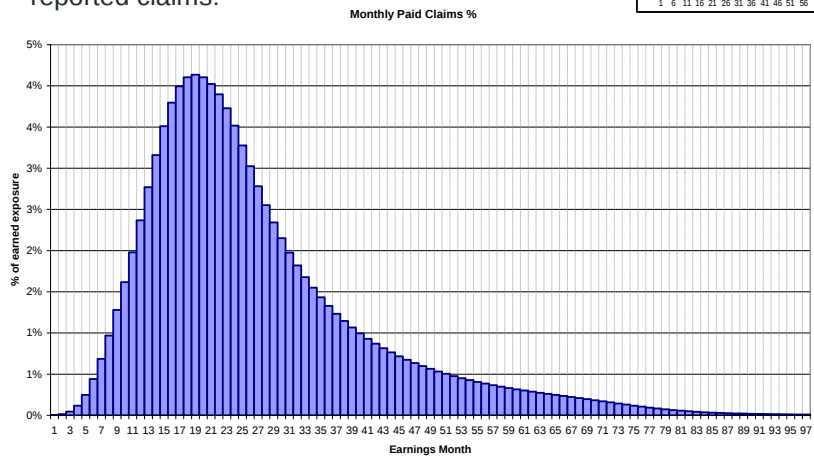
Building the model: the detail (5)

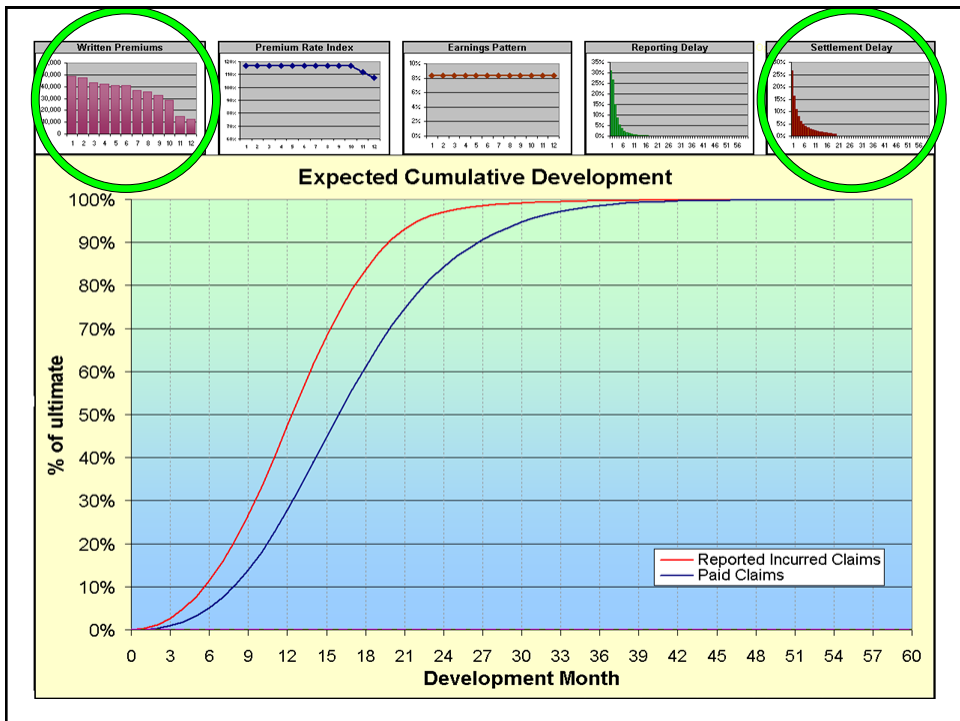
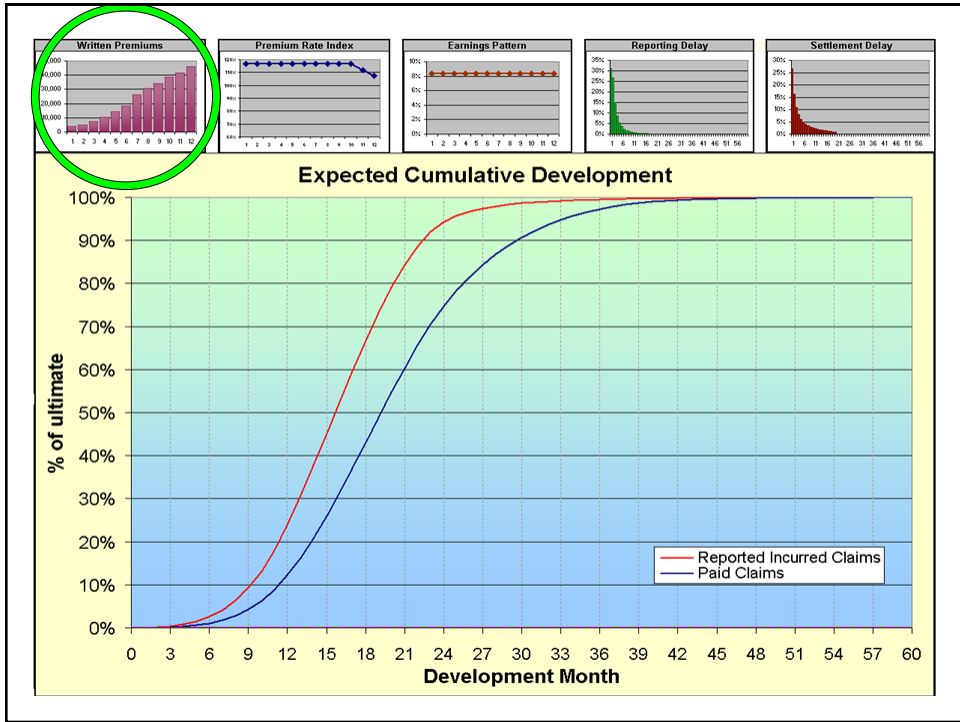
- Apply the reporting delay pattern to each month's earnings:

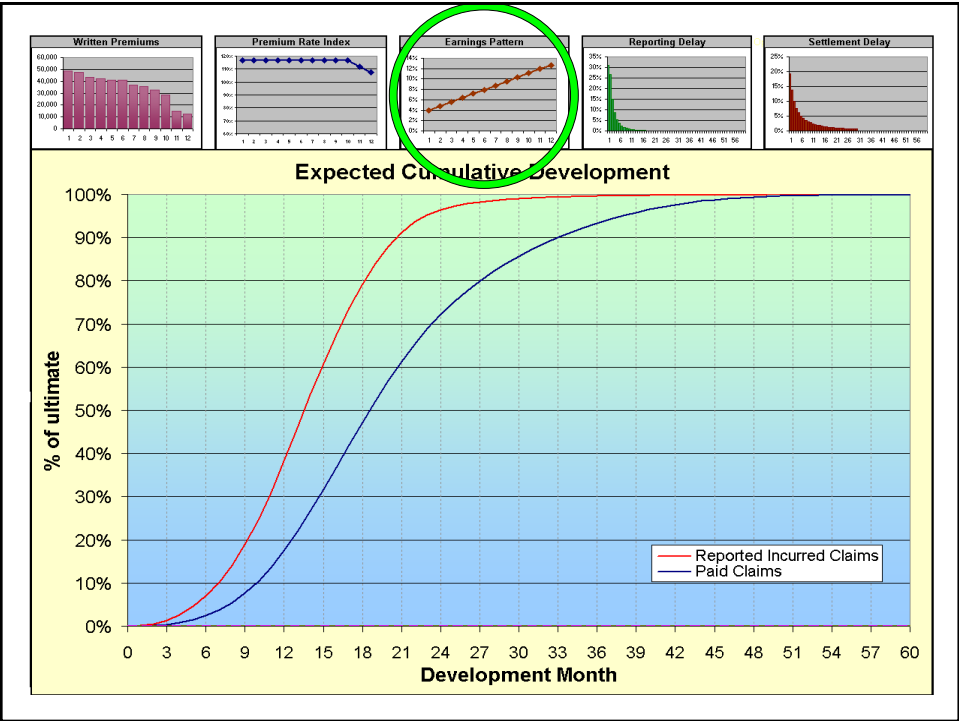
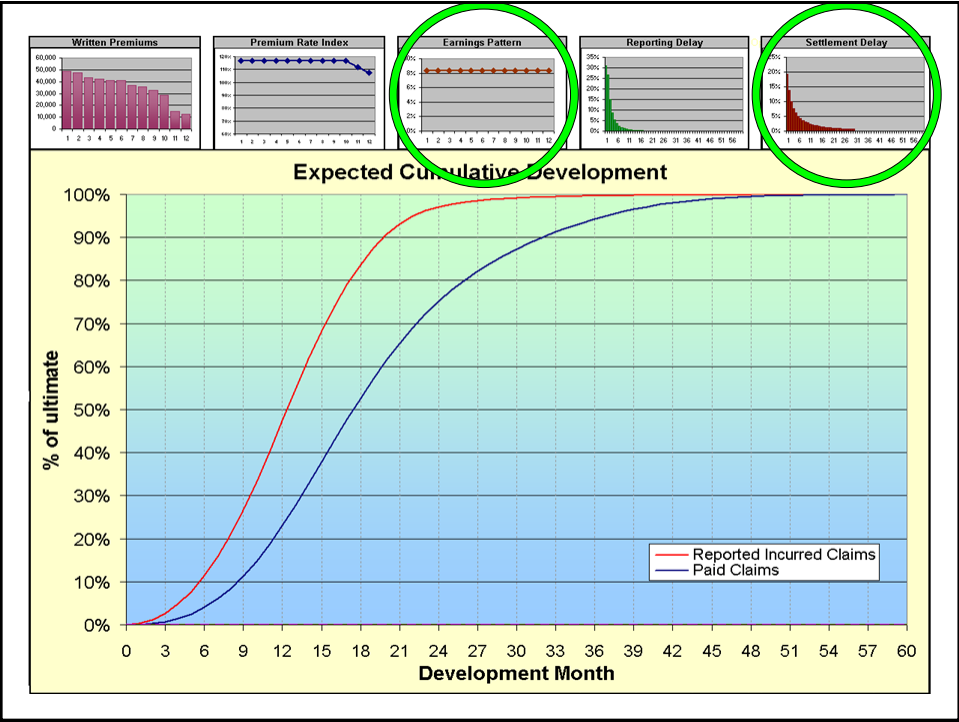


Building the model: the detail (6)

- Apply the settlement delay pattern to each month's reported claims:





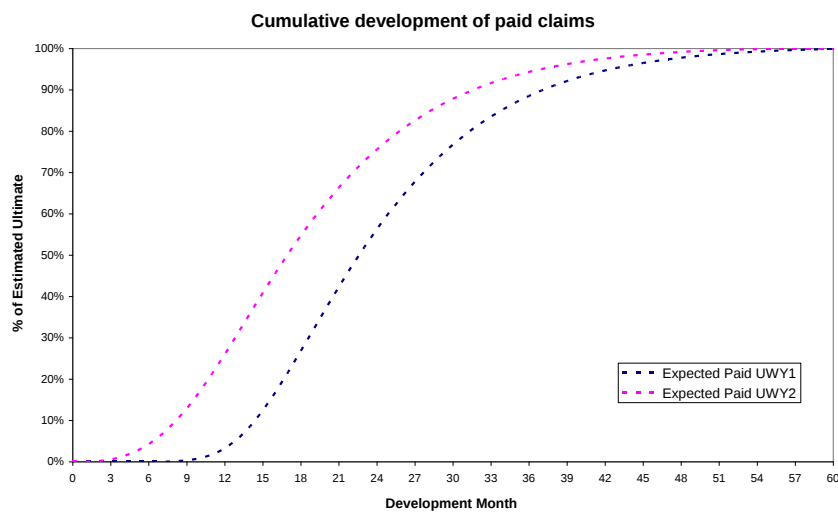


Real life case study – the problem

- Produce estimates of ultimate claims and expected cash-flows for a new GAP account
- Multi-year policies
- Earnings patterns are distinctly non-uniform
- Forecasts required on an underwriting year basis
 - Business began partway through a financial year
 - and ended partway through the following year

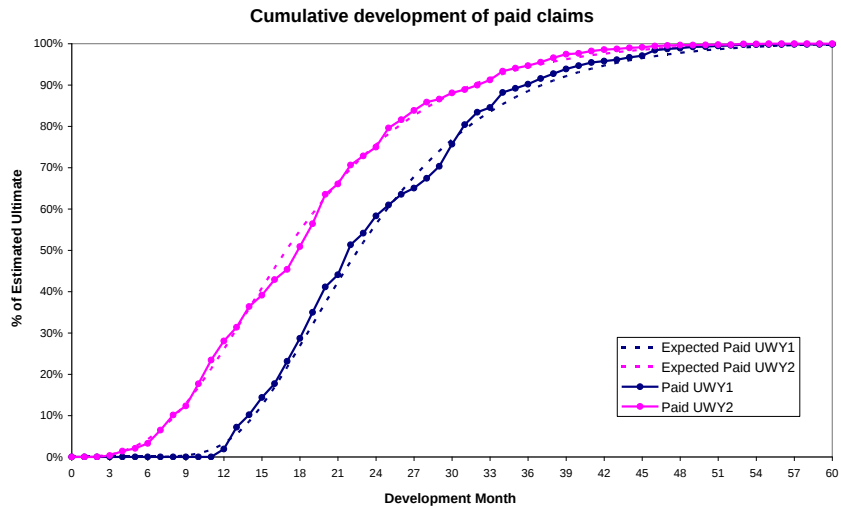
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Real life case study: our prediction



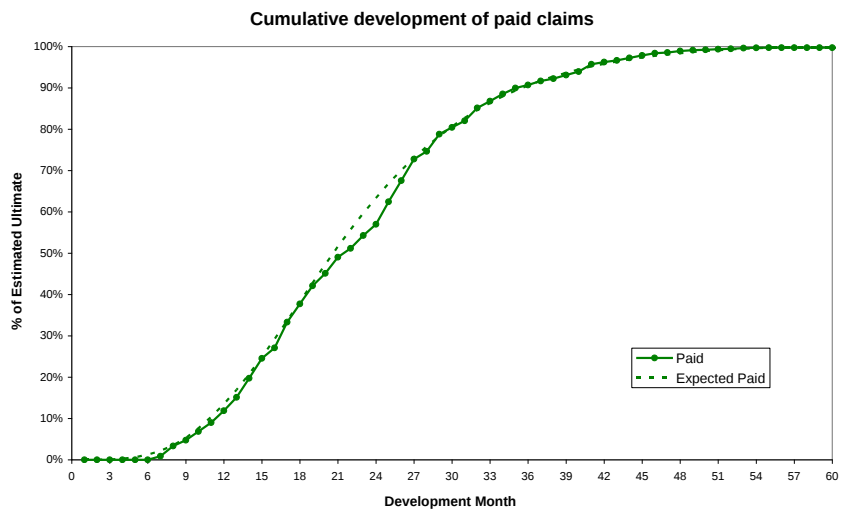
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Real life case study: actual experience



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Real life case study: actual experience Looking at the business as a whole



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Some of the benefits...

- Projections can be made with little or no claims data
- Early warning management tools can be constructed
- Enables management to act or react faster
- Different years do not have to follow the same pattern
- Can allow for changes in exposure/reporting/settlement
- Insights into the business
 - how the business is earned
 - claims reporting and settlement processes
- Natural link between reserving management and exposure management
- Easy to produce models on different bases
 - eg underwriting year or accident year

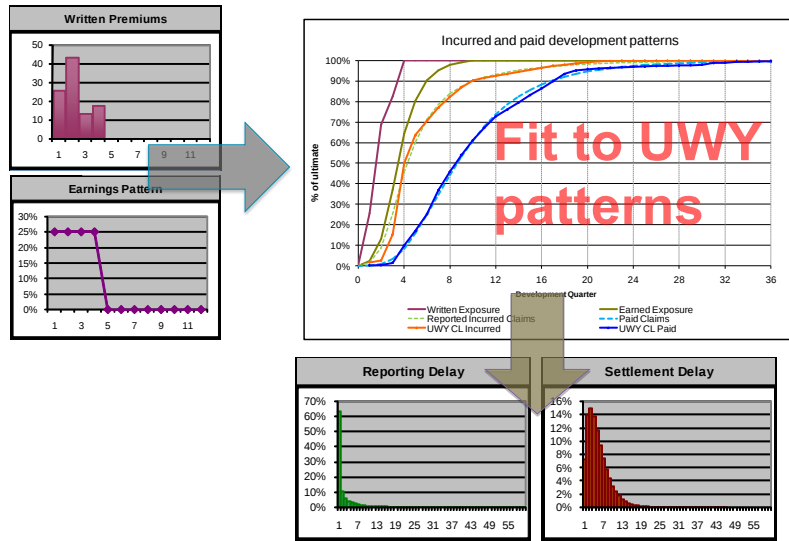
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Examples from Barbican

- Using Radar and Radar concepts
 - to derive reporting and settlement patterns
 - to adjust chain ladder development patterns
 - if you don't have any development patterns

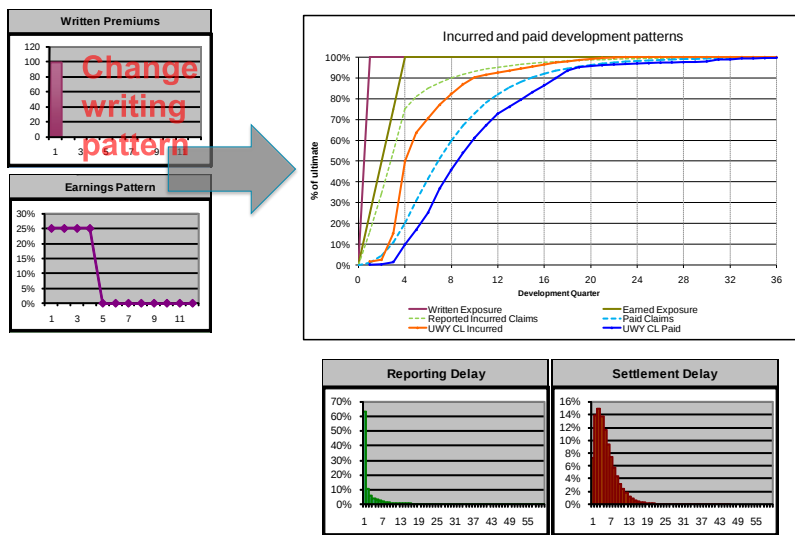
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Reporting and settlement delays



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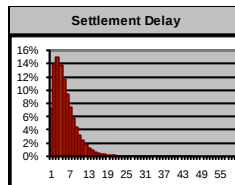
Unincepted business



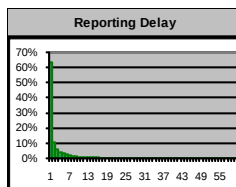
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Payment patterns for OS and IBNR

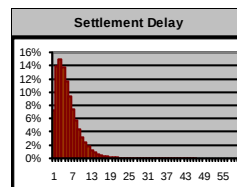
Outstandings =



IBNR =



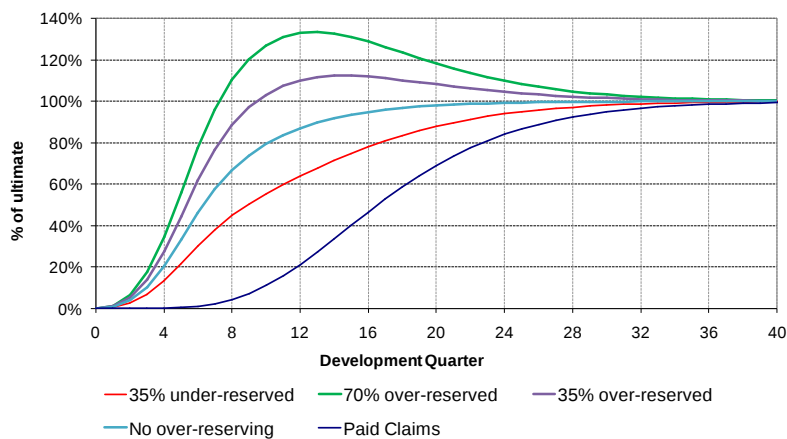
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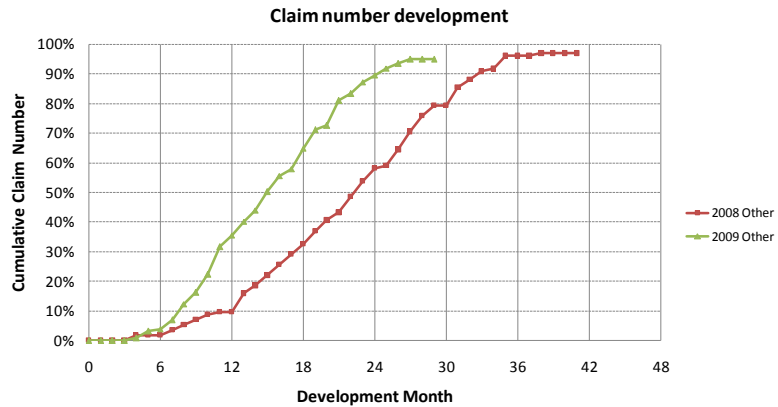
Over/under-reserving

UK Liability Incurred and Paid Development Patterns



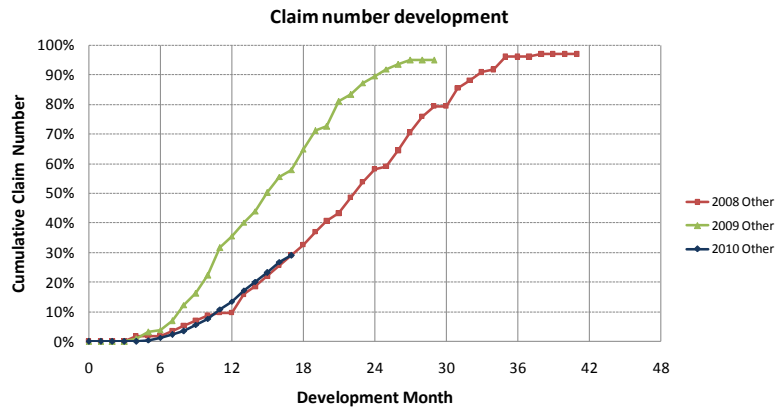
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When you have no development patterns



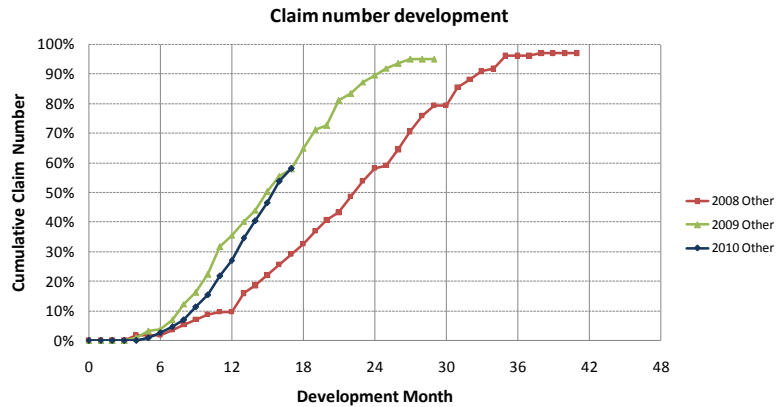
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When you have no development patterns



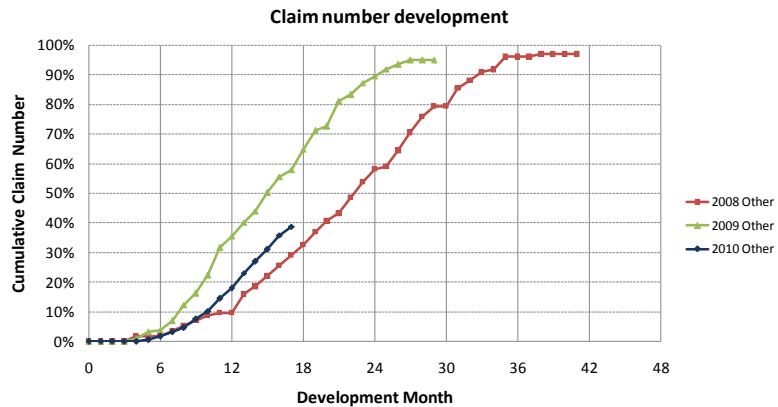
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When you have no development patterns



28

When you have no development patterns



29

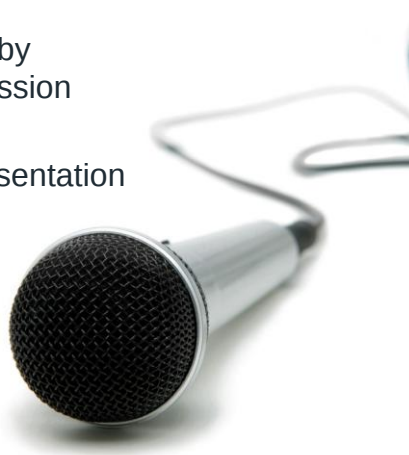
Conclusions from use at Barbican

- Useful for Solvency II
- Useful for Barbican as young managing agent
- Simple concepts
 - It may be nothing new?
 - But the better the data, the better the models

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.



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