

The Actuarial Profession
making financial sense of the future

Reserving Seminar - November 2011 Jerome Kirk – Lloyd's



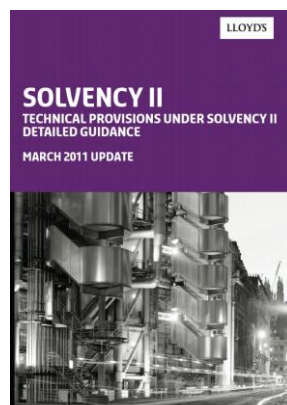
Solvency II Technical Provisions - Practical Examples

23 November 2011

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Agenda

- **Background**
 - Lloyd's Dry Run
- **Practical Examples**
 - Binary Events
 - Risk Margin
 - Reinsurance cashflows
 - Half-year versus Year-end
- **Summary & Questions**



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Which elements of Solvency II are changing?

Documentation *Segmentation*
Expenses *Data* *Guidance*
Contract Boundaries *Lapses* *Premium Provisions*
IFRS **“Almost Everything!”** *Cashflows*
Actuarial Function *Expected counterparty default*
Discounting *“Best estimate”*
Binary Events *Validation* *Risk Margins*

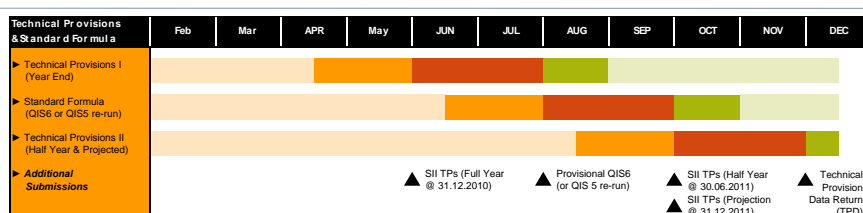
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Summary of the key changes in basis

Current Basis	Solvency II
UPR	Premium provision
Undiscounted	Discounted
Margin for prudence	No margin for prudence
No risk margin	Risk margin
Limited latent claims allowance	"All possible" claims included
ULAE	ULAE + overheads + investment costs
Incepted contracts	Legal obligation basis
Deterministic methods	Cashflow basis - possibly stochastic

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Lloyd's Dry Run includes qualitative and quantitative returns during 2011



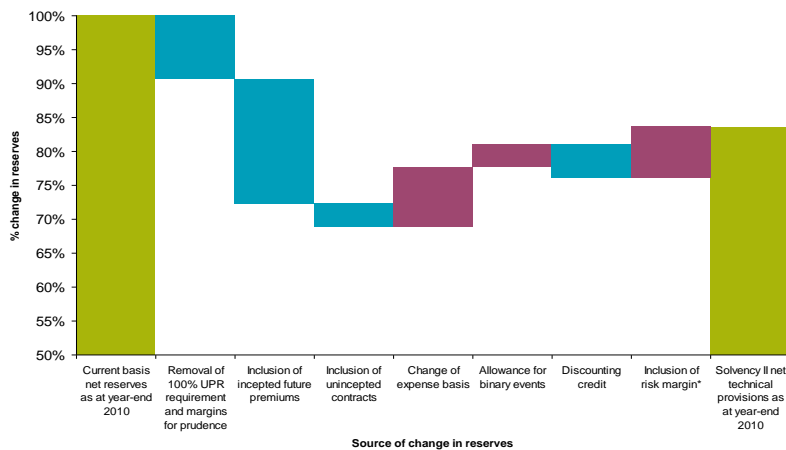
What and when?

- Year-end 2010 TPs submitted on 27 May
 - full feedback packs in August
- Year-end full standard formula recalculation received 29 July
 - agent specific feedback packs in September
- Half-year 2011 and projected 2011 year-end TPs by 30 September
 - feedback by end of November
- TPD and GQD data due by 30 November

www.lloyds.com/The-Market/Operating-at-Lloyds/Solvency-II/Information-for-managing-agents/Guidance-and-workshops/Technical-Provisions-and-Standard-Formula

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The results confirm the impact is significant ...



Source: y/e 2010 SRD and May 2010 TP submissions
Note: excludes some syndicates so that a like for like comparison can be made
Note: Solvency II TPs include estimated risk margin of 10%

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... but do look closely at the overall balance sheet before making firm conclusions

Analysis of Technical Provisions and Impact on Balance Sheet (£m)	Market Total			
	Current Basis	Solvency II Basis	Change from Current Basis	%change
Net Technical Provisions	35,422	28,123	(7,299)	(21%)
Net Premium Debtors*	(2,612)	(238)	2,375	(91%)
Deferred Acquisition Costs	(2,348)	-	2,348	(100%)
Net technical provisions less premium debtors and DAC	30,462	27,885	(2,577)	(8%)

Note: table above shows liabilities with a positive sign and assets with a negative sign
* Net premium debtors are calculated as insurance and intermediary recoverables less reinsurance accounts payable

- “Real” impact is much lower allowing for asset movements
 - direct impact on Solvency position
 - need to ensure consistency with any Internal Model

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Practical challenges have emerged - the usual suspects

- The same issues are fast becoming the “usual suspects” for TPs:
 - segmentation
 - currencies
 - cashflows
 - binary events
 - contract boundaries
 - expenses
 - risk margins
- And remember data challenges will underlie all points!



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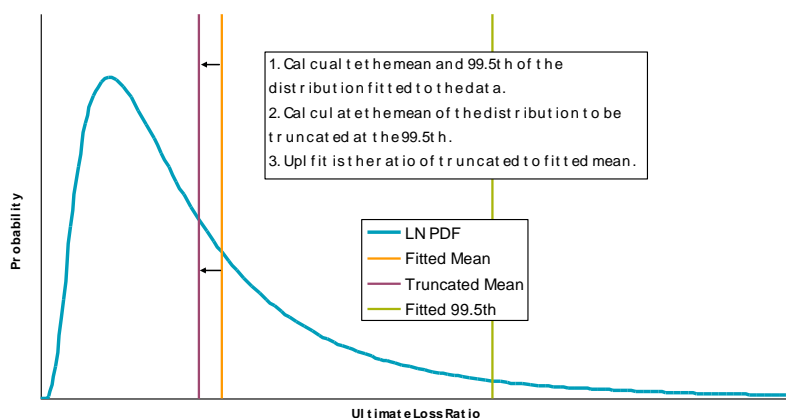
Binary Events

- “All possible future outcomes” so binary events are required
 - not just a Lloyd’s requirement
 - although not much airtime outside Lloyd’s
- Methods difficult by definition (“unknown unknowns”)
 - so will always be subjective / based on expert judgement
 - but do try to be explicit
- Possible approaches
 - uplifts based on effect of truncating distributions
 - scenario-type approaches
- One of Lloyd’s worked examples follows:

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Overview of proposed method

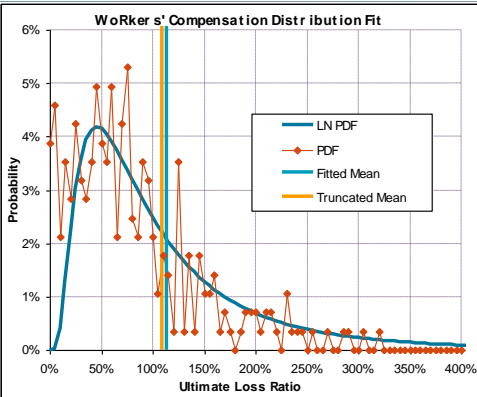
- Need distribution of reserves or ultimates
 - could be reserving risk distribution or market data



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Fit a distribution to the claims and then assume truncated

- Use expert judgement and data available to fit an assumed “true underlying” claims distribution
- Calculate the impact on the mean of truncating the “true underlying” distribution to an assumed level
 - e.g. 99.5% level
- Derive the uplift to the ultimate losses based on the two mean ULRs



- Fitted “true underlying”:
 - LogNormal (-0.2, 0.8);
 - Mean = 113.1%; SD = 107.7%
- Truncated Mean = 109.3%
- **Uplift Percentage = 3.45%**

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Apply the uplift to the reserves
- but assume a decay

- Assumption
 - decay uplift on ultimate claims by 15% for each year of account prior to the latest modelling year (decay varies by class) to account for lower likelihood of binary event
- Derive reserve loading required to uplift ultimates to level required for each year of account
 - apply these uplifts to the future claims
- Can conduct a similar exercise for reinsurance or net losses

Direct Workers Compensation (USD)			
Reserves	Run-Down Factor	Unadjusted	Adjusted
1993	5%	122.6%	101.2%
1994	6%	112.8%	100.8%
1995	7%	119.7%	101.5%
1996	9%	120.3%	101.8%
1997	10%	120.1%	102.1%
1998	12%	118.2%	102.2%
1999	14%	116.7%	102.4%
2000	17%	108.3%	101.4%
2001	20%	105.9%	101.2%
2002	23%	104.9%	101.1%
2003	27%	105.4%	101.5%
2004	32%	105.4%	101.7%
2005	38%	104.1%	101.6%
2006	44%	104.2%	101.8%
2007	52%	103.7%	101.9%
2008	61%	103.6%	102.2%
2009	72%	103.5%	102.5%
2010	85%	103.6%	103.1%
2011 (Unincpted)	100%	103.4%	103.4%

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What have we seen on binary events

- Market average results
 - closer to those in Lloyd's first detail guidance paper (i.e. 5%)
 - looks on the high side?
 - but is it only moving capital into TPs anyway?

Binary Events included within Technical Provisions for Lloyd's top 6 classes	Net BE (undisc, excl expenses) (£m)	Net Binary Events (£m)	Binary Events %
General liability	7,859	314	4.0%
Marine, aviation and transport (MAT)	3,407	185	5.4%
Fire and other damage to property	3,205	167	5.2%
Non-proportional casualty	2,659	163	6.1%
Non-proportional property	2,245	166	7.4%
Non-proportional MAT	1,434	59	4.1%
Other	2,871	124	4.3%
TOTAL	23,680	1,178	5.0%

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Please do remember: this is only one approach!

- This is an example of one possible approach based on several subjective assumptions
- Results are very sensitive to:
 - amount and credibility of data
 - choice of distribution

Distribution	Pareto	LogNormal
Uplift to ultimate claims	100.5%	103.4%

- assumed amount of observable data

'Unknown' Percentile	99.0%	99.5%	99.9%
Uplift to ultimate claims	106.3%	103.4%	100.6%

- uplift decay over time

Decay over time	10%	15%	30%
1993 Uplift to Reserves	103%	101%	100.04%

- Need to derive own methodology which is appropriate for your business
 - and validated and documented

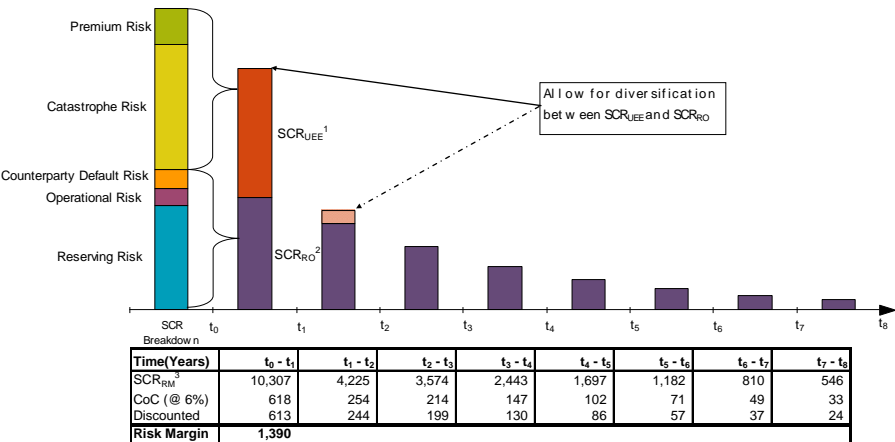
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Risk Margin

- “Simplification 3” was extensively used in QIS5 Rerun
 - quantify SCR for Risk Margin purposes (excluding avoidable Market Risk and Type 2 Counterparty Default Risk)
 - run off in line with best estimate
- Originally method was potentially applied “blindly”
 - need to consider the risk margin more carefully
- Proposed:
 - calculate element of SCR which is to be run-off
 - for **current obligations** transferred to “reference undertaking” (reserving risk, operational risk and counterpart default risk)
 - also allowance for unexpired exposures between t_0 and t_1 (Premium risk, Catastrophe Risk)

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Worked example: what does this actually look like?



¹ SCR_{R0} – SCR component to be run-off
² SCR_{UEE} – SCR component relating to unexpired exposures
³ SCR_{RM} – SCR component used to calculate risk margin

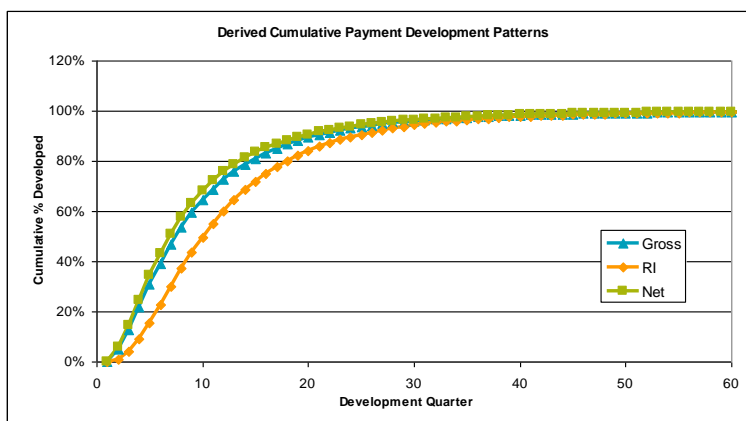
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Reinsurance cashflows

- Reinsurance cashflow will tend to be different to gross
 - but by how much?
- Calculating the patterns
 - net/gross ratios would imply a link to gross
 - or use net projections?
- Decision tree could be:
 - do I have to do anything specific?
 - if so would a link to the gross patterns be appropriate?
 - can “shift” or “stretch” patterns
 - or a combination of the two
- Materiality is a key consideration
- The following exhibits demonstrate some of the concepts:

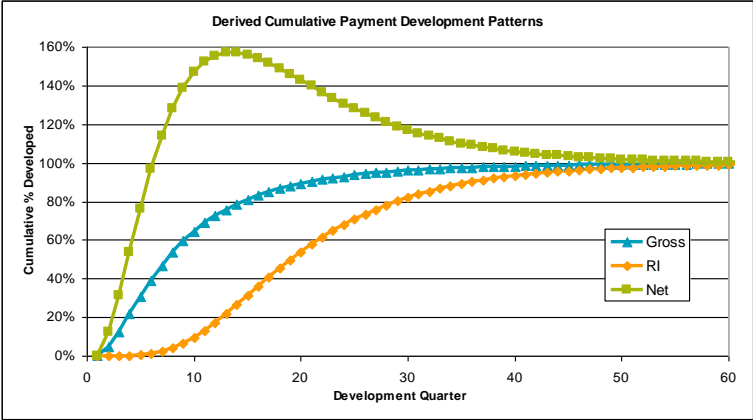
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Tends to be “easy” for short tailed classes with low reinsurance reliance.....



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... but not the case when patterns diverge or reinsurance reliance increases



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Materiality is probably the best place to start
- for example when do you get a 5% difference?

Short Tail Class: Net Discounted Future Claims Payments
Impact of differences in the R/I payment pattern from the gross payment pattern of 11.5 years
(R/I = 20% of Gross)

		Length of pattern (years)										
		11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	15.5	16.0	16.5
Mean Shift (years from gross)	0.0	100.0	100.1	100.3	100.4	100.5	100.6	100.7	100.9	101.0	101.1	101.2
	0.5	100.7	100.8	101.0	101.1	101.3	101.4	101.6	101.7	101.9	102.0	102.2
	1.0	101.0	101.1	101.3	101.5	101.6	101.8	101.9	102.1	102.3	102.4	102.6
	1.5	101.3	101.5	101.6	101.8	102.0	102.1	102.3	102.5	102.7	102.8	103.0
	2.0	101.6	101.8	102.0	102.1	102.3	102.5	102.7	102.9	103.1	103.2	103.4
	2.5	101.9	102.1	102.3	102.5	102.7	102.9	103.0	103.2	103.4	103.6	103.8
	3.0	102.2	102.4	102.6	102.8	103.0	103.2	103.4	103.6	103.8	104.0	104.2
	3.5	102.5	102.7	103.0	103.2	103.4	103.6	103.8	104.0	104.2	104.4	104.6
	4.0	102.8	103.1	103.3	103.5	103.7	103.9	104.2	104.4	104.6	104.8	105.0
	4.5	103.1	103.4	103.6	103.9	104.1	104.3	104.5	104.8	105.0	105.2	105.4
	5.0	103.5	103.7	103.9	104.2	104.4	104.7	104.9	105.1	105.4	105.6	105.8

Long Tail Class: Net Discounted Future Claims Payments
Impact of differences in the R/I payment pattern from the gross payment pattern of 17.5 years
(R/I = 60% of Gross)

		Length of pattern (years)										
		17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.5	22.0	22.5
Mean Shift (years from gross)	0.0	100.0	101.3	102.5	103.5	104.7	105.9	107.1	108.1	109.2	110.3	111.2
	0.5	103.4	104.8	106.1	107.2	108.4	109.7	111.0	112.1	113.2	114.4	115.4
	1.0	105.3	106.7	108.0	109.1	110.4	111.7	113.0	114.1	115.3	116.5	117.5
	1.5	107.1	108.5	110.0	111.1	112.4	113.7	115.1	116.2	117.4	118.6	119.6
	2.0	109.0	110.5	111.9	113.1	114.4	115.7	117.1	118.3	119.5	120.7	121.8
	2.5	110.9	112.4	113.8	115.0	116.4	117.7	119.1	120.3	121.6	122.8	123.9
	3.0	112.7	114.3	115.7	117.0	118.3	119.8	121.2	122.4	123.7	124.9	126.0
	3.5	114.6	116.2	117.7	118.9	120.3	121.8	123.2	124.4	125.8	127.0	128.1
	4.0	116.5	118.1	119.6	120.9	122.3	123.8	125.3	126.5	127.8	129.2	130.3
	4.5	118.3	120.0	121.5	122.8	124.3	125.8	127.3	128.6	129.9	131.3	132.4
	5.0	120.2	121.9	123.5	124.8	126.3	127.8	129.3	130.6	132.0	133.4	134.5

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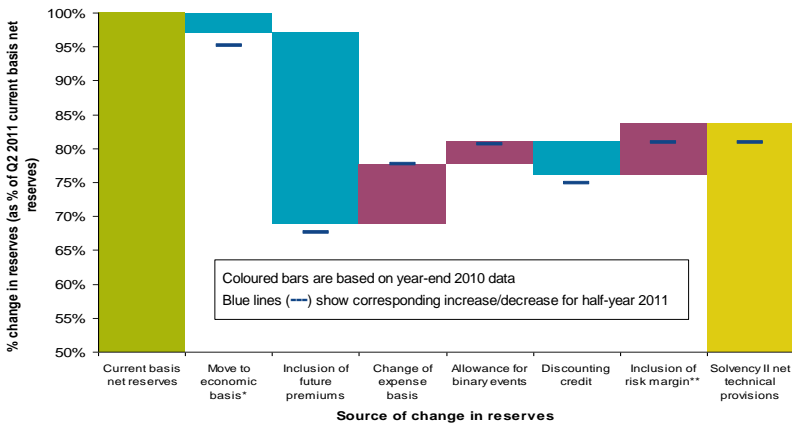
Half-Year vs. Year-End valuations: what might be different?

This is what we expected...

Element	Compared to year-end
Margins + 100% UPR	Higher
Future Premiums	Higher
Unincepted business	Lower
Expenses	Lower (less Acq. costs)
Binary events	Similar
Discounting	Similar
Risk Margin	Similar

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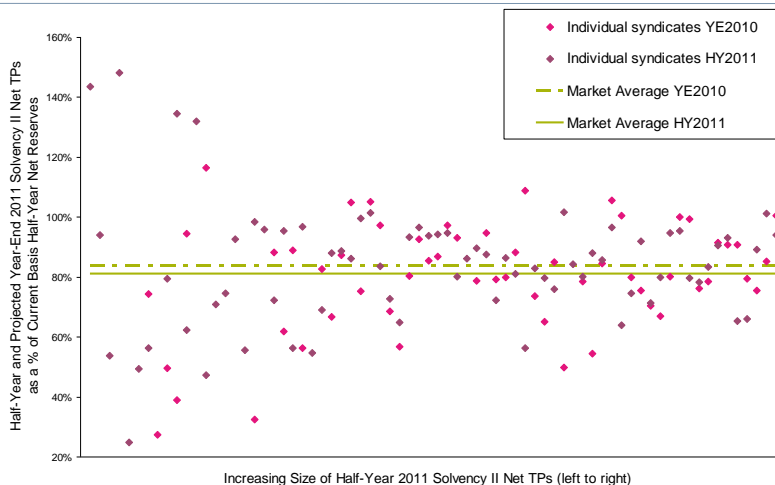
... and here are the results



Source: May and September 2011 TP submissions to Lloyd's, QMA data
* Economic basis includes removal of profit in UPR, claims from unincepted business and removal of margins
** Syndicate risk margins were not collected as at year-end 2010. Lloyd's has therefore included a 10% risk margin (based on the QIS5 results) so that the overall change can be analysed.

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Remember: the impact does vary significantly between syndicates



* Source: September and May 2011 TP submissions to Lloyd's

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Summary and Questions

- The change in basis for Solvency II technical provisions is marked
- There will be many challenges
 - both methodological and practical
 - try to test approaches as much as you can
 - only then will most “practical” issues emerge
 - 5th time for market and we’re still tuning methods
- Data will always play a part – don’t leave until the end
- Remember to look at all angles
 - for example consider half-year vs year-end differences
- And of course, it is still a moving target !!
 - maintain a flexible approach as requirements continue to evolve

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The views expressed in this presentation are those of the presenter