



Future of Cat Modeling ***Our Current Market***



Gero Michel
Reinsurance Bermuda

Modeler's Hippocratic Oath

***“I will never sacrifice reality for elegance
(without explaining why I have done so)”***

***“Strategy is becoming,...
the art of managing assets that one does not own”
Marko lansiti and Roy Levien (2004)***

Open Source

Do we need to Change Cat Analytics?

We need a platform that is capable of

- Communicating,
- Validating, Optimizing, Scenario/Stress Testing
- Risk Assumptions and Risk measures
- Across all relevant/available Science/Knowledge
- Using standard and open-source data formats and basic open source codes
- Allowing implementation of wide ranges of public and proprietary tools that is
- Managed Appropriately and Sustainably

TOO HIGH COSTS FOR A NON-
Unique & Complex Process

1950

1970

1990

2010

Date of Introduction

Rethinking Cat Reinsurance Analytics

- ❑ Depressed Stock Multiple, Rating & Reputation (Volatility & Systemic Risk)
- ❑ Underwriting Cycle Out of Phase with Hazard Cycle & Change?
- ❑ Create Markets: 65% GDP ~ 95% Insurance
- ❑ Heuristics & Decision Making Under (Un)Certainty
- ❑ Loading for the Unknowns: Adverse Selection?
- ❑ Inform “Local with Global” and Vice Versa

The Reinsurance Market Needs Change?

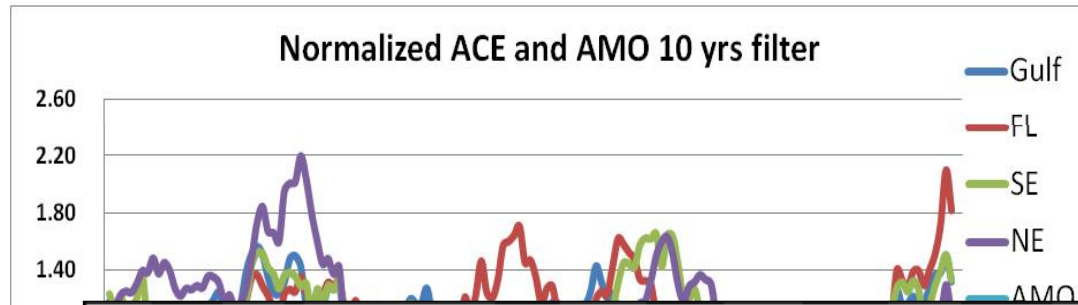
The Reinsurance Market has Been Successful Despite Some Investment and Nat Cat Losses

- ❑ With average ROEs at 10-20% over the last 6 years, moderate beta-values at 0.4 - 0.9
- ❑ Significant surplus growth

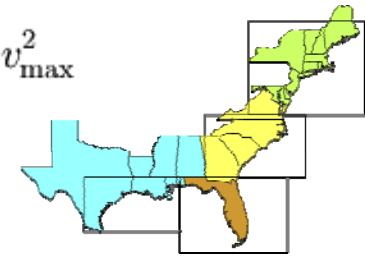
However...

- ❑ Depressed Market Price to tan. Book Values: average ~0.94 (S&P500: 5.6)
- ❑ Deemed Lower for Cat-Only Companies!

Underwriting Cycle vs. Hazard Cycle



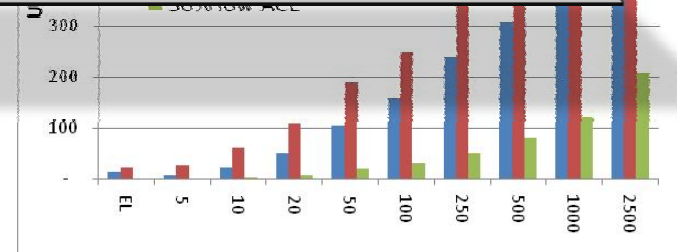
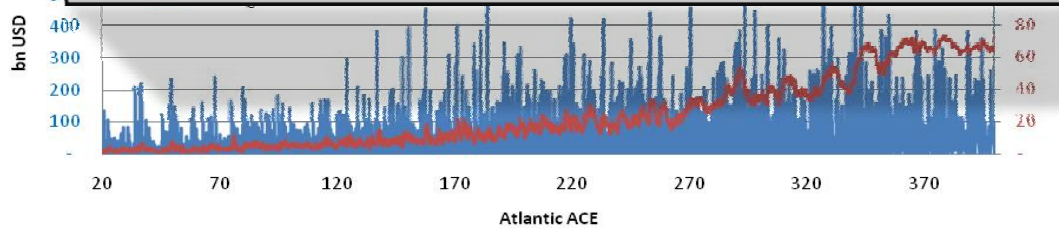
$$ACE = 10^{-4} \sum v_{max}^2$$



Q-Q FL 10ky

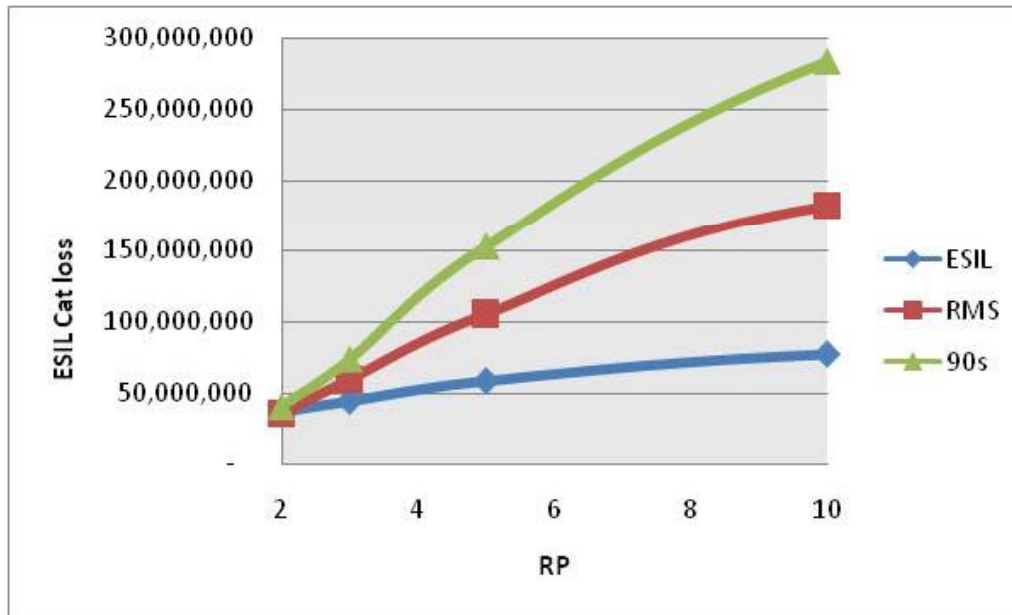
Hist vs ACE 150y

Katrina is a 1/11 in 30% high active & 1/5 in 2005 year
Katrina becomes a 1/250 in "Andrew Year"
"Knowledge Creates Capital!"



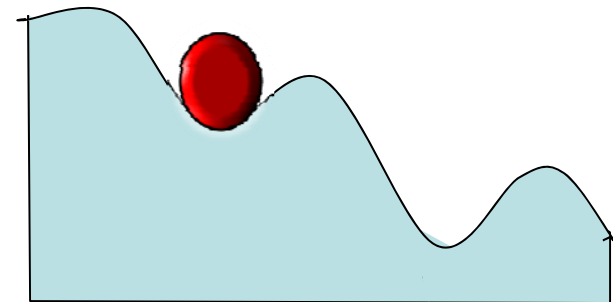
NOAA Hurdal reanalysis: Storms in a box since 1851

European Wind Storms: Risk Regimes – Temporarily Stable States?



International Cat has provided consistent highest returns for our company since 2002.
Can we forecast a change in regime?

Dynamic systems are characterized by varying “temporarily stable states” known as *Regimes*. These varying regimes cannot be modeled using long-term models, but instead require numerical modeling, awareness, forecasting and hedging.



Overcapacity at Low Take-up Rates...

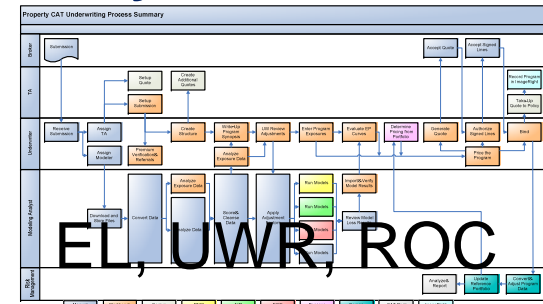
The Philippines and Haiti: Depressing Evidence of Ineffective Global (Re)Insurance?

- ❑ 5 Market Cat Pillars: US, EU, JP, CA, and AU make up 65% of the worlds GDP, but >90% of the current (Re) Insurance business
- ❑ Worldwide average cat “technical” insured loss AAL: 50-60bn dominated by atmospheric perils and US (>60%)
- ❑ Insured/Economic: 45-50% USWS, JPWS, and EUWS, 7%-20% all other perils
- ❑ <1-3% for developing countries

Heuristics: Decision Making under (Un)Certainty?

❑ Inefficient Process?

1. Exposure modeling alone is insufficient
2. EL & ROC, Nutshell numbers guide 80% of our decision

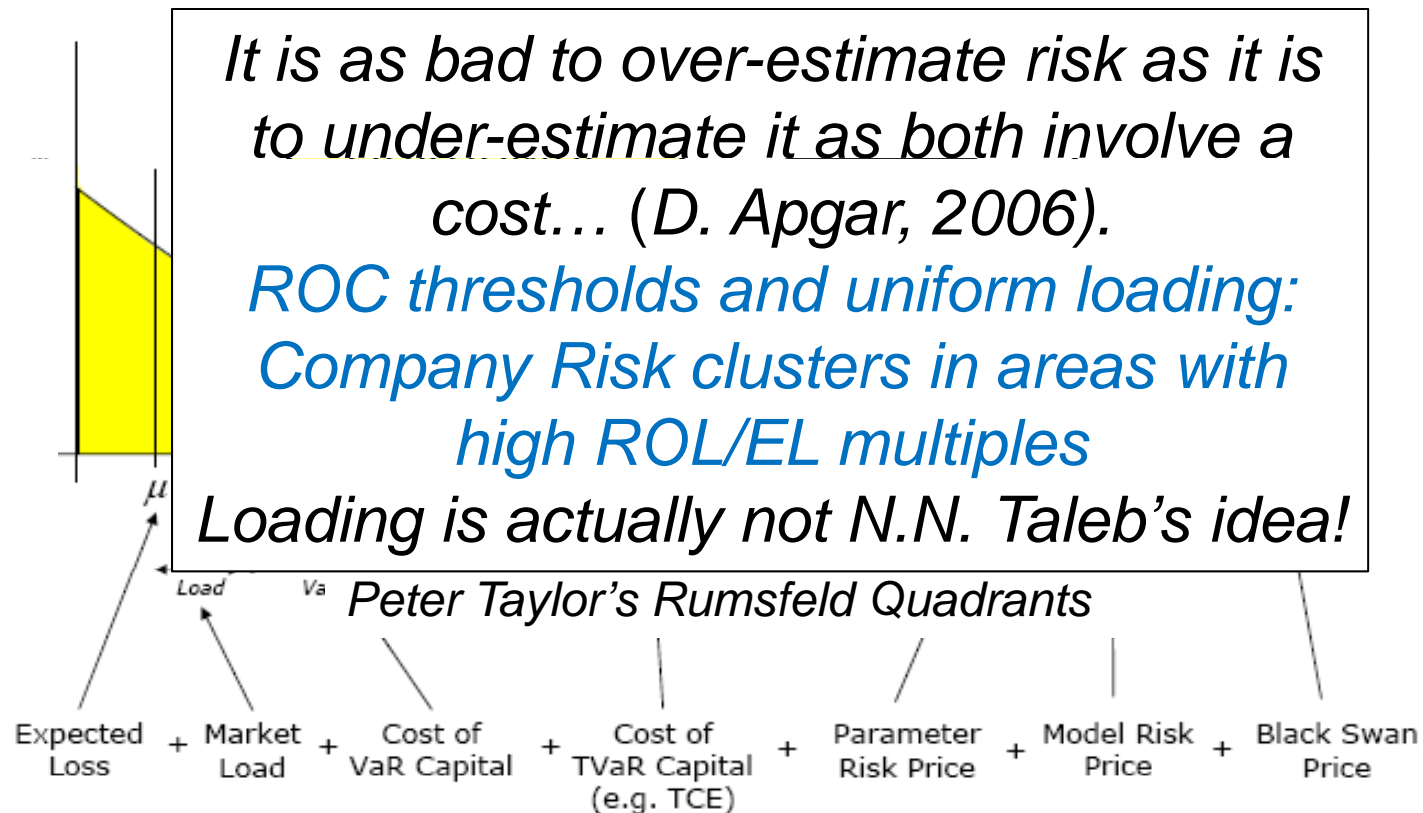


“Collective inductive inference”: we all magically agree in a RP-loss, even without knowing it explicitly from our peers – unless the loss happens

4. Our fear of outsized (larger than peers) loss might be more important than market opportunity, variety of risk results, and accuracy
5. We care about precision rather than accuracy

Loading Creates Adverse Selection? Minimize the Downside!

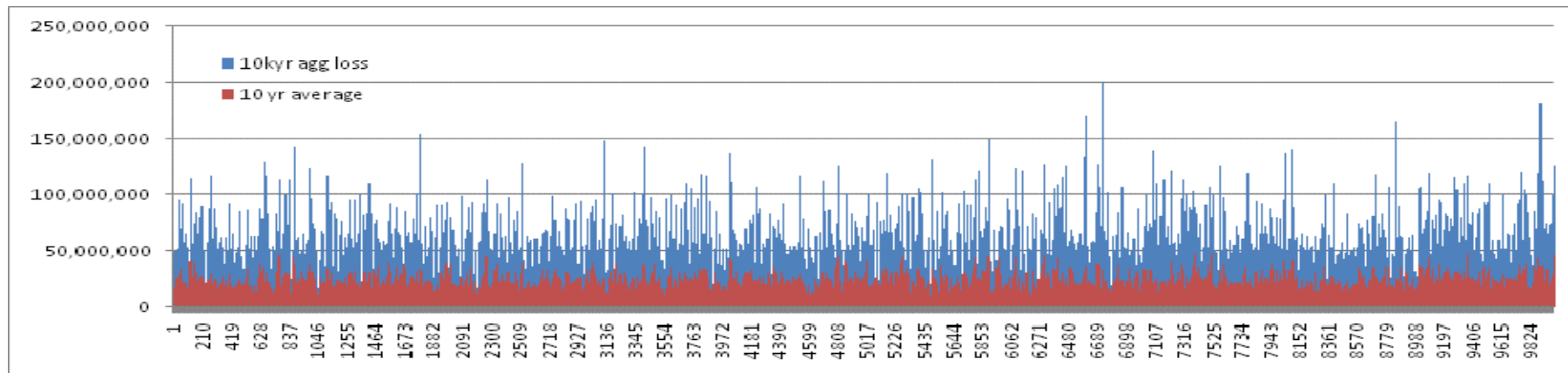
Components of Price



Peter Taylor, 2009

Inform “Local with Global” and Vice Versa

- ❑ Test: Combining all regional EQ models loaded with worldwide exposure resulted in >3 times higher high frequency-low severity losses than those observed
- ❑ We need to learn horizontally (in space) what we might not understand in time
- ❑ We need Global Models!



20x independent equal limit EQ low RoL territories, Max loss: 7 times premium (1/10,000)
 ~90% chance that we know in 10 years whether the model is sufficiently accurate!

Into the Bright Future...

- ❑ Create **Knowledge Economy**: Increase Cat Risk Reputation with Knowledge and Variety, Minimize Systemic Model Risk
- ❑ Promote **Public-Private Partnerships**: Advancement in Science
- ❑ **Differentiate your Business**: Embrace Complexity and Diversity of Results
- ❑ Consider **Forecasting Skills** and Fancy Peer Reviewed Science/Tools
- ❑ **Capital Adequacy** in a World of Changing Risk
- ❑ Rather than Products or Models **Markets**: Understand that Data, Scientific Knowledge, and Modeling Tools are Commodities that add Value if they help Create Markets
- ❑ Consider **Portfolios** Rather than Individual Deals and Inform Global Results Using Local Information and Vice Versa

... like Wal-Mart, Microsoft created ... a platform that a vast number of firms could leverage to increase productivity, enhance stability, and use as building blocks for innovation... (The Keystone Advantage, 2004)