Institute and Faculty of Actuaries

Re-Thinking Reinsurance

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4 October 2017

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Thoughts on various reinsurance topics

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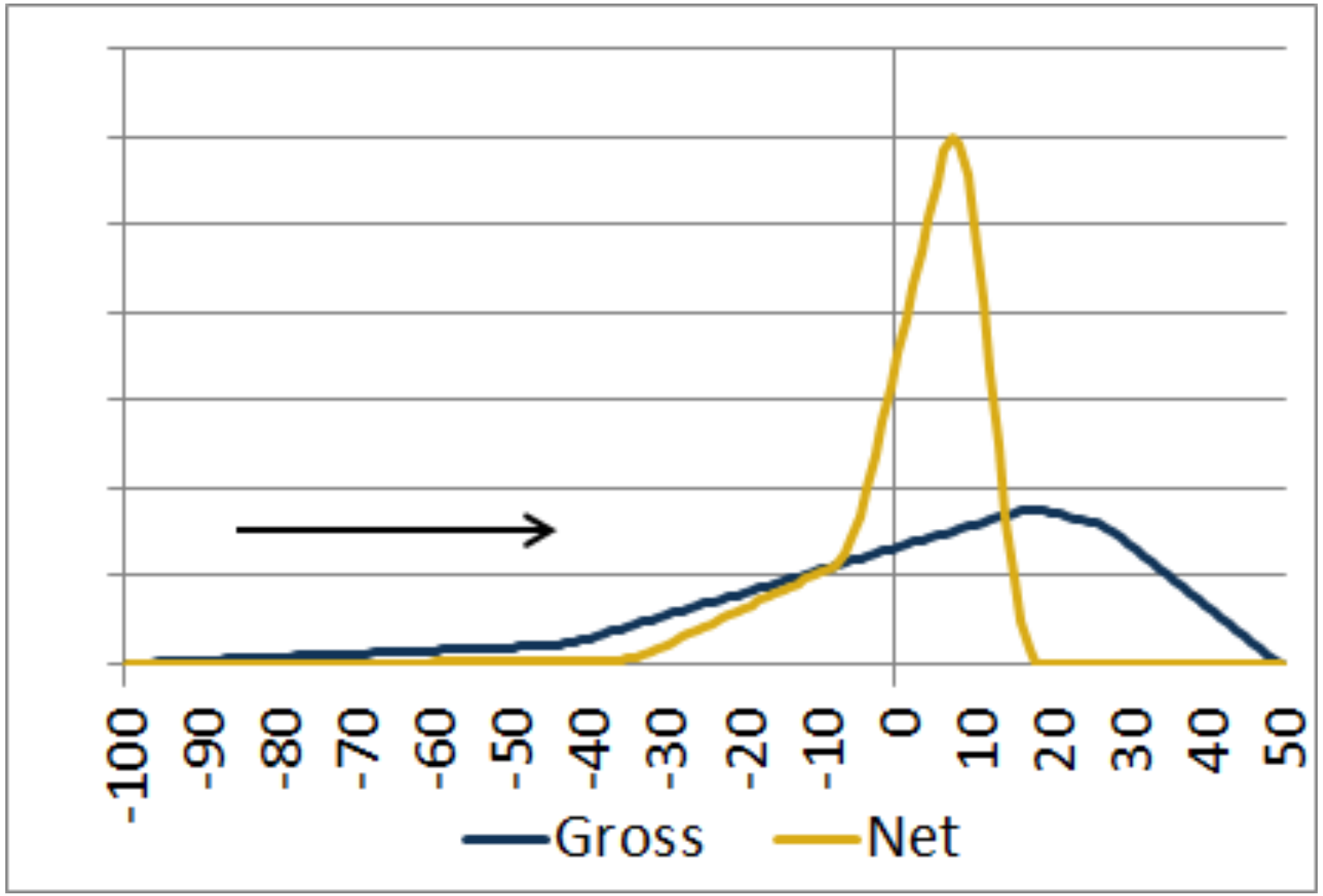
Framework ... how I think about reinsurance

- CAPITAL (only capital) ... I believe reinsurance should only consider the insurer's capital (at the legal entity / Group level). Nothing else. And in the short-medium term: capital is fixed.
- Not the profit & loss (P&L)
- Not the size of gross written premium (GWP)
- Not class-of-business, or divisional, results (i.e. underwriter bonuses)

- There's no such thing as 'cheap' reinsurance: your reinsurers are smarter than you are ... and if they aren't then you should be pushing up reinsurance Credit Risk dramatically
- There's no use buying something you don't need: if you've got a closet full of black trousers, buying another pair 'on sale' doesn't improve your life
- Reinsurance always has a cost: at a minimum, the brokerage. An insurer will maximise expected Return On Capital by minimising reinsurance purchased, at a given level of capital.

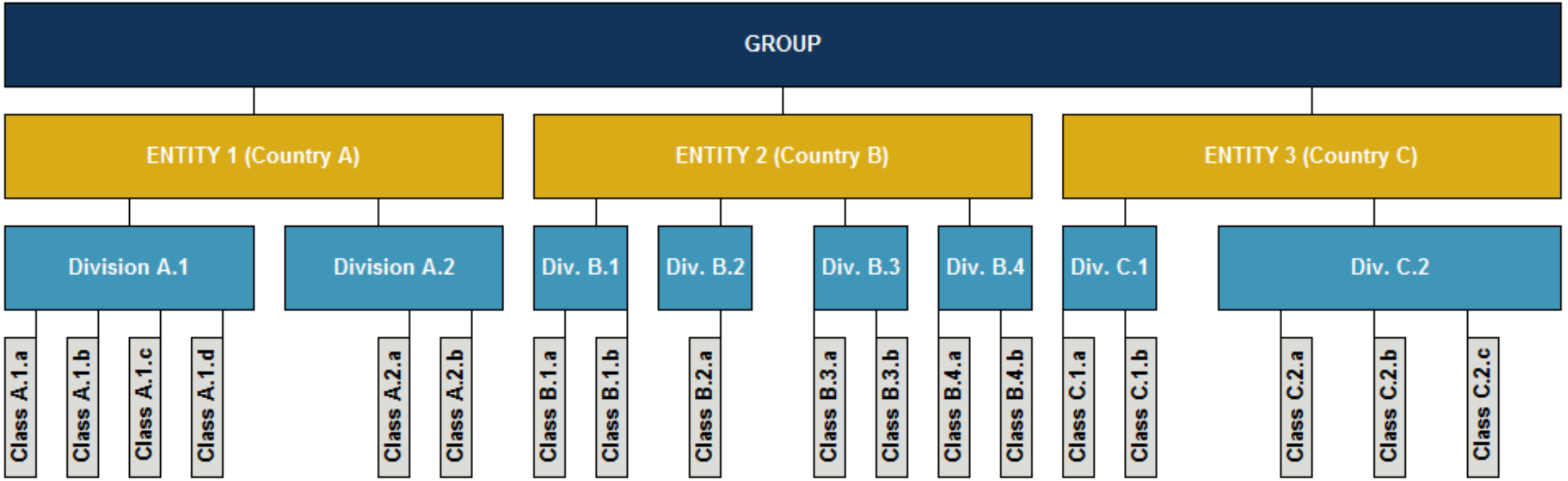
Framework (continued)

- What fundamentally is reinsurance trying to achieve?
- An efficient reduction of the insurer's required capital
- This stylised representation of the Underwriting Result shows this: upside is sacrificed for downside reinsurance protection
- Considerably less capital is required by the insurer for extreme events / results



Group / Entity / Division / Class

- A typical insurance group is organised as follows. Where should the insurer optimise reinsurance purchasing?



Group / Entity / Division / Class (continued)

- "... the last time I attended this meeting [in Brussels with insurance regulators from many nations], I tried to explain how it is in everybody's interest that surplus capital is held at a holding company [i.e. Group] level so it can be moved quickly to whichever legal entity requires additional capital at any given point in time." *Stephen Catlin, Risk & Reward, page 191*
- Optimising reinsurance purchasing to the Group level is the philosophically correct approach, but ... given that there is not complete fungibility of capital within the Group the focus should instead be on optimising reinsurance purchasing at the highest possible level, the legal entity, and at no narrower sub-division thereof
- The natural by-product of this latter approach is that the Group as a whole is likely to over-purchase reinsurance since there are significant diversification benefits from a multi-jurisdiction strategy

The Urge to Over-Purchase Reinsurance

- Often underwriters are measured on their class-of-business or divisional net results
- They're thus motivated to over-buy reinsurance, and I don't blame them: they're doing what makes sense (for them individually, not the legal entity / Group)
- Solution: make the elephant be worth more alive than dead

- Photo Credit: National Geographic

The Urge to Over-Purchase Reinsurance (continued)

- Analogy: safari lodges in Africa are perpetually plagued by poachers, often aided-and-abetted by the local community, for whom enrichment (in the face of the alternative: poverty) means it's a no-brainer
- Solution: make the animals be worth more alive than dead to the local community. (Literally) turn the local community from poachers to game keepers via stable, good, secure jobs. Encourage significant local participation in the workforce of the safari lodges (food and beverage, housekeeping, management) rather than flying in out-of-towners. Soon, the local community have a strong vested interest in keeping the animals alive.
- How can an insurer encourage underwriters not to over-purchase reinsurance? The same way ... by making 'not reinsuring' a better outcome to the underwriter than 'reinsuring'.

The Urge to Over-Purchase Reinsurance (continued)

- The starting point: the Underwriting Authority Letter (UAL) (or similar), which normally states the underwriter's normal maximum gross line size and/or the underwriter's absolute maximum gross line size (the latter may require additional levels of sign-off) ... for example let's assume it is $10m
- Rather than measuring the underwriter on their net results, instead let the UAL state that the underwriter will be measured on their gross results, except that:
  - the excess of any individual risk loss greater than X% of the absolute maximum gross line will be excluded
  - the excess of any catastrophe loss greater than Y% of the absolute maximum gross line will be excluded
- X <= Y, and to the greatest extent possible X and Y should be relatively uniform across all classes-of-business / underwriters
- How much should the insurer 'charge' the underwriter for this 'reinsurance'? Nothing.

The Urge to Over-Purchase Reinsurance (continued)

- Nothing! The underwriter is now completely disinterested in what reinsurance (if any) the insurer chooses to buy to protect his / her class-of-business i.e. ‘not reinsuring’ is a better outcome to the underwriter than ‘reinsuring’. Additionally, the insurer has forced the underwriter to take a thoughtful approach to the question: “what absolute maximum gross line do I really need?”
- The denominator of the underwriter’s loss ratio (premium) won’t have any deductions for reinsurance. I know this sounds counter-intuitive. In effect the insurer (as ‘owner’ of the capital) is giving away reinsurance for free to underwriters. This is necessary to keep underwriters onside while the insurer implements a reinsurance programme right-sized to the legal entity / Group, and quite obviously has the benefit of being administratively simple.
- The ‘standard’ alternative is to enact some sort of internal (intra-Group) reinsurance (either notional or actual) but that is administratively cumbersome and I’ve never seen it work well in practice. It also fails to adequately answer the question: “does the legal entity / Group need that reinsurance at all?”

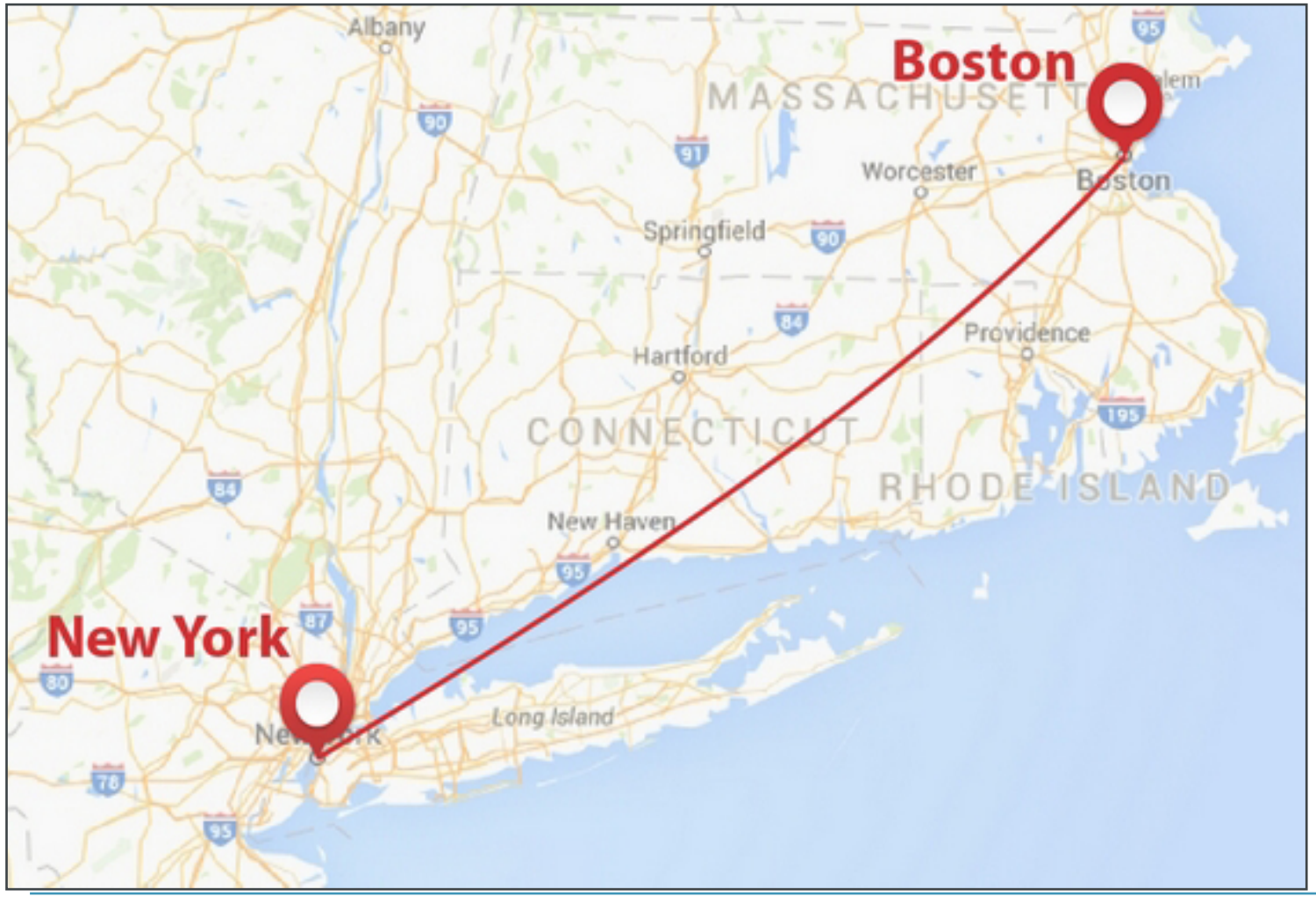
The Guardian of the Insurer's Capital: the CFO

- In many insurers the reinsurance function will be seen as the bailiwick of the underwriters, and more-particularly the Chief Underwriting Officer (CUO)
- But, having now solved the 'Urge to Over-Purchase Reinsurance' conundrum and recognising (as I fundamentally believe) that reinsurance should only consider the insurer's capital (at the legal entity / Group level), isn't it natural that the reinsurance function would move under the Chief Financial Officer (CFO)?
- Underwriters and the CUO will still have valuable insights on reinsurance strategy, but they only see one element of the balance sheet – the Finance function and the CFO will be more holistic

Quota Share

- This is what I think of when I think of an insurer making use of quota share (QS) reinsurance ... a big SUV (4x4) crowding out other legitimate road users
- Or this: a Dachshund trying to be a Doberman

Quota Share (continued): an analogy

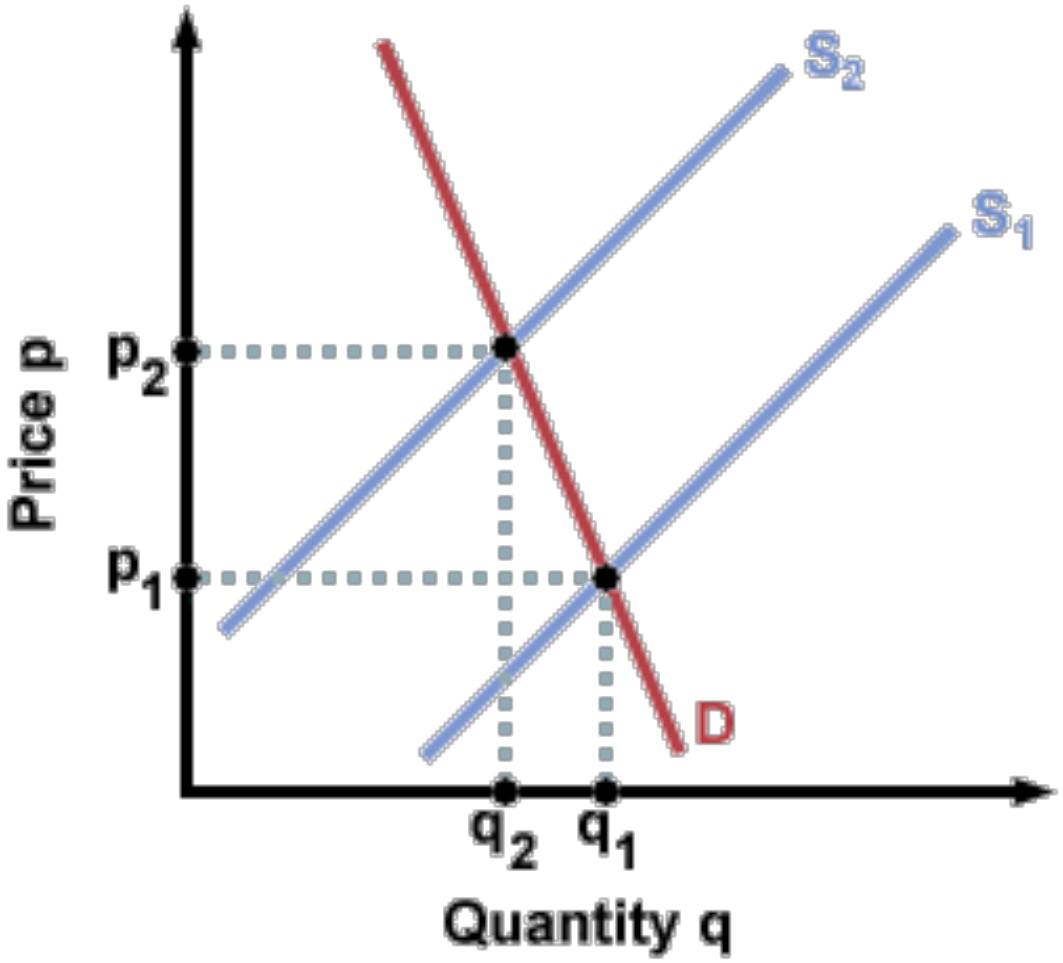


- New York to Boston ~ 200 miles (320km), and ten airlines (A to J) fly 5 flights (each) per day
- The market is stable, and average ticket prices are stable at about $80 (one way) which allows a reasonable margin
- The CEO of Airline A wakes up one day with a ‘brilliant’ idea. “Let’s add a 6th flight each day!”
- Budget is tight, but a Dubai-based airline offers one of their redundant planes (modest fee)

Quota Share (continued): an analogy

- Broadly-speaking there's not a lot of growth in demand year-on-year for NYC-BOS air travel ... the extra flight (slightly) depresses the average ticket price, but Airline A is certainly making more profit as it now has 6 flights (not 5) per day, even if the average ticket price is slightly lower
- The CEOs of Airlines B to J (whose airlines are now all making slightly less profit) see this, and they think "Well, why don't we add a 6th flight each day too?", and they too seek out international airline partners willing to lend one of their redundant planes for a modest fee
- Average tickets prices and margins collapse, the whole airline industry is in trouble
- Sound familiar? The easy addition of capacity imperils the entire industry. The industry should, at least in theory, self-regulate such behaviour. If it doesn't then the regulator should step in.

Quota Share (continued): an analogy



- Demand for insurance is relatively inelastic, additional Supply (via QS) causes the Price to collapse
- The airline industry used to act this way until collectively they all came to their senses. The insurance industry isn't quite there yet.
- But where is the regulator, whose indifference is palpable? Why is the regulator not scrutinising insurers reliant on quota share? Those insurers are the equivalent of the big SUV (4x4) taking up multiple car parking spaces.

Quota Share (continued)

- Why is the regulator not more-thoroughly investigating the Reinsurance Strategy of the insurers it regulates, rigorously analysing the reasons for, and reliance on, QS reinsurance?
- Quota Share has a (short-term) place for an unexpected shortage of capital, but otherwise what is it precisely that a quota share achieves other than an unwarranted ‘cornering’ / crowding-out of the market to the detriment of all insurers (and the stability of the market as a whole)? That simply cannot be good public policy.
- There are many reasons advanced for quota share reinsurance: soft market control of risk, the over-riders (to ameliorate fixed overhead), the profit commissions, dipping one’s toe into a new class-of-business. I reject all these: if the insurer hasn’t got enough capital why should it be permitted to grow in this manner, when the inevitable result is destabilisation of the market as a whole?
- P.S. why is the ‘obvious’ solution, i.e. just writing less GWP, always the last option?

Quota Share (continued)

- It is possible, in addition to undermining the stability of the market as a whole, that the insurer is also undermining itself. An example:
- The Gross Loss Ratio (GLR) of a class-of-business is 57.5%, made up of the ‘best’ 80% of risks which run at 55.3% GLR and the ‘worst’ 20% of risks which run at 66.3% GLR

		Gross	Net	Rl'ed	Reduce book by 20.00%	
Quota Share	20.0%	$12.500m	$10.000m	$2.500m	$10.000m	
Commission	30.0%	-$3.750m	-$3.000m	-$0.750m	-$3.000m	
Gross Loss Ratio	57.5%	-$7.188m	-$5.750m	-$1.438m	-$5.530m	[55.30%]
Administration Expense	7.5%	-$0.938m	-$0.938m		-$0.938m	
Underwr. Result (pre- O/R)		$0.625m	$0.312m	$0.313m	$0.533m	
Over-rider	8.0%		$0.200m	-$0.200m		
Underwr. Result (post- O/R)		$0.625m	$0.512m	$0.113m	$0.533m	
Combined Ratio		95.0%	94.9%	95.5%	94.7%	

Quota Share (continued)

- In other words, by reducing the book by 20% (rather than taking a 20% QS) the insurer could actually make a higher profit and:
  - with reduced capacity in the market, rates should rise and the Gross Loss Ratio should fall
  - reinsurance Credit Risk is eliminated
  - reinsurance administration expense is eliminated
  - capital modelling is simplified
  - improved underwriter focus because there is no perception of a reinsurance safety net
- Quota Share reinsurance is the equivalent of junk food: not good for the individual, not good for society. Challenge to the regulator: Step Up. Quota share reinsurance in a soft market retards the ‘signal’ that should be (but isn’t) being sent that rates are too low and that corrective action needs to be taken.
- Why does QS use increase in a soft market? Like a drunk drinking more, hoping to get sober.

Quota Share (continued)

- From Insurance Insider on 10 September 2017:
- “… the syndicate, which was anticipated to go live in January this year [2017], has had its start-date pushed back, as it altered its core purpose. XXXXX originally intended to write quota share deals for other Lloyd's businesses, giving individual members another means of providing capital to the market and access to a spread of syndicates. However, the team behind the syndicate now want to extend its remit, so that rather than writing a series of whole-account quota share deals for other Lloyd’s businesses, the syndicate will look to write class-specific quota share business.”
- Does this smell like CDO-Squared circa 2007 to anyone else?

- CDO = Collateralised Debt Obligation

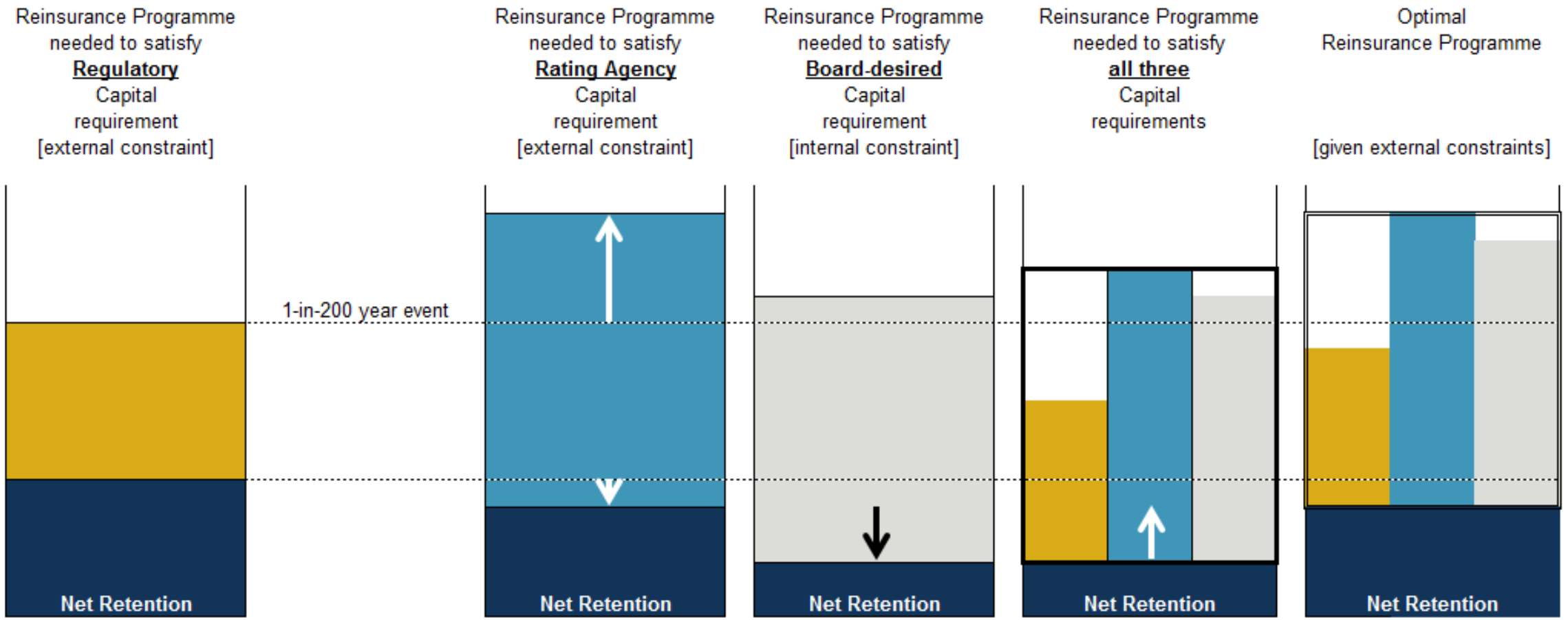
One Man, Three Guvnors

- Before he found fame in the US James Corden starred in the National Theatre's 2011 production of *One Man, Two Guvnors* [Governors] which I was lucky enough to see
- The story, originally based on an Italian play from 1743, tells of the comic challenges the lead player faces as he attempts to manage the challenges and demands of working for two different employers simultaneously
- Senior insurance executives have a bigger challenge: (at least) three guvnors:
  - Regulators
  - Rating Agencies
  - Board / Shareholders [/ Stock Analysts]

One Man, Three Guvnors (continued)

- For simplicity assume the only Underwriting Risk the insurer faces is catastrophe risk, for which a catastrophe excess-of-loss reinsurance programme must be purchased
- Simplistically, to satisfy the regulator, the insurer must buy excess of a Net Retention up to the 1-in-200 year event. The size of the Net Retention is determined by the insurer's available capital.
- Imagine now that the principal rating agency takes a more-pessimistic view of both an extreme catastrophe and the insurer's available capital, causing the attachment point of the reinsurance programme (the Net Retention) to be lowered and the exhaustion point to be raised
- Imagine now that the Board desires to lower the attachment point of the reinsurance programme (the Net Retention) even further
- The sum of these three constraints is the reinsurance programme in BOLD on the following slide ... this satisfies the insurer's two external 'guvnors' (regulator and rating agency) and the insurer's internal 'guvnor' (the Board)

One Man, Three Guvnors (continued)



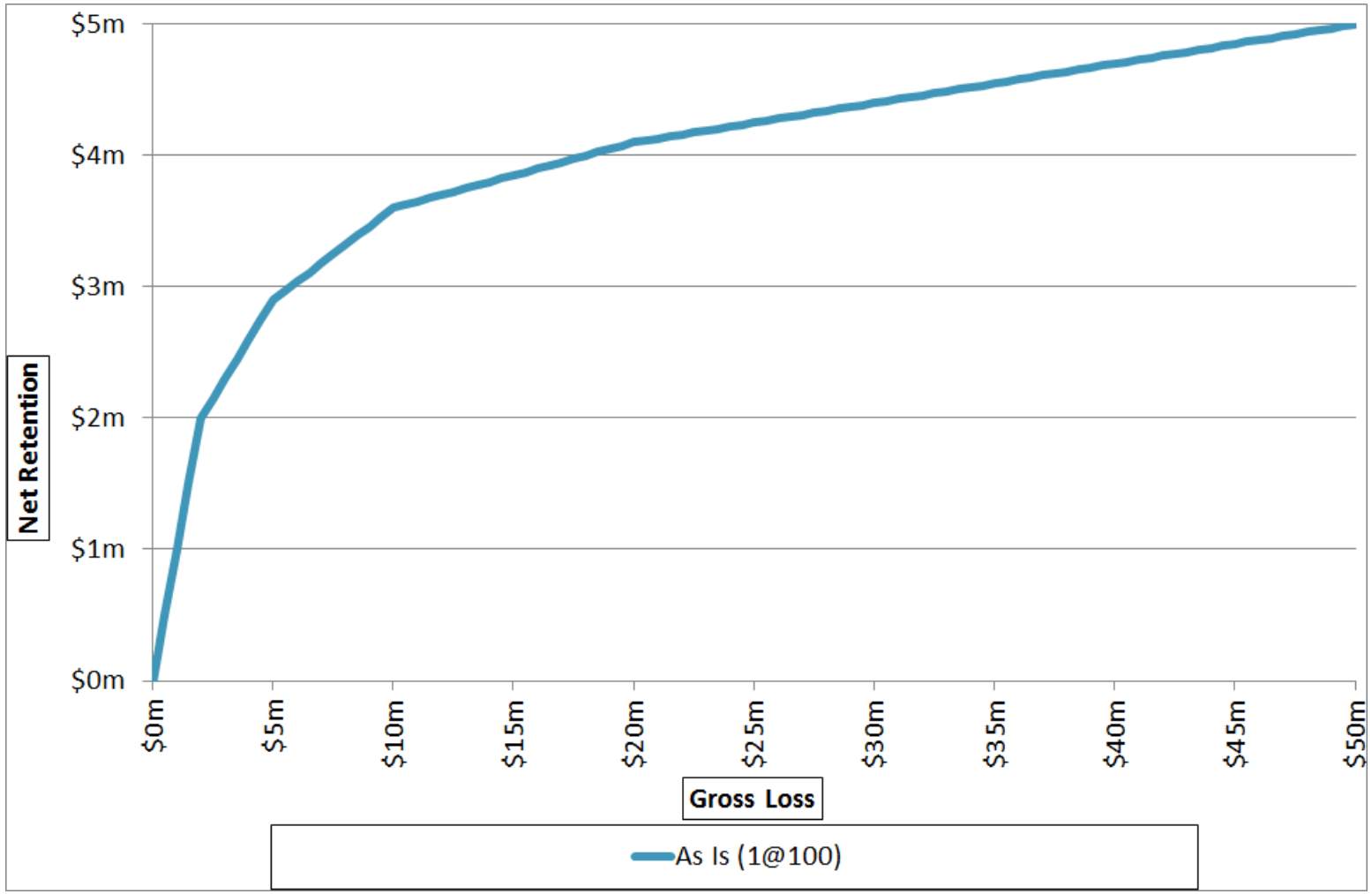
One Man, Three Guvnors (continued)

- However, the reinsurance programme in BOLD on the previous slide is sub-optimal given the demands of the insurer's two external 'guvnors' (regulator and rating agency)
- To the greatest extent possible the insurer's internal 'guvnor' (the Board) should restrain itself from unduly reducing the Net Retention. In this example the optimal reinsurance programme (that which satisfies the two external 'guvnors' (regulator and rating agency)) is the right hand schematic on the previous slide.
- What of the 'fourth guvnor', the stock analyst, demanding (we are often told) stable earnings? NEWSFLASH: insurers are in the 'risk' business. Results (P&L) will fluctuate. If the stock analyst doesn't understand this, and/or if the insurer (or insurance industry) isn't educating the stock analyst of this, then that is a great shame. Excessive reinsurance will retard expected Book Value growth over time, even if the stock attracts a higher Book Value multiple.
- The insurer should no more seek to unduly reduce P&L fluctuation via reinsurance than an umbrella manufacturer should consider buying an ice-cream distributor. Basic portfolio theory: specific risk can be diversified away by the investor: no need for the insurer to do it.

Reinstatement Premiums

- “Reinstatement strategy: philosophy, theory and practice”, Richard Hartigan, published in the Australian Journal of Actuarial Practice (Vol. 5, pp. 47-54)
- In a nutshell: it is more efficient to prepay for reinstatement premiums (by buying 1@free rather than 1@100%)
- But what is the practical effect? Imagine as an ‘as is’ case the insurer buys the following (all 1@100%):
  - $3m x/s $2m at 30% ROL (i.e. $0.90m) [note: ROL = Rate On Line]
  - $5m x/s $5m at 14% ROL (i.e. $0.70m)
  - $10m x/s $10m at 5% ROL (i.e. $0.50m)
  - $30m x/s $20m at 3% ROL (i.e. $0.90m) ... Total Premium $3m, Maximum Net Retention $5m

Reinstatement Premiums (continued)

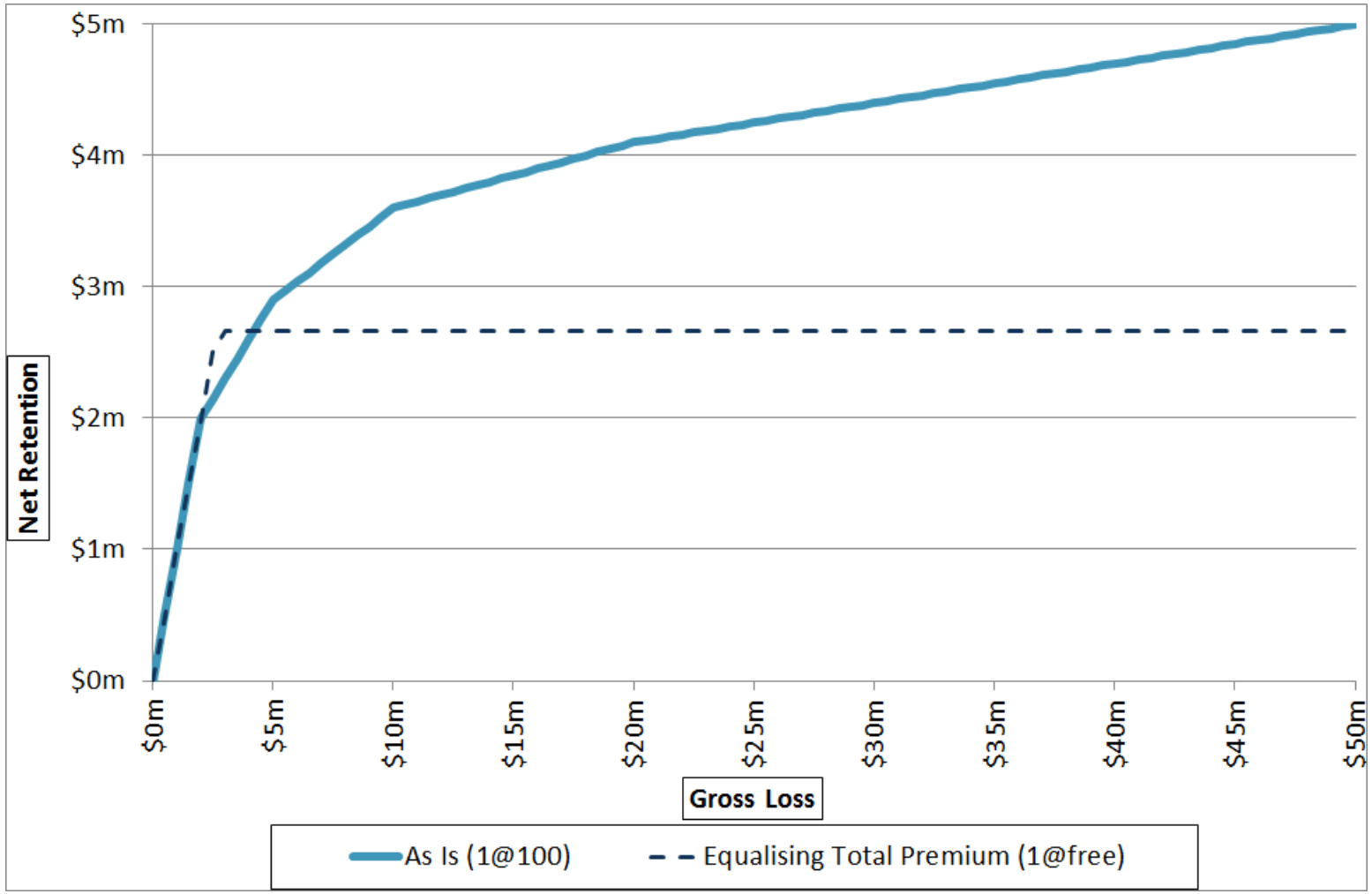


- The Net Retention recognises that not only is the ‘headline’ $2m retained, but that mandatory reinstatement premiums are payable

Reinstatement Premiums (continued)

- Alternatively the insurer buys the following (all 1@free):
  - $2.33m x/s $2.67m at 34.59% ROL (i.e. $0.81m) **
  - $5m x/s $5m at 15.39% ROL (i.e. $0.77m) *
  - $10m x/s $10m at 5.12% ROL (i.e. $0.51m) *
  - $30m x/s $20m at 3.04% ROL (i.e. $0.91m) * ... Total Premium $3m, Maximum Net Retention $2.67m
- Note: same Total Premium of $3m
- Note (*): these ROL are the 1@free equivalents e.g. 14% ROL (1@100%) = 15.39% (1@free)
- Note (**): this ROL is the 1@free equivalent to 28% ROL (1@100%), not 30%, recognising the slightly higher attachment point of $2.67m

Reinstatement Premiums (continued)



- Same Total Premium of $3m
- For a Gross Loss between $2m and $4.22m the Net Retention is (slightly) higher
- Otherwise, the Net Retention is considerably lower
- Simpler post-event communication to senior insurance executives / Board of the Net Retention from an event

Reinstatement Premiums: why not Unlimited?

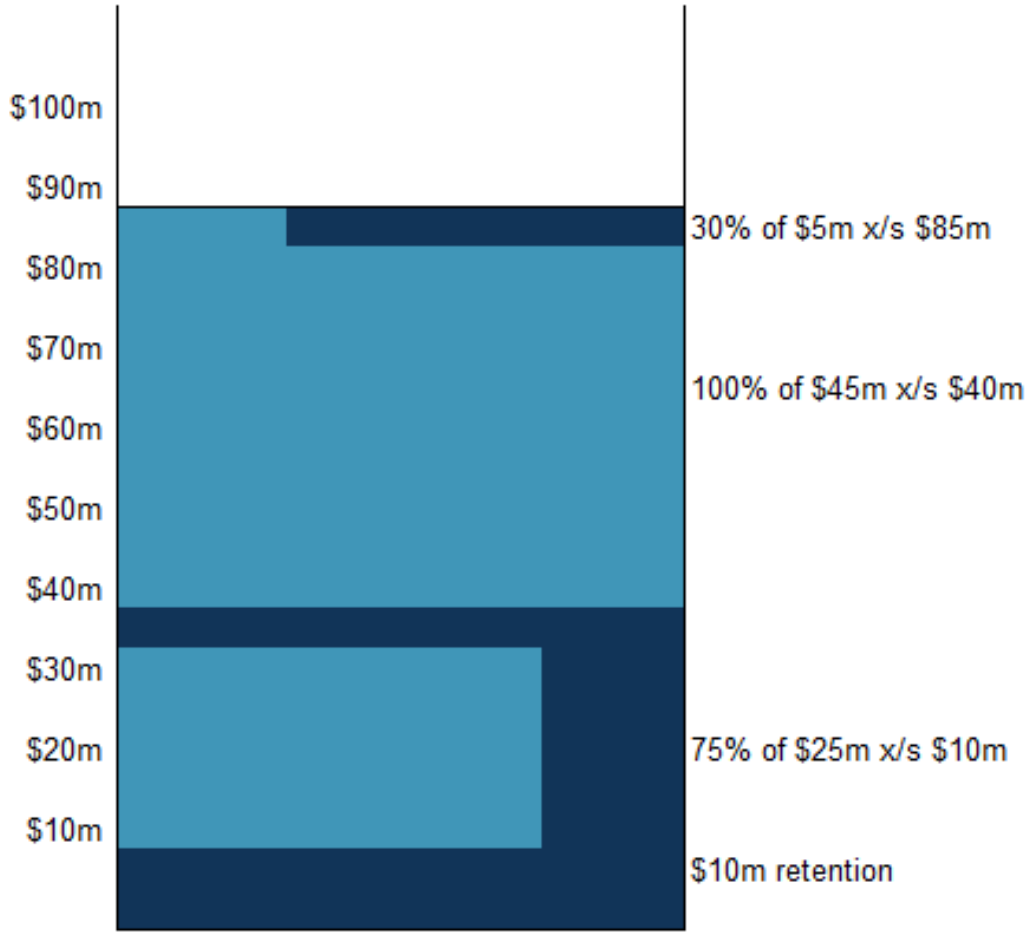
- The prior discussion focussed on holding the number of reinstatements steady (at one) and varying the cost of the reinstatement (1@100% versus 1@free)
- Looking at reinstatements the other way, that is: by varying the number of reinstatements (from 1@100% to 2@100% to 3@100%, etc.), what can we deduce?
- Somewhat counter-intuitively the ‘theoretical’ upfront ROL falls (very slightly) as the number of reinstatements increases
- Consider a Gross ROL of 25% (1@100%). This provides reinsurance protection for two full losses. If the pricing is right how often will there be more than two full losses? About 0.15% of the time (1-in-665 years).
- Why not offer unlimited reinstatements @100%?
- Non-traditional reinsurers can not possibly compete with unlimited@100% (since they typically post collateral for the maximum limit)

Reinstatement Premiums: why not Unlimited? (continued)

- Insurers may be so appreciative of the sleep-easy nature of unlimited@100% that they would be willing to pay an above-warranted upfront ROL (increased pricing power to the reinsurer)
- Unlimited@100% may be particularly useful to standard formula insurers
- In short: there is a simple, relatively low-risk, advantage that traditional reinsurers have that they are not offering to insurers. Why?

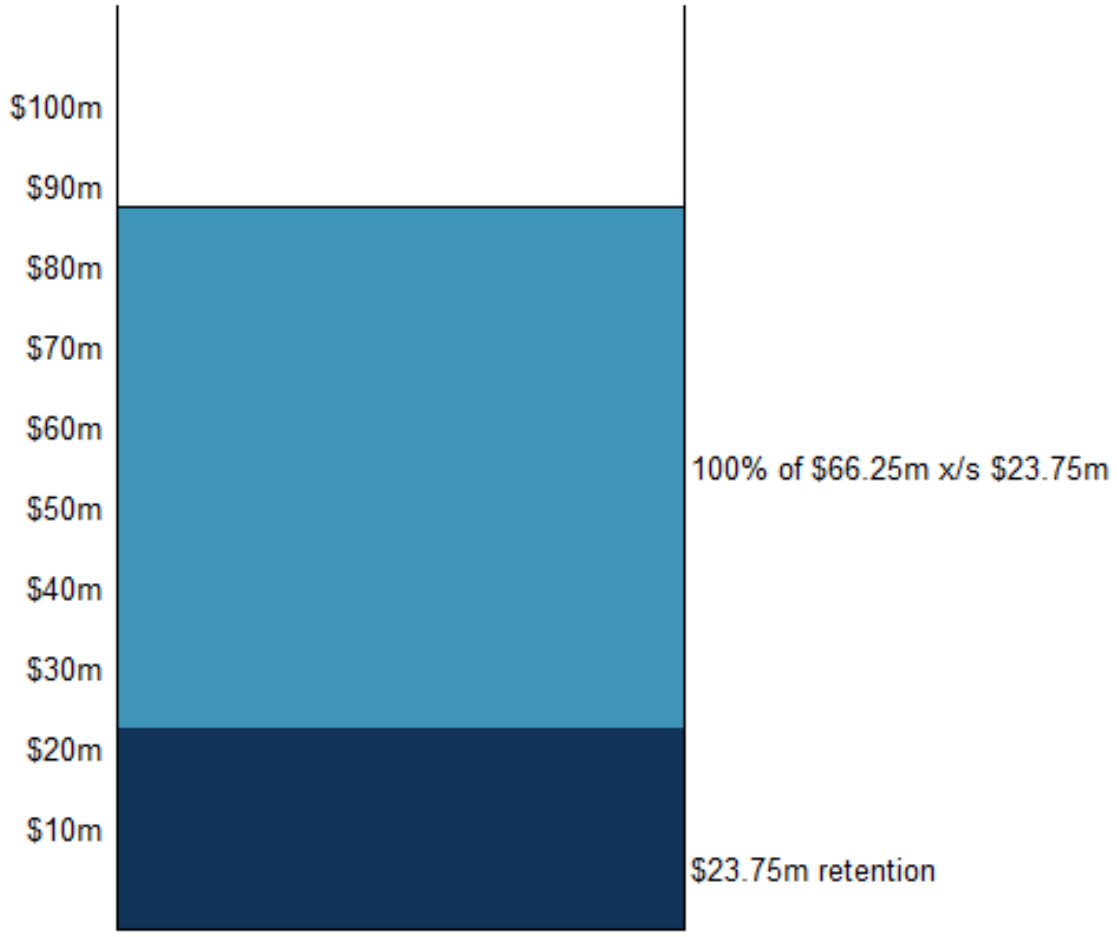
Mind The Gap

- For simplicity assume the only Underwriting Risk the insurer faces is catastrophe risk, for which a catastrophe excess-of-loss reinsurance programme must be purchased
- Often, one sees a reinsurance structure something like this schematic i.e. with ‘gaps’
- $66.25m of protection has been purchased (30% x $5m + 100% x $45m + 75% x $25m)
- Assumption: 1-in-200 year event = $90m



Mind The Gap (continued)

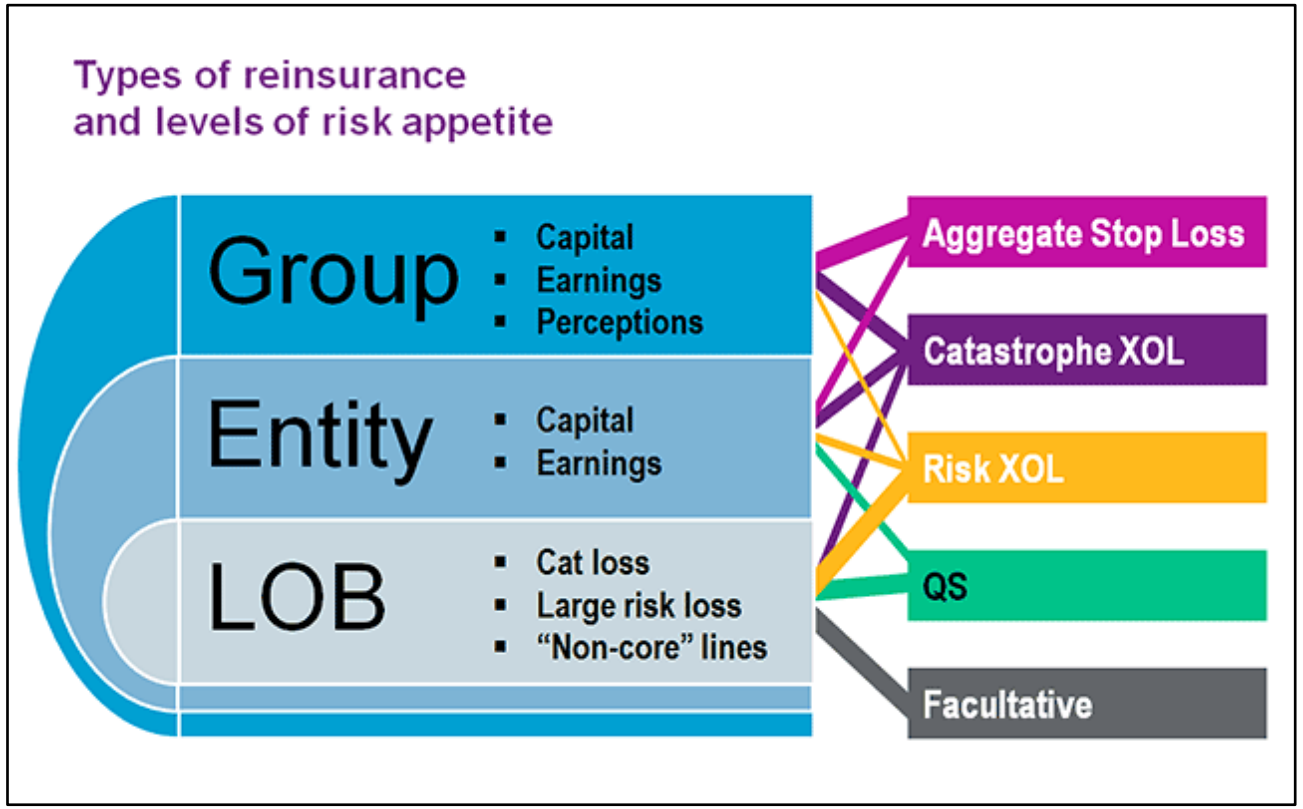
- Same level of protection $66.25m
- Same exhaustion point of $90m
- Same capital protection
- Less expensive protection (ROLs not shown, but since protection attaches at a higher level it must be cheaper)
- Any and all gaps will be sub-optimal from a capital point-of-view, since by closing the gaps the insurer is ceding less reinsurance premium / ceding less profit (in an absolute sense) to reinsurers



What does an ‘ideal’ reinsurance programme look like?

- no facultative reinsurance
- no quota share reinsurance
- sparse use of surplus reinsurance (only where risk excess-of-loss is uneconomic)
- risk excess-of-loss attachment points set in light of legal entity (/ Group) capital levels
- if there’s money to burn (“reinsurance budget”) then overbuy high-attachment / low-ROL catastrophe excess-of-loss, from highly-rated reinsurers ... when the Big One hits the insurer will be protected (and this strategy also defends against catastrophe model risk)
- prepay for reinstatements (but not via mirror layers or reinstatement premium protection (RPP))
- aim for aggregate excess-of-loss and stop-loss coverage ... not common, but very capital efficient
- no gaps in excess-of-loss

What does an ‘ideal’ reinsurance programme look like? (continued)



- I don’t 100% agree with this schematic but it is the best graphic I’ve seen showing the hierarchy of reinsurance solutions / needs
- Depending on the lens through which one looks at risk then one’s level of risk appetite will change, and the reinsurance solution suited to bringing the net risk back within that risk appetite will also change

- Source: Willis Tower Watson, Reinsurance and enterprise risk management, Dave Ingram, 10 October 2016 (http://blog.willis.com/2016/10/reinsurance-and-enterprise-risk-management/)

Other final random unconnected thoughts

- Why do reinsurance brokerage rebates still exist?
- Proportional (QS or Surplus) reinsurance ... does the insurer really need to place this via a reinsurance broker? Stop paying away the reinsurance brokerage, and place direct.
- Proportional (QS or Surplus) reinsurance ... mind Event Caps: could be a very unpleasant surprise
- Proportional (QS or Surplus) reinsurance ... reduce the deficit carry-forward period for Profit Commission purposes. Sometimes there is unlimited carry-forward ... is that even reinsurance? A medium-term profit to the reinsurers is guaranteed.
- Are insurers just as competent / more competent than Rating Agencies at assessing Credit Risk? No, how can they be? Time to fundamentally re-think the Solvency II insistence that insurers reduce their reliance on external credit ratings. Rating Agencies aren't perfect, but assessing Credit Risk is their sole job.

Other final random unconnected thoughts (continued)

- If the insurer's reinsurance programme 'models' at an expected profit, should the insurer be allowing for that in their capital model? If so, should the insurer also be pushing up reinsurance Credit Risk dramatically?
- When determining the expected cost of a reinsurance programme, model the insurer's expected reinsurance recovery rate to gross premium not the reinsurer's expected loss ratio to net premium (brokers must be paid, their services are not free)
- Transparency is good: what do investors really know about an insurer's reinsurance programme? Usually not very much. [call out to Insurance Australia Group, who do a really good job on this]
- Underwriting Cycles are much more a by-product of varying premium levels than varying loss levels
- Actuaries (especially working with capital modelling and finance) bring a level of mathematical rigour to an insurer's reinsurance strategy, and can provide valuable alternative views

Questions

Comments