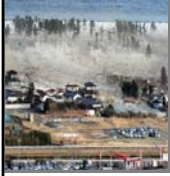


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Pricing Global Risks

Andrew Marcell, Philadelphia

What is a Global Risk?

Five broad criteria for a risk to be "global":

- Global Scope
- Cross-Industries
- Uncertainty
- Economic Impact
- Complexity requires multi-stakeholder mitigation

Two basic types of global risk:

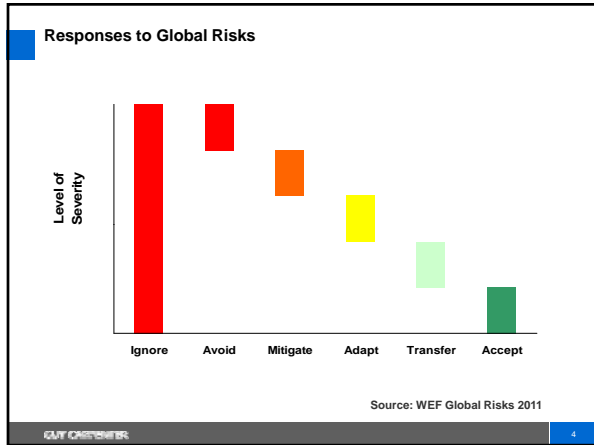
- Chronic
- Event-driven

Top Ten Global Risks

1. Climate change
2. Fiscal crisis
3. Economic disparity
4. Global governance failures
5. Storms and cyclones
6. Extreme energy price volatility
7. Geopolitical conflict
8. Corruption
9. Flood
10. Water security

Source : WEF Global Risk 2011





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**Transfer and Accept:
Using Analytics to Model and Price Global Risk**

MMC Marsh & McLennan Companies

Modeling and Pricing of Event-Driven Risk Property

Guy Carpenter's Global Property Catastrophe Modeling

- GC Analytics's cutting edge research in global frontier such as "GC's detailed hydrodynamic Asia Flood Modeling Capabilities"
- GC's own internal Pan-CEE (Central and Eastern Europe) flood model was developed to address the issue of flood risk on a per country and regional basis
- GC's Business Intelligence unit timely issued report of Tohoku Quake and Tsunami and the challenge and economic impact

iAXS

- is a web-based data and analytical platform
- Delivers customized tools and solutions to aid decision making
- Provides an easy and cost effective way to monitor and manage data

GC Capital Ideas.com

TOHOKU QUAKE AND TSUNAMI

UPDATE: 9.26th Earthquake Strikes off Northeastern Japan

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Modeling and Pricing of Event-Driven Risk Property and Casualty

Considerations on Benchmark Pricing

- MetaRisk: a comprehensive pricing economic model in assessing return vs. risks. Technical aspects are assessed for benchmarking**
 - Uses an investment-equivalency based methodology
 - Sets price to deliver target ROE on contract capital (8% over Risk Free Rate)
- Cost vs. benefits on profitability**
- Risk transfer analysis: what is the efficient frontier of risk vs. returns**

Technical benchmark pricing

Pricing of 2012 European Cat of Insurance

Cost/benefit of reduction in public liability

Risk Transfer: Efficient frontier for two-way trade-off comparison

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Modeling and Pricing of Event-Driven Risk Casualty

Guy Carpenter's Global Casualty Modeling

- GC Analytics uses in-depth insight into underlying risk characteristics to develop unique modeling tools for casualty classes of business
- The LEAD model analyses propensity for class actions in D&O
- GC's CasCat is the world's first cat model for assessing the impact on an insurance portfolio of casualty disaster scenarios

LEAD D&O International Pricing Model

Casualty Cat Modeling

LEAD D&O Model Overview
Exploring Underlying Risk Characteristics

LEAD D&O Model Overview

- Model for companies with U.S. SEC registration
- Evaluates over 75 variables in four categories:
 - Market characteristics
 - Financial statement items
 - Governance
 - Trading characteristics
- Regression-based
 - All variables significant at 95% level
 - Eight versions released in 2010, several iterations
 - Revised variable selection
 - Full-Specialized Portfolio (SP) model
 - Re-calibrated severity model

Casualty Cat Modeling

- Supply of goods and services to chemical / industrial gas mfg.
 - All links included
 - Wide range of industry groups
- Large hub and spoke arrangement
 - Centered industrial gas mfg. (D25120), as expected
- With two areas of interlinking
 - One group centered on primary and fabricated metal product mfg.
 - The other around construction, architects & engineers and machinery mfg.

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Assessing the impact of Economic Risk on insurance portfolios

Inflation & Hyper Inflation Risk

MindRisk Reserve Model: A New Model to Assess the Impact of Under-Reserving

- Guy Carpenter's MindRisk Reserve Model helps insurance companies assess their potential exposure to inflation and hyper inflation in less developed in emerging markets
- The model simulates the impact of under-reserving

Currency & Exchange Rate Risk

Global Economic Capital Model

Additional Impact: **credit, operational and reputational risk**

Additional Impact: **Currency & Exchange Rate risk, Investment & Operational Risk**

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Environmental Risks

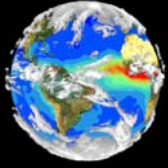
Assessing environmental impact

Issues

- Industrial growth and lack of environmental planning in China, India and developing countries have caused significant damages to the environment
- Less than 1% of China's city population breathe air considered safe by the EU
- The direct and indirect consequences of pollution will impact health, life, various liability lines of insurance business

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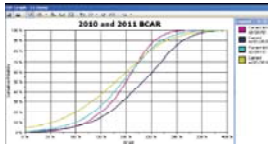


Climate Change

MMC Marsh & McLennan Companies

Assessing the impact of global climate change

- Pricing models will need re-calibration as the impact of climate change becomes better understood
- Potential changes in insurance claims frequency and severity could have a major impact on the cost of natural disaster risk



Scenario	2011	2050
BCAR	100.0	100.0
Frequency	100.0	100.0
Severity	100.0	100.0

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Societal Risks

MMC Marsh & McLennan Companies

Societal Risks

Legal and Regulatory	Sovereign Risk	Demographic Challenges
<p>Examples on GC knowledge banks</p> <ul style="list-style-type: none">• GC publication on "Succeeding under Solvency II"• "Continental European Legislative and Judicial Trends"• "Annuities in Third Party Bodily In jury Claims Settlements in Europe"	<ul style="list-style-type: none">• The risk of capital being locked up or frozen by government action• Inter-related with currency and exchange rate risk, inflation and hyper inflation in the country	<ul style="list-style-type: none">• Litigation and fraud are on the rise in European countries• Rapid economic growth and wealth accumulation at an uneven pace

The impact of social inflation has to be factored in to the cost of risk
