Calibrating New Emerging Risks

From Climate Change to Cyber, Including Long-Term Care:
Should Emerging Risks be Treated Equally on a Global Scale?

Panel

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Setting the Scene

“Insurance has thrived on globalisation with limited barriers to entry, which has created ever-more interconnectivity between markets and participants, and with that comes the higher risk of contagion between insurers and other sectors. However, material protection gaps still exist, with generally a cautious approach to managing exposure and accumulations, and where underinsurance and opportunities remain abound.

More importantly, there still remains the ‘unknown unknowns’ and unexpected accumulations.”
Market Events: Looking back...

- Lehman Brothers bankruptcy
- 2007: Subprime crisis
- 2008: Lehman Brothers bankruptcy, European Storm Kyrill
- 2009: Fires in Southern CA, European Storm Klaus
- 2010: Lehman Brothers bankruptcy, European Storm Kyrill
- 2011: Hurricanes Gustav & Ike, Floods in Australia, New Zealand EQ, Japan EQ / Tsunami
- 2012: Thai Floods, Hurricane Sandy, Depressed oil prices
- 2013: Ebola, Depressed oil prices, European & Alberta Floods, Single Large Losses, German Hailstorms
- 2014: Italian Earthquakes, Arab Spring, European Storm Klaus
- 2015: European & Alberta Floods, Single Large Losses, European & Alberta Floods, Depressed oil prices, Solvency II
- 2016: Brexit, Depressed oil prices, Single Large Losses
- 2017: Zika Virus, Depressed oil prices, Single Large Losses

Insurance Market Briefing Middle East

4 October 2017
Market Events: Continued…

What next?
- Catastrophe (frequency and severity)
- Major Pandemic
- Unforeseen casualty accumulation
- Cyber attack
- Significant terror event

What next?
- Regulatory changes
- Trade Wars
- Economic pressures
- Contagion from other sectors
- Disruptive innovation
Looking forward...

Are these and other risks equally important to the insurance industry?

Insurance
- Pricing
- Reserving
- Premium growth
- Nat Cat
- Casualty Accumulation
- Concentration
- Pandemic
- Terrorism
- Man-made disasters
- Mortality / morbidity
- Competition
- Excess capacity
- Climate change
- Counter-party credit risk
- Management control
- Cyber

Political
- Brexit / Geopolitical Risk
- Elections
- Instability / conflict
- Change in government policies

Economic
- Growth/slowdown
- Interest rates
- Inflation
- Currency
- Regulation
- Indirect exposures (e.g. banking, affiliates)

Technology
- Distribution
- Disruptive innovation
- Big data
- Block chain
- Driverless cars
- Artificial Intelligence
- Drones
- Autonomous Vehicles

Other
- Globalisation
- Energy
- Medical advances
- Power outages / blackouts
- Economic and Social Governance
- Climate Change

Threats and Opportunities
Growth: Gross Domestic Product vs GWP

North America

Europe

Oceania

Latin America

Asia & ME

Africa

Notes: Gross Domestic Product (GDP) Gross Written Premium (GWP)
Source: A.M. Best data and research, Swiss Re sigma “World Insurance” series
European Market: A Context of Economic Recovery

GDP Growth
Period of economic recovery, expected to moderate

Spain
Germany
Italy
France
United Kingdom
Eurozone

p = projection
Source: International Monetary Fund
Increased economic activity with lower unemployment and modest inflation

**Unemployment, Selected Countries**

- Germany*: 5.2%, 3.6%
- UK**: 7.6%, 4.3%
- Eurozone*: 12.0%, 3.6%
- France*: 10.3%, 9.0%
- Italy*: 12.1%, 11.1%
- Spain*: 26.1%, 6.3%

**Inflation, Selected Countries, Feb 2018**

- UK: 2.70%
- Germany: 1.40%
- France: 1.20%
- Eurozone: 1.10%
- Spain: 1.10%
- Italy: 0.50%

Note: *Data as at January 2018, **Data as at November 2017
Source: Europa.eu; ONS; De Statis; INSEE; INE; ISTAT
European Markets: Challenging Interest Rate Environment

Historical Low interest rate environment persists

European Union - Yields of Government Bonds With Maturities Close to 10 Years (2010-18)

Notes: Percentages per month; period averages
Source: European Central Bank – Long Term Interest Rate for Convergence Purposes
## Climate Change

### Relationship between global warming and severe weather related events
- Global temperature rise
- Decreased snow cover
- Warming oceans
- Glacial retreats
- Shrinking ice sheets
- Declining Arctic sea ice
- Rising sea levels

### Higher frequency of extreme events
## Climate Change

### What do the studies say

- Four-fold increase in weather-related losses since 1980
- 1980-2011 – USD 500 billion in losses
- Expect the extremes: hurricanes, superstorms, mega-tornadoes, flooding, habitat loss, famine, droughts, increased diseases due to wetter-weather

### What are insurers doing?

- Retreating from near-shore risks
- Encouraging more prudent land use
- Stronger building codes
- Better planning
- Policy exclusions

### US lawsuits and liability claims may be more of an issue
Long-Term Care

Positioning integrated long-term care between health and social care systems

Source: InterLinks
No standard definition of entitlements

Share of older people (65+) entitled to long-term care in total population, based on national eligibility

Source: InterLinks
Long-Term Care

Different levels of expenditure

Public expenditures on long-term care as percent of GDP (2011)

Source: InterLinks
Long-Term Care

- Ageing Population
- LTC generally funded through taxes, social security
- Reduce proportion of GDP spent on LTC
- Population stagnating; lower relative birth rates

Is the solution public private partnership?

Source: Indexmundi
## Pandemic: Major threat?

### Is a pandemic a major risk?

- Rare events – reoccurrence rates between 30-50 years
- Consequences can be devastating
- Substantial global financial risk

<table>
<thead>
<tr>
<th>Disease</th>
<th>When?</th>
<th>Casualties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spanish Flu</td>
<td>1918-20</td>
<td>40-50 million*</td>
</tr>
<tr>
<td>Asian Flu</td>
<td>1957</td>
<td>1-2 million</td>
</tr>
<tr>
<td>Hong Kong Flu</td>
<td>1968</td>
<td>Approx. 1 million</td>
</tr>
</tbody>
</table>

Estimated global cost of a pandemic according to the World Bank is USD 800 billion (1-10% of global GDP). Insurance loss is difficult to predict.

Notes: Two of these pandemics comprised bird flu with human flu viruses. *Some estimates (World Health Organisation) suggest up to 100 million lives
# Pandemic: Risk to Companies

## Understanding how the risk has changed

<table>
<thead>
<tr>
<th>Positive Effects</th>
<th>Negative Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Better drugs</td>
<td>• Globalisation</td>
</tr>
<tr>
<td>• Co-ordinated responses</td>
<td>• Global travel</td>
</tr>
<tr>
<td>• Development of influenza models</td>
<td>• Larger population size</td>
</tr>
<tr>
<td>• Better communication methods</td>
<td>• Higher concentration in urban areas</td>
</tr>
<tr>
<td>• Healthier population</td>
<td>• Diseases can have greater resistance to drugs</td>
</tr>
<tr>
<td>• Significant investment / research</td>
<td>• Unknowns - time to prepare a new vaccine</td>
</tr>
</tbody>
</table>
Future growth in casualty – there is a huge opportunity!

"Content provided/compiled by Praedicat Inc"
## Latent liability risk in context

### Past events data source: Swiss Re Sigma and Institute. All losses are in USD

All WS losses are indexed to 2017. Others vary.

<table>
<thead>
<tr>
<th>Event</th>
<th>Year</th>
<th>Economic Loss</th>
<th>Insured Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurricane Katrina</td>
<td>2005</td>
<td>160B</td>
<td>82.4B</td>
</tr>
<tr>
<td>Japanese EQ</td>
<td>2011</td>
<td>210B</td>
<td>38.1B</td>
</tr>
<tr>
<td>Hurricane Maria</td>
<td>2017</td>
<td>90B</td>
<td>32B</td>
</tr>
<tr>
<td>Hurricane Sandy</td>
<td>2012</td>
<td>70.2B</td>
<td>31B</td>
</tr>
<tr>
<td>Hurricane Irma</td>
<td>2017</td>
<td>50B</td>
<td>30B</td>
</tr>
<tr>
<td>Hurricane Harvey</td>
<td>2017</td>
<td>125B</td>
<td>30B</td>
</tr>
<tr>
<td>Hurricane Andrew</td>
<td>1992</td>
<td>47.8B</td>
<td>27.9B</td>
</tr>
<tr>
<td>9/11 Attacks</td>
<td>2001</td>
<td>55B</td>
<td>25.9B</td>
</tr>
<tr>
<td>Northridge EQ</td>
<td>1994</td>
<td>44B</td>
<td>25.3B</td>
</tr>
<tr>
<td>Hurricane Ike</td>
<td>2008</td>
<td>34.8B</td>
<td>23B</td>
</tr>
</tbody>
</table>

### Property & BI

**Losses**


<table>
<thead>
<tr>
<th>Event</th>
<th>Year</th>
<th>Economic Loss</th>
<th>Insured Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asbestos</td>
<td>To-date</td>
<td>200B</td>
<td>100B</td>
</tr>
<tr>
<td>DEHP</td>
<td>Modelled</td>
<td>100B+</td>
<td>? TBD</td>
</tr>
<tr>
<td>BPA</td>
<td>Future Losses</td>
<td>50B+</td>
<td>? TBD</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td></td>
<td>75B+</td>
<td>? TBD</td>
</tr>
</tbody>
</table>

Praedicat estimates that:

- There is $86B of latent liability risk currently ‘locked-and-loaded’.
- There are 71 named latent liability perils which could be candidates for ‘the next asbestos’ (which are largely independent of one another).
- Per year, $7B of new risk is emerging for those 71 perils.
Cyber Risk

“the business risk associated with the use, ownership, operation, involvement, influence and adoption of IT within an enterprise”
– ISACA IT Risk Framework

Cyber risk spreads and mutates along with technology – making it hard to model

There is more than data loss

| Theft of intellectual property/commercially sensitive information | Network failure liabilities |
| Disruption/interruption | Reputational loss |
| Cyber extortion | Physical damage |
| Cyber fraud | Investigation and response costs |
| Breach of privacy event | Death and bodily injury |
Cyber Risk: Scale of the Risk

- A top five risk in terms of likelihood – World Economic Forum
- Cyber security incidents – 66% increase year on year since 2009
- Estimated cost to global economy – USD 600bn (0.8% of global GDP) – 20% is US (McAfee)

- Global cyber insurance premium – over USD 3bn
- US exposure – approx. 75%
- London – approx. 10%
- Insurance industry exposure – potentially USD 30bn (single event loss)
- Growth – continues across all industries
- Issues surrounding silent cyber cover
A.M. Best surveyed over 450 insurers in 48 markets

How critical is innovation to the success of your organisation?

- Not critical: 15%
- Somewhat critical: 12%
- Moderately critical: 42%
- Very critical: 30%
- Extremely critical: 0%

Source: A.M. Best data and research
Innovation: The Primary Reason Why Innovation is Important

- Addressing customer needs: 22
- Gaining a competitive advantage: 21
- Realizing operational efficiencies: 16
- Improving risk selection: 11
- Expanding to new markets/products: 10
- Revamping the business model: 8
- Growing in existing markets: 6
- Managing cost/expense: 4
- Other: 3

Source: A.M. Best data and research
Innovation: Impact of New Technology

Source: A.M. Best data and research
Innovation
Environment, Social, Governance

A set of metrics used by investors to assess a company’s risks which may not be captured by conventional financial metrics with the intention of enhancing long-term returns.

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Social</th>
<th>Governance</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Climate change</td>
<td>• Human capital</td>
<td>• Corporate governance</td>
</tr>
<tr>
<td>• Carbon emissions</td>
<td>• Product liability</td>
<td>• Corporate behavior</td>
</tr>
<tr>
<td>• Natural resources</td>
<td>• Stakeholder opposition</td>
<td>• Transparency</td>
</tr>
<tr>
<td>• Pollution and waste</td>
<td>• Health and safety</td>
<td>• Board composition</td>
</tr>
<tr>
<td>• Environmental</td>
<td>• Social opportunities</td>
<td>• Business ethics</td>
</tr>
<tr>
<td>opportunities</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Environment, Social, Governance**

**Insurance Asset Risk**

Insurers underperform on ESG integration

**Financial Times**

Swiss Re shifts entire $150bn portfolio to ethical indices

**GreenBiz**

Apple, Akamai, Etsy and Swiss Re get together to buy clean power

**Insurance Journal**

Natural Disasters Cost Insurers a Record $144 Billion in 2017: Swiss Re’s sigma

**Reuters**

Munich Re sticks with coal underwriting despite investor pressure
Environment, Social, Governance

PreventionWeb 10 years
Natural catastrophes and man-made disasters in 2017: a year of record-breaking losses

REUTERS
Zurich Insurance ups 'impact investment' target to $5 billion

EXPERT INVESTOR
Generali eyes Sycomore to expand sustainable expertise

The Actuary
Europe’s largest insurance company ends coverage for coal projects

ARTEMIS
Swiss Re in first-of-its-kind index-based wind farm weather hedge

REUTERS
Mapfre converts 1 bln eur credit line into sustainable loan
Insuring Intangible Assets

How important will insuring intangible assets be?

Change in Market Capitalisation for Largest Companies

<table>
<thead>
<tr>
<th>Year</th>
<th>Tangible Assets</th>
<th>Intangible Assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>83%</td>
<td>17%</td>
</tr>
<tr>
<td>1985</td>
<td>68%</td>
<td>32%</td>
</tr>
<tr>
<td>1995</td>
<td>32%</td>
<td>68%</td>
</tr>
<tr>
<td>2005</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>2015</td>
<td>13%</td>
<td>87%</td>
</tr>
</tbody>
</table>

Source: Annual Study of Intangible Asset Market Value, Ocean Tomo, 4 March 2015

Change in Market Capitalisation for Largest Companies (1990-2018)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IBM</td>
<td>64.5</td>
<td>Apple</td>
<td>1,044</td>
</tr>
<tr>
<td>2</td>
<td>Exxon</td>
<td>64.5</td>
<td>Microsoft</td>
<td>821</td>
</tr>
<tr>
<td>3</td>
<td>GE</td>
<td>50.3</td>
<td>Amazon.com</td>
<td>801</td>
</tr>
<tr>
<td>4</td>
<td>Philip Morris</td>
<td>47.9</td>
<td>Alphabet</td>
<td>748</td>
</tr>
<tr>
<td>5</td>
<td>Royal Dutch</td>
<td>42.1</td>
<td>Berkshire</td>
<td>493</td>
</tr>
</tbody>
</table>

Source: Swiss Re sigma No5/2018
Scale of Risk

Source: HM UK Government
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Mahesh Mistry, Senior Director, 4 Dec 2018

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