**verisk Analytics**

## Global Data and Analytical Challenges in the 21st Century

CAS Spring Meeting, Vancouver 2013

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## Agenda

- Insurance Landscape
- Actuarial Role
- Analytical Challenges
- Focus on Casualty
- Focus on Property

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## Total Life & Nonlife 2011 Premiums by Country (U.S. $millions)

| Rank | Country | Total Premiums | NonLife Premiums | % Nonlife | % Total World Premiums |
|---|---|---|---|---|---|
| 1 | USA | $1,204,677 | $667,107 | 55.4% | 26.0% |
| 2 | Japan | 655,408 | 130,741 | 19.9 | 14.3 |
| 3 | UK | 319,553 | 109,486 | 34.3 | 7.0 |
| 4 | France | 273,112 | 98,359 | 36.0 | 5.9 |
| 5 | Germany | 245,162 | 131,292 | 53.6 | 5.3 |
| 6 | P.R. China | 221,858 | 87,319 | 39.4 | 4.8 |
| 7 | Italy | 160,514 | 55,426 | 34.5 | 3.5 |
| 8 | South Korea | 130,383 | 51,223 | 39.3 | 2.8 |
| 9 | Canada | 121,213 | 69,045 | 57.0 | 2.6 |
| 10 | Netherlands | 110,913 | 79,722 | 71.9 | 2.4 |

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## Actuarial Role Outside US
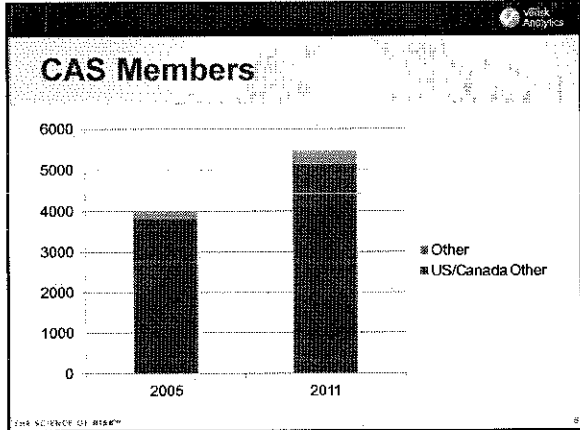
**Historically**
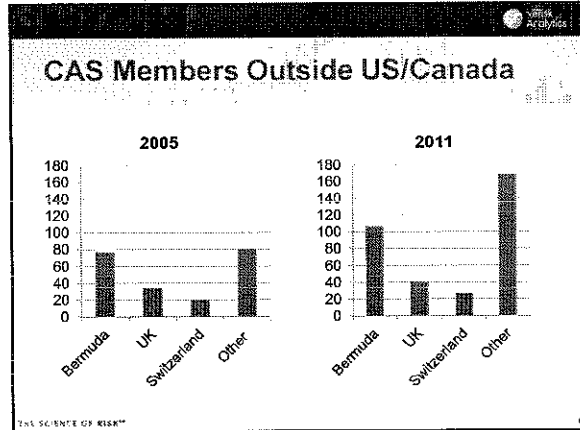- Focus on Reserving

**21st Century**
- Regulatory focus on capital adequacy & risk evaluation– Solvency II
- Acceptance of Cat Modeling Globally
- ERM

**Recent**
- Need for technical price – not just underwriting price
- Increase in number of actuaries in pricing role
- *Need for Data and Analytics!*

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## CAS Members

Legend:
- Other
- US/Canada Other

Years: 2005, 2011

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## CAS Members Outside US/Canada

**2005** and **2011**

Categories: Bermuda, UK, Switzerland, Other

## Quote from Catlin Group Casualty Actuary

"Global casualty pricing is straightforward, ☺

you only need to consider how the legal, social & cultural differences in approximately 200 different environments may affect the base rates and ILFs.

Also, don't forget to allow for different currencies and exchange rate fluctuations. And inflation. And wordings.

And possible changes in legal trends & political influence after elections.

And availability of data.

Oh and different languages, that can make things tricky."

WARNING
CHALLENGES

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## Analytical Challenges

| Legal, Social Cultural | • Litiguousness • Jury Awards • **Need local knowledge!** |
| Currency/ Exchange Rates | • Need to match premiums & losses • Handling of emerging losses |
| Wordings/ Coverages | • Coverage/exclusion differences • Unlimited liability • Defense costs |

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## Global Litigation Rates

| Country | Cases per 1,000 Population in 1998* |
|---------|------------------------------------|
| Germany | 123.2 |
| Sweden | 111.2 |
| Israel | 96.8 |
| Austria | 95.9 |
| USA | 74.5 |
| UK | 64.4 |
| Denmark | 62.5 |
| Hungary | 52.4 |
| Portugal | 40.7 |
| France | 40.3 |

* From Christian Wollschlager "Exploring Global Landscapes of Litigation"

## Global Litigation Comparison

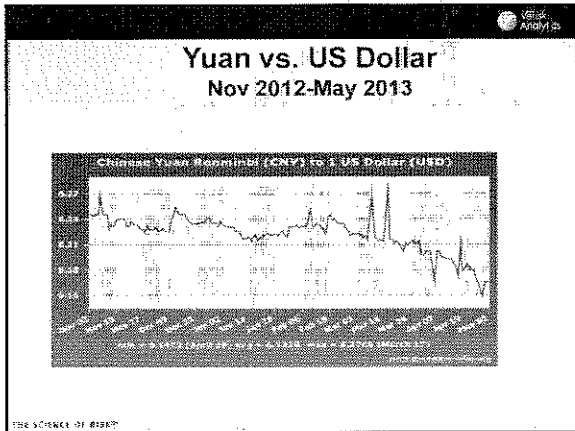| Country | Litigation Cost as % of GDP | Loser Pays? | Class Action Mechanism? | Civil Jury Trials? |
|---|---|---|---|---|
| USA | 2.2 | no | yes | yes |
| Canada | 0.8 | yes | yes (in some provinces) | yes (in some provinces) |
| UK | 0.7 | yes | no | Almost none |
| Germany | 1.1 | yes | no | No |
| France | 0.7 | yes | no | No |
| Australia | 1.1 | yes | yes | Yes (in some states) |

* 2008 Civil Justice Report by Marie Gryphon "Greater Justice, Lower cost: How a "Loser Pay " Rule Would Improve the American Legal System"

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10

### US Dollar vs. Euro
### 2008-2013
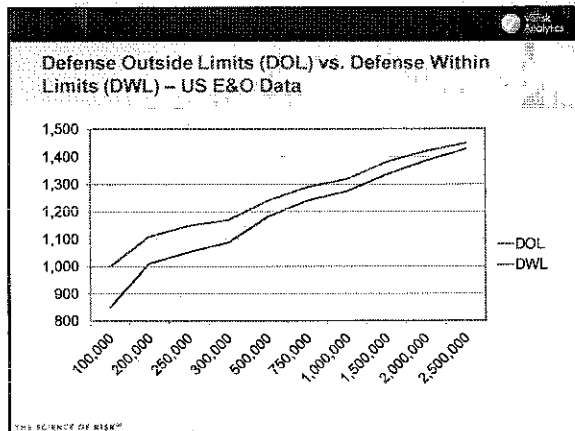


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### US Dollar vs. British Pound
### 2008-2013



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4

## Yuan vs. US Dollar
### Nov 2012-May 2013

Chinese Yuan Renminbi (CNY) to 1 US Dollar (USD)
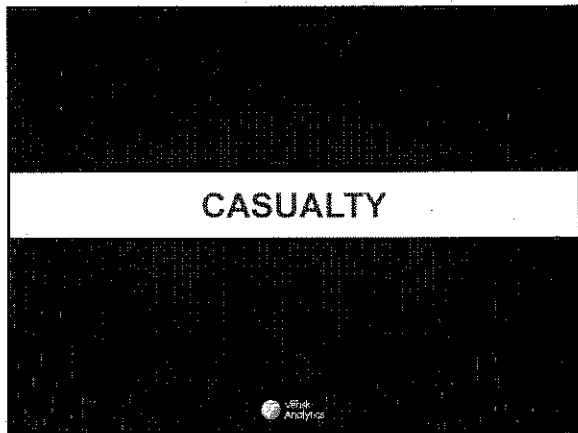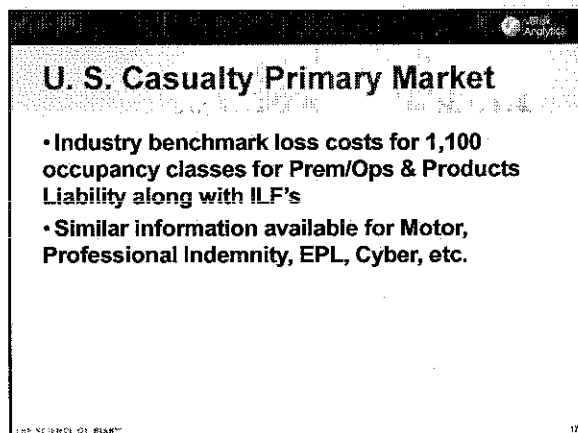
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## Example of Wording/Coverage Differences
### "U.S. Defense Costs"

•Standard CGL policies have defense costs outside policy limits

•For some lines (D&O, E&O) , defense costs are within limits or even offer both scenarios depending on market conditions

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## Defense Outside Limits (DOL) vs. Defense Within Limits (DWL) – US E&O Data

Y-axis: 800, 900, 1,000, 1,100, 1,200, 1,300, 1,400, 1,500

X-axis: 100,000 200,000 250,000 300,000 500,000 750,000 1,000,000 1,500,000 2,000,000 2,500,000

Legend: DOL, DWL

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## CASUALTY

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## U. S. Casualty Primary Market

• Industry benchmark loss costs for 1,100 occupancy classes for Prem/Ops & Products Liability along with ILF's

• Similar information available for Motor, Professional Indemnity, EPL, Cyber, etc.

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## Primary Pricing Models

| Scenario #1 | Scenario #2 | Scenario #3 |
|---|---|---|
| • Risks located outside the U.S. with local risk exposure | • Global portfolios with risks in many countries incl./excl. U.S. | • Risks outside the U.S. with Products Liability exposure to U.S. |

Actuaries building internal models to develop technical pricing benchmark that local underwriter can use

## UK Liability Combined Ratios*

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Accident Year combined ratio | 106.4 | 106.9 | 108.6 | 113.8 | 118.0 |
| Calendar Year combined ratio | 97.4 | 108.1 | 104.7 | 106.7 | 108.7 |

* Based on FSA returns for all firms – A.M. Best Co.

**Possible Reasons Include:**

- Weak premium rates
- More litigious claim environment
- Claims due to financial crisis & economic downturn
- Difficulty in predicting claim trends for long-tail lines

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## Methodology for Primary Casualty

U.S. Benchmark industry loss costs

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Analysis of own portfolio data + local knowledge

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Develop adjustment factor for local market to create modified benchmark

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## Global Casualty Excess/Reinsurance Pricing

- **European ILF Method**
  - Rule of thumb is that CSP's to higher layers are a factor of 1+x:
    - if limit = $2M then assume cost = ( 1+x) * cost for $1M limit
    - if limit = $4M then assume cost = $(1+x)^2$ * cost for $1M limit

- **Parameter is based on expert judgment, not fitting of data**

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## ISO Global Benchmarking Service Initiative

•Initial Focus on Reinsurance/Excess Pricing

•Goal is to export the U.S. Methodology & Modify for International use

•Ideal is to collect non-US data to use along with U.S. curves

•Alternately, can adapt U.S. distributions for international use
- Adjust individual exponential distributions to alter curves
- Adjust the Pareto smoothing method to allow for different Pareto curves over different loss layers

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## ISO (U.S.) Increased Limits Methodology

• Large database used to create Distribution of Losses (Indemnity or Indemnity plus ALAE)
  o Empirical Distribution is Smoothed with Pareto
  o Smoothed Empirical is fit to a Mixture of Exponential Distributions
  o Final product presents a good fit through $10M, and continues to fit the Pareto well through $100M
  o Over 125 different commercial casualty ILF curves

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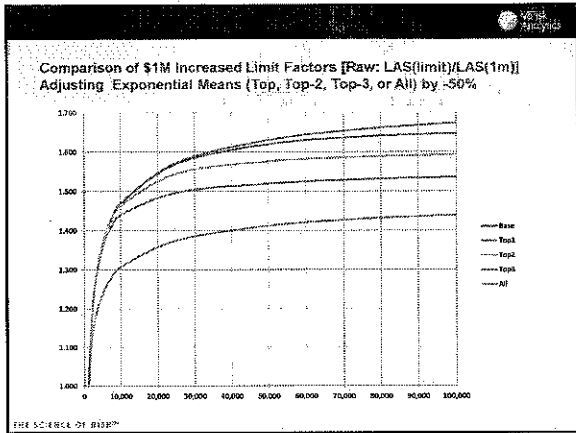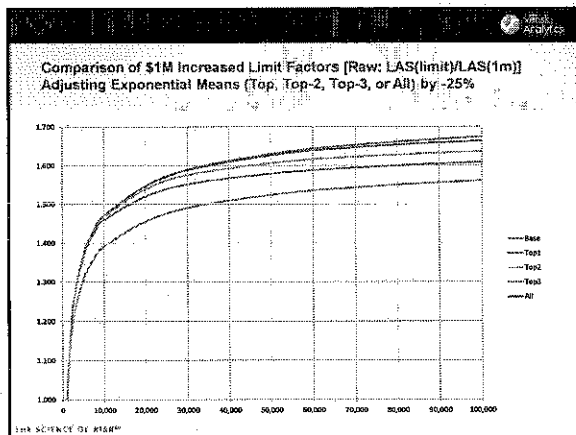## Global Benchmarking Service (GBS) Alternative # 1 Using U.S.-Based Curves

Alternative curves based on percentage adjustments to the exponential means of a sample GL curve:

• adjust top 1, 2 or 3 layers
  o by -50%
  o by -25%

| EXPONENTIAL MEANS |
| --- |
| 2,500 |
| 5,000 |
| 10,000 |
| 50,000 |
| 500,000 |
| 1,000,000 |
| 10,000,000 |
| 25,000,000 |
| 100,000,000 |

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## Global Benchmarking Service (GBS) Alternative # 2 Using U.S.-Based Curves

• Can modify Pareto Smoothing Method above $10M for assumption of less severe curve
  o Example U.S. GL Curve - initial Pareto smoothing begins at $1.6M limit with Pareto Q of 1.40
  o Two alternative curves  - select Pareto Q's of 1.80 and 2.20 to smooth the curve above the $10M limit

Comparison of $10 Million Increased Limit Factors (ILFs)
Fixed Q (1.4 at $1.6M) vs. Second Q (at $10M) of 1.8 or 2.2