Pricing in the London Market
20 Years On

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Its was 20 Years ago today…

Well not quite

1994 – Pricing Working Party Formed

Paper at GIRO 1995
Paper at GIRO 1996
Institute Paper 1998
International Congress Paper Birmimgham

Tools available 1994

- Lotus 123

- Excel just coming into force

- GLM….well best of luck

- Some simulation programmes such as @risk

- Rules of thumb

1995 Paper

- Risk XL
  - Experience Rating
  - Curve Fitting (including Pareto Rating)
  - Exposure Rating

- Catastrophe Excess of Loss
  - Aggregate Based Methods
  - Loss based methods
  - Simulation/modelling type methods
  - Burning Cost Rates
  - Exposure Rates

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1995 Paper

- Proportional Treaty

- Use of simulation methods

- Stop Loss Treaties

- Credibility Thepry

- Distribution Calculus

- Generalised Interactive Linear Models

Catastrophe Models

- Karen Clarkes paper on US Hurricanes

- Some UK windstorm in development and of limited use

- Other losses being "researched"

- Cresta zones

Today

- Excel

  - A powerful, yet simple, programming language

  - Lotus 123 RIP following IBM acquisition

  - Most of what we did in 1994 was in done in VBA in excel and translated

  - In output there is 2002 programme we wrote for extreme events paper which works today (but you will have to make sure that the Solver is working properly)

  - Nothing really new in methodology

  - Available on PC, mini PC and IPAD so portable (which is important for discussion

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Today

- Cat models more sophisticated

  – Covers multitude of losses over variety of causes

  – My model is better than your model

  – Still very simplistic

  – Most models rely on historic storms and events

Today

- Higher software such as R tend not to be used

- Information is still limited

- GLM applied to Marine Liability, but with limited results and certainly no application

- So not much has really changed

- Sophistication is derived from Greek Sophos – means "over the top"

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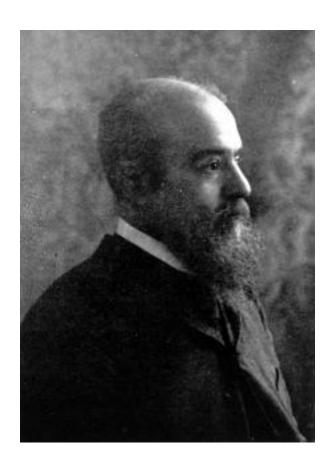and Faculty
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Some examples of rule of thumb

- In a typical book a significant number of policies are follow with a minority of lead

- In a typical book a large percentage of losses come from a small number of contracts

- Cat models may not give absolute answers but may give rise to relative amounts

- Stop loss and excess of loss looks like a derivative..so what information do we have if we treat it like a derivative

Pareto

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Pareto

- 80 percent of wealth belongs to 20 per cent of distribution

- X percent of losses belong to (1-X) per cent of policies

- I only rate y per cent of contracts, the rest is follow..how do I consider these?

Underwriting considerations

- Why me?

- What is the risk?

- Should I underwrite or not

- What is the premium?

- Key is the balance of the portfolio

Pareto Consideration

- A simple rule

- What is the Pareto parameter of my claims

- If 20% of claims account foe 80% of losses then I need only really concentrate on those claims.

- If I misprice the 80% of policies by 10% then this will impact my loss ratio by 2%

- BUT

- If the others are out by 10%.....

Pareto Parameter

- This is NOT the parameter in a pareto distribution

- It is the X such that (1-x)% of claims account for x% of claims

- It may be 80/20, 90/10or so on

- Knowing the parameter is important as it tells you what risks (or class of risks) you should concentrate on

- It also enables you to establish how balanced the portfolio is

Pareto Reinsurance

- This reinsurance was considered in the 80's/90's

- The risk covers the highest x losses in any one year

- The reinsurer takes most of the volatility out of the risk

Pareto Rule

- Some ways of pricing the 80% of risks you don't see

- Others are deal with in the paper

Information

- Information is the key to pricing

- To see if a risk is reasonably price we need information on risks seen but not priced

- We only see a small portion of risks for pricing and we need to also consider a quick method of determining whether the risk is keenly priced to accept the risk

- 20 years ago this was difficult

- In todays age it should be automatic

Example 1 Cat XoL

- We have a series of for similar Cat XoL

- There has been a recent major loss that has affected the portfolio

- Graph the rate on line of the midpoint of the exposure

- The mid point of the exposure is expressed as a percent of the major cat loss to the insured

- Ideally the ROE should follow an exponential decay shifted upwards

Cat XoL

- The line of shift represents the markets minimum rate on line

- Any loss above the line is possibly better priced than that below the line

- However

- You need a reason for its position which may help in understanding the loss.

- This helps in managing the risks not priced

Example 2 Implied Volatility

- Think of a stop loss as a derivative

- Excess of loss is thus a series of derivatives

- Block Scholes expresses price as a function of volatility

- Turn on its head and from the pricing of various layers you can obtain the implied volatility from the price (this is why you want the price of risks that you are not quoting)

- From this you can now effectively put a price on any layer

Black Scholes Formula

$$C(S,t) = N(d_1)S - N(d_2)Ke^{-r(T-t)}$$

$$d_1 = \frac{1}{\sigma\sqrt{T-t}} \left[\ln\left(\frac{S}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)(T-t) \right]$$

$$d_2 = \frac{1}{\sigma\sqrt{T-t}} \left[\ln\left(\frac{S}{K}\right) + \left(r - \frac{\sigma^2}{2}\right)(T-t) \right]$$

$$= d_1 - \sigma\sqrt{T-t}$$

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Implied Volatilty

- Use with caution as insurance risks don't follow requirement of BS

- However

- Not essential when determining relativity of risks

- Formula may blow up in your face!

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Some Links

- *Pricing in the London Market*

- *www.actuaries.org.uk/system/files/documents/pdf/0103-0211.pdf*

- *Part 2*

- *www.actuaries.org.uk/system/files/documents/pdf/0141-0174.pd*

- *Institute Paper*

- *www.actuaries.org.uk/system/files/.../18796baj43427-4831998**sanders**.pdf*

- *Modelling of extreme events*

- www.actuaries.org.uk/system/files/documents/pdf/sm20050404.pdf

- **Pricing, management and control of extreme events. Excel spreadsheet**

Questions

Comments

Expressions of individual views by members of the Institute and Faculty of Actuaries and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

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