

23 January 2017

Research Showcase: Advisory Board Meeting



Future Directions of the Cambridge Centre for Risk Studies

Centre for
Risk Studies



UNIVERSITY OF
CAMBRIDGE
Judge Business School

Dr. Andrew Coburn

Director of Advisory Board
Centre for Risk Studies

Research Evaluation Framework



McKinsey&Company



“ We consider CCRS a world class organisation in the theory and application of risk analysis and value their conferences, publications and thought leadership... ”

“ [The CCRS report] has underpinned the extension of Pool Re’s coverage to include cyber terrorism. ”

“ Partnering with CCRS on some of the world’s greatest and most complex risks allows us to develop our own view of risk based on the most expert of analysis... ”

“ ...one of the leading thinkers in the emerging threat area of cyber... ”

- Research institutions at University of Cambridge are evaluated on the ‘Impact’ of their research output - how publications have influenced business decisions
- We have been reaching out to our research partners to ask for testimonials of our business impact

Research Focus for 2018

Impact of research on business decisions

- Improve our understanding of how our research outputs are used by private sector organizations
- Optimize research outputs to maximize their influence
- Make outputs accessible in more useable formats

Areas of Research Focus 2018



Integrated Risk Assessment

Multi-threat Cambridge Risk Framework, scenarios, risk indexes, emerging risks, and their application to business decisions.



Risks and the Digital Economy

Cyber risk and risks inherent in the growth of the digital economy, exploring social, political, and economic dimensions of the proliferation of big data and AI.



Risky Futures

Trend risks and business decisions

Risks resulting from longer term changes to the environment, society, and business, and how businesses should prepare for these potential outcomes



Understanding Corporate Risks

Aligning research activities and outputs to business decisions in organizations, and applications in improving risk management practices and business strategy.

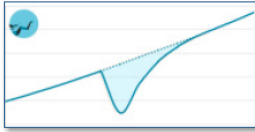


Integrated Risk Assessment

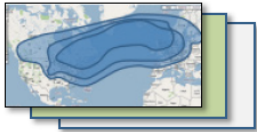
Threat Maps



Risk Models
& Output Data



Scenarios



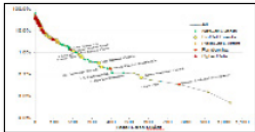
Software Platform
(Cambridge Risk Framework)



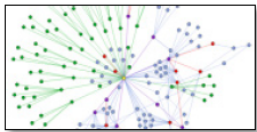
Exposure Data



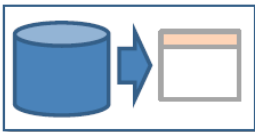
Use Cases
Business Applications



Network Models



Private Portals
APIs & Modelling Interfaces



- Improving the Cambridge Risk Framework to make it useful in business decisions
 - Improving granularity, precision, and confidence in assessments
- Enterprise Risk Management: Integrating external shock risk into internal risk management for organizations
- Identifying insurance opportunity
 - Completing multi-line insurance exposure data schemas to operationalize scenarios on portfolios

Making Scenarios More Useful: CCRS Evolution

2013



2014



2015



2016



2017



Class	Line of Business	Class	Line of Business
Property	Personal Lines/Homeowner 4	Marine & Specie	5
	Personal Contents 4	Marine Hull 5	
	Commercial Combined 5	Marine Liability 3	
	Construction & Engineering 3	Specie 4	
	Commercial Facultative 5		
	Binding Authorities 3	Aerospace	
Casualty	Workers Compensation 5	Airline 5	
	Directors & Officers 4	Airport 4	
	Financial Lines 4	Aviation Products 3	
	General Liability 4	General Aviation 2	
	Healthcare Liability 5	Space 4	
	Professional Lines 3	Energy	
Auto	Personal Lines 4	Downstream 1	
	Commercial & Fleet 5	Energy Liability 4	
		Onshore Energy & Power 5	
		Upstream 3	
		Specialty	
		Accident & Health 5	
		Aquaculture Insurance 1	
		Contingency - Film & Event 1	
		Equine Insurance 1	
		Errors & Surplus 0	
		Life Insurance 4	
		Livestock 3	

Insurance industry loss estimate and Line of Business scorecard



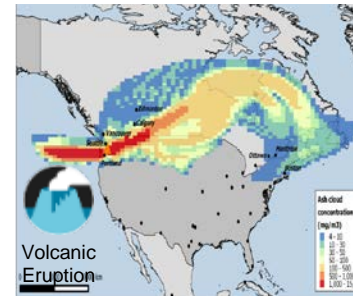
Published calculations for portfolio-specific loss estimation



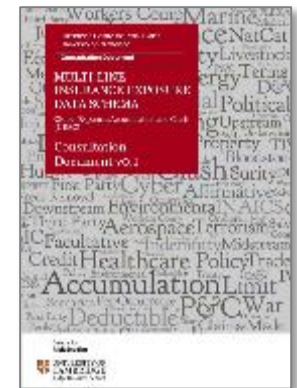
Leakomania Accumulation Scenario

	Premier	Scenario	Small
Information Technology - Software
Information Technology - Hardware
Information Technology - Services
Retail
Financial Services - Banking
Financial Services - Insurance
Financial Services - Investment Management
Healthcare
Business & Professional Services
Energy
Telecommunications
Utilities
Tourism & Hospitality
Manufacturing
Pharmaceuticals
Defense / Military Contractor
Entertainment & Media
Transportation / Aviation / Aerospace
Public Authority / NGOs / Non-Profit
Real Estate / Property / Construction
Education
Mining & Primary Industries
Food & Agriculture
Other

Scenario loss calculations as SQL queries

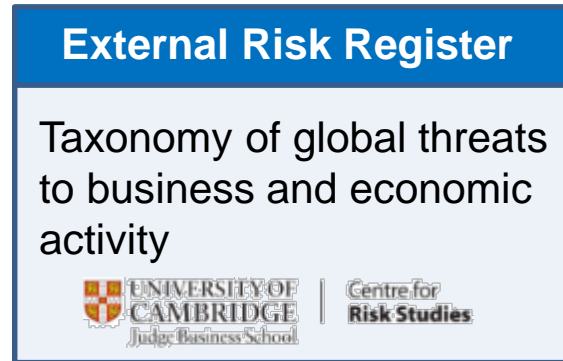


Loss Models on Pandora Platform



Scenario Best Practice Guide and Multi-Line Exposure Data Schema

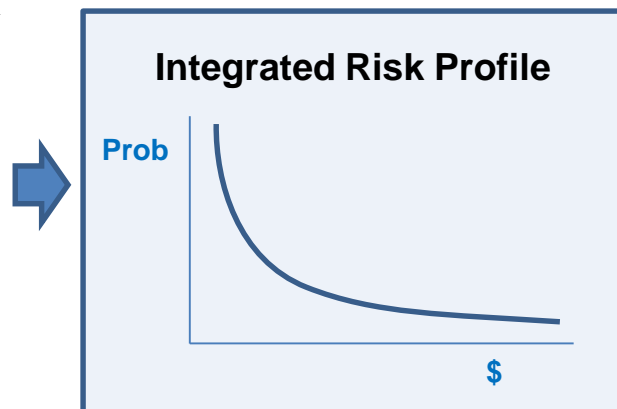
Combining Internal Risks with External Risk Register



Company-Specific Inputs

Outputs and Applications

- Business Network
 - Locations and revenue sources
- Activity Matrix
- Scenarios from internal risk register



- Annual report risk declarations
 - 10K and other reporting
- Regulatory risk reporting
 - Long term viability statements
- Insurance purchasing strategy
- Crisis and continuity management
 - Management stress tests
- Emerging risk monitoring and stress test design
- Monitoring of risk metrics for business units

Integrated Risk Assessment

Potential Research Topics

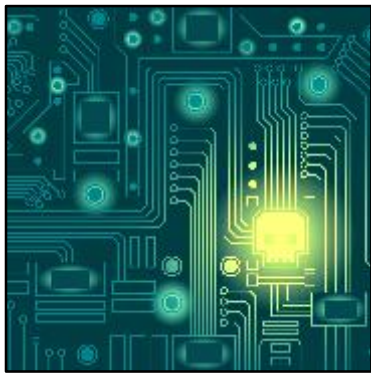
- Improving the core analytics in Pandora
 - Granularity, completeness, and sectoral coverage
- Understanding ‘resilience’ and recovery economics
- Data standards for risk profiling of organizations
- Developing risk indices and benchmarking
- Identifying insurance opportunities
 - Mapping insurance exposure to threats, geographies, and coverages
- Profiling and managing the external risks of an organization
 - Integrating internal risk register with external risk information
 - Corporate ‘risk accounting’; 10K reporting; which divisions are riskiest?
 - How does an EP curve help with corporate decision-making?
 - Risk assessment of Supply Chains
 - Assessment of Counterparty risk
- Municipal risk management for major cities

Integrated Risk Assessment

Maximizing the Impact of Research Outputs

Which types of Research Outputs will help with business decisions?

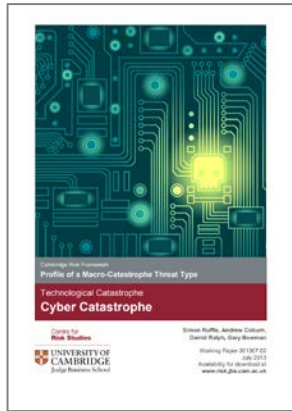
- Operational risk and crisis management
- Threat Assessments for Key Facilities
- 10K and Long Term Viability Statements
- Risk Accounting – attribution of risk to departments
- Cross Balance Sheet Analysis
- Insurance purchasing optimization tools



Risks and the Digital Economy

- Taking CCRS cyber risk research to the next level
 - Improving assessment of cyber risk
- Measuring cyber threat trends
 - Moving from the anecdotal to the quantification
- Integrating cyber risk analytics into risk management for organizations

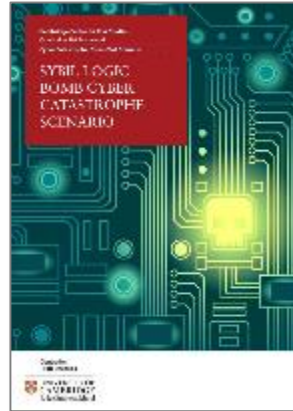
Five Years of Cyber Risk Research



2013

Cyber Catastrophe Threat Monograph

Research into cyber threat and its potential to generate systemic shocks to the global economy



2014

Sybil Logic Bomb Stress Test Scenario

Development of a stress test scenario for an algorithmic cyber event that causes systemic loss



2015

Business Blackout CNI Scenario

Exploring potential for cyber attacks against critical national infrastructure



2016

Exposure Data Schema and Accumulation Risk

Cyber accumulation risk management and models of cyber loss to support the growth of cyber insurance



2017

Cyber Risk Landscape Monitoring

Monitoring changes in the cyber risk landscape and its application to terrorism and other societal issues

Risks and the Digital Economy

Potential Research Topics

- Quantification of cyber risk
 - Assessing probabilities for cyber loss
 - Potential for systemic cyber catastrophes
 - Developing indices to track cyber threat
- Emerging issues in digital risk management
 - Cryptocurrency risks and financial services
 - Implications of Quantum Computing
 - Risks in the 4th Industrial Revolution: AI and social disruption
- Understanding the motivations and capabilities of cyber threat actors
- Managing cyber terrorism
- Regional & global dimensions of cyber risk
 - Geopolitical risk and cyber warfare
 - Geography and Cyber Space
 - SE Asia and regional hubs of cyber expertise
- Strategic investment in cyber security in your company
 - The value of different components of cyber security
 - Managing exposure to your cyber counterparty supply chain
 - Managing the insider threat

Risks and the Digital Economy

Maximizing the Impact of Research Outputs

Which types of Research Outputs will help with business decisions?

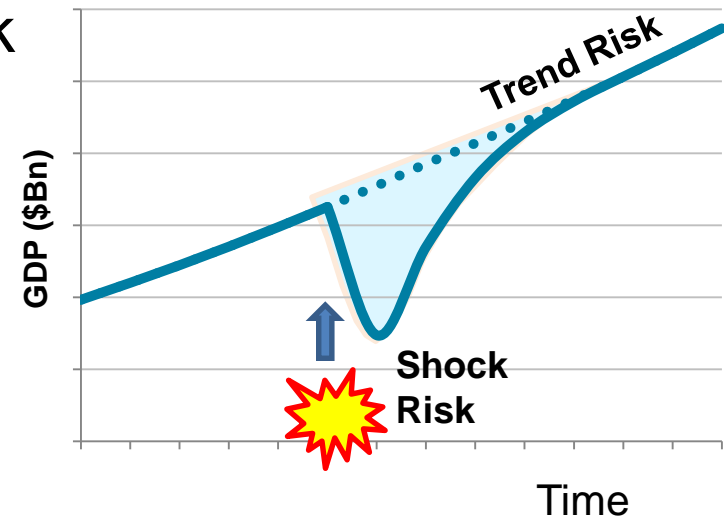
- Cost-benefit analysis of security spend
- Data attributes and toolkits needed for better analysis
- Cyber threat indices, alerts, and triggers that can be applied to risk management decisions
- Information dissemination and helping organizations learn more about the threat



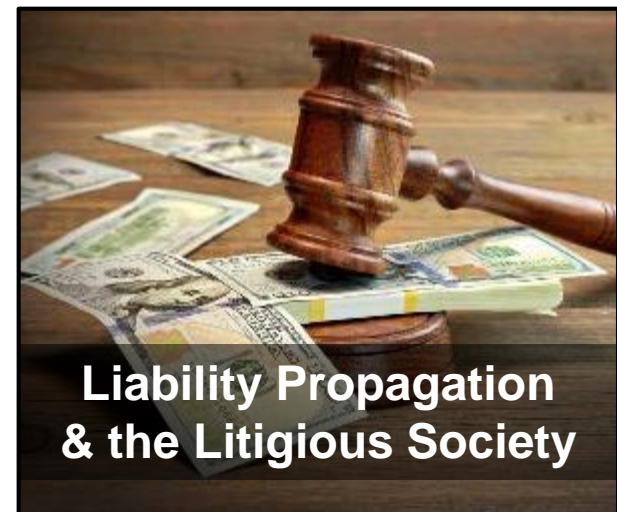
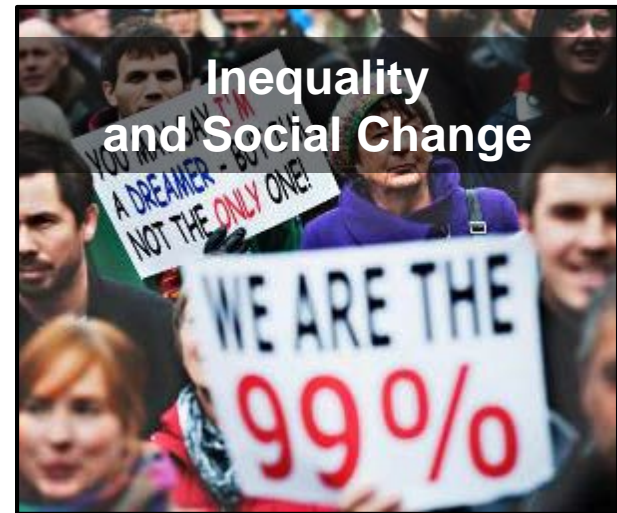
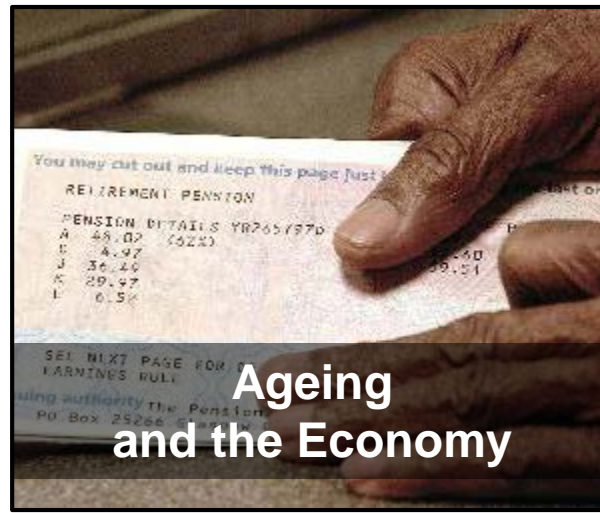
Risky Futures

Trend Risks and Business Decisions

- CCRS focus has been on shock risk
- Trend risk is equally important
- We are increasingly being asked to consider business risks that come from potential trends
- Businesses are struggling to understand how to prepare for future changes in their core assumptions



Risky Futures



Maximizing the Impact of Research Outputs

Which types of Research Outputs will help with business decisions?

- Communication and lobbying policy-makers
- How to help companies build these potential futures into their contingency planning
 - What kinds of investment decisions are needed?
 - How do you invest in optionality in case risky futures arrive?
 - How do you optimise decisions under deep uncertainty?
- Change management – anticipating problems

Research Themes for 2018



Integrated Risk Assessment

A

Multi-threat Cambridge Risk Framework, scenarios, risk indexes, emerging risks, and their application to business decisions.



Risks and the Digital Economy

B

Cyber and risks inherent in the growth of the digital economy, exploring social, political, and economic issues of the proliferation of big data and AI.



Risky Futures Trend risks and business decisions

C

Risks from longer term changes to the environment, society, and business, and how businesses should prepare for these potential outcomes



Understanding Corporate Risks

Aligning research activities and outputs to business decisions in organizations, and applications in improving risk management practices and business strategy.

The Year Ahead

- We intend to focus on research outputs that maximize their impact on business decisions
- We will adapt research on **Integrated Risk Assessment** to explore the impact of EP curves on organisation's risk management decisions
- For **Risks and the Digital Economy** we will identify ways to help businesses assess their cyber security strategies
- We will structure views of **Risky Futures** that can help organisations optimise their contingency planning

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