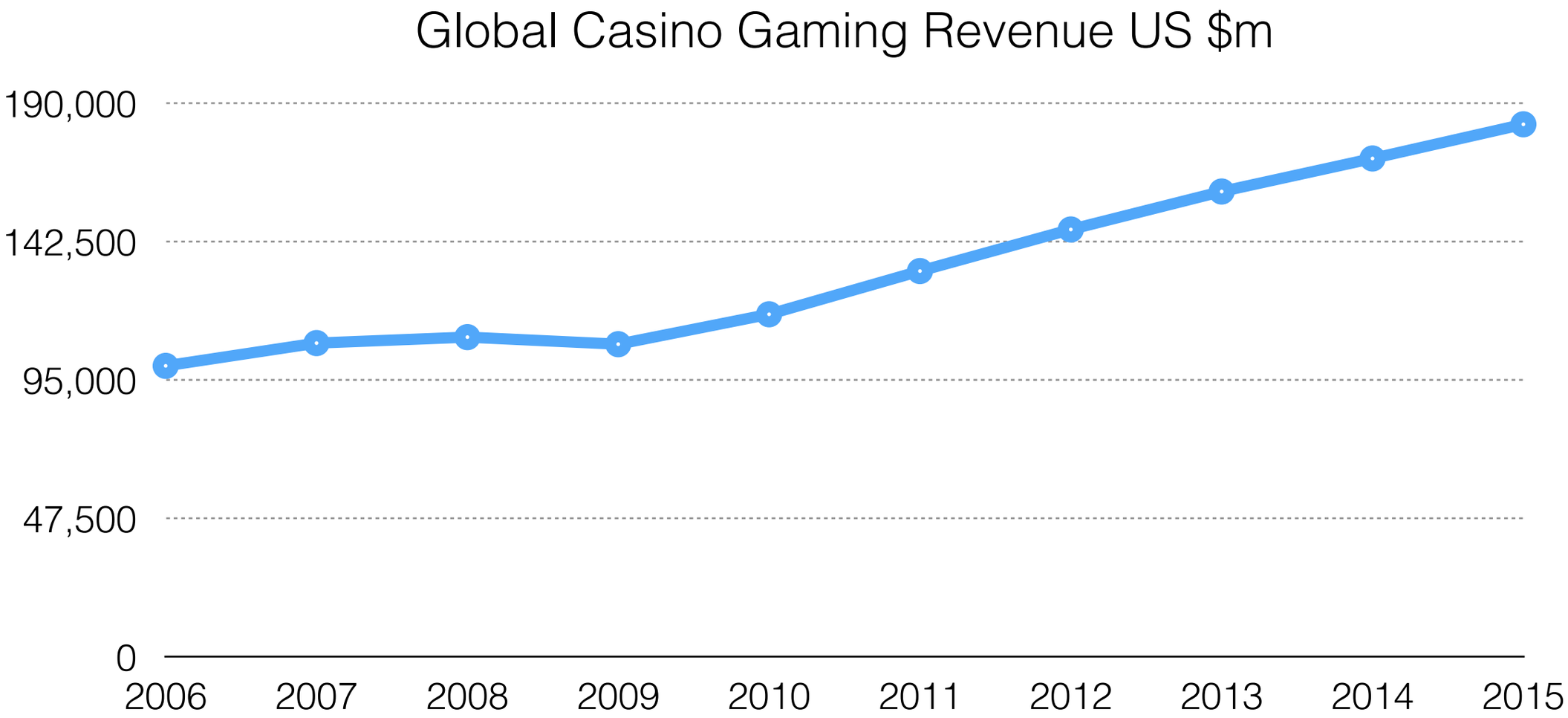
Communicating Risk

Markus Gesmann, R in Insurance

29 June 2015

Smoking kills

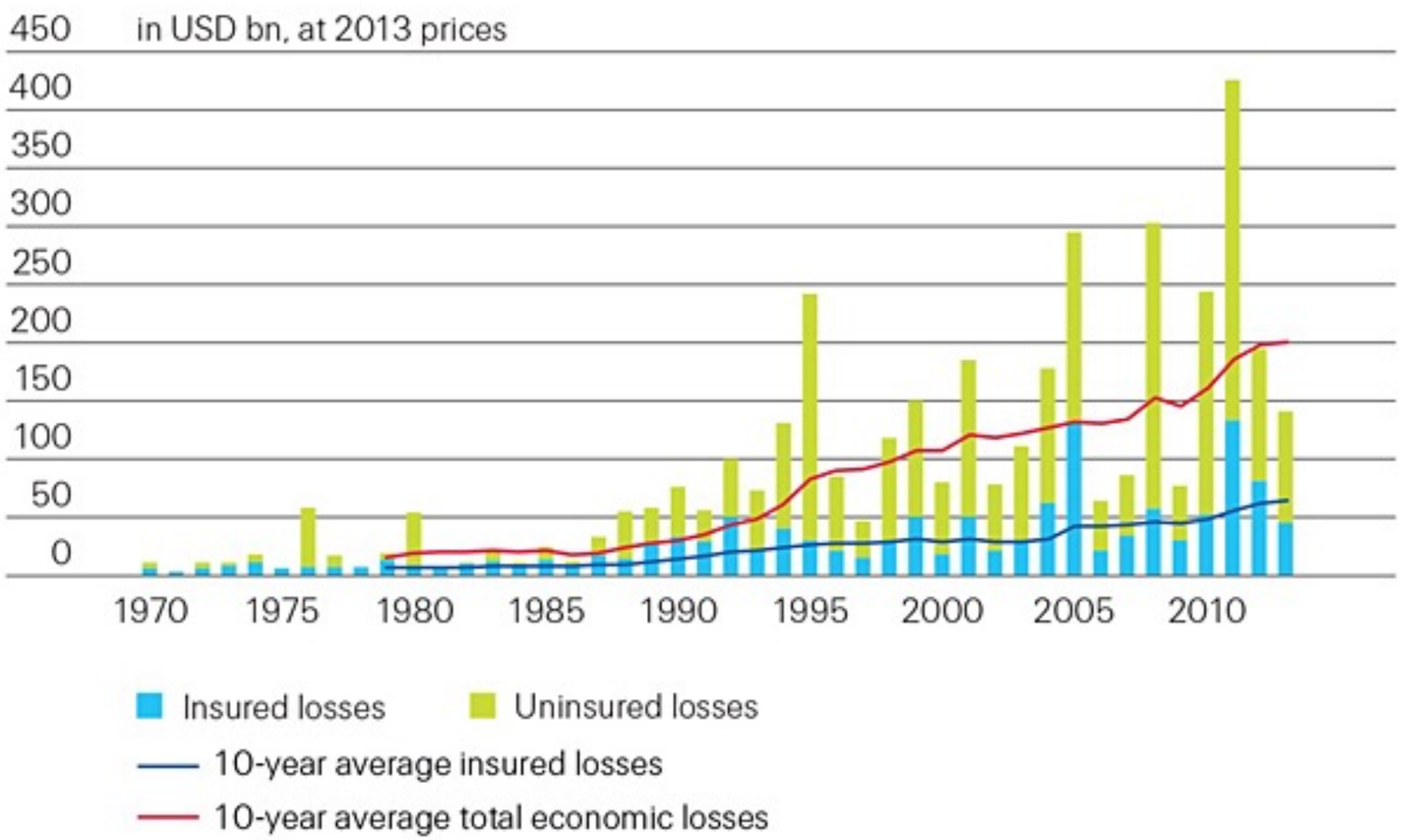
Wish me luck!



Sources: PricewaterhouseCoopers LLP, Wilkofsky Gruen Associates

Insurance is sold, not bought

Figure 1: Insured losses vs uninsured losses,1970–2013



Economic loss = insured + uninsured losses

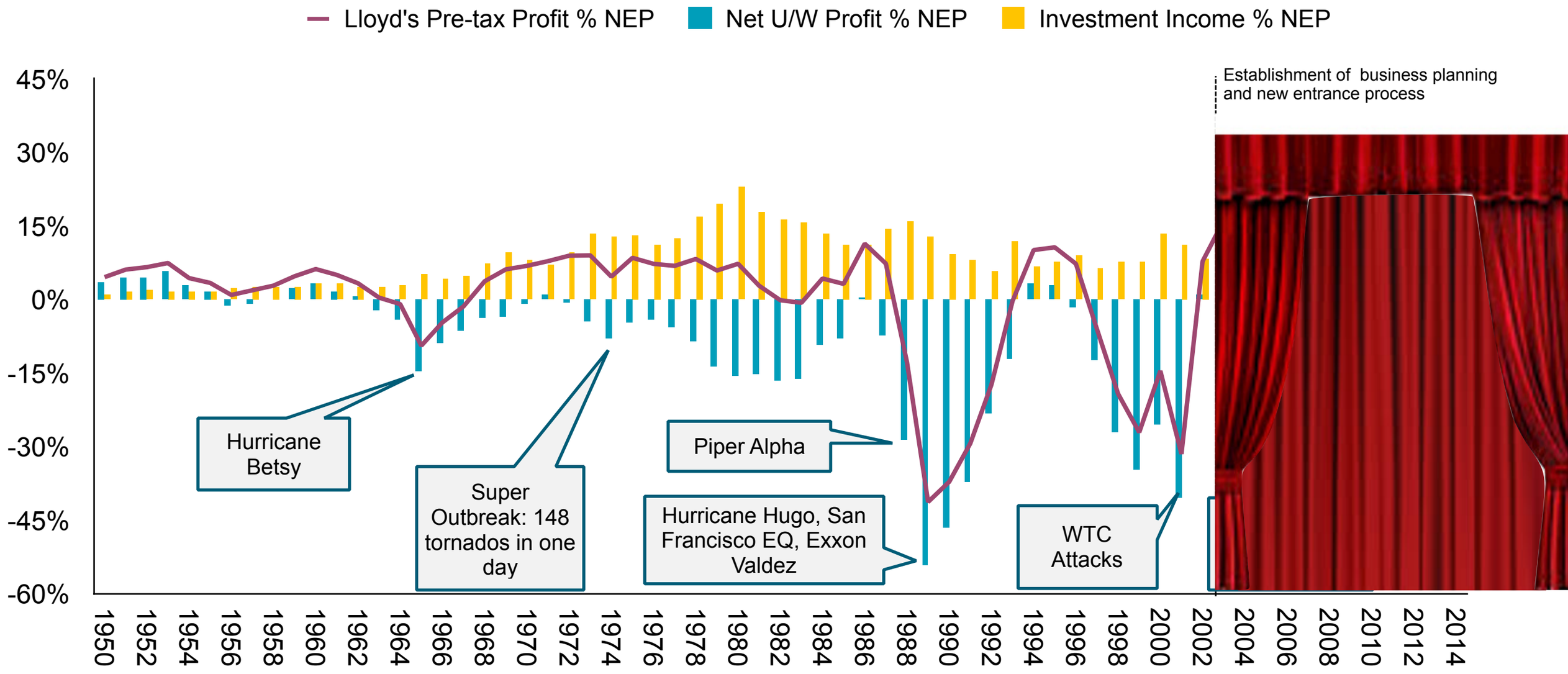
Source: Swiss Re Economic Research & Consulting

The God complex:

We underestimate risk[1]

[1]Particular risks we are responsible for.

Lloyd’s historical results 1950 - 2002

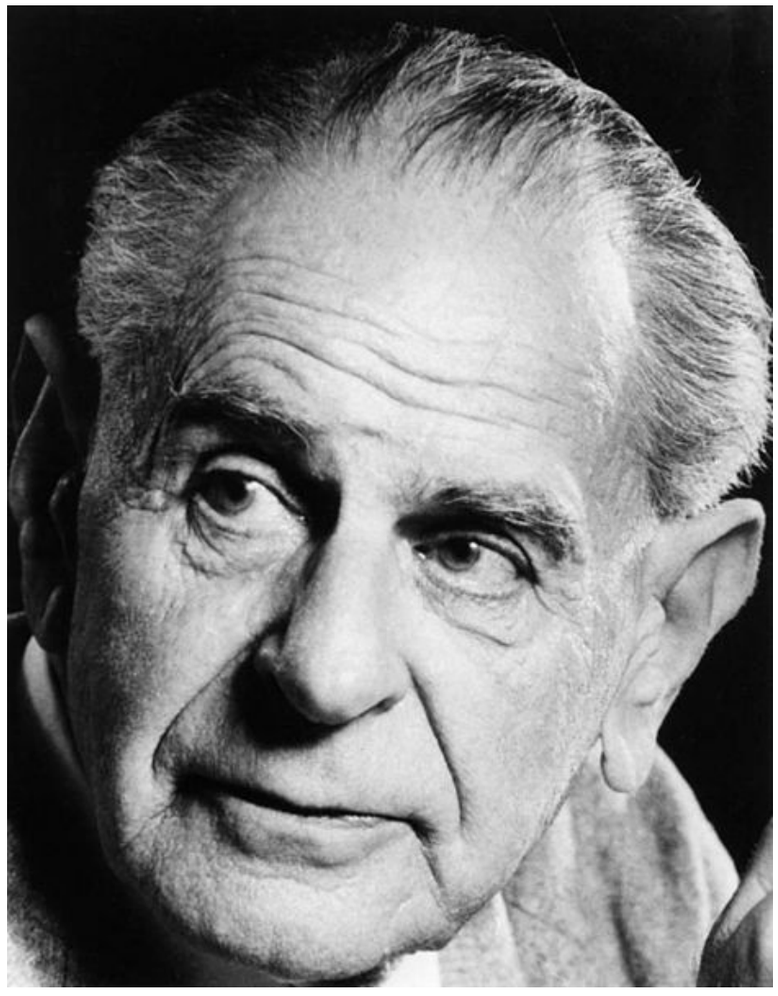


Major losses: Hurricane Betsy (1965), 1974 Super Outbreak 148 tornados in one day, Piper Alpha (1988), Hurricane Hugo (1989), the San Francisco Earthquake (1989), Exxon Valdez (1989) North European storms (1987 and 1990), Typhoon Mireille (1991), Hurricane Andrew (1992), Northridge Earthquake (1994) , WTC (2001), Hurricanes Charlie, Francis, Ivan (2004), Hurricanes Katrina, Rita, Wilma (2005), New Zealand, Chile Earthquake (2010, New Zealand, Japan Earthquake, Thailand Flood (2011)

Source: Lloyd's Annual Reports, Statistics relating to Lloyd's 2001; Lloyd’s data for 1950 – 1999 on three year accounting (assuming written=earned premium and 18% brokerage), and from 2000 onwards on annual accounting basis.

You can only be proven wrong

Black Swans

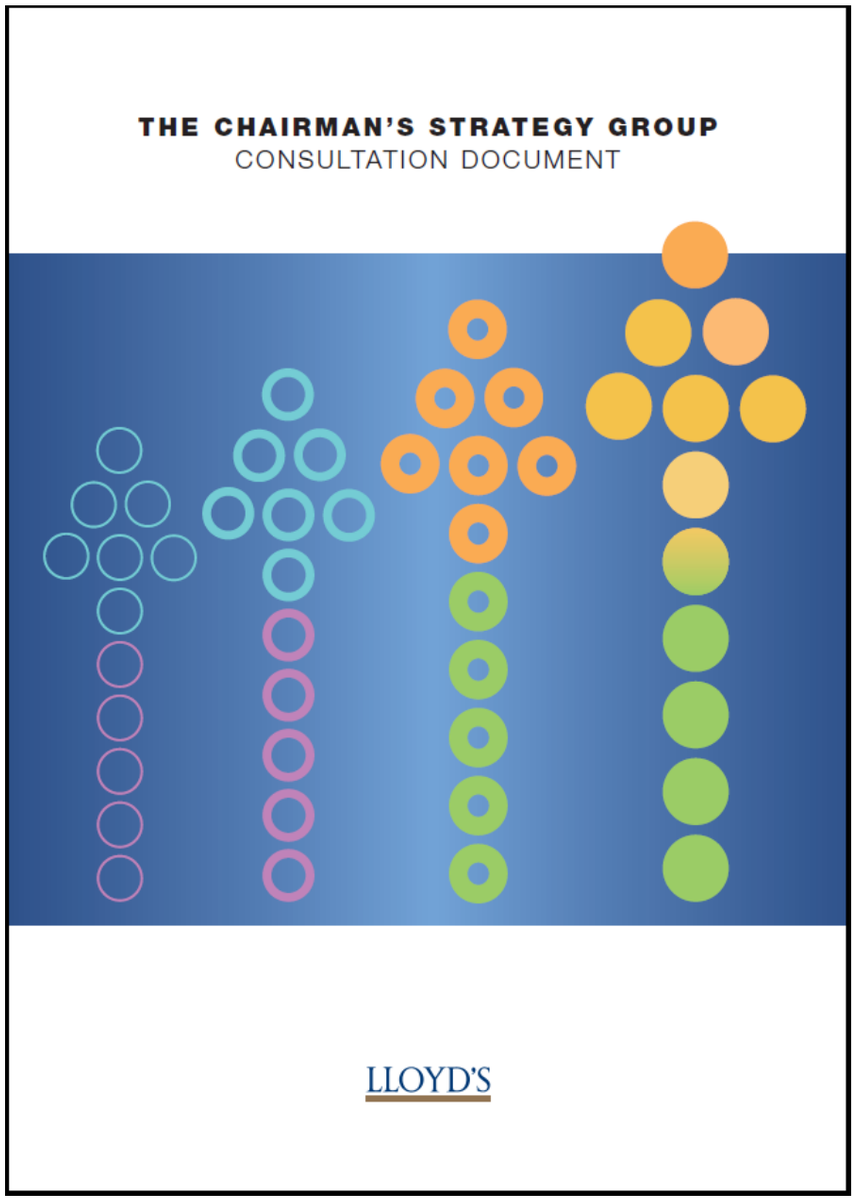


Karl Popper

Good tests kill flawed theories;
we remain alive to guess again.

A new start in 2002 for Lloyd's

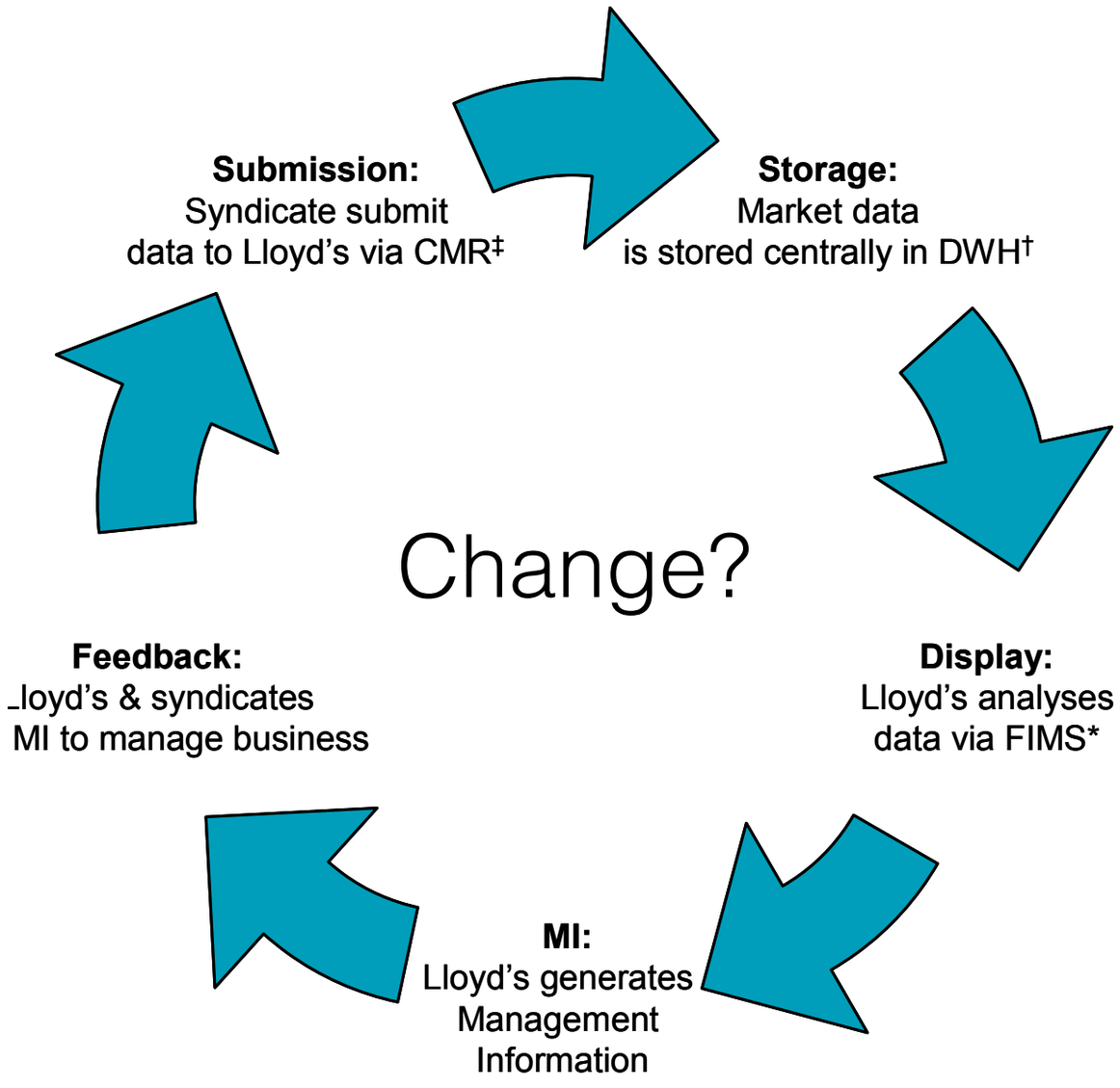
- Published in 2002
- Set out new Lloyd's structure
- Usage of data for business planning and monitoring



Source: http://goo.gl/UJJ8g

Performance data review cycle

- Market submits data to Lloyd's
- Lloyd's analyses the data
- Bespoke management information is generated
- Agent specific reports and tools are played back internally and externally
- Lloyd's and agents use the MI to review and improve their performance



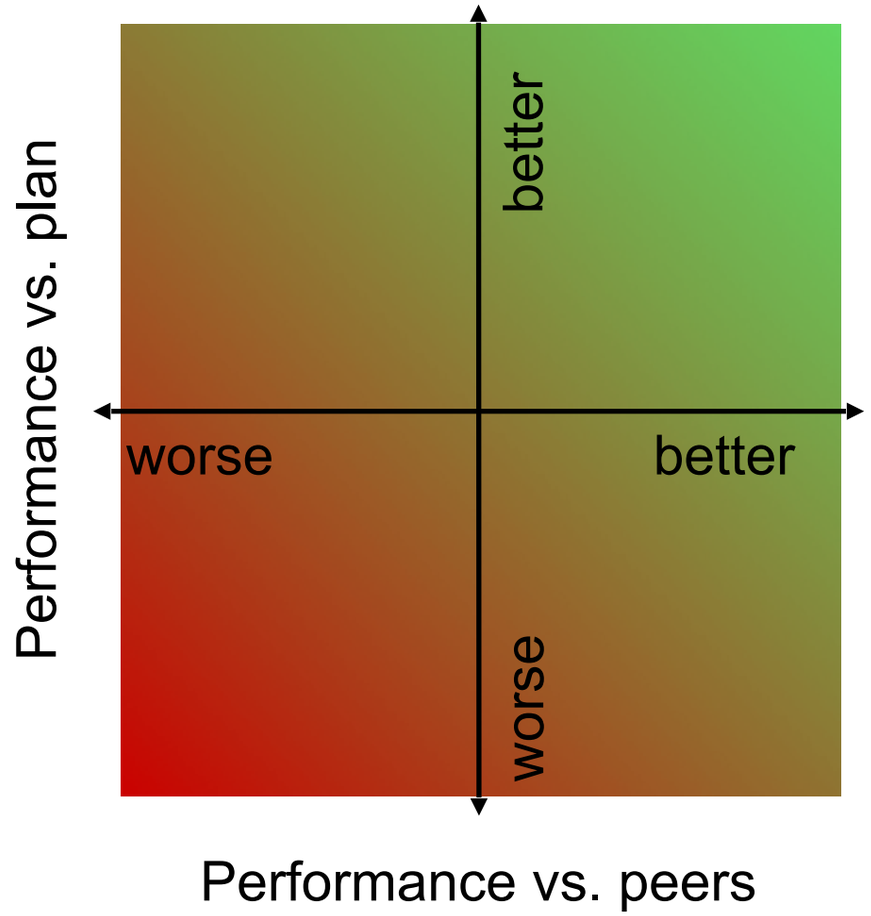
†DWH: Data Ware House

‡CMR: Core Market Return

*FIMS: Franchise Information Management System

Benchmarks versus peers and plan

- Summarises performance benchmarks versus **notional market and Business Plan**
  - Top performing syndicates or classes sit in the top right quadrant
  - Bottom performers sit in the bottom left quadrant
  - Movements over time highlight changes in performance



Hit and Run. What do you think?

- A cab was involved in a hit and run accident at night. Two cab companies, the Green and the Blue, operate in the city.

- 85% of the cabs in the city are Green and 15% are Blue. A witness identified the cab as Blue.

- The court tested the reliability of the witness under the same circumstances that existed on the night of the accident and concluded that the witness correctly identified each one of the two colours 80% of the time and failed 20% of the time.

- What is the probability that the cab involved in the accident was Blue rather than Green knowing that this witness identified it as Blue?

Source: Thinking, Fast and Slow, Daniel Kahneman

What is our hypothesis?

What is our data?

Thomas Bayes can help

$$P(H|D) = \frac{P(H)P(D|H)}{P(D)}$$

H = Accident caused by Blue cab

D = Witness said the cab was Blue

Thinking, fast and slow

Use of belief network

```
cb <- cptable(~ cab, values=c(0.15, 0.85),
              levels=c("blue", "green"))
wtnss <- cptable(~ witness|cab,
                 values=c(0.8*0.15, 0.2*0.85,
                          0.8*0.85, 0.2*0.15),
                 levels=c("correct", "incorrect"))
plist <- compileCPT(list(cb, wtnss))
plist$witness
#           cab
# witness          blue      green
#   correct   0.4137931 0.95774648
#   incorrect 0.5862069 0.04225352
```

Hit and run … away from your tail

- There are two kinds of casualty underwriters, the skilful ones and the ones who run away from their tails
- Reviewing the historical market data reveals that only 15% of casualty underwriters are skilful and 85% are running away from their tails
- A CEO employs a new casualty underwriter
- The CEO believes that she can identify the skilful underwriter with 80% confidence
- What is the probability that the CEO actually employed a skilful underwriter?

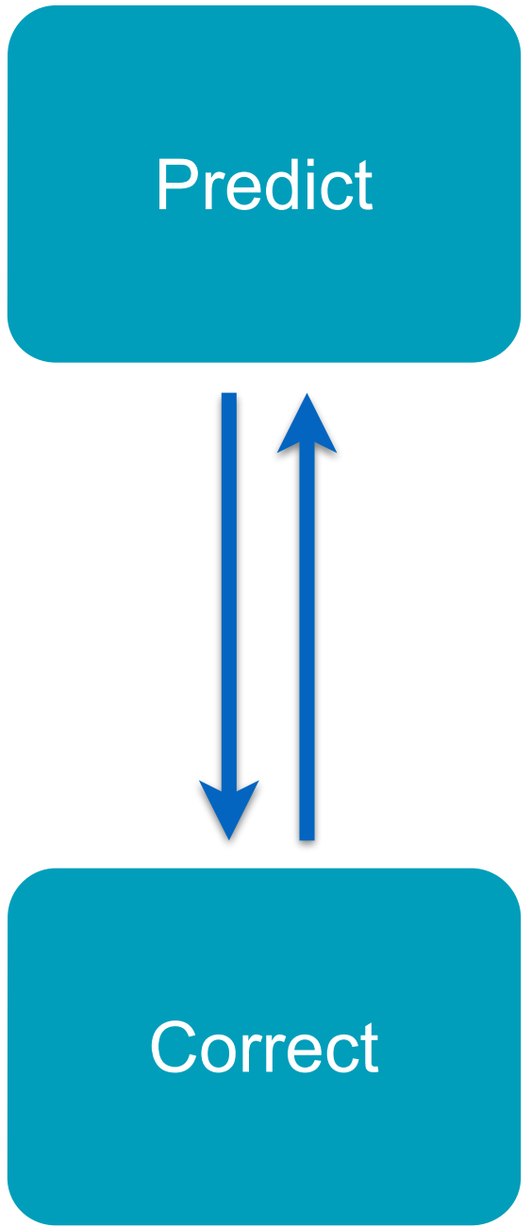
Chances of entering a new class of business successfully

- A Lloyd's syndicate is planning to enter a new class of business, where historically only 15% of the syndicates met its planning loss ratio and 85% failed.

- The syndicate has a track record of meetings its business plan loss ratio 4 out 5 years.

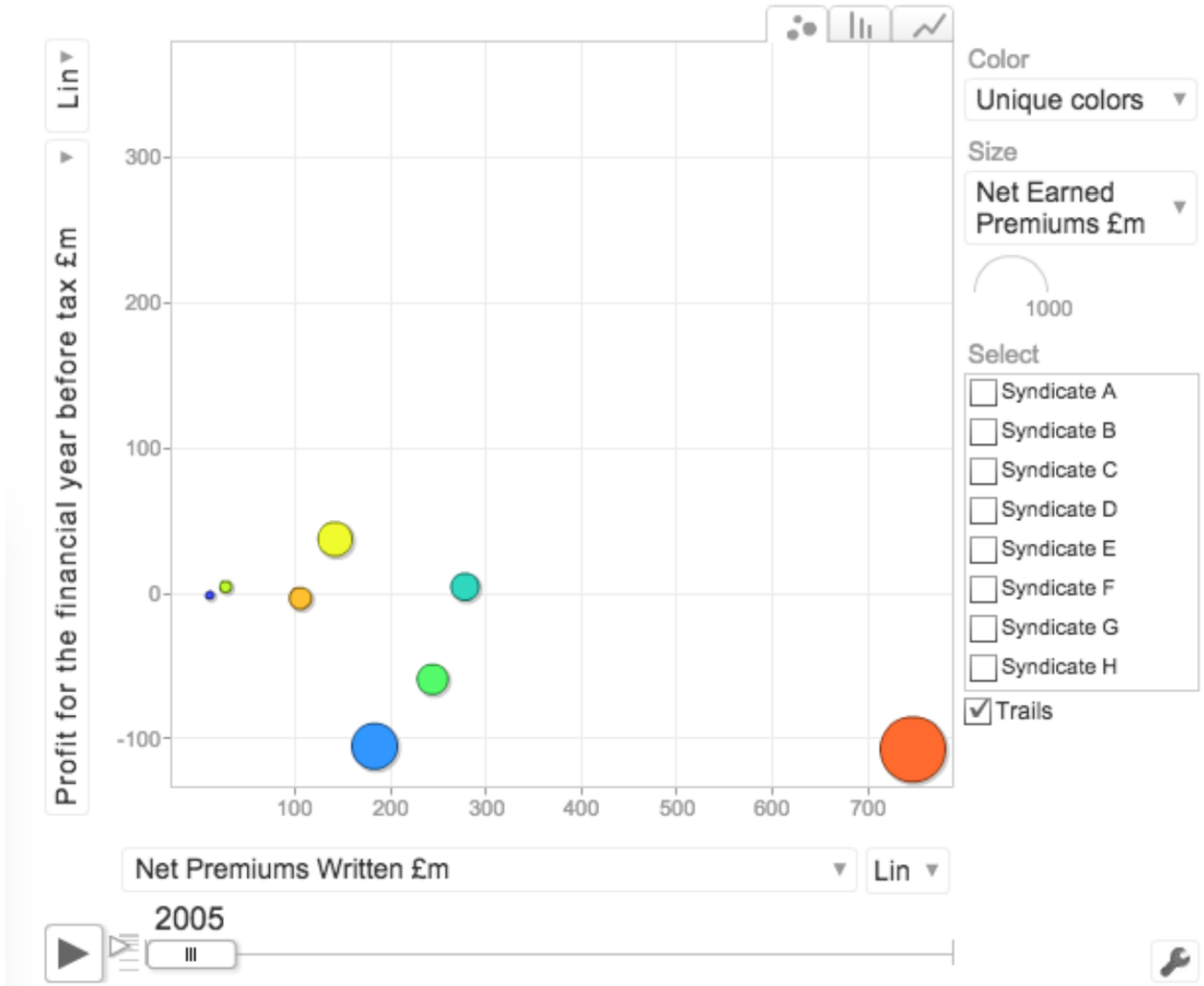
- How much confidence would you have that this syndicate can achieve its planning loss ratio in the new class of business?

In a nutshell



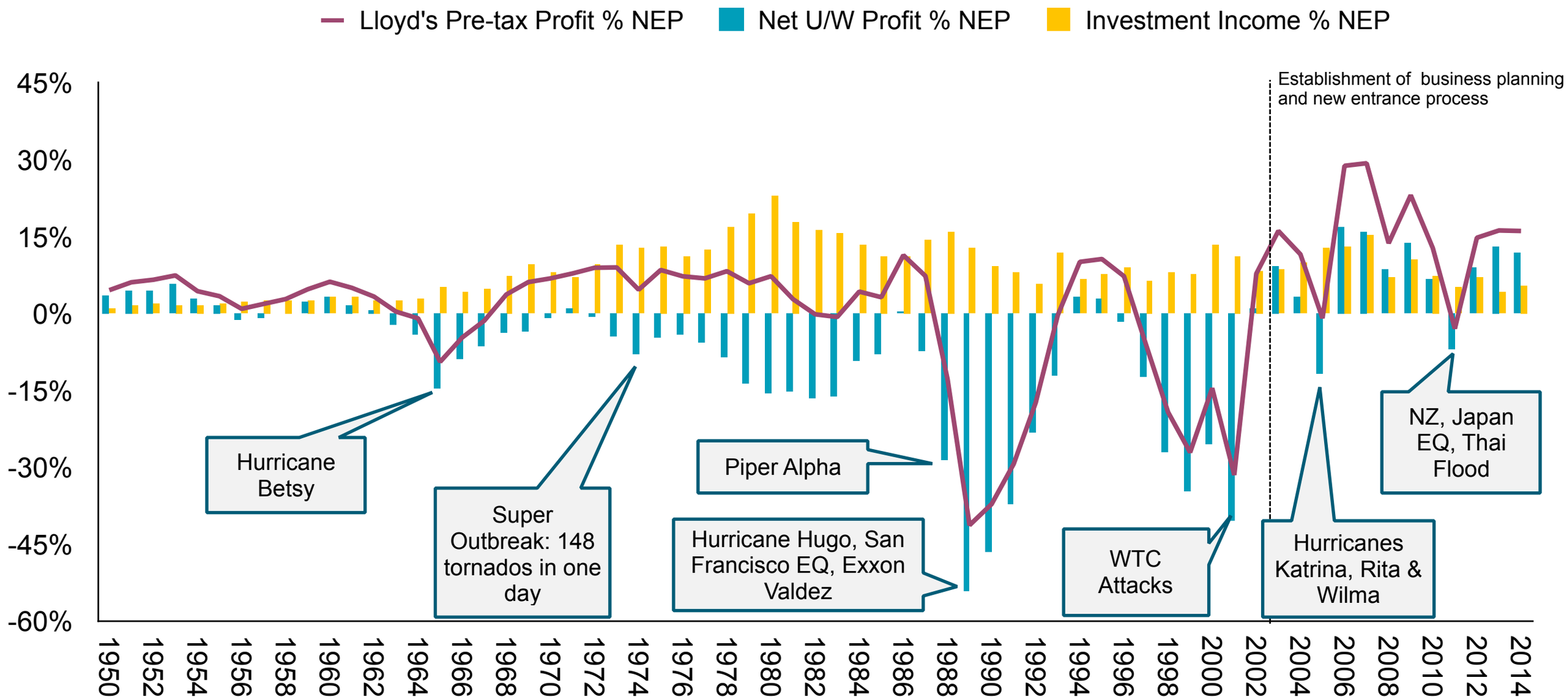
Has it made a difference?

Review Lloyd's Statistics



www.lloyds.com/stats (using R and googleVis)

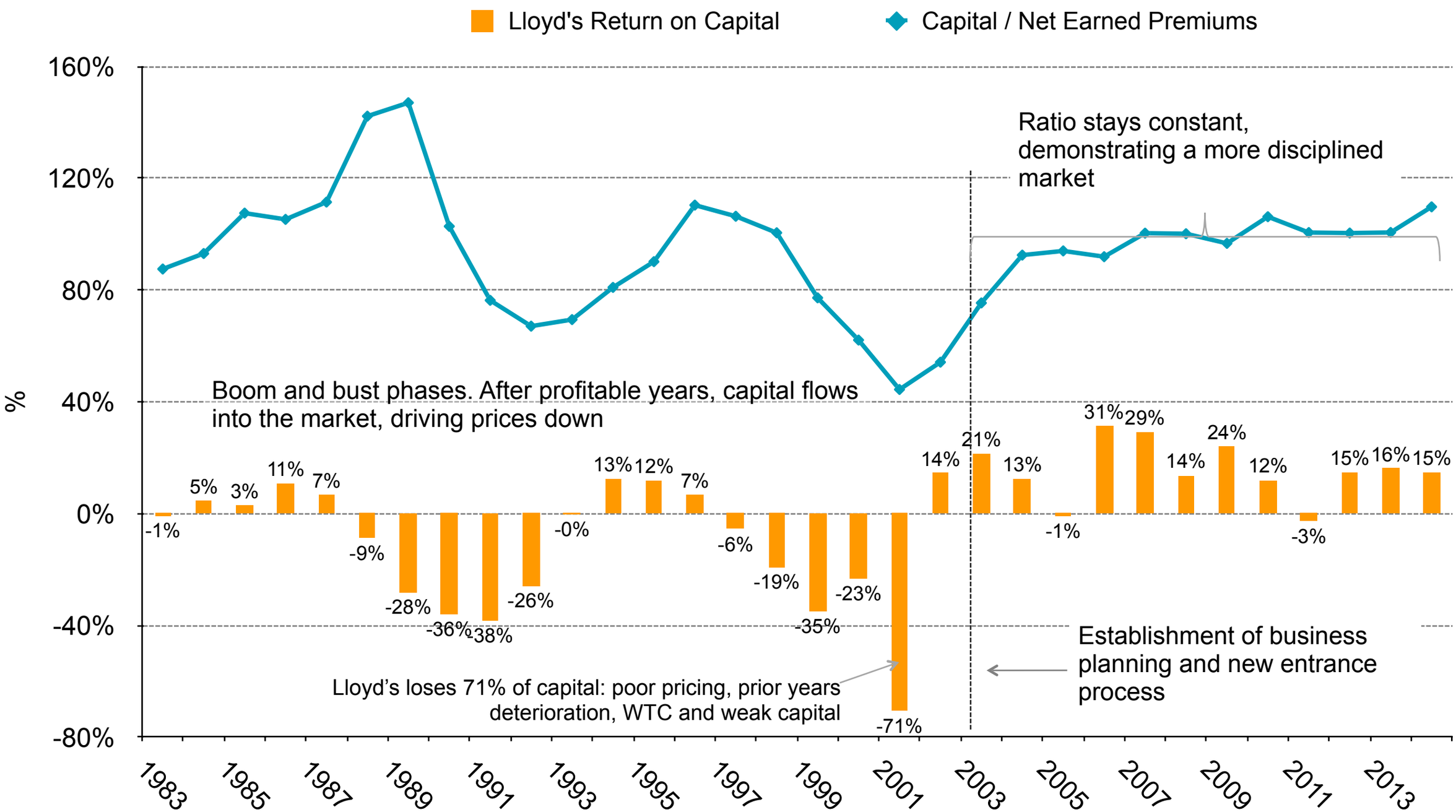
Lloyd’s historical results 1950 - 2014



Major losses: Hurricane Betsy (1965), 1974 Super Outbreak 148 tornados in one day, Piper Alpha (1988), Hurricane Hugo (1989), the San Francisco Earthquake (1989), Exxon Valdez (1989) North European storms (1987 and 1990), Typhoon Mireille (1991), Hurricane Andrew (1992), Northridge Earthquake (1994) , WTC (2001), Hurricanes Charlie, Francis, Ivan (2004), Hurricanes Katrina, Rita, Wilma (2005), New Zealand, Chile Earthquake (2010, New Zealand, Japan Earthquake, Thailand Flood (2011)

Source: Lloyd's Annual Reports, Statistics relating to Lloyd's 2001; Lloyd’s data for 1950 – 1999 on three year accounting (assuming written=earned premium and 18% brokerage), and from 2000 onwards on annual accounting basis.

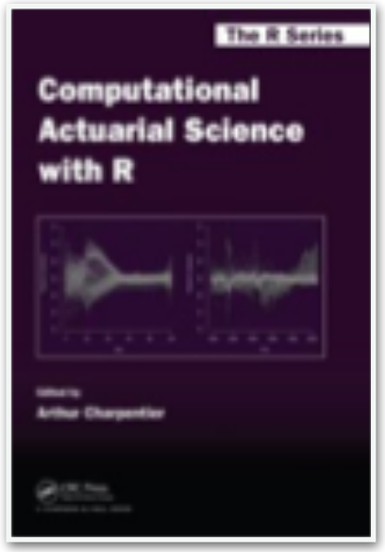
Lloyd’s return on capital 1983 - 2014



Source: Lloyd's Annual Reports, Statistics relating to Lloyd's 2001; Lloyd’s data for 1983 – 1999 on three year accounting (assuming written=earned premium and 18% brokerage), and from 2000 onwards on annual accounting basis. Capital = Total Net Resources of the Society of Lloyd’s and its members less subordinated debt

Conclusions

- We often underestimate risks:
  - Demonstrated by the gap between economic and insured losses and the boom and bust cycles of the insurance industry
- However, the scientific method can help:
  - Start with a business plan / model and rigorously monitor planning assumptions and take actions early



The End

Contact:
Markus Gesmann
markus.gesmann@lloyds.com
www.magesblog.com