How Societies Manage Risk –
the big picture of (re)insurance, and beyond

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About the speaker

- Dr. (rer. nat.) Michael Fackler, Munich, Germany
- Qualified actuary (DAV), self-employed
- Studied Math at Univ. Munich, Pisa, Oldenburg
- Doctorate in parallel with working: on experience rating, completed 2017
- 10 years with leading reinsurers
- 15+ years consulting actuary
- Specialized in: non-life reinsurance pricing, dealing with scarce data
Abstract

Modern society **mitigates and transfers risks** in a variety of ways, which range from *catastrophe prevention* and *(re)insurance* solutions through to *injustices* of a minor and inconspicuous nature.

We illustrate that the measures taken depend on the uncertainty about the risks in question, and involve **three trade-offs:**

- **innovation vs. risk avoidance;**
- **liability vs. collective risk sharing;**
- **equity vs. practicable claims settlement.**

We study two highly instructive **examples** (*nuclear liability* and the measures taken in the wake of the *9/11 terrorist attack*) and discuss the **insurability** of systemic risks like a **pandemic.**
Outline

- Introduction
- Nuclear Liability
- Insurability of pandemics
- Regulation of 9/11 loss
Statements about risk

1) Risk management has been there for ages.

2) Modern society trades off:
   • innovation vs. risk avoidance,
   • liability vs. collective risk sharing,
   • equity vs. practicable claims settlement.
Prevention and mitigation of accidents

More visible (e.g. Dikes), or less:
• Fire brigades
• Safety codes
• Insurance (and its regulation)
• Legal system

Problem: How much prevention/protection is adequate?
• Hard to decide for novel risks
Types of risk

risk vs. uncertainty
   Frank H. Knight, Economist, USA, 1921
small worlds vs. large worlds
   Leonard J. Savage, Statistician, USA, 1954
known unknown vs. unknown unknown
   Donald H. Rumsfeld, Politician, USA, 2002
   D. H. Lawrence, Poet, UK, c. 1915
   Ibn Yamin, Poet, Persia, 13th cent.

insurable vs. uninsurable

29 Nov 2021
Dr Michael Fackler: Society Risk
Liability … and its restrictions

Ideal: accountability, polluter-pays principle

Reality: Who would take a large-world risk if one is fully liable?

How liberal societies cope:

• Let (all) people innovate
• Spread certain risks on many shoulders, e.g. via public funds
• Lax or limited liability, limited company, insolvency
Uninsurable risks (almost / partly)

• Certain natural hazards:
  storm surge Netherlands, earthquake Japan, hurricane Florida
• Pandemic
• War etc.
• NBCR (nuclear, biolog., chem., radiolog.) events
• Terrorism
• Software errors
• Nuclear liability
Nuclear liability

- Complex framework of operator liability, public guarantees … and possibly insufficient limits
- Trend towards increased operator liability (no fault), but slow

Background:
- Nuclear energy often of “national interest”
- Private operators don’t build/run plants if fully liable
- Public shall believe that mayor accidents are impossible (with the national technology)
Layers of protection per event: high end

**Germany** (unlimited liability, in ’’’ €, i.e. billions)
- 0.256 xs 0 insurance
- 2.244 xs 0.256 operators’ pool
- illimité xs 2.5 operator (”self-insured”)

**USA** (*Price-Anderson Act*, in ’’’ $)
- 0.45 xs 0 insurance
- ≈13 xs 0.45 operators’ pool
- ill. xs ≈13.4 at discretion of Congress
Layers: international “standard”

2004 Protocol to Paris convention on Nuclear TPL
(minimums, in “” €)

• 0.7  xs  0  operator / insurance
• 0.5  xs  0.7  country of plant
• 0.3  xs  1.2  pool of signatory countries
• ill.  xs  1.5  nil

Switzerland: 1st layer insurance, above operator (ill.)
Problems

• No protection above €1.5 billion required
• Protocol not yet in force, ratification by EU upcoming – for several years
• Protection still a magnitude lower in many countries
Adequacy of guarantees

• Loss potential in populated areas: controversial, say € 500-5’000 (!?) billion
• Operators won’t be able to pay that, governments possibly won’t be willing
• Consumers can’t protect themselves by insurance

Bottom line: The risk is spread on many shoulders in an undesirable way
Insurance options?

In principle (probably) yes, but:

• would require open debate on loss potential
• would involve the whole financial market:

In (re)insurance about €10 billion per event seems to be the maximum amount that can be placed in one program, across programs maybe $100””

• Many (re)insurers are not keen on business in “political” areas
No surprise: a deadly viral pandemic after 100 benign years with some near-misses (yet, one expected rather influenza than corona)

Surprise: most affected insurance not life/health/WC, but NDBI (*non-damage business interruption*) due to preventive measures; correlation with investment

Although everyone now wants it, *industry* apparently not keen on offering pandemic insurance

Issues: severity, lack of diversification, frequency (?)
Severity

Worldwide figures in ‘‘’’ $ (trillion), rough estimates

- 100 bond market, stock market (each)
- 80 GDP
- 2-10.5 Global Financial Crisis economic losses
- 12 Covid-19 economic losses, SR estimate
- 0.1 Covid-19 insured P&C losses, early est.
- 0.8 future econ. losses from pandemics p.a.
- 0.2 market insurance cost p.a., AAE est.
Severity

US figures in ’’’ $, estimates

- 100  P&C aggregate sum insured
- 0.8  P&C insurers’ capital resources
- 0.1  Nat Cat event loss potential
- 0.07 Property premium p.a. (not only NDBI)
- 0.14 monthly insured BI (<100 employees)
- 1    monthly BI insurance potential
- 2    public aids to citizens, small businesses
Return period

- Some think that any Property policy can be sold at premium rate 1 per mil of sum insured.
- Some in London Market: Covid-19 is 500y event
- Wimbledon Tennis Tournament had pandemic insurance, premium $2’’ p.a., 2020 Covid loss $142’’ (≈SI), Rate on Line 1.4%; ≈100y event
- World Bank PEF Cat Bond Class A (covering flu and coronaviruses): risk RoL 3.57%; 28y event
- Spill-over of coronavirus from animal: 12y event?
Insurability of pandemics

BI insurance: no small partial losses as even regional epidemics take 6+ months; product can’t be cheap

Overall picture:

• If loss potential has magnitude of world GDP, diversification can only work over time

• If return period is 100+ years, no vehicle in the financial market can smooth that over time

• If return period is 10-20 years, saving might work better than insurance, e.g. equalization reserve
The WTC loss

- Terrorist attack, 11 September 2011

- Tragic, but very instructive, example for successful risk management “after the event”
Key facts

• Four airliners hijacked, used as missiles
• WTC’s Twin Towers destroyed, Pentagon damaged
• About 3’000 people killed, 250 seriously insured
• Many victims highly paid and married (matters for compensation)
• Insured loss about $40 billion
• Economic damage $1’000 (?) billion
Potentially responsible (i.e. suable)

- Airlines (UA, AA)
- Airports, security firms
- The authorities, the City of New York
- Police, fire brigade
- Motorola
- Terrorist groups
- Members of the Saudi-Arabian government
- …
Sources of compensation

Not mutually exclusive:

• Own insurance covers
• Tort system (by suing someone)
• Government programs
• Charity
Measures taken by government

• Quick
• Unorthodox
• 3 steps
1. Ensuring survival of institutions

*Air Transportation Safety and Stabilization Act (ATSSA):*

- In force 11 (!) days after the attack
- Exclusive jurisdiction: Southern New York
- Retroactive (!) liability cap for U.S. institutions: according to existing TPL covers
- Tax breaks for victims
- *Victims Compensation Fund (VCF)*
2. Channelling of benefits through VCF

Not compulsory, but with incentives and conditions:

- Claims regulation within 3 years
- Compensation of loss of income, lax onus of proof
- Stricter rules for very high incomes
- Awards for noneconomic loss capped
- No punitive damages
- Own insurance (Life, Workers’ Comp) deducted (contradicts legal practice)
- Waiver of legal actions for damage
3. Creation of an atmosphere of solidarity and patriotism

The (re)insurance industry feared *adverse selection*, with well-off victims preferring to go to court. Plausible scenario: years of legal proceedings, constant negative press, …, social self-destruction with huge economic consequences

Instead:

- Mayor Rudy Giuliani: *We’re going to rebuild. ... Do things. Go to restaurants.*
- Strong spirit of national solidarity – rather than revenge, opportunism
Compensated amounts

in ”” $ Source
1.0 Life insurance
1.0 Workers’ Compensation
5.6 VCF
0.4 Other public
0.7 Charity
8.7 Total
Key figures

- 97% of affected families opted for the VCF, average compensation $3 million
- VCF saved $2 billion (>20%) by deducting insurance benefits
- Only 70 families went to court, received $7 million on average (i.e. not much more – after deduction of legal fees)
- On top: $1.9””” for police and rescue workers
Bottom line

• In administrative and economic terms, the U.S. coped well with the 9/11 attack.
• Measures taken were unorthodox, partly unfair – but very effective.
• Impressive, though perhaps singular, example of a society’s ability to take action post crisis – by briefly breaking its own rules.
Thanks

For details see paper on SSRN:

*Mitigation and transfer of risks: prevention, insurance, and limited liability*

Additional literature (on insurability of pandemics) on next slide.

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Literature

AAE (2021) Insurability and pandemic (or more generally, shared resilience) risk. AAE position paper. Actuarial Association of Europe (AAE), June 2021.
