

Cambridge Judge Business School

Cambridge Centre for Risk Studies 2018 Risk Summit

OVERVIEW OF TREND RISKS: INSIGHTS INTO IDENTIFICATION AND ASSESSMENT

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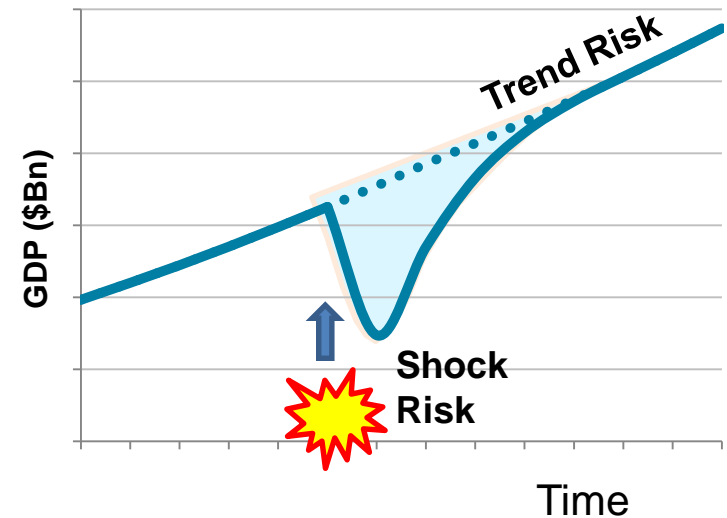
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Risky Futures

Trend Risks and Business Decisions

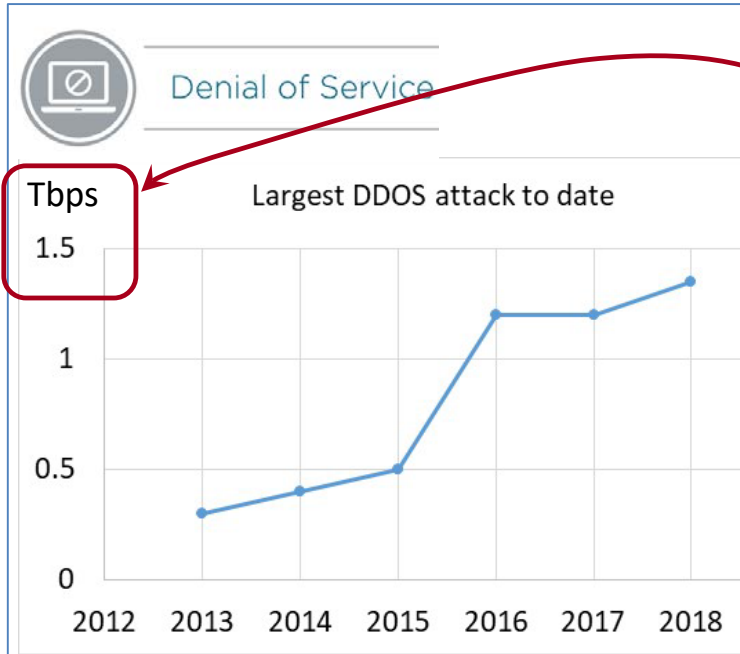
- CCRS has studied and modelled shock risks for nearly a decade
- Trend risk is equally important
- We are increasingly being asked to consider business risks that come from potential trends
- Businesses are struggling to understand how to prepare for future changes in their core assumptions



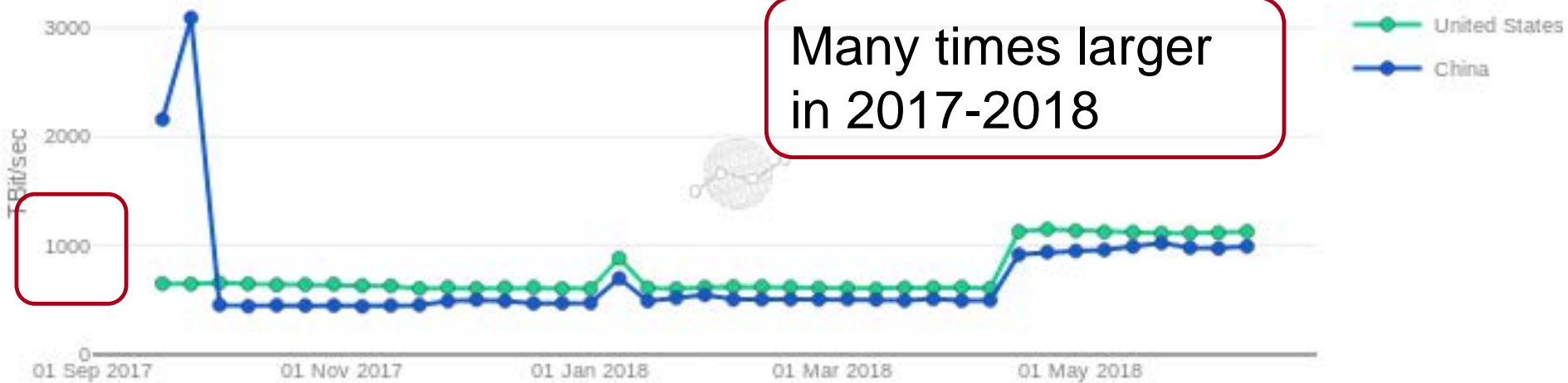
Trend Risk ↔ Emerging Risk

- WEF's 2018 Global Risk Report: A **“trend”** is
 - long-term pattern that is currently evolving ... amplifying global risks...
- **Emerging** risks arising from
 - IRGC: **Unexpected impacts ... in evolving environments or contexts”**
[www.irgc.org/risk-governance/emerging-risk/]
 - Academic: Newly created or identified, **Increasing** [Flage, Aven 2015]
- CCRS identifies a risk as **emergent** as a threat that
 - **That isn't fully recognised** as a driver of catastrophe
 - Whose catastrophic impacts are difficult to assess
 - **Newness or changing nature** of the threat
 - **Complexity**: systemic effects, nonlinear dynamics etc

Case Study: Emergence of Cyber Fear and Loathing



Worst Case Bound: Global constrained rDDoS median potential across IPV4 of 108 Tb/sec as of 2016
[Leverett & Kaplan 2017]



Many times larger in 2017-2018

Potential Capacity for rDDoS in US, China 2017-18

[Leverett 2018]

Scenarios as Management Tools

- Scenario Stress Tests are plausible but extreme narratives
 - Ask: What challenges might my organisation face in future?
 - Derive question from
 - Historical events
 - Counterfactual events
 - Creative thinking: “Imagineering”
 - Sectoral applications of Scenarios
 - Oil & Gas, and corporates for *trends and emergent phenomena*
 - Insurance: Lloyd’s Realistic Disaster Scenarios for *shocks to enterprise*
 - Banking: CCAR Severe Adverse Scenario for *shocks to enterprise*
- Scenario Stress Tests are typically a qualitative approach to quantify “tail risk”

Scenario Planning: Identifying Different Futures



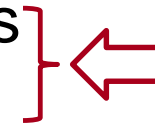
■ History

- Herman Kahn / RAND: scenarios for post nuclear war
- Pierre Wack / Shell: scenarios for strategic challenges



■ Scenario planning

- Decide drivers for change/assumptions
- Combining drivers to generate 2-5 scenarios
 - These are deliberately different / plural
- Use these scenarios to challenge BAU



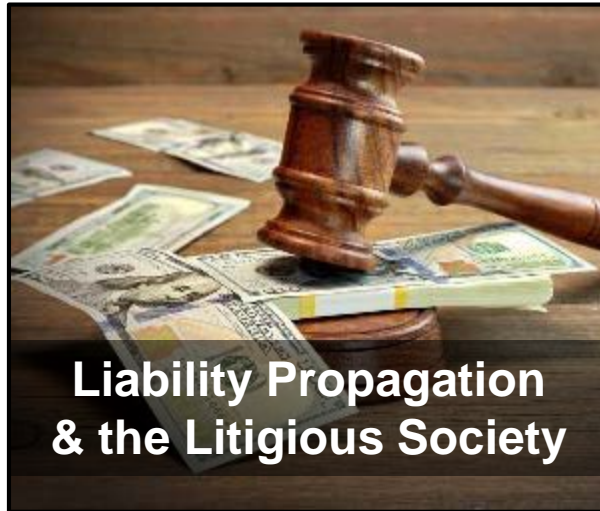
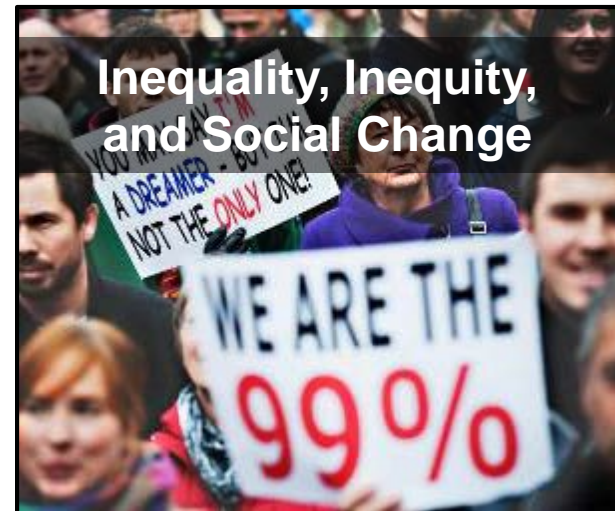
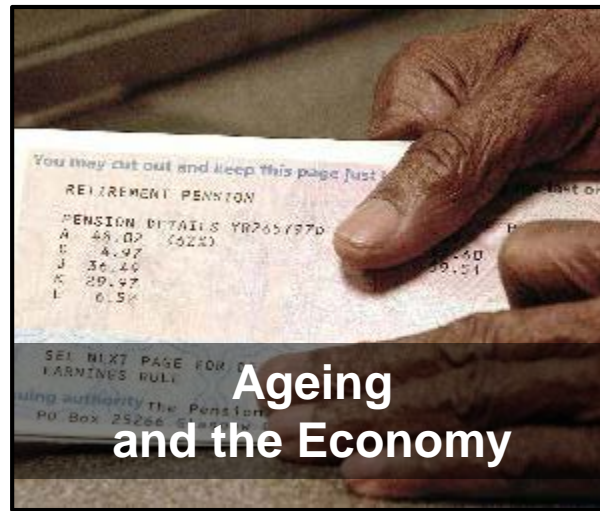
■ Planning the firm's response

- Current state & capabilities
 - Key Success Factor analysis [Schoemaker 2002, Profiting From Uncertainty]

- Different scenarios suggest different evolution paths



Risky Futures – Drivers of Change



Correlated Risk Trends

- Climate & Nationalism are positively correlated
 - Rise in Nationalism hastens Climate Change
 - Climate-related stresses induce social unrest, movement of people and associated geopolitical reactions
- Demographics & Inequality are *fait accompli* in developed economies
 - Are these immutable in developed nations?
 - What about developing economies?
- 4th Industrial Revolution ⇒ Driver of future Inequality
- Liability (visibility) is emergent

Scenarios for Assessing Preparedness and Resilience

Can we combine an analysis of trends and shocks?

Scenario Targets for Preparation & Resilience	Sudden onset	Slow impact
Operational Risk Business Stress Testing	<ul style="list-style-type: none"> • Business Continuity • Asset damage • Performance Impairment 	<ul style="list-style-type: none"> • Competitive advantages erode
Strategic Risk	<ul style="list-style-type: none"> • Credit • Reputational 	<ul style="list-style-type: none"> • Business Model • Innovation capacity • Competition Scenario Planning

Case Study: Global Economic Impact of Climate as Trend Risk

■ CGRI

- 279 cities representing 41% of global GDP
- 22 threat types: nat cats, pandemic, cyber attack, war, etc.
- 2018 Results released 6 June

■ If for climatic events

- All frequencies increased by **10%**,
- All severities increased by **5%**

Then GDP@Risk would increase by \$19 Bn

- 15% of GDP@Risk due to climatic threats
- 3.5% of total GDP@Risk for all 22 threats



Flood



Drought



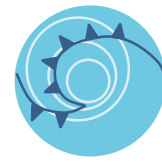
Freeze



Heatwave



Tropical
Windstorm

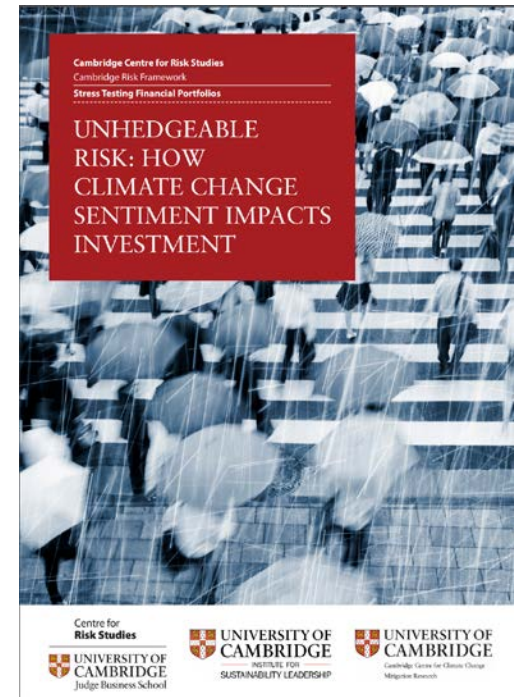


Temperate
Windstorm

Case Study: Global Economic Impact of Climate as Trend Risk

Next steps

1. Model climate change trends consistent with IPCC's Representative Concentration Pathways (RCPs)
 - Apply CGRI analysis to future years accounting for GDP growth and a given RCP
2. Combine a trend, eg, RCP, with our library of shocks, eg, shift in market sentiment



Shock Scenarios Developed by CCRS



Freeze Event: US-Europe



Marine Piracy: Horn of Africa



Interstate Conflict: China-Japan War



Systemic Cyber: Sybil Logic Bomb



Pandemic: São Paulo Virus



Social Unrest: Millennium Uprising



Financial: Global Property Crash



Financial: Eurozone Meltdown



Financial: High Inflation World



Financial: Dollar Deposed



Power Outage Cyber: US Business Blackout



Power Outage Cyber: UK Regional Blackout



Systemic Cyber: Data Exfiltration



Systemic Cyber: Denial of Service



Systemic Cyber: Extortion



Systemic Cyber: Cloud Outage



Systemic Cyber: Financial Theft



Power Outage: Solar Storm



Cyber-Physical: Commercial Property Laptop Fires



Cyber-Physical: Industrial Facilities Explosion



Cyber-Physical: Oil Rig Fire and Explosion



Cyber-Physical: Marine Cargo Theft



Cyber-Physical: Aviation Spoofing Attack



Cyber-Physical: Terrorism Cyber Attacks



Investment Risk: Climate Change



Marine Realistic Disaster Scenarios



Project Pandora Scenario Suite



Trillion Dollar NatCats



The Future: Modelling Risky, Futures

Quantify strategic exposure for

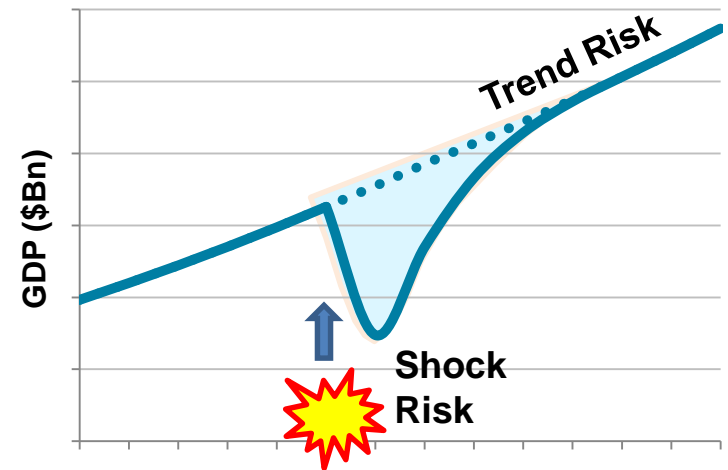
■ Business

- CEOs
- Risk managers

■ Investors

- Portfolio managers

■ Governments & NGOs



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