GIRO Conference and Exhibition 2012
Juggling uncertainty the actuary’s part to play

20th September 2012

Will science brake the Pricing Cycle?
Phil Ellis & Graham Fulcher

© 2012 The Actuarial Profession • www.actuaries.org.uk
There is a spectrum of belief

We are all somewhere between:

**Total Believer**
- New science will save us
- Cycles will be a thing of the past

**Total Sceptic**
- Nothing has changed at all
- Cycles will be here for ages yet

Heard it all before …
Dozens of false dawns already …

**Insurance industry history**
- Regular pronouncements about “beating the cycle”
- Over very many years
- Experience consistently proved otherwise
  - To date at least
- Are we REALLY better than our fathers (and mothers)?
Sciences and Cycles – It can be done

When it works
• Limited science to date
• Predictable and objective
• External factors minimised

The challenges
• Science has been around for years
• Competition and competitors cheating
• Crashes & weather

There are many other examples …

You may not recognise this man
Some clues … he’s not …
• Roger Taylor
• Mark Cox
• Buster Mottram
• Jeremy Bates, John Lloyd,
• Andrew Castle, Chris Wilkinson,
• Tim Henman, Greg Rusedski, …
“76 years of hurt …”

Major Global Cause: Capacity constraints

Cycle turns historically always driven by capital impairment

- Capital higher and companies greater diversified
- Perception of impairment a driver
- Less severe upturns
- More mini-cycles
Cycles not always a problem? Under-price & Payback can work

- Arguably makes sense
  - eg Airlines & Japanese property

Cause Reducing(?): Uncertainty of costs

Driving through the rear view mirror
- Naïve rate making
- Institutional lags (accounting, regulatory, rate filing)
- Estimation errors
But even a clear model may not help a lot

... *Une reprise from Phil's 2010 GIRO talk*

---

**The Drake equation**

- \( N = N^* \times f_p \times n_e \times f_l \times f_i \times f_c \times L/T_g \)
  - Billions of stars, but rare life
- Model first proposed in 1961, not seriously improved since
- Drake's original result was 10
- Current "plausible" estimates include 2.1, 6.5*10^-5, 2*10^4
- Actuaries must price, capitalise for and reserve "binary events"
  - even with a "sound model", usefulness may be limited!

---

*Note: Wikipedia now (14 Sept 12) says original estimates were 10^3 to 10^8 and shows "possible estimates" as 8*10^-20 and 2*10^9*

---

Science hasn’t helped personal lines much?! 

Consider UK motor insurance
- Sophisticated modelling
  - Multi-factor GLMs
  - Pricing elasticities
  - etc, etc
- Early-adopter advantage
- Now science is essential
  - except perhaps the most comfortable niches

Arguably: Cycle persists, margins just thinner for everyone
Cause Persisting: Competitive factors

Greater ease of price discovery and switching

Aggregate effect of winners curse on profit
\[ \xi(N) * \beta * \sigma(X) * \sqrt{1 - p(X)} / N \]

Independent of
- Volatility of claims
- Correlation between claims and estimates

Depends on
- Volatility of estimates
- Correlation between estimates of competitors
- Susceptible to rogue/uninformed competition

Some science can be dangerous (or just wrong)

- Capital Allocation for Pricing
  - Perennial Ellis hobby horse
- I doubt the sense
- And it can be badly applied
- A likely failure in hindsight (!)

Ref: Bernhard Bergman papers

I'm not that convinced by string theory either …
Cause Reducing: Market structure

Ease of uninformed entry
- ORSA
- Cost of the scientists
- Franchise board

Difficulty of rational exit
- Sidecars
- Hedge funds

There is a spectrum of belief

**Total Believer or Total Sceptic?**

- *Graham & Phil's view:*
  - Science won't **break** the cycle
    - It's here to stay
  - But might well **brake** it
    - Not as severe
    - Classes more dislocated
    - Fewer, more extreme causes

- **What do you think?!**
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 presenters.